



**MA/COM**



## RF & Microwave Product Solutions June 2005

**tyco**  
Electronics

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## M/A-COM Product Selection Guide Overview

This product selection guide contains information about our standard products. It is intended to assist in the selection of products to ensure availability, ease of use, and optimal performance. These products represent more than five decades of innovation in design and manufacturing. Detailed specifications for our standard parts can be found quickly on our web site at [www.macom.com](http://www.macom.com) by typing the part number into the search box. We provide product samples, test boards, and applications support. See the back cover for contact information to request any of these items or to get more information.

M/A-COM also produces custom products and modifications to standard products, so please contact us with your specifications if you cannot find a standard product that meets your needs. Most of our standard products can be up-screened to meet defense and space applications or we can design custom parts to your specific requirements.

## Partner of Choice

A leader in the RF and microwave industry for more than 50 years, M/A-COM has earned a global reputation as the partner of choice in applications for RF, microwave and millimeter wave technology. Not only do we offer one of the industry's broadest range of solutions available today, but with our ongoing commitments to R&D, we continue to drive tomorrow's innovations.

Our technology and expertise extend across a broad range of solutions for the commercial wireless telecommunications, broadband, and aerospace and defense markets. M/A-COM products are utilized around the globe in some of the most challenging applications found in wireless infrastructure, handsets, WLAN, CATV, VSAT, RFID, automotive, test and measurement, radar, electronic warfare, missile guidance, and space.

M/A-COM is a business unit of Tyco Electronics, which provides advanced technology products from more than 40 well-known and respected brands, including Agastat, Alcoswitch, AMP, AMP NETCONNECT, Buchanan, CII, CoEv, Critchley, Elcon, Elo TouchSystems, M/A-COM, Madison Cable, OEG, OneSource Building Technologies, Potter & Brumfield, Raychem, Schrack, Simel, and TDI Batteries.





Tyco Electronics is a major business segment of Tyco International, a 37 billion dollar manufacturing and service company.

## **RF and Microwave Capabilities**

M/A-COM is one of the only vertically-integrated, non-captive RF and microwave suppliers in the industry. Therefore, we're uniquely able to produce and process semiconductor materials, design and manufacture complex devices, and combine these devices into multi-function components. We can manufacture integrated subassemblies using these components and devices, then combine the integrated subassemblies into complete systems driven by in-house software. Thus, we can offer customers low cost, high-volume solutions tailored to their need at any step of the process.

We are a leader in the industry in offering "dual use" technologies that allow us to participate successfully in both commercial and government markets. We have unique technologies and capabilities to offer innovative design solutions including:

- Si, GaAs, AlGaAs, InGaAs, InP and SiGe IC products
- Unique MMIC processes: HMIC™, GMIC™, MSAG™, iHBT™
- In-house design, fabrication, assembly, and screening capabilities
- Multiple facilities for improved flexibility and local content manufacturing
- Wide spectrum coverage from RF to millimeter wave frequencies
- One of the broadest selection of standard and custom products in the industry

## **Commercial, Military, and Space Products**

This guide features our standard commercial products and a sampling of our standard aerospace and defense products. Additionally, most commercial parts listed can be up-screened to meet defense or space applications. We also provide custom products for all markets to meet your specific requirements if a standard product is not available. If you cannot find a product that meets your requirements in this guide, please contact us and we will work together to develop or recommend an appropriate solution.

M/A-COM has fully equipped environmental screening labs designed to handle high-volume, high-reliability screening needs. When program screening requirements call for more than our standard catalog screening,





custom screening programs can be created by either adding options to the standard screening or generating a program-specific sequence. M/A-COM can perform screening per most military and space standards including MIL-STD-883, MIL-H-38534, and ESA requirements.

For applications that involve more difficult customer requirements and critical schedules, M/A-COM offers a dedicated program management team. Our staff of senior program managers is available to support all program and critical management needs and offer the experience and attention to detail that ensures success.

### **Operational Excellence**

Our Quality Policy is to deliver error-free products and services on time. Therefore our product and services are developed and integrated throughout the entire supply chain into capable processes to achieve Six Sigma levels of performance.

M/A-COM operations are certified to ISO 9001, ISO 14001, AS 9100, and QS-9000. Everyone is involved in the continuous improvement effort from suppliers to customers. Best practices are identified and implemented throughout the company, with a continuing challenge to identify opportunities for innovation and improvement.

In our markets, superior reliability and a robust design aren't added benefits – they're often a matter of life and death. While all companies pledge their commitment to designing more reliable products, we literally wrote the book on reliability. It's called Design for Reliability, and it is required reading for many college engineering courses. The methodology encompasses the full engineering cycle, from design to verification to analysis.

### **How to Order**

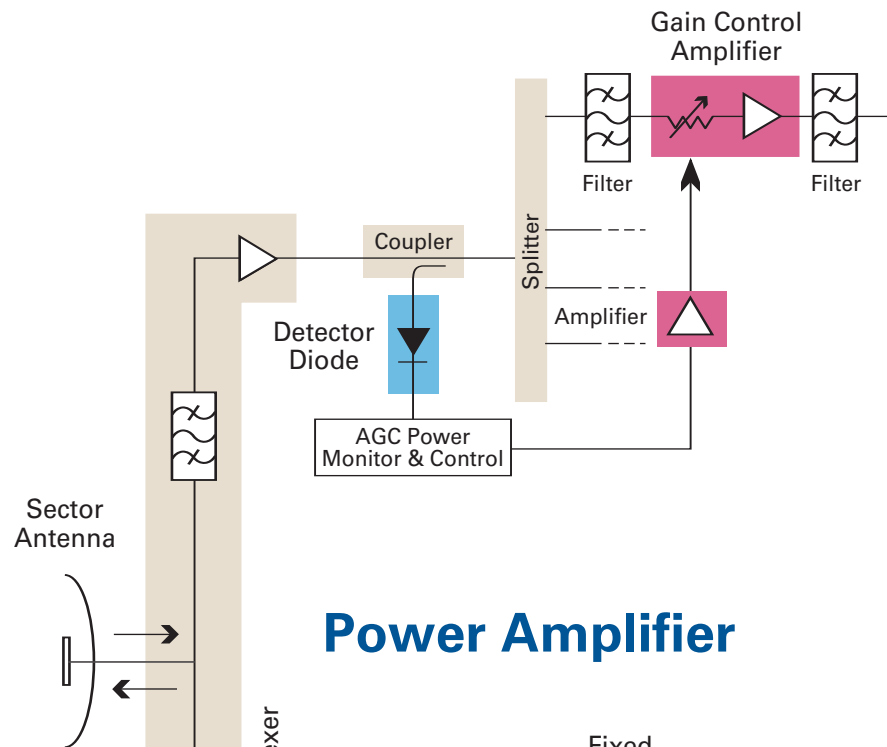
Most of the standard products listed in this selection guide are available directly from the distribution partners found on our web site at [www.macom.com/distributors](http://www.macom.com/distributors). In addition, your local M/A-COM sales office or nearest representative can assist you with ordering or service. Our regional phone numbers are listed on the back cover of this guide as well as on our web site at [www.macom.com/sales](http://www.macom.com/sales).



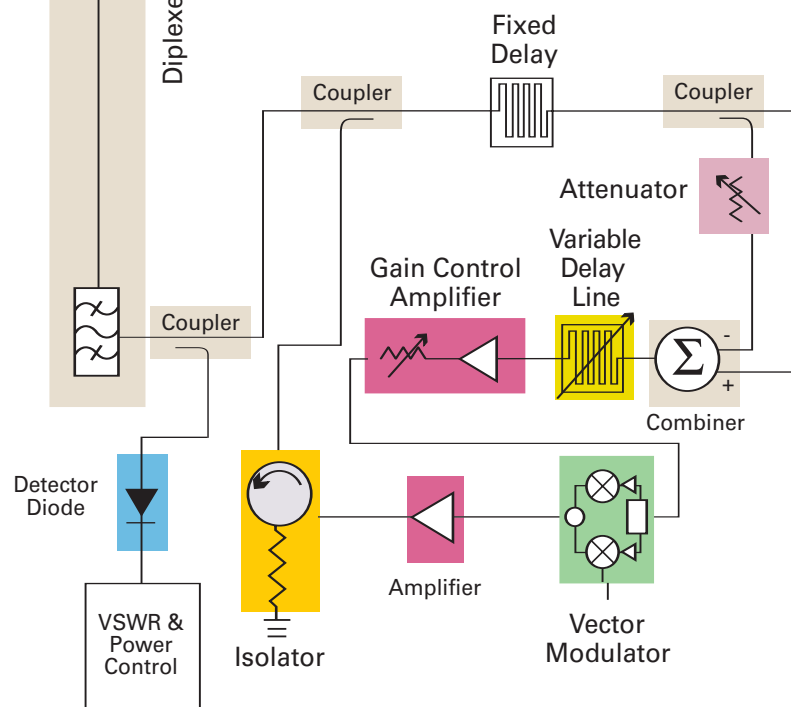
# Block Diagrams Typical Transceiver



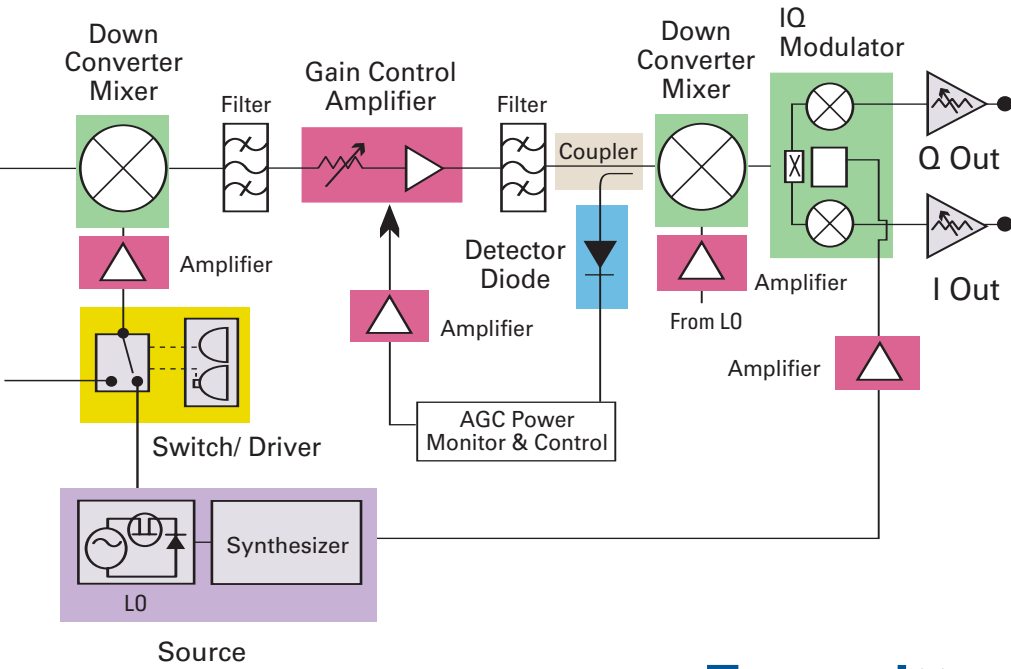
## Receiver RF Front End



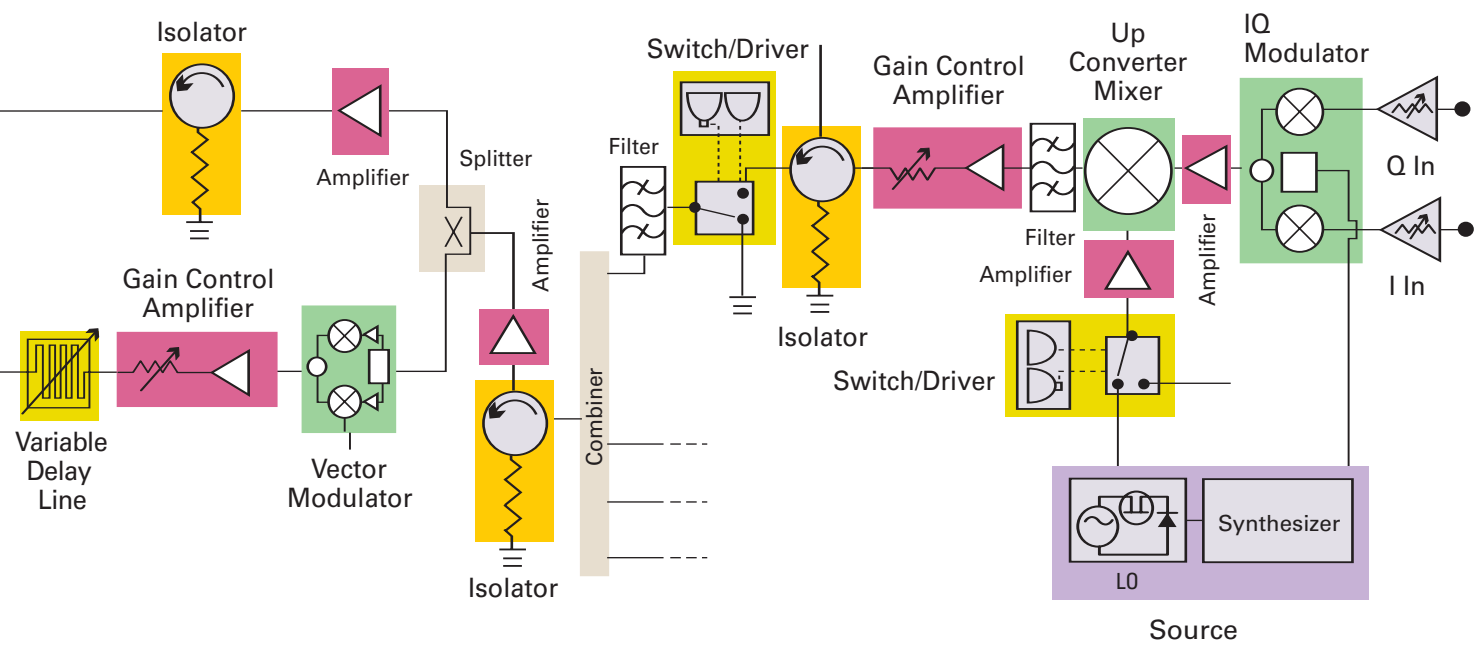
## Power Amplifier



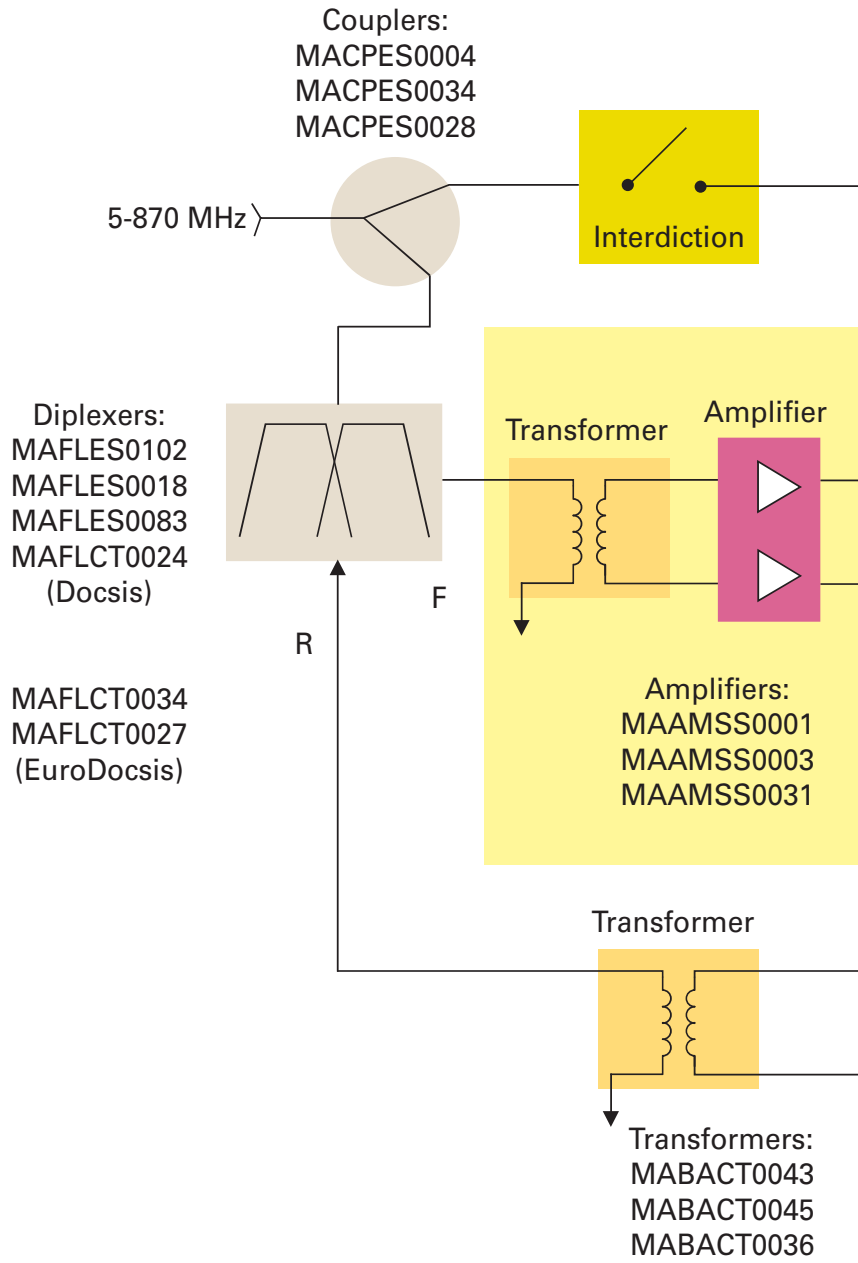
## Receiver IF



## Transmitter



# Block Diagrams Parts for CATV

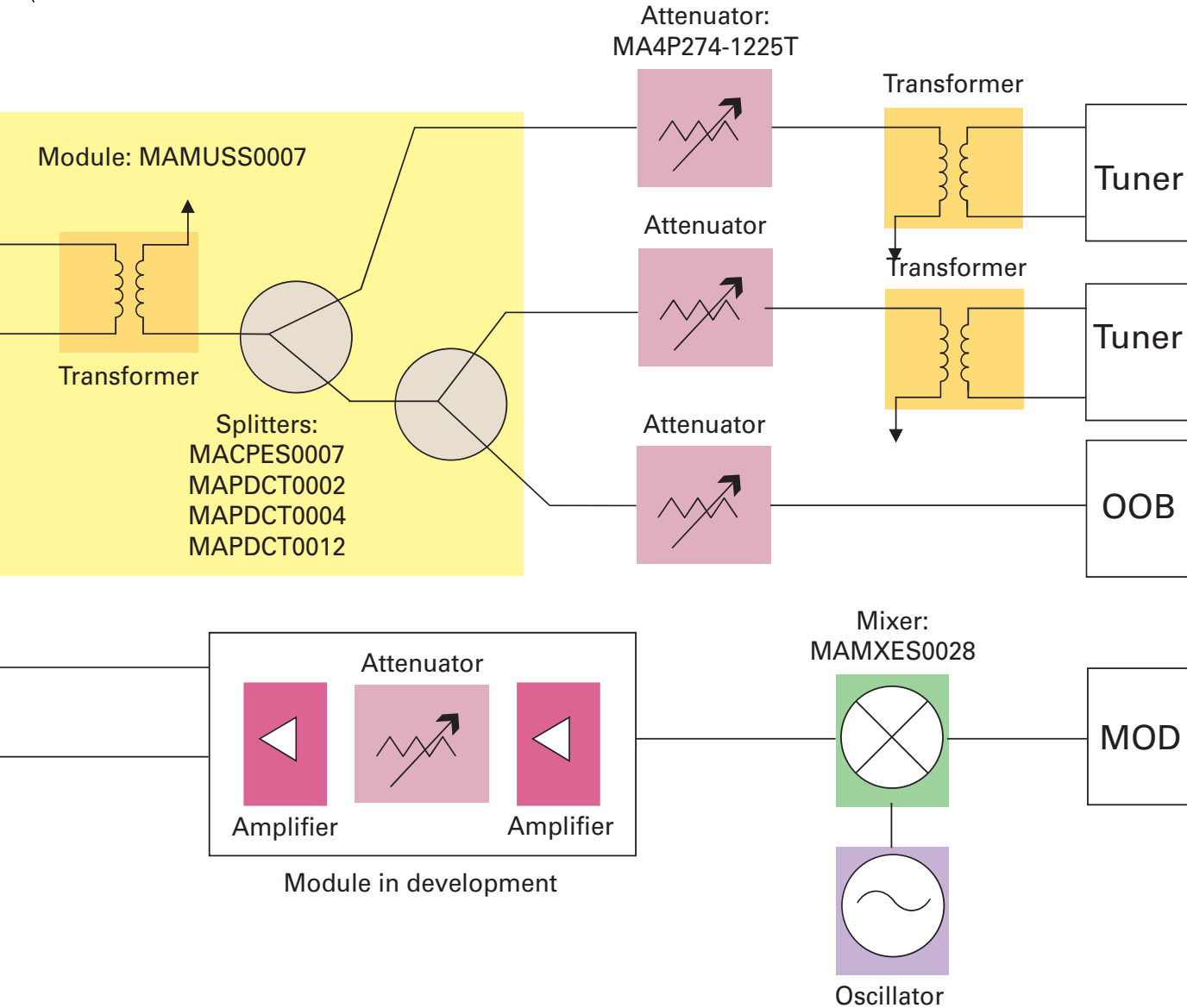




Switches:  
 MASWSS0102  
 MASWSS0103  
 MASWSS0067  
 MASWSS0068

Balun Transformers:  
 MABACT0034 MABAES0032  
 MABAES0029 MABAES0034  
 MABAES0039 MABAES0034  
 MABAES0054

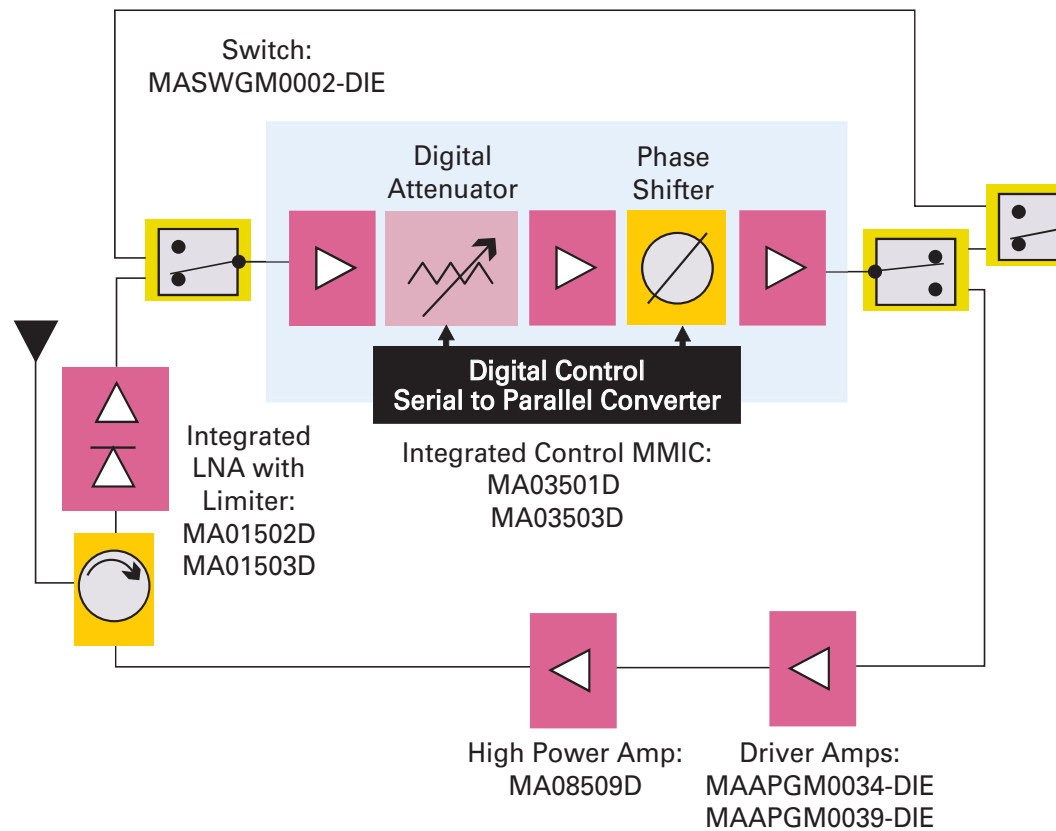
to TV



# Block Diagrams

## MMIC, RFID, WiMax, WLAN

### X-Band Radar GaAs MMIC Chipset



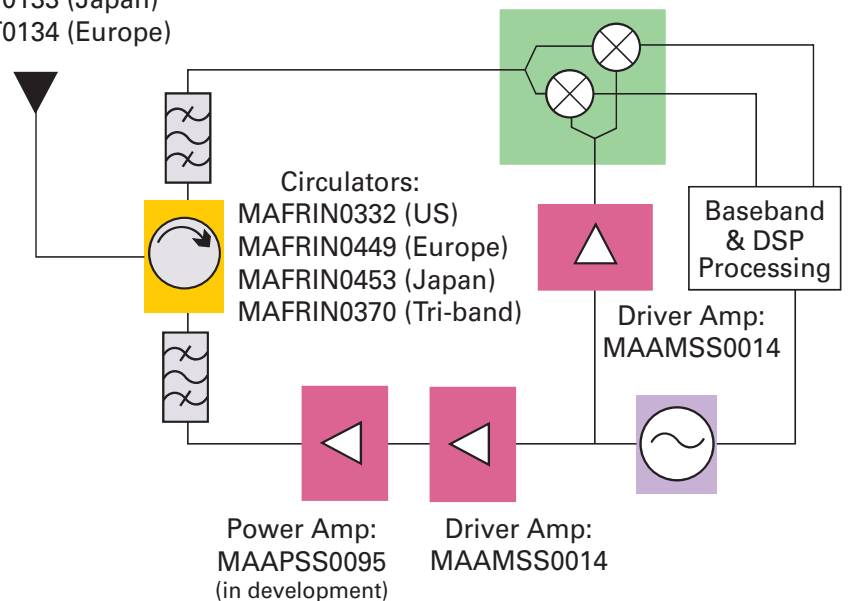
### RFID Reader

#### EPCglobal UHF Architecture

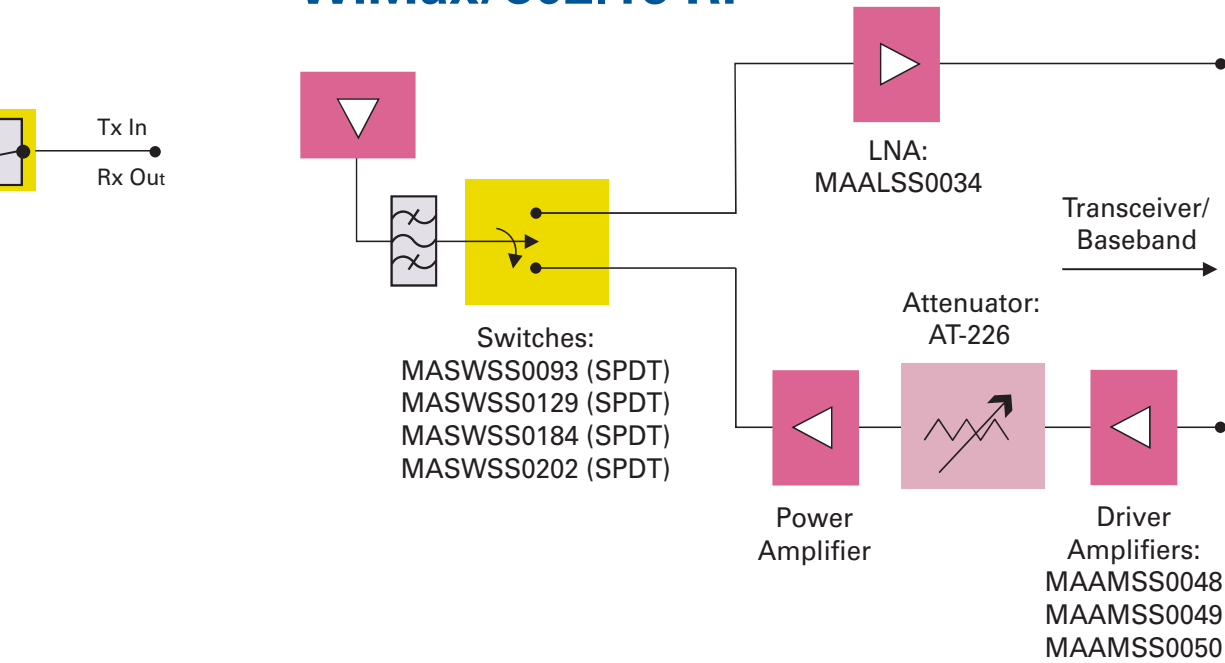
Antennas Single-Element: MAANAT0144 (US)

Antennas Dual-Element: MAANAT0123 (US) MAANAT0133 (Japan) MAANAT0134 (Europe)

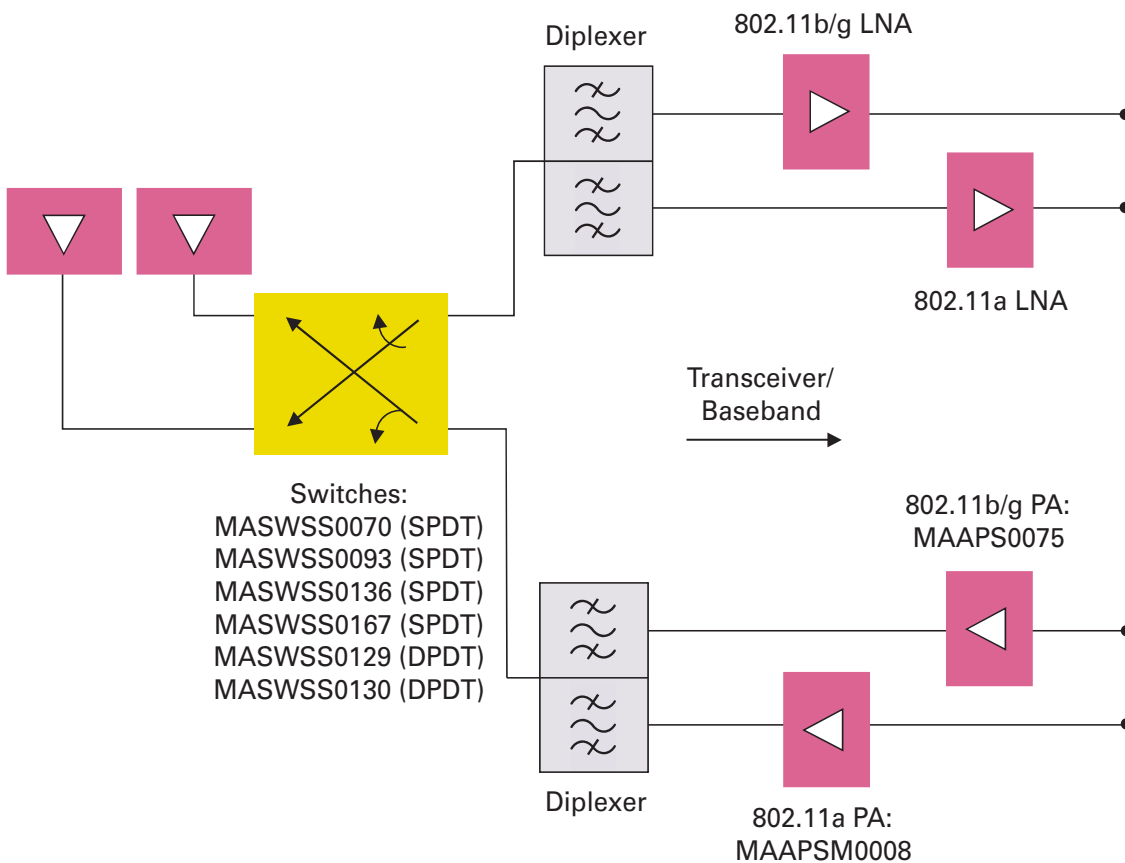
IQ Demodulators: MA4IQP900L-1291T MA4IQP900M-1291T MA4IQP900H-1291T



## WiMax/802.16 RF



## WLAN/802.11 RF



# Amplifiers



## M/A-COM Amplifiers

M/A-COM Amplifiers are used extensively in commercial and military electronics applications. M/A-COM produces low noise amplifiers (LNA), power amplifiers (PA), driver amplifiers and wideband amplifiers ranging from 50 MHz to 77 GHz designed specifically for voice and data applications for the consumer and military market.

- Cordless and mobile phones
- Infrastructure cellular base stations for
  - GSM
  - CDMA
  - PHS
  - UMTS
- Satellite radios
- Mobile GPS radios
- VSAT
- CATV and broadband
- WLAN cards and access points
- Aerospace and Defense products
- Bluetooth
- RFID



## General Amplifiers

Freq (MHz)	Part Number	Gain (dB)	NF (dB)	Output P1dB (dBm)	Input IP3 (dBm)	Output IP3 (dBm)	Sat. P Out (dBm)	Package
<b>Die Products</b>								
0 - 2000	MAAPSM0015-DIE	11	7	—	—	—	21	Die
200 - 3000	MAAM02350	18	4.1	14	24	—	—	Die
<b>800 - 3300</b>	<b>MAAPGM0026-DIE</b>	<b>20</b>	<b>6</b>	<b>27</b>	—	<b>36</b>	<b>28</b>	<b>Die</b>
<b>1000 - 18000</b>	<b>MAAMGM0002-DIE</b>	<b>10</b>	<b>4</b>	<b>20</b>	—	<b>31</b>	<b>21</b>	<b>Die</b>
<b>1200 - 3200</b>	<b>MAAPGM0036-DIE</b>	<b>20</b>	<b>5</b>	<b>30</b>	—	<b>40</b>	<b>31</b>	<b>Die</b>
1500 - 6500	MAALGM0006-DIE	17	3.5	16	—	—	—	Die
<b>2000 - 4000</b>	<b>MAAPGM0027-DIE</b>	<b>22</b>	<b>6</b>	<b>29</b>	—	<b>37</b>	<b>30</b>	<b>Die</b>
<b>2000 - 6000</b>	<b>MAAM26100</b>	<b>19</b>	—	<b>28</b>	—	<b>39</b>	<b>30</b>	<b>Die</b>
<b>2000 - 8000</b>	<b>MAAM28000</b>	<b>17</b>	<b>7.5</b>	<b>14</b>	<b>24</b>	—	—	<b>Die</b>
<b>2000 - 8000</b>	<b>MAAPGM0028-DIE</b>	<b>14</b>	—	<b>26</b>	—	<b>38</b>	<b>28</b>	<b>Die</b>
2000 - 12000	6884-710	28	2.5	14.2	—	24.5	—	QSL
2000 - 13000	MAAPGM0057-DIE	7	8	30	—	—	31	Die
2000 - 18000	MAAMGM0007-DIE	8	6	19	—	—	22	Die
2000 - 18000	MAAPGM0053-DIE	6	7	26	—	—	27	Die
<b>3000 - 6000</b>	<b>MAAPGM0022-DIE</b>	<b>17</b>	<b>6</b>	<b>31</b>	—	<b>43</b>	<b>31</b>	<b>Die</b>
<b>3500 - 6500</b>	<b>MAAPGM0029-DIE</b>	<b>20</b>	<b>7</b>	<b>30</b>	—	<b>42</b>	<b>31</b>	<b>Die</b>
<b>3500 - 7000</b>	<b>MAAM37000</b>	<b>17</b>	<b>1.8</b>	<b>14</b>	—	<b>24</b>	—	<b>Die</b>
4000 - 18000	MAAPGM0052-DIE	13	6	25	—	—	26	Die
<b>4500 - 9000</b>	<b>MAAPGM0021-DIE</b>	<b>17</b>	<b>9</b>	<b>31</b>	—	<b>41</b>	<b>33</b>	<b>Die</b>
<b>5000 - 9000</b>	<b>MAAPGM0030-DIE</b>	<b>17</b>	<b>8</b>	<b>29</b>	—	<b>38</b>	<b>30</b>	<b>Die</b>
5500 - 7000	MAAPGM0025-DIE	18	5	36	—	43	38	Die
6500 - 12500	MAAPGM0037-DIE	13	8	29	—	37	30	Die
<b>7000 - 11000</b>	<b>MAAM71100</b>	<b>18</b>	—	<b>28</b>	—	<b>38</b>	<b>31</b>	<b>Die</b>
7000 - 15000	MAAPGM0056-DIE	25	10	30	—	—	31	Die
7500 - 10500	MAAPGM0024-DIE	26	—	37	—	—	38	Die
<b>7500 - 12000</b>	<b>MAAM71200</b>	<b>15.5</b>	<b>3.2</b>	<b>11</b>	<b>22</b>	—	—	<b>Die</b>
7500 - 13500	MAAPGM0038-DIE	19	8	29	—	40	31	Die
8000 - 11000	MA08509D	22	—	—	—	—	40	Die
8000 - 12000	MAALGM0002-DIE	13	2.3	10	—	23	—	Die
8000 - 12500	MAAPGM0034-DIE	15	8	26	—	33	28	Die
8500 - 11500	MAAPGM0063-DIE	25	—	36	—	—	37	Die
8500 - 12500	MAAPGM0051-DIE	15	9	30	—	37	31	Die
<b>9500 - 11000</b>	<b>MAAPGM0033-DIE</b>	<b>14</b>	<b>6</b>	<b>29</b>	—	<b>36</b>	<b>30</b>	<b>Die</b>
9500 - 12000	MAAPGM0062-DIE	23	—	35	—	—	36	Die
9500 - 13000	MAAPGM0019-DIE	19	10	31	—	38	32	Die
10500 - 15500	MAAPGM0040-DIE	20	8	25	—	33	27	Die
<b>11000 - 15000</b>	<b>MAAPGM0041-DIE</b>	<b>20</b>	<b>7</b>	<b>30</b>	—	<b>35</b>	<b>31</b>	<b>Die</b>
11000 - 16000	MAALGM0004-DIE	11	2.9	12	—	23	—	Die
11500 - 16500	MAAPGM0044-DIE	19	8	25	—	36	27	Die
11500 - 15000	MAAPGM0016-DIE	18	—	36	—	43	37	Die
<b>11500 - 15000</b>	<b>MAAPGM0045-DIE</b>	<b>19</b>	<b>10</b>	<b>31</b>	—	<b>37</b>	<b>33</b>	<b>Die</b>

Blue listings indicate standard stock items widely available from our franchised distribution partners. Detailed specifications for our standard parts can be found quickly on our web site at [www.macom.com](http://www.macom.com) by typing the part number into the search box.

Green listings indicate RoHS Compliant parts

## General Amplifiers

Freq (MHz)	Part Number	Gain (dB)	NF (dB)	Output P1dB (dBm)	Input IP3 (dBm)	Output IP3 (dBm)	Sat. P Out (dBm)	Package
<b>Die Products</b>								
<b>11500 - 16000</b>	<b>MAAPGM0042-DIE</b>	<b>20</b>	<b>10</b>	<b>28</b>	–	<b>35</b>	<b>31</b>	<b>Die</b>
<b>12000 - 15500</b>	<b>MAAPGM0018-DIE</b>	<b>18</b>	–	<b>32</b>	–	–	<b>33</b>	<b>Die</b>
12000 - 19000	MAAPGM0005-DIE	15	15	22	–	27	23	Die
<b>13500 - 15000</b>	<b>MAAPGM0043-DIE</b>	<b>17</b>	<b>7</b>	<b>31</b>	–	<b>37</b>	<b>32</b>	<b>Die</b>
<b>14000 - 14500</b>	<b>AM42-0007-DIE</b>	<b>22</b>	–	<b>32</b>	–	<b>41</b>	<b>33</b>	<b>Die</b>
<b>15500 - 18000</b>	<b>MAAPGM0046-DIE</b>	<b>16</b>	<b>8</b>	<b>25</b>	–	<b>32</b>	<b>26</b>	<b>Die</b>
<b>16000 - 19500</b>	<b>MAAPGM0047-DIE</b>	<b>16</b>	<b>11</b>	<b>24</b>	–	<b>27</b>	<b>26</b>	<b>Die</b>
24500 - 29000	MAAPGM0049-DIE	13	–	27	–	35	27	Die
31500 - 36000	MAAPGM0012-DIE	16	–	16	–	–	17	Die
32000 - 36000	MAAPGM0013-DIE	13	–	22	–	–	23	Die
<b>Packaged Products</b>								
0.01 - 2500	A3010	9.5	4.5	19	–	35	–	TO-8, SMA
2 - 1500	A25-1	13.5	3	9	–	22	–	TO-8, SMT, SMA
2 - 2400	A33-1	9	4	6	–	19	–	TO-8, SMT, SMA
2 - 2400	A35-1	9	4.2	9.5	–	23	–	TO-8, SMT, SMA
5 - 100	A101	17	3	23	–	36	–	TO-8, SMT, SMA
5 - 200	A71	18	2.1	-2.5	–	10	–	TO-8, SMT, SMA
5 - 200	PAW1026	24	5.5	26	–	–	–	Flange
5 - 250	A74-1	31	4.5	8.5	–	21	–	TO-8, SMT, SMA
5 - 250	A75-2	21	4.2	8	–	19	–	TO-8, SMT, SMA
5 - 300	A78	14	3.5	19.5	–	35	–	TO-8, SMT, SMA
<b>5 - 300</b>	<b>A79</b>	<b>14</b>	<b>4</b>	<b>22</b>	–	<b>38</b>	–	<b>TO-8, SMT, SMA</b>
5 - 300	A88-1	18.5	3.8	18.5	–	30	–	TO-8, SMT, SMA
5 - 400	A56	26	5.5	13.5	–	27	–	TO-8, SMT, SMA
5 - 500	A1	16	2.4	-1	–	11	–	TO-8, SMT, SMA
5 - 500	A5	14.8	4.5	8.5	–	22	–	TO-8, SMT, SMA
5 - 500	A5-5	15.5	4	9	–	21	–	TO-8, SMT, SMA
5 - 500	A514	28	4	19	–	32	–	TO-8, SMT, SMA
5 - 500	A515	27.5	3.5	22	–	33	–	TO-8, SMT, SMA
5 - 500	A54	15.5	4	9	–	21	–	TO-8, SMT, SMA
5 - 500	A58	11.5	4	19	–	34	–	TO-8, SMT, SMA
5 - 500	A59	11.5	4.3	22	–	36	–	TO-8, SMT, SMA
5 - 500	A72	15	3.3	12.5	–	26	–	TO-8, SMT, SMA
5 - 500	A73	32	3.5	1.5	–	15	–	TO-8, SMT, SMA
5 - 500	A74	30	3	8.5	–	20	–	TO-8, SMT, SMA
5 - 500	A74-2	26	3.8	-1	–	10	–	TO-8, SMT, SMA
5 - 500	A75	21	2.1	9	–	21	–	TO-8, SMT, SMA
5 - 500	A76	28	3	14.7	–	28	–	TO-8, SMT, SMA
5 - 500	A76-1	27.5	3	12.7	–	26	–	TO-8, SMT, SMA
5 - 500	A77	16.5	4.5	16.5	–	30	–	TO-8, SMT, SMA
5 - 500	A88	18.7	6.5	20.5	–	30	–	TO-8, SMT, SMA
5 - 600	A77-1	16	5	16.5	–	30	–	TO-8, SMT, SMA
5 - 1000	A11	14.7	3.1	-2	–	10	–	TO-8, SMT, SMA
5 - 1000	A11-2	16	2.5	-1	–	10	–	TO-8, SMT, SMA

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Green listings indicate RoHS Compliant parts

## General Amplifiers

Freq (MHz)	Part Number	Gain (dB)	NF (dB)	Output P1dB (dBm)	Input IP3 (dBm)	Output IP3 (dBm)	Sat. P Out (dBm)	Package
<b>Packaged Products</b>								
5 - 1000	A63	16	3	4	—	15	—	TO-8, SMT, SMA
5 - 1200	A21-1	15.5	2.4	-1	—	11	—	TO-8, SMT, SMA
5 - 1500	A24	20	4.2	8	—	21	—	TO-8, SMT, SMA
5 - 1500	A25	10	6	9	—	21	—	TO-8, SMT, SMA
5 - 1500	A27	8.5	7.5	15.5	—	28	—	TO-8, SMT, SMA
6 - 600	A5-6	16	4.5	8.5	—	21	—	TO-8, SMT, SMA
10 - 250	A70-1	8	1.8	14	—	28	—	TO-8, SMT, SMA
10 - 250	A70-2	8	2.2	19	—	38	—	TO-8, SMT, SMA
10 - 250	A83-1	35.5	2.5	-1.5	—	9	—	TO-8, SMT, SMA
10 - 300	A87-2	16	2.9	11	—	24	—	TO-8, SMT, SMA
10 - 400	A51	15	2.7	-3.5	—	10	—	TO-8, SMT, SMA
10 - 400	A87	14	3.8	17.5	—	33	—	TO-8, SMT, SMA
10 - 400	A87-1	16	3.4	17	—	31	—	TO-8, SMT, SMA
10 - 400	A411	15.8	3	10	—	24	—	TO-8, SMT, SMA
10 - 500	A53	15	3	3.5	—	16	—	TO-8, SMT, SMA
10 - 500	A55	14.7	5	11	—	24	—	TO-8, SMT, SMA
10 - 500	A57	14.7	4.8	14	—	28	—	TO-8, SMT, SMA
10 - 500	A83	30	3	-1	—	10	—	TO-8, SMT, SMA
10 - 500	A180	16.5	3.4	18	—	33	—	TO-8, SMT, SMA
10 - 500	A511	17	3.4	21	—	33	—	TO-8, SMT, SMA
10 - 500	A513	20	5.5	18	—	30	—	TO-8, SMT, SMA
10 - 500	A514	28	4	19	—	32	—	TO-8, SMT, SMA
10 - 500	A515	27.5	3.5	22	—	33	—	TO-8, SMT, SMA
10 - 500	PA512	18	5.2	27.5	—	33	—	TO-8, SMT, SMA
10 - 600	A67-1	15	3.7	17	—	30	—	TO-8, SMT, SMA
10 - 700	A59-1	10.5	6	22	—	36	—	TO-8, SMT, SMA
10 - 800	A67	14	4	16	—	30	—	TO-8, SMT, SMA
10 - 1000	A12	16	2.8	8	—	22	—	TO-8, SMT, SMA
10 - 1000	A17	12	6	15.3	—	27	—	TO-8, SMT, SMA
10 - 1000	A18-1	14.7	3.8	16	—	30	—	TO-8, SMT, SMA
10 - 1000	A19-1	11.5	5.5	22.5	—	35	—	TO-8, SMT, SMA
10 - 1000	A66-1	27.5	2.9	15	—	28	—	TO-8, SMT, SMA
10 - 1000	A66-3	26	3	3	—	13	—	TO-8, SMT, SMA
10 - 1000	A181	16.5	3.8	22	—	35	—	TO-8, SMT, SMA
10 - 1000	A1021	26	3.8	14.5	—	26	—	TO-8, SMT, SMA
10 - 1000	A1031	28.5	2.7	10	—	22	—	TO-8, SMT, SMA
10 - 1200	A64	26	3.4	8	—	20	—	TO-8, SMT, SMA
10 - 1200	A66	23.5	4	15	—	28	—	TO-8, SMT, SMA
10 - 1200	A1211	14	2.8	6	—	20	—	TO-8, SMT, SMA
10 - 1200	A16-2	13	3.5	6	—	18	—	TO-8, SMT, SMA
10 - 1500	A26	20.5	5	16	—	27	—	TO-8, SMT, SMA
10 - 1500	A28	11	6	15	—	29	—	TO-8, SMT, SMA
10 - 1500	A28-2	14	3.5	10.5	—	24	—	TO-8, SMT, SMA
10 - 1500	A29-1	9	5.5	22	—	32	—	TO-8, SMT, SMA

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## General Amplifiers

Freq (MHz)	Part Number	Gain (dB)	NF (dB)	Output P1dB (dBm)	Input IP3 (dBm)	Output IP3 (dBm)	Sat. P Out (dBm)	Package
<b>Packaged Products</b>								
10 - 2000	A31-1	11.5	3.5	-2	—	9	—	TO-8, SMT, SMA
10 - 2000	A33	9.5	4.5	3	—	15	—	TO-8, SMT, SMA
10 - 2000	A35	10	5	9	—	21	—	TO-8, SMT, SMA
10 - 2000	A37	10	6.8	15	—	28	—	TO-8, SMT, SMA
10 - 2000	A38	9.5	6.5	19	—	30	—	TO-8, SMT, SMA
10 - 2000	A39	7.5	8.5	22	—	34	—	TO-8, SMT, SMA
20 - 250	A70-3	8	2.8	21	—	40	—	TO-8, SMT, SMA
20 - 250	A81	25.5	3	17	—	28	—	TO-8, SMT, SMA
20 - 250	A81-1	25	2.5	13.5	—	27	—	TO-8, SMT, SMA
20 - 250	A82	25	2.8	20	—	31	—	TO-8, SMT, SMA
20 - 250	A82-1	19	2.8	15	—	26	—	TO-8, SMT, SMA
20 - 500	A81-2	24.5	3	15	—	28	—	TO-8, SMT, SMA
20 - 500	A81-3	17	4	8	—	20	—	TO-8, SMT, SMA
20 - 500	A80	29	2.3	14.3	—	27	—	TO-8, SMT, SMA
20 - 2700	SMA2002	12.5	3.8	27	—	36	—	TO-8, SMT, SMA
35 - 350	PAW1027	38	4.5	31	—	43	—	Flange
35 - 500	PAW1027-1	38	4.5	31	—	43	—	Flange
40 - 550	PAW587	21	7	—	—	42	—	Flange
40 - 550	PAW588	33.5	6.5	—	—	44	—	Flange
40 - 750	PAW788	33.5	8	—	—	36	—	Flange
40 - 860	PAW887B	30	8.5	—	—	37	—	Flange
50 - 860	MAMUSS0007	5	3.7	—	—	—	—	Surface Mount
50 - 870	MAAMSS0001	12	3.3	23	20	—	—	SOICN-16
50 - 1000	MAAMSS0003	12.2	3.3	24	—	32	—	4 mm PQFN 20
50 - 1000	MAAMSS0031	14.8	2.7	23	—	36	—	SOT-89
<b>50 - 2500</b>	<b>MAAMSS0017</b>	<b>18</b>	<b>4.4</b>	<b>22</b>	<b>—</b>	<b>40</b>	<b>—</b>	<b>SOT-89</b>
<b>50 - 2500</b>	<b>MAAMSS0046</b>	<b>18</b>	<b>4.4</b>	<b>22</b>	<b>—</b>	<b>40</b>	<b>—</b>	<b>SOT-89</b>
<b>70 - 3000</b>	<b>MAALSS0034</b>	<b>12</b>	<b>1.5</b>	<b>21</b>	<b>—</b>	<b>32</b>	<b>—</b>	<b>SOT-89</b>
100 - 800	A89	22	4.5	17.5	—	30	—	TO-8, SMT, SMA
100 - 2000	RA36	24	5.5	13	—	22	—	TO-8, SMT, SMA
100 - 2000	A32	12.5	2.5	22	—	32	—	TO-8, SMT, SMA
100 - 2000	A32-1	12	2.5	15.5	—	25	—	TO-8, SMT, SMA
100 - 2000	A34	16	5.5	7	—	18	—	TO-8, SMT, SMA
100 - 2000	A36	16.5	5.5	12	—	23	—	TO-8, SMT, SMA
100 - 2300	A36-1	16.2	6	12	—	23	—	TO-8, SMT, SMA
100 - 2600	A36-2	15	7	14	—	30	—	TO-8, SMT, SMA
100 - 3200	A43	11.5	7	8.5	—	21	—	TO-8, SMT, SMA
<b>200 - 3000</b>	<b>MAAM02350-A2</b>	<b>18</b>	<b>4</b>	<b>14</b>	<b>6</b>	<b>—</b>	<b>—</b>	<b>CR-3</b>
200 - 2000	PA2010	10	5	25.5	—	33	—	TO-8, SMT, SMA
200 - 2000	PA38	10	4	23	—	34	—	TO-8, SMT, SMA
200 - 2600	PA38-2	8.5	4.5	23.5	—	33	—	TO-8, SMT, SMA
400 - 500	MAALSS0025	21	0.9	—	7	28	—	SOIC-8
<b>400 - 3500</b>	<b>MAAMSS0048</b>	<b>21</b>	<b>4.5</b>	<b>27</b>	<b>—</b>	<b>40</b>	<b>—</b>	<b>SOT-89</b>
<b>400 - 3500</b>	<b>MAAMSS0049</b>	<b>19</b>	<b>3.5</b>	<b>28.5</b>	<b>—</b>	<b>43</b>	<b>—</b>	<b>SOT-89</b>

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<b>Packaged Products</b>								
<b>400 - 3500</b>	<b>MAAMSS0050</b>	<b>20</b>	<b>3.5</b>	<b>30</b>	—	<b>43</b>	—	<b>SOT-89</b>
<b>500 - 2400</b>	<b>MAAMSS0014</b>	<b>19</b>	<b>5</b>	<b>23</b>	—	<b>38</b>	—	<b>SOT-89</b>
500 - 2050	SMA2001	17.5	2.5	27	—	36.5	—	TO-8, SMT, SMA
800 - 960	PA1162A	30	2.3	36	—	48	—	Flange
800 - 960	PA1186	29	2.4	38	—	52	—	Flange
850 - 900	PA1131	27.5	2.5	33	—	49	—	Flange
900 - 942	MA02104AF	30.8	—	—	—	—	—	TSSOP-16
900 - 942	MA02107AF	30.8	—	—	—	—	—	TSSOP-16
900 - 2000	MAAMSS0005	15.5	2.8	6	—	17	—	SOT-143
1000 - 4000	A4012	18	3.5	15.5	—	26	—	TO-8, SMT, SMA
1000 - 4000	A45	17.5	4	19.5	—	29	—	TO-8, SMT, SMA
1000 - 4000	A45-1	17.5	4	13	—	26	—	TO-8, SMT, SMA
1000 - 18000	MAAMGM0002	10	4	20	—	—	21	5x5 mm PQFN
<b>1200 - 3200</b>	<b>MAAPGM0036</b>	<b>20</b>	<b>5</b>	<b>31</b>	—	<b>40</b>	<b>31</b>	<b>Ceramic</b>
1400 - 1450	AM42-0041	28	—	—	—	—	28	CR-15
1435 - 1525	AM42-0054	26	—	—	—	—	33	CR-15
1435 - 1525	MA05515-DIE	32	—	—	—	—	24	Hybrid
1500 - 1700	MAALSS0027	20	1.5	8.5	—	17	—	SOT-26
1500 - 2300	A34-1	14.5	5.7	8	—	20	—	TO-8, SMT, SMA
1700 - 2100	MAALSS0024	20	1	11	—	26	—	SOT-26
<b>1700 - 2500</b>	<b>MAAMSS0007</b>	<b>13</b>	<b>5.5</b>	<b>23</b>	—	<b>40</b>	—	<b>3mm PQFN 20</b>
1800 - 1930	MA02203AD	24.5	—	—	—	—	26.5	SOIC-16
1800 - 1930	MA02204AF	32	—	—	—	—	27	TSSOP-16
1800 - 1930	MA02205AF	29.3	—	—	—	—	27.2	TSSOP-16
<b>1800 - 1930</b>	<b>MA02206GJ</b>	<b>28.9</b>	—	—	—	—	<b>26.9</b>	<b>MSOP-8EP</b>
1810 - 1870	PA1163	27	2.4	36.5	—	52	—	Flange
1880 - 1930	MAAPSS0071	35	—	—	—	40	26	3mm PQFN 12-lead
1930 - 1990	PA1151	26.5	2.4	36.8	—	54	—	Flange
1930 - 1990	PA1166	26	2.7	38	—	53	—	Flange
2000 - 2200	PA1138	26	2.7	25.5	—	40	—	Flange
2000 - 2200	PA1157	24.5	3	36	—	52	—	Flange
2000 - 2200	PA1224	25	3	37.5	—	51	—	Flange
2000 - 4000	MAAPGM0027	22	6	30	—	—	31	5x5 mm PQFN
2000 - 6000	A61	7.5	3.2	12.5	—	25	—	TO-8, SMT, SMA
2000 - 6000	A611	15	3.2	12.5	—	24	—	TO-8, SMT, SMA
<b>2000 - 6000</b>	<b>MAAM26100-B1</b>	<b>18</b>	—	<b>27</b>	—	<b>39</b>	<b>29</b>	<b>CR-2</b>
<b>2000 - 6000</b>	<b>MAAM26100-B1G</b>	<b>20</b>	—	<b>28</b>	—	<b>40</b>	<b>29</b>	<b>CR-2</b>
<b>2000 - 6000</b>	<b>MAAM26100-P1</b>	<b>19</b>	—	<b>28</b>	—	<b>39</b>	<b>30.5</b>	<b>CR-15</b>
2000 - 6500	MAAPGM0028	14	8	26	—	37	29	Ceramic Flange
<b>2000 - 8000</b>	<b>MAAM28000-A1</b>	<b>17</b>	<b>8</b>	<b>14</b>	<b>7</b>	—	—	<b>Ceramic</b>
2110 - 2170	PA1223	25	3	37.5	—	51	—	Flange
2200 - 2500	AM42-0055	29	—	—	—	—	33	CR-15
2200 - 2500	MA05535-DIE	29	—	—	—	—	24	Hybrid
2300 - 2400	PA1159	23.5	2.7	36.5	—	50	—	Flange

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<b>Packaged Products</b>								
2300 - 2400	PA1182	23	3	37.5	—	51	—	Flange
2400 - 2500	AM52-0024	31	—	27	—	40	—	MSOP-8EP
<b>2400 - 2500</b>	<b>MA02303GJ</b>	<b>29.5</b>	<b>3.6</b>	<b>26.5</b>	—	<b>43</b>	—	<b>MSOP-8EP</b>
<b>2400 - 2500</b>	<b>MAAPSS0093</b>	<b>29.5</b>	<b>3.6</b>	<b>26.5</b>	—	<b>43</b>	—	<b>MSOP-8EP</b>
<b>2400 - 2500</b>	<b>MAAPSS0066</b>	<b>27</b>	—	—	—	<b>35</b>	<b>25</b>	<b>3mm PQFN 12</b>
<b>2400 - 2500</b>	<b>MAAPSS0075</b>	<b>32</b>	—	<b>26.5</b>	—	<b>52</b>	—	<b>3mm PQFN 12</b>
<b>2500 - 5500</b>	<b>MAAPGM0035S</b>	<b>18</b>	<b>7</b>	<b>32</b>	—	<b>42</b>	<b>33</b>	<b>CR-15</b>
<b>3500 - 7000</b>	<b>MAAM37000-A1</b>	<b>17</b>	<b>2.2</b>	<b>14</b>	<b>8</b>	—	—	<b>CR-3</b>
3500 - 6000	MAAPGM0022	17	6	31	—	43	32	
<b>3600 - 6500</b>	<b>MAAPGM0029</b>	<b>19</b>	<b>8</b>	<b>30</b>	—	<b>42</b>	<b>30</b>	<b>Ceramic Bolt-down</b>
4000 - 8000	MLA2440-603	30	4	—	—	—	—	TWTA Replacement
4800 - 6700	MAAPGM0060	23	—	37	—	—	37	Ceramic Flange
<b>4900 - 6000</b>	<b>MAAPSM0008</b>	<b>20.5</b>	—	<b>29.5</b>	—	<b>40</b>	<b>31.5</b>	<b>4 mm PQFN 16</b>
<b>4900 - 6000</b>	<b>MAAPSS0096</b>	<b>20.5</b>	—	<b>29.5</b>	—	<b>40</b>	<b>31.5</b>	<b>4 mm PQFN 16</b>
<b>5000 - 8500</b>	<b>MAAPGM0021</b>	<b>17</b>	<b>9</b>	<b>32</b>	—	<b>40</b>	<b>33</b>	<b>Ceramic</b>
<b>5000 - 9000</b>	<b>MAAPGM0030</b>	<b>14</b>	<b>9</b>	<b>30</b>	<b>24</b>	<b>38</b>	<b>30</b>	<b>Ceramic</b>
5900 - 7100	AM42-0039	33	—	33	—	43	33	CR-15
5900 - 7100	AM42-0046	27	—	—	—	—	36	CR-15
<b>7500 - 12000</b>	<b>MAAM71200-H1</b>	<b>15.5</b>	<b>3.5</b>	<b>11</b>	<b>21</b>	—	—	<b>Ceramic</b>
<b>8000 - 12500</b>	<b>MAAPGM0034</b>	<b>15</b>	<b>9</b>	<b>27</b>	—	<b>33</b>	<b>28</b>	<b>Ceramic</b>
8000 - 18000	MLA2470-703	30	7	—	—	—	—	TWTA Replacement
<b>9000 - 12000</b>	<b>MAAPGM0038</b>	<b>21</b>	<b>9</b>	<b>30</b>	—	<b>40</b>	<b>32</b>	<b>Ceramic</b>
<b>9800 - 13000</b>	<b>MAAPGM0019</b>	<b>19</b>	<b>10</b>	<b>31</b>	—	<b>38</b>	<b>32</b>	<b>Ceramic</b>
<b>11000 - 15000</b>	<b>MAAPGM0040</b>	<b>20</b>	<b>8</b>	<b>27</b>	—	<b>33</b>	<b>27</b>	<b>Ceramic Bolt-down</b>
<b>11500 - 15000</b>	<b>MAAPGM0041</b>	<b>19</b>	<b>7</b>	<b>30</b>	—	<b>34</b>	<b>31</b>	<b>Ceramic</b>
14000 - 14500	AM42-0007	22	—	32	—	41	33	CR-15
14000 - 14500	MA08602FR	34	7	—	40	—	33	FR

## Multifunction Control Circuits

Freq (MHz)	Part Number	Gain (dB)	NF (dB)	Output P1dB (dBm)	Input IP3 (dBm)	Output IP3 (dBm)	Sat. P Out (dBm)	Package
<b>Packaged Products</b>								
8000 - 11000	MA03501D	18	—	21	7	26	—	Die
8000 - 11000	MA03503D	18	10	22.5	8.5	26.5	—	Die
7000 - 12000	MAMFGM0001-DIE	27/20	—	—	—	—	—	Die

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## IF Amplifiers

Freq (MHz)	Part Number	Gain (dB)	NF (dB)	Output P1dB (dBm)	Input IP3 (dBm)	Output IP3 (dBm)	Sat. P Out (dBm)	Package
<b>Packaged Products</b>								
5 - 200	AM-132	10.5	6	25	—	38	—	FP-9
5 - 200	AM-134	15.2	7	23	—	37	—	FP-9
5 - 200	AMC-132	10.5	6	25	—	38	—	Conn
5 - 500	AM-123	10.6	7.5	16	—	22	—	FP
<b>5 - 500</b>	<b>AM-131</b>	<b>10.6</b>	<b>7.5</b>	<b>16</b>	<b>—</b>	<b>22</b>	<b>—</b>	<b>TO-8-1</b>
5 - 500	AM-143	16.3	3.5	4	—	16	—	TO-8
<b>5 - 500</b>	<b>AM-147</b>	<b>17.6</b>	<b>4.5</b>	<b>19</b>	<b>—</b>	<b>28</b>	<b>—</b>	<b>TO-8</b>
5 - 500	AM-151	12.5	7	19	—	34	—	TO-8
5 - 500	AMC-143	16.3	3.5	4	—	16	—	Conn
5 - 500	AMC-147	17.6	4.5	19	—	28	—	Conn
5 - 500	AMC-151	12.5	7	19	—	34	—	Conn
5 - 1000	AM-176	14.2	5	12	—	25	—	TO-8
5 - 1000	AM-182	29.2	4.5	9	—	18	—	TO-8
5 - 1000	AMC-176	14.2	5	12	—	25	—	Conn
5 - 1000	AMC-182	28.2	4.5	9	—	18	—	C-32
<b>10 - 100</b>	<b>AM-162</b>	<b>13</b>	<b>1.6</b>	<b>13</b>	<b>—</b>	<b>26</b>	<b>—</b>	<b>TO-8</b>
10 - 100	AMC-162	13	1.6	13	—	26	—	C-6
10 - 100	AMS-162	13	1.6	13	—	26	—	SF-1
10 - 200	AM-136	20.8	7	23	—	36	—	FP-9
10 - 200	AM-138	25.8	7	23	—	35	—	FP-9
10 - 200	AM-140	30.3	7	23	—	36	—	FP-9
10 - 200	AMC-136	20.8	7	23	—	36	—	C-25
10 - 200	AMC-138	25.8	7	23	—	35	—	C-25
10 - 200	AMC-140	30.3	7	23	—	36	—	C-25
10 - 500	AM-146	21.7	7.5	20	—	30	—	FP
10 - 500	AMC-146	21.7	7	20	—	30	—	Conn
10 - 1000	AM-145	11.3	5.5	14	—	26	—	TO-8-1
10 - 1000	AM-177	12.5	8.5	20	—	30	—	TO-8-1
10 - 1000	AM-183	29.5	5	13	—	20	—	TO-8
10 - 1000	AMC-145	11.3	5.5	14	—	26	—	C-32
10 - 1000	AMC-183	29.5	5	13	—	20	—	Conn
10 - 2000	AM-180	10.7	7	13	—	25	—	TO-8
10 - 2000	AM-184	21	6	10	—	20	—	TO-8-1
10 - 2000	AMC-180	10.7	7	13	—	25	—	Conn
10 - 2000	AMC-184	21	6	10	—	20	—	C-32
15 - 100	AM05-0005	15	5	23	—	37	—	LGA-1
15 - 100	AM05-0006	10.6	5	23	—	40	—	LGA-1
30 - 250	AMC-119	8.5	3.5	20	—	34	—	Conn
30 - 250	AM-119	8.5	3.5	20	—	34	—	TO-8
<b>50 - 450</b>	<b>MAAMSS0017</b>	<b>18</b>	<b>4.4</b>	<b>22</b>	<b>—</b>	<b>40</b>	<b>—</b>	<b>SOT-89</b>
<b>50 - 450</b>	<b>MAAMSS0046</b>	<b>18</b>	<b>4.4</b>	<b>22</b>	<b>—</b>	<b>40</b>	<b>—</b>	<b>SOT-89</b>
100 - 600	AM-160	29.2	3	16	—	27	—	FP-9
100 - 600	AM-191	24	4.5	20	—	28	—	FP-3
200 - 1000	AM-142	12.6	3.8	2	—	15	—	TO-8-1

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Freq (MHz)	Part Number	Gain (dB)	NF (dB)	Output P1dB (dBm)	Input IP3 (dBm)	Output IP3 (dBm)	Sat. P Out (dBm)	Package
<b>Packaged Products</b>								
200 - 1000	AMC-142	12.6	3.8	2	—	15	—	C-32
300 - 1000	AM-155	13.25	5.5	18	—	27	—	TO-8
300 - 1000	AMC-155	13.25	5.5	18	—	27	—	Conn
300 - 1800	AM-153	12.9	3	6	—	17	—	TO-8-1
1710 - 1910	AM40-0023	11	0.9	-13	—	—	—	CR-5

## Antenna Switches Amplifiers

Freq (MHz)	Part Number	Gain (dB)	I.L. (dB)	Output P1dB (dBm)	Isol. (dB)	Types	Package
<b>Packaged Products</b>							
1.8 - 2	AM55-0004	24	0.6	24	20	T/R	Plastic

## Gain Control Amplifiers

Freq (MHz)	Part Number	Gain (dB)	Output P1dB (dBm)	Output IP3 (dBm)	Atten. Step (dB)	Atten. Range (dB)	Package
<b>Die Products</b>							
1000 - 15000	MAAMGM0003-DIE	7.5	25	39	—	35	Die
<b>Packaged Products</b>							
100 - 400	AM55-0024	21	17.5	30	0.5	31.5	8mm PBGA

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Green listings indicate RoHS Compliant parts

## Low Noise Amplifiers

Freq (MHz)	Part Number	Gain (dB)	NF (dB)	Output P1dB (dBm)	Input IP3 (dBm)	Output IP3 (dBm)	Sat. P Out (dBm)	Package
<b>Die Products</b>								
1200 - 1750	MAAM12000	26	1.25	14	24	24	—	Die
2000 - 3000	MAAM23000	26	1.1	14	—	—	—	Die
<b>3500 - 7000</b>	<b>MAAM37000</b>	<b>17</b>	<b>1.8</b>	<b>14</b>	<b>—</b>	<b>24</b>	<b>—</b>	<b>Die</b>
<b>5000 - 8000</b>	<b>MAALGM0003-DIE</b>	<b>14</b>	<b>2.1</b>	<b>13</b>	<b>—</b>	<b>25</b>	<b>—</b>	<b>Die, CR-3</b>
<b>Packaged Products</b>								
10 - 200	A80-1	27.3	2	16	0	28	0	TO-8, SMT, SMA
10 - 250	A231	26	1.7	10	0	22	0	TO-8, SMT, SMA
10 - 250	A70	8	1.6	8	0	24	0	TO-8, SMT, SMA
10 - 250	A70-1	8	1.8	14	—	28	—	TO-8, SMT, SMA
10 - 500	A531	31.7	2	2.5	0	14	0	TO-8, SMT, SMA
10 - 500	A75-3	20.5	1.7	3	0	16	0	TO-8, SMT, SMA
<b>70 - 3000</b>	<b>MAALSS0034</b>	<b>12</b>	<b>1.5</b>	<b>21</b>	<b>—</b>	<b>32</b>	<b>—</b>	<b>SOT-89</b>
100 - 1200	A1212	14	1.8	19	0	29	0	TO-8, SMT, SMA
<b>200 - 3000</b>	<b>MAALSS0012</b>	<b>12</b>	<b>1.5</b>	<b>21</b>	<b>—</b>	<b>36</b>	<b>—</b>	<b>SOT-363</b>
<b>200 - 3000</b>	<b>MAALSS0038</b>	<b>12</b>	<b>1.5</b>	<b>21</b>	<b>—</b>	<b>36</b>	<b>—</b>	<b>SOT-363</b>
400 - 500	MAALSS0025	21	0.9	—	7	28	—	SOIC-8
800 - 960	PA1066	31	0.9	27.5	45	—	—	Flange
800 - 1000	AM50-0003	15	1.2	16.5	15	30	0	SOIC-8
<b>800 - 1000</b>	<b>AM50-0011</b>	<b>16.8</b>	<b>0.95</b>	<b>14</b>	<b>13.5</b>	<b>30</b>	<b>—</b>	<b>SOT-26</b>
<b>800 - 1000</b>	<b>MAALSS0040</b>	<b>16.8</b>	<b>0.95</b>	<b>14</b>	<b>13.5</b>	<b>30</b>	<b>—</b>	<b>SOT-26</b>
800 - 1000	AM55-0016	16	1.6	0	24	20	—	Plastic
1000 - 4000	A4011	15.5	2	18.3	0	29	0	TO-8, SMT, SMA
<b>1200 - 1750</b>	<b>MAAM12000-A1</b>	<b>26</b>	<b>1.35</b>	<b>14</b>	<b>-2</b>	<b>—</b>	<b>—</b>	<b>CR-3</b>
1400 - 2000	AM50-0004	14	1.5	16	15	29	0	SOIC-8
1400 - 2000	AM50-0006	18	1.6	1	-6	—	—	SOT-26
<b>1500 - 1600</b>	<b>MAAM12021</b>	<b>21</b>	<b>1.55</b>	<b>6</b>	<b>-2</b>	<b>0</b>	<b>0</b>	<b>SO-8</b>
1500 - 1700	MAALSS0027	20	1.5	8.5	—	17	—	SOT-26
1550 - 1600	AM50-0002	27	1.15	1	-14	0	0	SOIC-8
<b>1550 - 1600</b>	<b>MAALSS0042</b>	<b>27</b>	<b>1.15</b>	<b>1</b>	<b>-14</b>	<b>0</b>	<b>0</b>	<b>SOIC-8</b>
<b>1700 - 2000</b>	<b>MAAM12031</b>	<b>20</b>	<b>1.65</b>	<b>7</b>	<b>-1</b>	<b>—</b>	<b>—</b>	<b>SOIC-8</b>
1700 - 2100	MAALSS0024	20	1	11	—	26	—	SOT-26
1800 - 2000	PA2001	21	2	30.3	—	46.5	—	Flange
1800 - 2000	PA2003	21	2.1	33	—	49	—	Flange
1800 - 2200	AM50-0012	19	1.4	20	14	32	—	3mm PQFN
<b>1800 - 2200</b>	<b>MAALSS0045</b>	<b>19</b>	<b>1.4</b>	<b>20</b>	<b>14</b>	<b>32</b>	<b>—</b>	<b>3mm PQFN</b>
1800 - 2000	PA1152	17	0.5	10	23	—	—	Flange
1800 - 2000	PA1153	28.5	1	26.4	45	—	—	Flange
1850 - 1910	PA1133	29	1	26.5	44	—	—	Flange
2000 - 6000	A6011	14.8	1.5	18	0	30	0	TO-8, SMT, SMA
<b>2000 - 3000</b>	<b>MAAM23000-A1</b>	<b>26</b>	<b>1.25</b>	<b>16</b>	<b>-2</b>	<b>—</b>	<b>—</b>	<b>CR-3</b>
2000 - 2200	PA1137	17	0.8	8	22	—	—	Flange
<b>2200 - 2400</b>	<b>MAALSS0013</b>	<b>17</b>	<b>1.1</b>	<b>10</b>	<b>8</b>	<b>25</b>	<b>—</b>	<b>SOT-26</b>
<b>2200 - 2400</b>	<b>MAALSS0033</b>	<b>17</b>	<b>1.1</b>	<b>10</b>	<b>8</b>	<b>25</b>	<b>—</b>	<b>SOT-26</b>
<b>3500 - 7000</b>	<b>MAAM37000-A1</b>	<b>17</b>	<b>2.2</b>	<b>14</b>	<b>8</b>	<b>—</b>	<b>—</b>	<b>CR-3</b>

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Green listings indicate RoHS Compliant parts

# Antennas



## M/A-COM Antennas

M/A-COM antennas are used extensively in automotive and aerospace/defense applications, as well as in other wireless markets. Broadband operation is available from 20 MHz to 40 GHz. Major applications include the following:

### Automotive Telematics

- Satellite radio antennas
  - XM
  - Sirius
- Mobile GPS and Bluetooth antennas
- Multi-band antennas
  - GPS
  - Cellular
  - PCS
  - SDARS

### Aerospace & Defense

- Military aviation
- Space launch antennas
- Missiles
- Electronic warfare
- Telemetry

### RFID

- Single and dual elements
- Lightweight
- Rugged construction





## RFID Antennas

Frequency (MHz)	Part Number	Elements	Polarization	Size (in inches)	Weight (lbs.)	Gain (dBic)
865 - 868	MAANAT0134	Dual	CP	19.6 x 8.8 x 1.6	1.8	8.9
902 - 928	MAANAT0123	Dual	CP	19.6 x 8.8 x 1.6	1.8	8.9
902 - 928	MAANAT0144	Single	CP	8.5 x 8.5 x 1.0	1	9
950 - 960	MAANAT0133	Dual	CP	19.6 x 8.8 x 1.6	1.8	8.9

## GPS Antennas

Frequency (MHz)	Part Number	Types	Gain (dBi)	Size (in inches)
1575.42	ANPC-185	Active	26	2.56 x 2.25 x 0.65

## Telematic Antennas

Frequency (MHz)	Part Number	Types	Size (in inches)
2320 - 2332.5	MAANIN0055	Active	3.0 x 4.5 x 1.56
2332.5 - 2345	MAANIN0050	Active	3.0 x 4.5 x 1.56

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# Attenuators



## M/A-COM Attenuators

M/A-COM Attenuators are used in various applications for automotive and wireless markets. There are serial and parallel logic controlled digital attenuators and voltage variable analog attenuators (VVA) that range from DC to 20 GHz.

- Cellular infrastructure
- Handset gain control
- Radar systems
- Satellite radios
- Test equipment







## Voltage Variable Attenuators

Frequency (MHz)	Part Number	I.L. (dB)	Attenuator Range (dB)	Input IP3 (dBm)	Package
<b>Packaged Products</b>					
0 - 2000	AT-250	3.2	12	36	SOIC-8
0 - 2000	AT-259	3.2	12	36	SOT-143
0 - 2000	MAAVSS0005	3.2	12	36	SOT-143
0 - 2000	AT-635	7.2	35	36	SO-14
0 - 2500	AT-255	3.6	25	28	SOT-25
0 - 2000	MAAVSS0006	3.6	25	28	SOT-25
5 - 2000	G1	2.5	25	—	TO-8, SMT, SMA
5 - 2000	G2	2.6	23	—	TO-8, SMT, SMA
5 - 3000	MA4P274-1225T	1	30	43	SOT-25
50 - 1000	AT10-0019	2.8	42	34	SOW-16
100 - 2000	G30	2.5	35	—	TO-8, SMT, SMA
500 - 2000	AT-109	2.5	35	25	SOIC-8
500 - 2000	AT-110	2.8	30	28	SOIC-8
500 - 2000	AT-113	2.7	40	28	SOIC-8
500 - 3000	AT-108	2.5	40	32	SOIC-8
500 - 3000	MAAVSS0007	2.5	40	32	SOIC-8
500 - 4000	G40	2.5	25	—	TO-8, SMT, SMA
800 - 1000	AT10-0009	4.2	35	35	SOW-16
800 - 1000	MAAVCC0001	3.6	38	40	CSP-8
824 - 960	AT65-0009	1.7	25	40	SOT-25
824 - 960	MAATCC0013	1.7	25	40	SOT-25
900 - 2500	AT65-0008	1.5	28	40	SO-8
1700 - 2000	AT10-0017	3.5	35	31	SOW-16
1700 - 2200	MAAVCC0002	2.9	33	31	CSP-8
1800 - 2500	AT-119	2.4	42	32	SOT-25
1800 - 2500	MAAVSS0001	2.4	42	15	SOT-25

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Electronics

## Digital Attenuators



Frequency (MHz)	Part Number	I.L. (dB)	Step Size (dB)	Attenuator Range (dB)	Input IP3 (dBm)	Package
<b>Die Products</b>						
0 - 2000	MADA2030G	1.9	0.5	15.5	45	Die
<b>0 - 6000</b>	<b>MAATGM0001-DIE</b>	<b>3.5</b>	<b>0.56</b>	<b>35</b>	<b>36</b>	<b>Die</b>
<b>2000 - 20000</b>	<b>MAATGM0004-DIE</b>	<b>4</b>	<b>0.75</b>	<b>23</b>	<b>32</b>	<b>Die</b>
<b>Package Products</b>						
<b>0 - 2000</b>	<b>AT-106</b>	<b>4.6</b>	<b>1</b>	<b>50</b>	<b>46</b>	<b>CR-13</b>
<b>0 - 2000</b>	<b>AT-107</b>	<b>4</b>	<b>0.5</b>	<b>31.5</b>	<b>48</b>	<b>CR-13</b>
<b>0 - 2000</b>	<b>AT-210</b>	<b>1.5</b>	<b>1</b>	<b>15</b>	<b>50</b>	<b>SO-16</b>
<b>0 - 2000</b>	<b>MAATSS0015</b>	<b>1.5</b>	<b>1</b>	<b>15</b>	<b>50</b>	<b>SO-16</b>
<b>0 - 2000</b>	<b>AT-220</b>	<b>1.6</b>	<b>2</b>	<b>30</b>	<b>50</b>	<b>SO-16</b>
<b>0 - 2000</b>	<b>AT-230</b>	<b>1.6</b>	<b>4</b>	<b>28</b>	<b>50</b>	<b>SO-14</b>
0 - 2000	AT-232	2.5	2	30	50	CR-6
0 - 2000	AT-233	2.8	2	30	50	CR-12
<b>0 - 2000</b>	<b>AT-260</b>	<b>1.9</b>	<b>1</b>	<b>31</b>	<b>50</b>	<b>SSOP-20</b>
<b>0 - 2000</b>	<b>AT-263</b>	<b>3</b>	<b>1</b>	<b>31</b>	<b>48</b>	<b>CR-12</b>
0 - 2000	AT-266	0.3	10	10	50	SOT-25
<b>0 - 2000</b>	<b>MAATSS0018</b>	<b>0.3</b>	<b>10</b>	<b>10</b>	<b>50</b>	<b>SOT-25</b>
<b>0 - 2000</b>	<b>AT-267</b>	<b>0.3</b>	<b>15</b>	<b>15</b>	<b>50</b>	<b>SOT-25</b>
<b>0 - 2000</b>	<b>MAADSS0008</b>	<b>0.3</b>	<b>15</b>	<b>15</b>	<b>50</b>	<b>SOT-25</b>
<b>0 - 2000</b>	<b>AT-273</b>	<b>1.9</b>	<b>16</b>	<b>32</b>	<b>48</b>	<b>CR-11</b>
<b>0 - 2000</b>	<b>AT-280</b>	<b>1.5</b>	<b>0.5</b>	<b>15.5</b>	<b>45</b>	<b>SO-16</b>
<b>0 - 2000</b>	<b>MAATSS0021</b>	<b>1.5</b>	<b>0.5</b>	<b>15.5</b>	<b>45</b>	<b>SO-16</b>
<b>0 - 2000</b>	<b>AT-283</b>	<b>2.9</b>	<b>0.5</b>	<b>15.5</b>	<b>47</b>	<b>CR-12</b>
0 - 2000	AT-357	6.5	1	31	47	C-46
0 - 2000	AT15-0001	7.3	1	31	40	Ceramic
<b>0 - 2000</b>	<b>AT20-0106</b>	<b>4.6</b>	<b>1</b>	<b>50</b>	<b>46</b>	<b>CR-13</b>
<b>0 - 2000</b>	<b>AT20-0107</b>	<b>3.8</b>	<b>0.5</b>	<b>31.5</b>	<b>48</b>	<b>CR-13</b>
<b>0 - 2000</b>	<b>AT20-0263</b>	<b>3</b>	<b>1</b>	<b>31</b>	<b>48</b>	<b>CR-12</b>
<b>0 - 2000</b>	<b>AT20-0273</b>	<b>1.9</b>	<b>16</b>	<b>32</b>	<b>48</b>	<b>CR-11</b>
<b>0 - 2000</b>	<b>AT65-0106</b>	<b>4.7</b>	<b>1</b>	<b>50</b>	<b>48</b>	<b>SOW-24</b>
<b>0 - 2000</b>	<b>AT65-0107</b>	<b>4.2</b>	<b>0.5</b>	<b>31.5</b>	<b>48</b>	<b>SOW-24</b>
<b>0 - 2000</b>	<b>AT65-0263</b>	<b>3.2</b>	<b>1</b>	<b>31</b>	<b>48</b>	<b>SOW-16</b>
<b>0 - 2000</b>	<b>AT65-0283</b>	<b>3</b>	<b>0.5</b>	<b>15.5</b>	<b>48</b>	<b>SOW-16</b>
<b>0 - 2400</b>	<b>AT90-0106</b>	<b>6</b>	<b>1</b>	<b>50</b>	<b>48</b>	<b>CSP-1</b>
<b>0 - 2400</b>	<b>AT90-1106</b>	<b>6</b>	<b>1</b>	<b>50</b>	<b>48</b>	<b>CSP-1</b>
0 - 2500	AT90-0233	2.7	2	30	48	CSP-1
0 - 2500	AT90-1233	2.7	2	30	48	CSP-1
<b>0 - 3000</b>	<b>AT-213</b>	<b>2.5</b>	<b>1</b>	<b>15</b>	<b>50</b>	<b>CR-11</b>
0 - 3000	AT65-0213	2.8	1	15	50	SOW-16
<b>0 - 3000</b>	<b>AT65-0233</b>	<b>3.1</b>	<b>2</b>	<b>30</b>	<b>50</b>	<b>SO-16</b>
<b>0 - 3000</b>	<b>AT65-0413</b>	<b>1.7</b>	<b>1</b>	<b>15</b>	<b>50</b>	<b>SO-16</b>
<b>0 - 3000</b>	<b>AT90-0263</b>	<b>4</b>	<b>1</b>	<b>31</b>	<b>48</b>	<b>CSP-1</b>
<b>0 - 3000</b>	<b>MAATCC0012</b>	<b>3.1</b>	<b>2</b>	<b>30</b>	<b>50</b>	<b>SO-16</b>
<b>0 - 3000</b>	<b>AT90-1263</b>	<b>3.8</b>	<b>1</b>	<b>31</b>	<b>48</b>	<b>CSP-1</b>

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## Digital Attenuators

Frequency (MHz)	Part Number	I.L. (dB)	Step Size (dB)	Attenuator Range (dB)	Input IP3 (dBm)	Package
<b>Package Products</b>						
0 - 3500	AT90-0283	3.2	0.5	15.5	48	CSP-1
<b>0 - 3500</b>	<b>AT90-1283</b>	<b>3.2</b>	<b>0.5</b>	<b>15.5</b>	<b>48</b>	<b>CSP-1</b>
<b>0 - 4000</b>	<b>AT90-0107</b>	<b>5.1</b>	<b>0.5</b>	<b>31.5</b>	<b>48</b>	<b>CSP-1</b>
0 - 4000	AT90-0413	2.5	1	15	48	CSP-1
<b>0 - 4000</b>	<b>AT90-1107</b>	<b>5.1</b>	<b>0.5</b>	<b>31.5</b>	<b>48</b>	<b>CSP-1</b>
0 - 4000	AT90-1413	2.5	1	15	48	CSP-1
0 - 6000	MAATGM0001	4	0.6	35	31	5x5 mm PQFN
<b>0 - 6000</b>	<b>AT90-0001</b>	<b>5.8</b>	<b>1</b>	<b>31</b>	<b>48</b>	<b>CSP-1</b>
20 - 1000	AT-103	5	0.5	15.5	30	DI-3
20 - 2000	AT-358	2.7	10	10	35	TO-8-2
250 - 2000	AT-354	5.5	3	45	40	Ceramic
500 - 2000	AT-226	1	1	15	47	TSSOP-16
500 - 2000	AT-242	1.4	4	28	45	SO-8
<b>500 - 2000</b>	<b>AT-264</b>	<b>2.2</b>	<b>2</b>	<b>30</b>	<b>47</b>	<b>TSSOP-16</b>
<b>500 - 2000</b>	<b>MAATSS0016</b>	<b>2.2</b>	<b>2</b>	<b>30</b>	<b>47</b>	<b>TSSOP-16</b>
<b>500 - 2500</b>	<b>MAATSS0001</b>	<b>1.9</b>	<b>0.5</b>	<b>15</b>	<b>46</b>	<b>QSOP-16 (SSOP-16)</b>
<b>500 - 2500</b>	<b>MAATSS00017</b>	<b>1.9</b>	<b>0.5</b>	<b>15</b>	<b>46</b>	<b>QSOP-16 (SSOP-16)</b>
<b>800 - 2500</b>	<b>MAATSS0002</b>	<b>1.8</b>	<b>1</b>	<b>31</b>	<b>43</b>	<b>QSOP-16 (SSOP-16)</b>

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## M/A-COM Cables

M/A-COM durable test cables have the flexibility and reliability required for testing applications, as well as excellent electrical characteristics. Customer-replaceable interfaces allow a single cable to interconnect a variety of male and female interfaces without degrading the low loss and VSWR of the cable assembly.

Other cables available from M/A-COM:

### Instrument test cables

- Protection for your ANA investment

### Super flexible coaxial cables

- For interconnecting RF and microwave modules, sub-assemblies and instruments

### EW cables

- MIL-qualified for high performance airborne, shipboard, and ground-based applications

### Space cables

- Low weight, radiation resistant, long-term stable for launch vehicles and satellites



## Test Cables

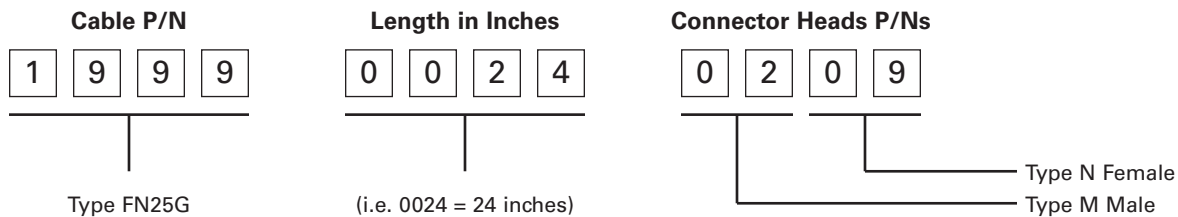
Freq. (GHz)	Part Number	VSWR (Max)	Ins. Loss (dB/ft)	Imped. (Ohms)	Velocity of Prop.	Time Delay (nS/ft)	Cap. (pF/ft)	RF Leakage (dB/ft Max)	Power (Rm Temp.)*	Con. Load (lbs/in)	Bend Radius	Outside Dia. (in min.)	Temp. (deg. C)**
18	FN25G	1.25:1	0.5 + 0.4	50	76%	1.34	27	-90	40W	100	1.25	0.25	-65 to 110
18	FN25GA	1.25:1	0.5 + 0.4	50	76%	1.34	27	-90	40W	Con. Fctry.	1.5	0.35	-65 to 110
18	FN35G	1.25:1	0.5 + 0.4	50	76%	1.34	27	-90	40W	100	1.75	0.35	-65 to 110
18	FE25G	1.25:1	0.5 + 0.4	50	76%	1.34	27	-90	40W	Con. Fctry.	1.25	0.25	-65 to 110
26.5	FN24G	1.40:1	0.5 + 0.52	50	76%	1.34	27	-90	25W	100	1.2	0.24	-65 to 110

\*Dependent upon connector style.

\*\*Power handling decreases to 1 Watt maximum at 18 GHz at 110°C during operation.

## Ordering Information

Design your own test cable using this simple format. The example below illustrates the part number formulation for a FN25G cable, 24" long with Nf and Nm connectors.



## Cables

Cable Type	Part Number
FN25G	1999
FN25G Armored	1998
FN35G	1997
FE25G	1996
FN24G	1985

## Accessories

Accessories (for 18 GHz models)	Part Number
Interlink	1600-8207
90° Interlink	1600-5136
Storage Box	9604-0250
Torque Wrench	9604-0251
Pat Wrench	9604-0321
Test Kit <small>(contains 2 each: ETNCm, SMAm, Nm and 7mm 1 each: Flat and torque wrench)</small>	9613-0001

## Connector Heads

Type	On Cable Assy's	For Individual Purchase	
		18 GHz Test Cables	26.5 GHz Test Cables
ETNCm	01	1550-0067	1550-0389
TNCf	08	1550-0165	1550-0390
Nm	02	1550-0068	1550-0392
Nf	09	1550-0166	1550-0393
SMAm	03	1550-0070	1550-0384
SMAf	07	1550-0164	1550-0385
3.5 mm (m)	10	1550-0168	1550-0386
3.5 mm (f)	11	1550-0167	1550-0387
7 mm	04	1550-0069	1550-0391
K/2.92 mm (m)	13	—	1550-0398
K/2.92 mm (f)	14	—	1550-0393
2.4 mm (m)	15	—	1550-0603
2.4 mm (f)	16	—	1550-0602

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Green listings indicate RoHS Compliant parts

# Ceramic Packages



## M/A-COM Ceramic Packages

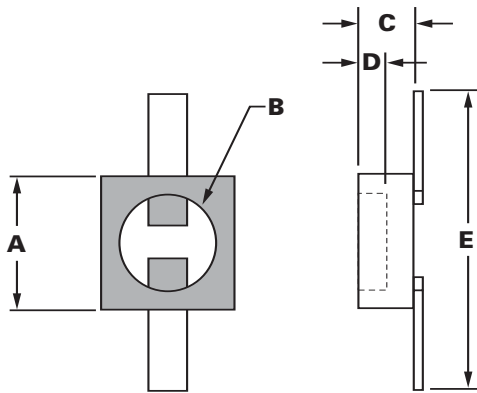
An industry leader in RF and microwave technology, M/A-COM is also an industry leader in ceramic packages for RF, microwave and optoelectronic devices. M/A-COM manufactures high thermal conductivity, low loss packages for a broad spectrum of advanced semiconductor devices, including:

- RF bipolar transistors
- RF LDMOS transistors
- GaAs FETs and MMICs
- GaN/SiC FETs
- Microwave diodes/varactors
- Hermetic, surface-mount component packages for mixers, LNAs, doublers, etc
- Photodiodes
- LEDs
- Laser diodes
- VCSELs and MEMS
- Both hermetic and non-hermetic packages

Our modern facility is fully equipped with all of the preparation, tooling, firing, brazing, plating, and inspection equipment necessary to produce state-of-the-art custom designs, as well as to execute high volume production runs. Progressive quality concepts are applied at all levels of business, with dedication to continuous process improvement.



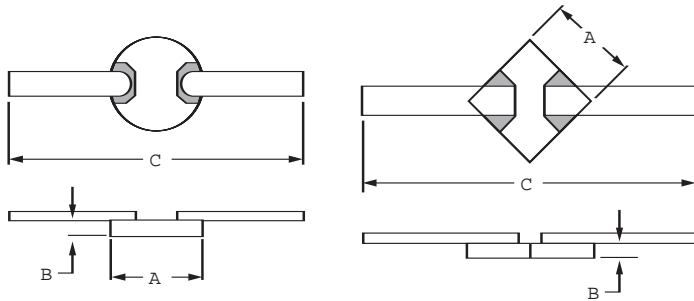
## J-Packs



A	B	C	D	E Available lead lengths
.070" Sq."	ø.050"	.030"	.015"	.155"
.070" Sq."	ø.055"	.030"	.015"	.165"
.100" Sq."	ø.055"	.030"	.015"	.400"
.100" Sq."	ø.063"	.030"	.015"	.500"
.100" Sq."	ø.072"	.030"	.015"	.540"

Parts are available in 2, 3, or 4 lead configurations

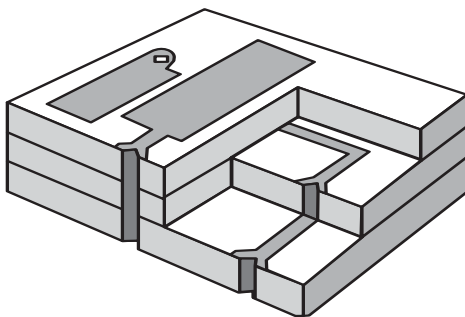
## W-Pack



A	B	C Available lead lengths
ø.053"	.010" or .015"	.270"
ø.100"	.010 or .015"	.290"
.050" Sq.	.010" or .015"	.300"
.070" Sq.	.010" or .015"	.330"
.100" Sq.	.010" or .015"	.400"

Parts are available in 2, 3, or 4 lead configurations

## HTCC Packages



## Design Information

	Standard	Custom
Material - 94% Al <sub>2</sub> O <sub>3</sub> - White		
Metalization		
Available Plating		
Electrolytic Au		
Electrolytic Ni		
Electrolytic Ag		
Electrolytic Cu		
Electroless Ni		
Electroless Au		
Surface Finish - As Fired	25µ IN. RMS	Machined
Layer Thickness Range	.010 - .025	.008 - .030
Number of Layers	2	as required
Camber	.004/inch	.003/inch
Dimensional Tolerances	±1% NLT .002	±.5% NLT .001
Conductor Line Width	.005 Min.	.003 Min.
Space between Conductors	.005 Min.	.003 Min.
Via Hole Diameter	.012 Min.	.009 Min.

Specific design parameters should be communicated regarding complex or unusual applications.

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Green listings indicate RoHS Compliant parts

## M/A-COM Diodes

### RF and Microwave Diodes: PIN, Schottky, and Varactor Devices

M/A-COM produces one of the widest variety of PIN, Schottky, and varactor diodes in the industry for microwave circuit applications from 1 MHz to 40 GHz. Diodes are manufactured in die form, plastic, ceramic, and metal packaging.

- Broadband and high power switch circuits: silicon and GaAs PIN switch diodes
- Analog and digital attenuator circuits: silicon PIN attenuator diodes
- High power limiter circuits: silicon PIN limiter diodes
- Detector and mixer circuits: GaAs and silicon Schottky diodes
- Multiplier circuits: GaAs and silicon Schottky diodes
- Filter and VCO circuits: GaAs and silicon varactor diodes

### Limiter Diodes

- Die series for chip and wire high frequency microwave frequency applications
- Ceramic package series for waveguide, coaxial and surface mount applications

### Multiplier Diodes

- Flip chip series for higher frequency millimeter wave applications
- Plastic package series for microwave frequency surface mount applications
- Ceramic package series for waveguide and coaxial circuit higher power applications

### Mixer and Detector Diodes

- SURMOUNT™ "0502" style diodes for surface mount high performance applications
- GaAs Flip Chip and GaAs beam lead series for surface mount millimeter frequency applications
- Plastic series for cost effective, surface mount applications
- Ceramic series for microwave frequency surface mount applications







## M/A-COM Diodes

### Switch and Attenuator PIN Diodes

- CERMACHIP and OFFSET BOND PAD series for microwave frequency applications
- Plastic series for cost effective, surface mount applications
- AlGaAs series for low loss, high isolation millimeter frequency applications
- GaAs & silicon flip chip series for surface mount millimeter frequency applications
- SURMOUNT™ "0502" style diodes for surface mount high performance applications
- HIPAX series for high average power surface mount UHF applications
- KILOVOLT series for high peak voltage HF and VHF applications
- HIPAX non-magnetic series for high average power MRI HF & VHF applications

### Tuning Diodes

- GaAs constant gamma series for higher frequency and high Q applications
- Plastic packaged silicon hyperabrupt varactor diodes for surface mount applications, including VCOs, tunable filters, and phase shifters



Diodes • [www.macom.com/diodes](http://www.macom.com/diodes)

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## Limiter

Junction Capacitance (pf)	Part Number	Max. Peak Power 1 $\mu$ sec -1% Duty (W)	Lifetime (ns)	Voltage Rating (V)	Input P1dB (dBm)	Package
<b>Packaged Products</b>						
-5V = .1 - .16	MA4L022	50	15	20 - 35	7	ODS-30, ODS-186
0V = .13 - .2	MA4L032	100	20	30 - 50	10	ODS-30, ODS-186
0.15	MA4L101	900	90	100	19	ODS-30, ODS-186
0.2	MA4L301	1000	200	200	23	ODS-30, ODS-186
0.25	MA4L302	1500	250	200	23	ODS-30, ODS-186
0.3	MA4L401	2000	800	250	29	ODS-30, ODS-186

## Multiplier

Junction Capacitance (pf)	Part Number	Reverse V. (Min.) (V)	Lifetime (ns)	Transition Time (ns)	Package
<b>Die Products</b>					
0.15 - 0.25 @ 0V	MA48701E	15	10	20	Die/Ceramic
0.2 - 0.3 @ 6V	MA43592	25	20	90	Die/Ceramic
0.2 - 0.5 @ 6V	MA44621	20	7	100	Die/Ceramic
0.2 - 0.55 @ 6V	MA43543	20	15	60	Die/Ceramic
0.4 - 0.6 @ 6V	MA44641	40	12	150	Die/Ceramic
0.45 - 0.85 @ 6V	MA43004	30	50	150	Die/Ceramic
1.6 - 2.4 @ 6V	MA43002	45	225	250	Die/Ceramic
<b>Packaged Products</b>					
0.6 - 1 @ 6V	MA44769	30	30	150	SOT-23
1.4 - 2.4 @ 6V	MA44768	30	225	250	SOT-23
2.8 - 4.3 @ 6V	MA44767	30	500	600	SOT-23

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Green listings indicate RoHS Compliant parts



## Mixing/Detector

Frequency (GHz)	Part Number	Tss (dBm)	Junction Capacitance (pf)	Total Capacitance (pf)	Test Frequency (GHz)	Package
<b>Die Products</b>						
0 - 18000	MA4E2099-1284	-55	0.16	0.16	10	1284 Die
<b>0 - 18000</b>	<b>MA4E2502H-1246</b>	<b>-55</b>	<b>0.12</b>	<b>0.12</b>	<b>10</b>	<b>1246 Die</b>
<b>0 - 18000</b>	<b>MA4E2502L-1246</b>	<b>-55</b>	<b>0.12</b>	<b>0.12</b>	<b>10</b>	<b>1246 Die</b>
<b>0 - 18000</b>	<b>MA4E2502M-1246</b>	<b>-55</b>	<b>0.12</b>	<b>0.12</b>	<b>10</b>	<b>1246 Die</b>
<b>0 - 18000</b>	<b>MA4E2508L-1112</b>	<b>-55</b>	<b>0.24</b>	<b>0.24</b>	<b>10</b>	<b>1112 Die</b>
0 - 18000	MA4E2508M-1112	-55	0.24	0.24	10	1112 Die
0 - 18000	MA4E2514L-1116	-55	0.12	0.12	10	1116 Die
<b>0 - 18000</b>	<b>MA4E2514M-1116</b>	<b>-55</b>	<b>0.12</b>	<b>0.12</b>	<b>10</b>	<b>1116 Die</b>
<b>0 - 18000</b>	<b>MA4E2532L-1113</b>	<b>-55</b>	<b>0.16</b>	<b>0.16</b>	<b>10</b>	<b>1113 Die</b>
0 - 18000	MA4E2544L-1282	-53	0.22	0.22	10	1282 Die
0 - 35000	MA4E1317	-55	0.06	0.06	10	Flip Chip
0 - 35000	MA4E1318	-55	0.06	0.12	10	Flip Chip
0 - 35000	MA4E1319-1	-55	0.06	0.06	10	Flip Chip
0 - 35000	MA4E1319-2	-55	0.06	0.06	10	Flip Chip
<b>0 - 35000</b>	<b>MA4E2037</b>	<b>-55</b>	<b>0.06</b>	<b>0.06</b>	<b>10</b>	<b>Beam Lead Die</b>
<b>0 - 35000</b>	<b>MA4E2039</b>	<b>-55</b>	<b>0.06</b>	<b>0.12</b>	<b>10</b>	<b>Beam Lead Die</b>
<b>0 - 35000</b>	<b>MA4E2040</b>	<b>-55</b>	<b>0.06</b>	<b>0.06</b>	<b>10</b>	<b>Beam Lead Die</b>
<b>Packaged Products</b>						
0 - 4000	MA4E2054 Series	-55	0.15	0.3	1	SOD-323, SOT-323 (SC-70), SOT-23, SOT-143
0 - 4000	MA4E2200 Series	-55	0.15 @ .15 Volts	.25 @ .15 Volts	1	SOD-323, SOT-23, SOT-143
0 - 6000	MA4E1338 Series	-55	0.6	1	1	SOD-323, SOT-323 (SC-70), SOT-23, SOT-143
0 - 6000	MA4E1339 Series	-55	1	1.2	1	SOD-323, SOT-323 (SC-70), SOT-23, SOT-143
0 - 6000	MA4E1340 Series	-55	0.9	2	1	SOD-323, SOT-323 (SC-70), SOT-23, SOT-143
0 - 6000	MA40261	-55	0.15	0.3	3	186 Ceramic
0 - 8000	MA40048	-50	0.08	0.2	6	Ceramic
0 - 10000	M40045-137	-55	0.15	0.3	6	137 Ceramic
0 - 12000	MA4E185-276	-55	0.15	0.3	10	276 Ceramic
0 - 16000	MA40126-186	-55	0.13	0.25	10	186 Ceramic
0 - 18000	MA40115-276	-55	0.13	0.25	16	276 Ceramic
0 - 18000	MA40201-119	-55	0.13	0.25	10	119 Ceramic
0 - 18000	MA40215-120	-52	0.13	0.27	16	120 Ceramic
0 - 18000	MA40215-276	-52	0.13	0.27	16	276 Ceramic
0 - 18000	MA40264	—	0.13	0.25	10	186 Ceramic
0 - 18000	MA4E932B-186	-50	0.25	0.45	10	186 Ceramic
0 - 18000	MA4E2532M-1113	-53	0.16	0.16	10	1113
0.1 - 3	MA40143-213	-50	0.13	0.3	3	Ceramic
0.1 - 6	MA40261	-55	0.13	0.3	3	Ceramic
0.1 - 18	MA4E929A-119	-48	0.3	0	0	Ceramic
0.1 - 18	MA4E929B-119	-50	0.25	0	0	Ceramic

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## Mixing/Detector

Frequency (GHz)	Part Number	Tss (dBm)	Junction Capacitance (pf)	Total Capacitance (pf)	Test Frequency (GHz)	Package
<b>Packaged Products</b>						
2 - 8	MA40176	0	0.15	0.3	10	186 Ceramic
3 - 12	MA40147-213	-55	0.13	0.3	10	Ceramic
4 - 8	MA4E197-186	0	0.19	0.35	10	Ceramic
4 - 12	MA4E185-276	0	0.19	0.35	10	Ceramic
10 - 18000	2087-6001-00	45	—	12	—	Coax
12 - 26	MA40205-119	-52	0.13	0.3	16	Ceramic
12 - 18	MA4E190-276	-52	0.19	0.35	16	Ceramic
18 - 26	MA4E914-276	-52	0.13	0.3	24	Ceramic
18 - 26	MA4E920-276	-52	0.15	0.3	24	Ceramic
18 - 26	MA4E926-276	-52	0.19	0.35	24	Ceramic
840 - 2200	DT65-0006	-45	0	10	0	SO-14
840 - 2200	DT65-0009	-45	0	10	0	SO-14
1000 - 2000	2085-6013-00	52	—	18	—	Coax
1000 - 15000	2086-6000-00	-52	—	12	—	Coax
1000 - 18000	2085-6010-00	46	—	12	—	Coax
1000 - 18000	2086-6010-00	-52	—	12	—	Coax
2000 - 4000	2085-6014-00	52.5	—	18	—	Coax
4000 - 8000	2085-6015-00	51	—	12	—	Coax
8000 - 12400	2085-6016-00	51.5	—	12	—	Coax
12400 - 18000	2085-6017-00	-51	—	9	—	Coax

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## Switch/Attenuator

Frequency (MHz)	Part Number	Dynamic Resistance (ohms)	Total Capacitance (pf)	Package
<b>Die Products</b>				
0.5 - 4000	MA4P606	0.7	0.6 (CJ)	131 (Die), 1072, 30 (Pkg)
0.5 - 8000	MA4P604	1	0.3 (CJ)	131 (Die), 1072, 30 (Pkg)
<b>1 - 6000</b>	<b>MA4P505</b>	<b>0.45</b>	<b>0.35 (CJ)</b>	<b>131 (Die), 1072, 186 , 30 (Pkg)</b>
<b>1 - 10000</b>	<b>MA4P504</b>	<b>0.6</b>	<b>0.2 (CJ)</b>	<b>132 (Die), 1072, 186 , 30 (Pkg)</b>
20 - 18000	MA4P202	2.5	0.05 (CJ)	134 (Die), 30,186 (Pkg)
<b>20 - 18000</b>	<b>MA4P303</b>	<b>1.5</b>	<b>0.15 (CJ)</b>	<b>134 (Die), 30,186 (Pkg)</b>
30 - 1800	MA4P404	2	0.05(CJ)	134 (Die), 30,186 (Pkg)
30 - 18000	MA4P203	2	0.05 (CJ)	134 (Die), 30,186 (Pkg)
50 - 15000	MA4SPS552	2.5	0.06	Die
50 - 36000	MA4FCP200	2.8	0.02	Die (ODS1264)
50 - 40000	MA4AGBLP912	4	0.02	Die
100 - 18000	MA4FCP305	1.7	0.05	1269 Die
100 - 50000	MA4GP907	4.2	0.025	Flip Chip
<b>Packaged Products</b>				
<b>0.02 - 500</b>	<b>MA4PK2002</b>	<b>0.20</b>	<b>3.2</b>	<b>1048</b>
<b>0.02 - 500</b>	<b>MA4PK2004</b>	<b>0.20</b>	<b>3.2</b>	<b>1080</b>
<b>0.02 - 500</b>	<b>MA4PK3000-1073</b>	<b>0.25</b>	<b>4</b>	<b>1073 Ceramic</b>
<b>0.02 - 500</b>	<b>MA4PK3001-1084</b>	<b>0.25</b>	<b>4</b>	<b>1084 Ceramic</b>
<b>0.02 - 500</b>	<b>MA4PK3002</b>	<b>0.25</b>	<b>4</b>	<b>1074</b>
<b>0.02 - 500</b>	<b>MA4PK3003-1085</b>	<b>0.25</b>	<b>4</b>	<b>1085 Ceramic</b>
<b>0.02 - 500</b>	<b>MA4PK3004</b>	<b>0.25</b>	<b>4</b>	<b>1075</b>
<b>0.05 - 500</b>	<b>MA4P4301</b>	<b>1</b>	<b>2</b>	<b>1091, 401 Ceramic</b>
0.1 - 500	MA4P4001	0.5	2.2	1091, 401 Ceramic
<b>0.1 - 500</b>	<b>MA4P4006</b>	<b>0.5</b>	<b>2.2</b>	<b>1091, 401 Ceramic</b>
0.1 - 500	MA4P4306	1	2	1091, 401 Ceramic
<b>0.1 - 500</b>	<b>MA4P7006</b>	<b>0.8</b>	<b>0.7</b>	<b>1072, 401 Ceramic</b>
<b>0.1 - 500</b>	<b>MA4PK2000-1027</b>	<b>0.2</b>	<b>3.2</b>	<b>1027 Ceramic</b>
<b>0.1 - 500</b>	<b>MA4PK2001-1082</b>	<b>0.2</b>	<b>3.2</b>	<b>1082 Ceramic</b>
<b>0.1 - 500</b>	<b>MA4PK2003-1080</b>	<b>0.2</b>	<b>3.2</b>	<b>1080 Ceramic</b>
<b>0.5 - 200</b>	<b>MA4PH239</b>	<b>25</b>	<b>0.8</b>	<b>1072</b>
<b>0.5 - 1000</b>	<b>MA4P74521F-1072T</b>	<b>0.9</b>	<b>0.7</b>	<b>1072 Non-Magnetic</b>
<b>0.5 - 1000</b>	<b>MA4P74701F-1072T</b>	<b>0.8</b>	<b>0.7</b>	<b>1072 Non-Magnetic</b>
<b>1 - 100</b>	<b>MA4PH237</b>	<b>0.6</b>	<b>1.5</b>	<b>1072</b>
<b>1 - 300</b>	<b>MA4P1450-1091T</b>	<b>0.35</b>	<b>1.8</b>	<b>1091</b>
<b>1 - 500</b>	<b>MA4P7461F-1072T</b>	<b>0.5</b>	<b>1</b>	<b>1072 Non-Magnetic</b>
<b>1 - 500</b>	<b>MA4P7464F-1072T</b>	<b>0.6</b>	<b>0.8</b>	<b>1072 Non-Magnetic</b>
<b>1 - 1000</b>	<b>MA4P7001F-1072T</b>	<b>0.8</b>	<b>0.7</b>	<b>1072</b>
<b>1 - 1000</b>	<b>MA4P7002F-1072</b>	<b>0.8</b>	<b>0.7</b>	<b>1072</b>
<b>1 - 1000</b>	<b>MA4P7101F-1072T</b>	<b>0.5</b>	<b>1</b>	<b>1072</b>
<b>1 - 1000</b>	<b>MA4P7102F-1072T</b>	<b>0.5</b>	<b>1</b>	<b>1072</b>
<b>1 - 1000</b>	<b>MA4P7104F-1072T</b>	<b>0.5</b>	<b>1</b>	<b>1072</b>
<b>5 - 3000</b>	<b>MA4P274 Series</b>	<b>3</b>	<b>0.35</b>	<b>SC-79, SOD-323, SOT-323 (SC-70), SOT-23, SOT-143, SOT-25</b>
<b>5 - 3000</b>	<b>MA4P277 Series</b>	<b>6</b>	<b>0.35</b>	<b>SOD-323, SOT-323 (SC-70), SOT-23, SOT-143</b>

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## Switch/Attenuator



Frequency (MHz)	Part Number	Dynamic Resistance (ohms)	Total Capacitance (pf)	Package
<b>Packaged Products</b>				
<b>5 - 3000</b>	<b>MA4P278 Series</b>	<b>10</b>	<b>0.35</b>	<b>SOD-323, SOT-323 (SC-70), SOT-23, SOT-143</b>
<b>5 - 3000</b>	<b>MA4P290 Series</b>	<b>16</b>	<b>0.3</b>	<b>SOD-323, SOT-323 (SC-70), SOT-23, SOT-143</b>
<b>5 - 3000</b>	<b>MA4P275 Series</b>	<b>0.5</b>	<b>1</b>	<b>SC-79, SOD-323, SOT-323 (SC-70), SOT-23, SOT-143</b>
<b>5 - 3000</b>	<b>MA4P789 Series</b>	<b>1.5</b>	<b>0.35</b>	<b>SC-79, SOD-323, SOT-323 (SC-70), SOT-23, SOT-143</b>
<b>5 - 3000</b>	<b>MA4P282 Series</b>	<b>0.6</b>	<b>1.2</b>	<b>SC-79, SOD-323, SOT-323 (SC-70), SOT-23, SOT-143</b>
<b>50 - 200</b>	<b>MA4PH235</b>	<b>0.5</b>	<b>1.2</b>	<b>1072</b>
<b>50 - 500</b>	<b>MA4P4302F</b>	<b>1.0</b>	<b>2.0</b>	<b>401 and 1072</b>
50 - 4000	MA4SPS302	1	0.4	ODS-1247
50 - 7000	MA4BPS301	0.9	0.3	ODS-1244
50 - 11000	MA4BPS201	1	0.2	ODS-1244
50 - 18000	MA4BPS101	1.9	0.13	ODS-1244
50 - 20000	MA4SPS402	4.5	0.04	ODS-1253

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Green listings indicate RoHS Compliant parts

## Tuning

Capacitance (pf)	Part Number	Vb (V)	Gamma	Q (Min.) At 50 MHz	Package
<b>Die Products</b>					
0.04	MA46H144	22	0.5	3000	Flip Chip
<b>0.35</b>	<b>MA46H120</b>	<b>20</b>	<b>1</b>	<b>3000</b>	<b>Flip Chip</b>
0.5	MA46580	18	1.25	3000	Beam Lead
0.5	MA46585	18	1.25	3000	Beam Lead
<b>GaAs Packaged Products — Ceramic</b>					
0.4	MA46601	30	0.5	7500	Ceramic
0.5	MA46602	30	0.5	7000	Ceramic
1	MA46505	30	0.5	5700	Ceramic
3	MA46506	30	0.5	4500	Ceramic
<b>0.6</b>	<b>MA46H070</b>	<b>20</b>	<b>0.75</b>	<b>4500</b>	<b>Ceramic</b>
1	MA46H071	20	0.75	4500	Ceramic
3	MA46H072	20	0.75	3000	Ceramic
5	MA46H073	20	0.75	2200	Ceramic
1	MA46452	22	1	3000	Ceramic
1.5	MA46454	22	1	3000	Ceramic
3.3	MA46459	22	1	2000	Ceramic
4.7	MA46461	22	1	1500	Ceramic
0.5	MA46470	22	1.25	4000	Ceramic
0.6	MA46H200	22	1.25	3000	Ceramic
0.7	MA46471	22	1.25	4000	Ceramic
1	MA46472	22	1.25	3000	Ceramic
<b>1</b>	<b>MA46H201</b>	<b>22</b>	<b>1.25</b>	<b>3000</b>	<b>Ceramic</b>
1.2	MA46473	22	1.25	3000	Ceramic
1.4	MA46474	22	1.25	3000	Ceramic
1.8	MA46475	22	1.25	3000	Ceramic
2	MA46476	22	1.25	3000	Ceramic
2.2	MA46477	22	1.25	3000	Ceramic
<b>3</b>	<b>MA46H202</b>	<b>22</b>	<b>1.25</b>	<b>2000</b>	<b>Ceramic</b>
3.8	MA46480	22	1.25	2000	Ceramic
4.7	MA46481	22	1.25	1500	Ceramic
<b>5</b>	<b>MA46H203</b>	<b>22</b>	<b>1.25</b>	<b>1500</b>	<b>Ceramic</b>
6.8	MA46483	22	1.25	1500	Ceramic
10	MA46485	22	1.25	1500	Ceramic
10	MA46H204	22	1.25	1500	Ceramic
12	MA46H205	22	1.25	1500	Ceramic
0.5	MA46410	18	1.5	3000	Ceramic
0.6	MA46H500	18	1.5	2500	Ceramic
1	MA46413	18	1.5	2500	Ceramic
1	MA46H501	18	1.5	2500	Ceramic
1.8	MA46416	18	1.5	2500	Ceramic
3	MA46H502	18	1.5	1800	Ceramic
5	MA46H503	18	1.5	1200	Ceramic
10	MA46425	18	1.5	1200	Ceramic
10	MA46H504	18	1.5	1200	Ceramic

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## Tuning

Capacitance (pf)	Part Number	Vb (V)	Gamma	Q (Min.) At 50 MHz	Package
<b>Silicon Packaged Products — Ceramic</b>					
0.8	MA4ST551	22	0.6	650	Ceramic
1	MA4ST552	22	0.7	650	Ceramic
1.2	MA4ST553	22	0.7	600	Ceramic
1.5	MA4ST554	22	0.8	600	Ceramic
1.8	MA4ST555	22	0.8	550	Ceramic
3.3	MA4ST558	22	0.9	500	Ceramic
3.9	MA4ST559	22	0.9	450	Ceramic
5.6	MA4ST561	22	0.9	450	Ceramic
6.8	MA4ST562	22	0.9	400	Ceramic
<b>Packaged Products — Plastic</b>					
2.9	MA4ST250	12	1.1	450	Plastic
5 @ 2V	MA4ST230 Series	12	1.1	400	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
3.5 @ 2V	MA4ST240 Series	12	1.1	450	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
4 @ 1V	MA4ST2200 Series	12	1.5	120	SC-79, SOD-323, SOT-323 (SC-70)
18 @ 1V	MA4ST2300 Series	12	1.5	125	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
31.8 @ 1V	MA4ST2400 Series	12	1.5	90	SC-79, SOD-323, SOT-323 (SC-70)
46 @ 1V	MA4ST2500 Series	12	1.5	75	SC-79, SOD-323, SOT-323 (SC-70)
60.3 @ 1V	MA4ST2600 Series	12	1.5	60	SC-79, SOD-323, SOT-323 (SC-70)
4.7 @ 2V	MA4ST1230 Series	12	1.3	850	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
3.4 @ 2V	MA4ST1240 Series	12	1.3	1200	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
55 @ 0.5V	MA4ST1320 Series	12	1.1	200	SC-79, SOD-323, SOT-323 (SC-70)
25 @ 0.5V	MA4ST1330 Series	12	1.1	310	SC-79, SOD-323, SOT-323 (SC-70)
18 @ 0.5V	MA4ST1340 Series	12	1.1	365	SC-79, SOD-323, SOT-323 (SC-70)
11 @ 0.5V	MA4ST1350 Series	12	1.1	475	SC-79, SOD-323, SOT-323 (SC-70)
55.5 @ 0.5V	MA4ST320 Series	12	1.1	300	SOD-323, SOT-23
26 @ 0.5V	MA4ST330 Series	12	1.1	350	SOD-323, SOT-323 (SC-70), SOT-23
18 @ 0.5V	MA4ST340 Series	12	1.1	350	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
11.8 @ 0.5V	MA4ST350 Series	12	1.1	400	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
54.1 @ 2.5V	MA4ST079 Series	12	1.4	80	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
24.8 @ 2.5V	MA4ST080 Series	12	1.4	150	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
10.1 @ 2.5V	MA4ST081 Series	12	1.4	300	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
7.3 @ 2.5V	MA4ST082 Series	12	1.4	350	SC-79, SOD-323, SOT-323 (SC-70), SOT-23

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## Tuning

Capacitance (pf)	Part Number	Vb (V)	Gamma	Q (Min.) At 50 MHz	Package
<b>Packaged Products — Plastic</b>					
5 @ 2.5V	MA4ST083 Series	12	1.4	450	SC-79, SOD-323, SOT-323 (SC-70), SOT-23
10 @ 4V	MA4ST401 Series	22	1	250	SOT-23
12 @ 4V	MA4ST402 Series	22	1	250	SOT-23
15 @ 4V	MA4ST403 Series	22	1	250	SOT-23
18 @ 4V	MA4ST404 Series	22	1	175	SOT-23
22 @ 4V	MA4ST405 Series	22	1	175	SOT-23
27 @ 4V	MA4ST406 Series	22	1	150	SOT-23
33 @ 4V	MA4ST407 Series	22	1	150	SOT-23
39 @ 4V	MA4ST408 Series	22	1	150	SOT-23
47 @ 4V	MA4ST409 Series	22	1	150	SOT-23
4.7 @ 4V	MA45436 Series	30	0.5	1800	SOT-23
5.6 @ 4V	MA45437 Series	30	0.5	1700	SOT-23
6.8 @ 4V	MA45438 Series	30	0.5	1600	SOT-23
8.2 @ 4V	MA45439 Series	30	0.5	1500	SOT-23
10 @ 4V	MA45440 Series	30	0.5	1300	SOT-23
12 @ 4V	MA45441 Series	30	0.5	1200	SOT-23
27 @ 4V	MA45445 Series	30	0.5	900	SOT-23
33 @ 4V	MA45446 Series	30	0.5	750	SOT-23

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# Drivers & Frequency Doublers



## M/A-COM Drivers & Frequency Doublers

### Drivers

M/A-COM drivers are used extensively in wireless infrastructure base stations as well as military and defense applications. Drivers are typically used to translate TTL control voltages for attenuators and switches.

- Cordless and mobile phones
- Cellular base stations/wireless infrastructure
- Satellite radio
- GPS & DAB
- 2.4 GHz and 5.0 GHz WLAN
- VSAT
- CATV and broadband
- Bluetooth
- Fixed Wireless Access (FWA)
- Instrumentation
- Commercial and military radar
- Radar systems
- Test equipment

### Frequency Doublers

Frequency Doublers are a specialized class of broadband mixers and are used in a variety of communications applications.

- Surface mount, connectorized and drop-in packaging available for standard components
- Multi-octave input frequency coverage in the range of 5 MHz – 12 GHz



## Drivers

Vcc (V)	Part Number	Types	Rise Time/Fall Time (ns)	Vee (-V)	Package
<b>Packaged Products</b>					
5	DR65-0001	Quad	25	5	SO-16
5	DR65-0002	PIN	—	—	SOW-16
5	DR65-0008	Quad	25	—	SO-16
5	DR65-0109	Single	25	—	SO-8
<b>5</b>	<b>SWD-109</b>	<b>Single</b>	<b>10</b>	<b>-5</b>	<b>SO-8</b>
<b>5</b>	<b>SWD-119</b>	<b>Quad</b>	<b>500</b>	<b>5</b>	<b>SO-16</b>
15	LG1	PIN	30000	-15	TO-8, SMT, SMA
15	LG30	PIN	2000	-15	TO-8, SMT, SMA
20	MADRCC0002	Dual Pin Driver	5000	—	CSP-9

## Frequency Doublers

Input Frequency (MHz)	Part Number	VSWR (ratio)	Input Power (dBm)	Conversion Loss (dB)	Package
<b>Packaged Products</b>					
<b>5 - 2400</b>	<b>FD25</b>	<b>1.5:1</b>	<b>10</b>	<b>11.5</b>	<b>TO-8</b>
5 - 2400	FD25C	1.5:1	10	11.5	SMA
5 - 2400	FD25E	1.5:1	10	11.5	FP
5 - 2400	FD25H	1.5:1	23	12	TO-8
5 - 2400	FD25HC	1.5:1	23	12	SMA
<b>5 - 2400</b>	<b>SFD25</b>	<b>1.5:1</b>	<b>10</b>	<b>11.5</b>	<b>SMT</b>
<b>5 - 2400</b>	<b>SFD25H</b>	<b>1.5:1</b>	<b>23</b>	<b>12</b>	<b>SMT</b>
5 - 2400	FM-107	1.5:1	10	11	FP
5 - 2400	FM-108	1.5:1	10	11	TO-8
5 - 2400	FMS-109	1.5:1	10	11	SMT
10 - 750	FM-105	2.0:1	13	14.5	Relay Header
10 - 2400	CSFD25	2.0:1	10	11.5	SMT
10 - 2400	CSFD25H	2.0:1	23	12	SMT
50 - 3300	CSFD26	2.0:1	10	12.5	SMT
50 - 3300	FD26	2.0:1	10	13	TO-8
50 - 3300	FD26C	2.0:1	10	13	SMA
50 - 3300	FD26E	2.0:1	10	13	FP
50 - 3300	SFD26	2.0:1	10	13	SMT
75 - 1500	FM-104	2.5:1	13	12	FP
200 - 3000	FM-106	2.0:1	13	13	FP
<b>2000 - 9000</b>	<b>FD93</b>	<b>1.5:1</b>	<b>12</b>	<b>12</b>	<b>Hermetic Module</b>
2000 - 9000	FD93C	1.5:1	12	12	SMA
2000 - 9000	FD93H	1.5:1	19	12	Hermetic Module
2000 - 9000	FD93HC	1.5:1	19	12	SMA
3000 - 12000	FDZ5013	2.0:1	13	12	Hermetic Module
3000 - 12000	FDZ5013C	2.0:1	13	12	SMA

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# Limiters



## M/A-COM Limiters

M/A-COM offers a complete line of RF and Microwave limiters, limiting amplifiers and LNA/Limiters up to 18 GHz. M/A-COM limiters and limiting amplifiers use the latest thin-film hybrid manufacturing techniques to obtain the highest levels of performance, repeatability, reliability and cost-effectiveness. These products use the latest technology available in the industry for silicon and GaAs MMICs, silicon bipolar, and GaAs FET devices.





## Limiting Amplifiers

Frequency (MHz)	Part Number	Gain (dB)	NF (dB)	Output P1dB (dBm)	Max. Out Limiting (dBm)	VSWR In/Out	Package
<b>Packaged Products</b>							
10 - 1000	LA17	11.5	5.8	10	16	1.9	TO-8, SMT, SMA
<b>50 - 500</b>	<b>AL7</b>	<b>13</b>	<b>5</b>	<b>-1.5</b>	<b>0.5</b>	<b>1.5</b>	<b>TO-8, SMT, SMA</b>
<b>50 - 500</b>	<b>LA7</b>	<b>12.5</b>	<b>7</b>	<b>12</b>	<b>15.5</b>	<b>1.5</b>	<b>TO-8, SMT, SMA</b>
1000 - 4000	LA45	11.5	8	14	17	2	TO-8, SMT, SMA
1000 - 4000	LA45-1	14	7.5	17	20.5	2	TO-8, SMT, SMA

## LNA with Integrated Limiter

Freq (MHz)	Part Number	Gain (dB)	NF (dB)	Output P1dB (dBm)	Input IP3 (dBm)	Output IP3 (dBm)	Sat. P Out (dBm)	Package
<b>Die Products</b>								
8500 - 12000	MA01502D	14	2.7	20	11	25	—	Die
8500 - 12000	MA01503D	19	2.7	20	6	25	—	Die

## Packaged Limiters

Frequency (MHz)	Part Number	I.L. (dB)	Avg. Power (W)	Peak Power (W)	Leakage (mw)	Recovery Time (ns)	Package
<b>Packaged Products</b>							
1000 - 2000	2690-1001	0.7	1	100	75	100	Coax
1000 - 2000	2690-1003	0.9	3	1000	100	1000	Coax
2000 - 8000	2690-1005	1.1	1	100	50	100	Coax
2000 - 8000	2690-1007	1.3	3	1000	100	1000	Coax
2000 - 18000	2690-1013	2	1	100	50	100	Coax
2000 - 18000	2690-1014	2.2	2	500	75	250	Coax
2000 - 18000	2690-1015	2.3	3	1000	100	1000	Coax
8000 - 18000	2690-1009	1.8	1	100	50	100	Coax
8000 - 18000	2690-1011	2.3	3	1000	100	1000	Coax

## Signal Limiters

Frequency (MHz)	Part Number	I.L. (dB)	Limiting Level (dB)	Input VSWR	Output VSWR	Package
<b>Packaged Products</b>						
<b>5 - 3000</b>	<b>L1</b>	<b>3</b>	<b>4</b>	<b>1.9</b>	<b>2</b>	<b>TO-8, SMT, SMA</b>
50 - 4000	L42	4	4.5	1.9	2.3	TO-8, SMT, SMA

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Green listings indicate RoHS Compliant parts



## Aerospace/Defense Receiver Protectors

Band/Frequency	Part Number	Application/Type	Protection Capability	Drive	Insertion Loss	Leakage	Recovery Time
<b>Packaged Products</b>							
S-Band - 2.7-2.9 GHz	Contact Factory	Commercial land based radar, WG	4.0kW pk, 400W avg.	Quasi-passive	0.5 dB	40mW flat, 500mW spike	800 ns
C-Band - 5.2-5.8 GHz	Contact Factory	Military shipborne radar, WG	1.2kW pk, 30W avg.	Quasi-passive	0.5 dB	40mW flat, 250mW spike	400 ns
X-Band - 9.4-10.0 GHz	Contact Factory	Military shipborne radar, WG	2.0kW pk, 150W avg.	Quasi-active	1.0 dB	20mW flat, 50mW spike	200 ns
X-Band - 8.9-9.5 GHz	Contact Factory	Military airborne radar, WG	5.0kW pk, 150W avg.	Quasi-passive	1.0 dB	25mW mean, 150mW spike	800 ns
Ka-Band - 33.8-34.4 GHz	Contact Factory	Military airborne radar, WG	130W pk, 15W avg.	Active	1.3 dB	15mW flat, 15mW spike	150 ns
Ka-Band - 35.0-35.6 GHz	Contact Factory	Military airborne radar, WG	30W pk, 5W avg.	Quasi-passive	1.2 dB	30mW flat, 250mW pk	75 ns
S-Band - 2-4 GHz	MALIML0035	Phase array radar Drop-in	50W pk	Passive	0.42 dB	100mW flat	3 ns
X-Band - 9.1-9.5 GHz	MALIML0028	Military airborne radar, WG	500W pk, 35W avg.	Quasi-passive	1.0 dB	45mW flat, 450mW spike	1.0 us

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## M/A-COM Mixers & Modulators

Mixers and modulators are widely used in Aerospace and Defense, wireless and broadband communications applications. M/A-COM offers a variety of connectorized, flat pack, drop-in and surface mount packages with a broad range of operating frequency ranges and performance specifications for these markets.

### Mixers

- Double and triple balanced designs
- Variety of technologies
  - Hybrid assemblies using Schottky quad diodes
  - GaAs pHEMT
  - Si HMIC
- Products available in subsets of the frequency range
  - RF/LO: 50 KHz – 24 GHz
  - IF: DC – 8 GHz

### Modulators

- I/Q mod/demod versions available
- Products available in subsets of the 9 – 960 MHz frequency range
- Surface mount packaging for maximum performance

Mixers & Modulators • [www.macom.com/mixers](http://www.macom.com/mixers)



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## IQ Modulators

Frequency (RF/LO) (MHz)	Frequency (IF) (MHz)	Part Number	Carrier Suppression (dBc)	SSB Rejection (dBc)	5X IQ Suppression (dBc)	Package
<b>Packaged Products</b>						
149.95	0.001 - 0.63	MAMDES0012	0.5	40	62	SM-28
390 - 420	0.001 - 0.27	EKIN2-390X	35	35	55	SM-59
410 - 430	0.001 - 2	EKIN2-420X	30	35	55	SM-92
851 - 869	0.001 - 10	MAMDES0001	40	35	55	SM-82
921 - 960	0.001 - 0.27	EKIN2-960	27	34	55	SM-28
1070 - 1095	0.001 - 5	EKIN2-1082	35	35	50	SM-28

## Demodulators

Frequency (MHz)		Part Number	Conversion Loss (dB)		Amplitude Unbalance (dB)		Phase Unbalance (deg.)		Harmonic Suppression (dBc) 3X I/Q		Package
f <sub>l</sub>	f <sub>u</sub>		Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	
<b>Packaged Products</b>											
<b>9</b>	<b>11</b>	<b>EKIN2-10DTR</b>	<b>6</b>	<b>7</b>	<b>0.2</b>	<b>0.4</b>	<b>1.5</b>	<b>3</b>	<b>50</b>	<b>35</b>	<b>SM-28</b>
<b>70</b>	<b>70</b>	<b>EKIN2-70DTR</b>	<b>8</b>	<b>9</b>	<b>0.2</b>	<b>1</b>	<b>0.5</b>	<b>2</b>	<b>–</b>	<b>–</b>	<b>SM-28</b>

## Mixers: Space Products

Frequency (RF/LO) (MHz)	Frequency (IF) (MHz)	Part Number	LO Drive (dBm)	Conversion Loss (dB)	Isol. (LO/RF) (dB)	Package
<b>Packaged Products</b>						
0.5 - 500	0.5 - 500	MD20-0016-S	7	35	1	FP-2
5 - 1500	5 - 1500	MD20-0018-S	9	30	1	FP-2
10 - 3000	10 - 3000	MD20-0017-S	8	25	6	FP-2

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## Mixers

Frequency (RF/LO) (MHz)	Frequency (IF) (MHz)	Part Number	LO Drive (dBm)	Conversion Loss (dB)	Isol. (LO/RF) (dB)	Input P1dB (dBm)	Package
<b>Die Products</b>							
<b>20000 - 26000</b>	<b>0 - 6000</b>	<b>MA4EX2401</b>	<b>13</b>	<b>8</b>	<b>30</b>	<b>10.5</b>	<b>CHIP</b>
<b>Packaged Products</b>							
— - 960	820 - 915	MAMXES0072	7	7	40	5	SM-89
0.05 - 200	0 - 200	M6D-50	7	7	50	0	Relay Can
0.05 - 200	0 - 200	SM6D	7	7	45	—	SMT
0.2 - 200	0 - 200	MAC-50	7	6	25	1	TO-5-2
0.2 - 200	0.2 - 200	MDS-222	7	7.5	35	2	SF-1
0.4 - 500	0 - 500	M6V, SM6V	7	6.5	47	0	TO-5, SMT
<b>0.5 - 500</b>	<b>0 - 500</b>	<b>ELCM-1</b>	<b>7</b>	<b>6.2</b>	<b>27</b>	<b>1</b>	<b>SM-89</b>
0.5 - 500	0 - 500	ELCM-1H	17	7.2	35	14	SM-87
0.5 - 500	0 - 500	EMRS-1	7	6.2	27	1	SM-1
0.5 - 500	0 - 500	EMRS-1L	3	7.5	27	1	SM-1
0.5 - 500	0 - 500	M9BC	17	7	52	8	Relay Can
0.5 - 500	0 - 500	MAMXES0022	7	6.5	30	1	SM-134
0.5 - 500	0 - 500	MD-124	7	7	25	2	FP-2
1 - 400	0 - 400	M9E	27	7	40	20	Relay Can
1 - 500	0 - 500	MD-161	13	8	25	10	FP-2
1 - 1000	0 - 1000	ESMD-C1	7	7.5	45	1	SM-2
1 - 1000	0 - 1000	ESMD-C1MH	13	6.5	30	13	SM-2
1 - 1000	1 - 1000	MAMXES0028	7	7.5	30	1	SM-134
1 - 1500	1 - 1000	MD-160	13	9	25	—	RH-3
1 - 3400	1 - 2000	CSM4T	10	8	35	7	SMT
1 - 3400	1 - 2000	CSM4T17	17	8	35	14	SMT
<b>1 - 3400</b>	<b>1 - 2000</b>	<b>M4T, SM4T</b>	<b>10</b>	<b>8</b>	<b>35</b>	<b>6</b>	<b>FP, SMT</b>
1 - 3400	1 - 2000	M4TH, SM4TH	23	8	35	17	FP, SMT
<b>1 - 3400</b>	<b>1 - 2000</b>	<b>M8T, M8TC</b>	<b>10</b>	<b>7</b>	<b>38</b>	<b>7</b>	<b>TO-8, SMA</b>
<b>1 - 3400</b>	<b>1 - 2000</b>	<b>M8TH, M8THC</b>	<b>23</b>	<b>7.5</b>	<b>36</b>	<b>17</b>	<b>TO-8, SMA</b>
<b>1 - 3400</b>	<b>1 - 2000</b>	<b>SM4T17</b>	<b>17</b>	<b>8</b>	<b>35</b>	<b>13</b>	<b>SMT</b>
1 - 3500	1 - 3500	MD-189	23	8	35	20	FP-2
1 - 3500	1 - 3500	MDC-169	10	10	35	7	C-7
<b>1 - 3500</b>	<b>1 - 3500</b>	<b>MD-169</b>	<b>10</b>	<b>10</b>	<b>35</b>	<b>7</b>	<b>FP-2</b>
1 - 3500	5 - 1500	MDS-169	10	8	35	7	SF-1
1 - 3500	1 - 3500	MDS-189	23	8	35	20	SF-1
1 - 4000	5 - 1500	MD-179	7	10.5	35	5	FP-2
1 - 4000	5 - 1500	MDC-179	7	10.5	35	5	C-7
2 - 500	0 - 500	ELCM-1MH	13	6	30	9	SM-89
5 - 500	0 - 500	M6E-50	7	7.5	43	—	Relay Can
5 - 500	0 - 500	MAC-51	7	7	25	2	TO-5-2
5 - 500	0 - 500	MD-108	7	9	35	2.5	RH-3
5 - 750	0 - 500	SM6EH	20	6	45	13	SMT
5 - 750	0 - 500	M6EH	20	6	47	13	Relay Can
<b>5 - 1000</b>	<b>0 - 1000</b>	<b>ELCM-2</b>	<b>7</b>	<b>7</b>	<b>25</b>	<b>1</b>	<b>SM-89</b>
<b>5 - 1000</b>	<b>0 - 1000</b>	<b>MAMXES0115</b>	<b>7</b>	<b>7</b>	<b>25</b>	<b>1</b>	<b>SM-89</b>
5 - 1000	0 - 1000	ELCM-2LH	10	6.5	35	1	SM-89

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**tyco**

Electronics

## Mixers

Frequency (RF/LO) (MHz)	Frequency (IF) (MHz)	Part Number	LO Drive (dBm)	Conversion Loss (dB)	Isol. (LO/RF) (dB)	Input P1dB (dBm)	Package
<b>Packaged Products</b>							
<b>5 - 1000</b>	<b>0 - 1000</b>	<b>MD-113</b>	<b>7</b>	<b>8</b>	<b>25</b>	<b>0</b>	<b>FP-2</b>
5 - 1000	0 - 1000	EMRS-2	7	7	25	1	SM-1
5 - 1500	0 - 1000	ELCM-5	7	7.5	30	1	SM-87
5 - 1500	0 - 1000	EMRS-5	7	7.5	30	1	SM-1
5 - 1500	0 - 1000	EMRS-5MH	13	9	30	7.5	SM-1
<b>5 - 1500</b>	<b>0 - 1000</b>	<b>MD-158</b>	<b>7</b>	<b>9</b>	<b>20</b>	<b>1</b>	<b>FP-2</b>
<b>5 - 1900</b>	<b>5 - 1000</b>	<b>ELCM-11X</b>	<b>7</b>	<b>7.4</b>	<b>27</b>	<b>1</b>	<b>SM-87</b>
5 - 1900	5 - 1000	MAMXES0041	7	7.2	37	1	SM-134
<b>5 - 2500</b>	<b>5 - 1500</b>	<b>EMRS-25MH</b>	<b>13</b>	<b>7.3</b>	<b>30</b>	<b>9</b>	<b>SM-1</b>
<b>5 - 2500</b>	<b>5 - 1500</b>	<b>ELCM-25MH</b>	<b>13</b>	<b>6.5</b>	<b>30</b>	<b>13</b>	<b>SM-2</b>
10 - 500	10 - 500	MDS-223	7	7	40	2.5	SF-1
10 - 1000	0 - 600	M2E, SM2E, M2EC	20	8	33	—	TO-8, SMT, SMA
10 - 1200	0 - 1000	M6R	7	8	40	0	TO-5
<b>10 - 1500</b>	<b>0 - 800</b>	<b>M2A, M2AC</b>	<b>7</b>	<b>7.5</b>	<b>40</b>	<b>0</b>	<b>TO-8, SMA</b>
10 - 1500	0 - 1000	M4A, SM4A	7	7.5	35	0	FP, SMT
10 - 1500	0 - 1000	M4B, SM4B	13	7.5	35	7	FP, SMT
10 - 1500	0 - 600	M9H, M9HC	20	8	29	15	TO-8, SMA
10 - 1500	10 - 1500	MD-148	10	6	40	5	FP-2
10 - 1500	10 - 1500	MD-149	7	7.5	40	0	FP-2
10 - 1500	10 - 1500	MDS-148	10	6	40	5	SF-1
10 - 1500	10 - 1500	MDS-149	7	7.5	40	0	SF-1
10 - 1600	0 - 800	M2B, M2BC	13	7.5	43	7	TO-8, SMA
10 - 2000	10 - 800	ESMD-C15	10	6.5	30	5	SM-2
10 - 2400	1 - 1000	M2T, M2TC	13	8	40	11	TO-8, SMA
20 - 2500	20 - 600	ESMD-C3	7	9	30	1	SM-2
50 - 4800	50 - 3000	CSM5T	10	7.2	35	7	SMT
50 - 4800	50 - 3000	CSM5T17	17	7.8	33	14	SMT
50 - 4800	50 - 3000	CSM5TH	23	7	35	17	SMT
50 - 5000	50 - 3000	M5T	10	8	32	7	FP
<b>50 - 5000</b>	<b>50 - 3000</b>	<b>SM5T</b>	<b>10</b>	<b>7.5</b>	<b>32</b>	<b>7</b>	<b>SMT</b>
50 - 5000	50 - 3000	SM5T17	17	7.5	32	13	SMT
50 - 5000	50 - 3000	SM5TH	23	7.7	32	17	SMT
<b>80 - 2500</b>	<b>0 - 1000</b>	<b>ESMD-C50H</b>	<b>17</b>	<b>7.3</b>	<b>28.9</b>	<b>14</b>	<b>SM-2</b>
<b>80 - 2500</b>	<b>0 - 1000</b>	<b>MAMXES0117</b>	<b>17</b>	<b>7.3</b>	<b>29</b>	<b>14</b>	<b>SM-2</b>
<b>80 - 2500</b>	<b>0 - 1000</b>	<b>ESMD-C50L</b>	<b>10</b>	<b>7.7</b>	<b>30</b>	<b>5</b>	<b>SM-2</b>
<b>80 - 2500</b>	<b>0 - 1000</b>	<b>ESMD-C50M</b>	<b>13</b>	<b>7.4</b>	<b>29.1</b>	<b>8</b>	<b>SM-2</b>
80 - 2500	0 - 1000	MAMXES0042	13	7.5	32	8	SM-140
<b>300 - 5000</b>	<b>0.1 - 3000</b>	<b>MD-154</b>	<b>10</b>	<b>10</b>	<b>11</b>	<b>7</b>	<b>FP-3</b>
350 - 2000	0 - 400	EMRS-11F	7	6.8	25	1	SM-1
500 - 9000	10 - 2000	MDC-164	13	6.5	17	8	C-3
500 - 19000	30 - 5000	M87	13	9	24	8	Minpac, SMA
600 - 3000	0 - 1000	MD-156	7	9	20	0	FP-2
700 - 1000	0 - 400	MA4EX900L-1226	5	6.5	26	1	MSOP-8
700 - 1000	70	MAMXES0065	15	6.5	33	11	SM-1

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## Mixers

Frequency (RF/LO) (MHz)	Frequency (IF) (MHz)	Part Number	LO Drive (dBm)	Conversion Loss (dB)	Isol. (LO/RF) (dB)	Input P1dB (dBm)	Package
<b>Packaged Products</b>							
700 - 1000	10 - 150	MD22-0002-MUC	5	—	22	8	SM-41
700 - 1200	0 - 400	MA4EX950H-1225	15	6.6	27.5	8.3	SOT-25
700 - 1200	0 - 400	MA4EX950L-1225	5	6.5	28	1.5	SOT-25
700 - 1200	0 - 400	MA4EX950M-1225	10	7	26	4.3	SOT-25
<b>700 - 1400</b>	<b>0 - 400</b>	<b>EMD40-900L</b>	<b>17</b>	<b>9</b>	<b>28</b>	<b>7</b>	<b>SOIC-8</b>
700 - 2000	0 - 300	MD-614	7	8	25	0	FP-2
747 - 960	125 - 208	MAMXES0039	—	6.4	45	7	SM-2
800 - 1000	1 - 150	CSM11-13	13	7.5	35	9	SMT
<b>800 - 1000</b>	<b>0 - 100</b>	<b>MD54-0004</b>	<b>13</b>	<b>7.5</b>	<b>38</b>	<b>21</b>	<b>SOIC-8</b>
<b>800 - 1000</b>	<b>0 - 100</b>	<b>MAMXSS0011</b>	<b>13</b>	<b>7.5</b>	<b>38</b>	<b>21</b>	<b>SOIC-8</b>
<b>800 - 1000</b>	<b>0 - 200</b>	<b>MD54-0005</b>	<b>8</b>	<b>8</b>	<b>35</b>	<b>15</b>	<b>SOT-25</b>
<b>800 - 1000</b>	<b>0 - 200</b>	<b>MAMXSS0012</b>	<b>8</b>	<b>8</b>	<b>35</b>	<b>15</b>	<b>SOT-25</b>
<b>800 - 1000</b>	<b>170</b>	<b>MD57-0001</b>	<b>-5</b>	<b>9.3</b>	<b>28</b>	<b>14</b>	<b>SOT-26</b>
800 - 2400	0 - 1500	M4G, SM4G	7	7.5	32	0	FP, SMT
<b>800 - 3500</b>	<b>0 - 1500</b>	<b>M2G, M2GC</b>	<b>7</b>	<b>8</b>	<b>28</b>	<b>0</b>	<b>TO-8, SMA</b>
<b>810 - 1000</b>	<b>10 - 100</b>	<b>EFM-900</b>	<b>13</b>	<b>8.5</b>	<b>22</b>	<b>22</b>	<b>SM-108</b>
<b>850 - 1050</b>	<b>0 - 200</b>	<b>MA4EXP950H-1277</b>	<b>19</b>	<b>8.3</b>	<b>55</b>	<b>12.7</b>	<b>3mm PQFN 16</b>
<b>850 - 1050</b>	<b>0 - 400</b>	<b>MA4EXP950L-1277</b>	<b>7</b>	<b>8.5</b>	<b>62</b>	<b>4.3</b>	<b>3mm PQFN 16</b>
<b>850 - 1050</b>	<b>0 - 400</b>	<b>MA4EXP950M-1277</b>	<b>15</b>	<b>8.2</b>	<b>62</b>	<b>8.1</b>	<b>3mm PQFN 16</b>
870 - 1910	240 - 250	MAMXES0047	17	7	32	14	SM-1
880 - 915	150 - 170	EMRS-6HX1	17	5.5	30	13	SM-1
<b>880 - 915</b>	<b>150 - 170</b>	<b>MAMXES0120</b>	<b>17</b>	<b>5.5</b>	<b>30</b>	<b>17</b>	<b>SM-1</b>
880 - 915	150 - 170	MAMXES0071	17	7	25	14	SM-89
890 - 915	71	ESMD-C2HX2	17	7.5	25	14	SM-2
925 - 1880	45 - 95	EMRS-6X1	7	9.5	30	7	SM-1
<b>925 - 1880</b>	<b>45 - 95</b>	<b>MAMXES0118</b>	<b>7</b>	<b>9.5</b>	<b>35</b>	<b>7</b>	<b>SM-1</b>
925 - 960	45	MAMXES0004	7	8	45	-2	SM-125
1000 - 1700	320 - 520	MAMXES0073	10	7	32	15	SM-1
1000 - 6000	10 - 2000	MDC-163	0	7	10	-2	C-2
1000 - 7000	10 - 2000	MDC-162	13	6	15	8	C-2
1000 - 18000	0 - 500	DM1-18A	7	6	22	3	SMA
1000 - 18000	30 - 5000	M83, M83C	13	7.5	25	6	Minpac, SMA
1000 - 18000	1000 - 8000	M88, M88C	13	8	28	7	Minpac, SMA
1000 - 18000	1000 - 8000	M89, M89C	10	8	28	4	Minpac, SMA
1300 - 1900	0 - 500	MA4EX180H-1225	15	6.5	27	8.5	SOT-25
1300 - 1900	0 - 500	MA4EX180M-1225	13	5.5	17	5	SOT-25
1400 - 2000	0 - 400	EMD40-1800H	17	8	29	7	SOIC-8
1400 - 2000	0 - 400	EMD40-1800L	7	7.9	29	1	SOIC-8
<b>1400 - 2100</b>	<b>0 - 500</b>	<b>MD54-0006</b>	<b>8</b>	<b>8</b>	<b>28</b>	<b>12</b>	<b>SOT-25</b>
<b>1400 - 2100</b>	<b>0 - 500</b>	<b>MAMXSS0013</b>	<b>8</b>	<b>8</b>	<b>28</b>	<b>12</b>	<b>SOT-25</b>
1400 - 2500	0 - 400	EMD40-2400L	7	8	29	1	SOIC-8
1500 - 2200	160 - 390	CSM2N-17	17	7.3	43	14	SMT
1700 - 2000	0 - 200	MAMXES0008	—	9	15	21	SM-2
<b>1700 - 2000</b>	<b>0 - 200</b>	<b>MD54-0003</b>	<b>13</b>	<b>8.5</b>	<b>27</b>	<b>21</b>	<b>SOIC-8</b>

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## Mixers

Frequency (RF/LO) (MHz)	Frequency (IF) (MHz)	Part Number	LO Drive (dBm)	Conversion Loss (dB)	Isol. (LO/RF) (dB)	Input P1dB (dBm)	Package
<b>Packaged Products</b>							
<b>1700 - 2000</b>	<b>0 - 200</b>	<b>MAMXSS0010</b>	<b>13</b>	<b>8.5</b>	<b>27</b>	<b>21</b>	<b>SOIC-8</b>
1700 - 2300	0 - 500	MA4EX190H-1225	15	6.6	30	10.5	SOT-25
1700 - 2300	0 - 500	MA4EX190L-1225	5	6.1	25	2	SOT-25
1700 - 2500	0 - 500	MA4EX240H-1225	15	5.4	17	8.5	SOT-25
<b>1700 - 2500</b>	<b>0 - 400</b>	<b>MA4EX240L-1225</b>	<b>5</b>	<b>7</b>	<b>17.5</b>	<b>1</b>	<b>SOT-25</b>
1700 - 2500	0 - 500	MA4EX240M-1225	10	5.5	17	5.3	SOT-25
<b>1725 - 2125</b>	<b>0 - 400</b>	<b>MA4EXP190H-1277</b>	<b>19</b>	<b>8.4</b>	<b>48</b>	<b>11</b>	<b>3mm PQFN 16</b>
1800 - 2000	10 - 150	CSM12-13	13	6.7	30	8	SMT
1800 - 10000	0 - 1000	MY84, MY84C	9	6.5	39	4	Versapac, SMA
1850 - 1910	240.1 - 240.1	MAMXES0061	17	7.5	30	20	SMW-2
1850 - 1910	170 - 170	MAMXES0080	18	8	22	22	SM-2
<b>1850 - 1980</b>	<b>100 - 500</b>	<b>EFM-1900</b>	<b>13</b>	<b>7.5</b>	<b>19</b>	<b>24</b>	<b>SM-106</b>
<b>1900 - 2200</b>	<b>160 - 390</b>	<b>CSM2-17</b>	<b>17</b>	<b>8</b>	<b>40</b>	<b>14</b>	<b>SMT</b>
2000 - 4000	0 - 300	MDC-176	7	4.5	25	2.5	C-3
2000 - 10000	0 - 2000	MC4110	10	6.2	22	3	Open Carrier
<b>2000 - 18000</b>	<b>30 - 5000</b>	<b>MY82, MY82C</b>	<b>13</b>	<b>7.5</b>	<b>20</b>	<b>6</b>	<b>Versapac, SMA</b>
2000 - 18000	0 - 1000	MY85, MY85C	7	8	35	1	Versapac, SMA
<b>2000 - 18000</b>	<b>1000 - 8000</b>	<b>MY88, MY88C</b>	<b>13</b>	<b>8</b>	<b>28</b>	<b>7</b>	<b>Versapac, SMA</b>
2000 - 18000	1000 - 8000	MY89, MY89C	10	8	28	4	Versapac, SMA
2000 - 18000	30 - 4000	MY93, MY93C	10	8	29	4	Versapac, SMA
2000 - 18000	2000 - 18000	M50A, M50AC	10	8	26	5	Minpac, SMA
2000 - 18000	0 - 1000	M85, M85C	7	8	35	1	Minpac, SMA
2000 - 18000	2000 - 8000	M88H, M88HC	21	8	28	17	Minpac, SMA
2000 - 18000	30 - 4000	M93, M93C	10	8	29	4	Minpac, SMA
2000 - 18000	1000 - 8000	MZ8810, MZ8810C	10	7.5	25	6	Versapac, SMA
2000 - 18000	1000 - 8000	MZ8813, MZ8813C	13	7	25	8	Versapac, SMA
2000 - 18000	30 - 5000	MZ9310, MZ9310C	10	7.5	23	6	Versapac, SMA
2000 - 18000	30 - 5000	MZ9313, MZ9313C	13	7	24	8	Versapac, SMA
2000 - 24000	100 - 5000	MZ5210, MZ5210C	10	9	20	4	Versapac, SMA
2000 - 24000	1000 - 15000	M51, M51C	10	8	25	5	Minpac, SMA
2000 - 24000	100 - 5000	M52, M52C	10	8	22	5	Minpac, SMA
2000 - 24000	1000 - 15000	MY51, MY51C	10	8	25	5	Versapac, SMA
2000 - 24000	100 - 5000	MY52, MY52C	10	8	22	5	Versapac, SMA
2000 - 26000	100 - 6000	M53, M53C	10	8	22	5	Minpac, SMA
2000 - 26000	1000 - 15000	M50, M50C	10	8	26	5	Minpac, SMA
<b>2000 - 26000</b>	<b>1000 - 15000</b>	<b>MY50, MY50C</b>	<b>10</b>	<b>8</b>	<b>26</b>	<b>5</b>	<b>Versapac, SMA</b>
2000 - 26000	1000 - 12000	MY50A, MY50AC	10	8	26	5	Versapac, SMA
2100 - 2700	0 - 300	MD54-0007	13	8	25	18	SOT-25
<b>2110 - 2170</b>	<b>100 - 500</b>	<b>EFM-2100</b>	<b>13</b>	<b>8.5</b>	<b>16</b>	<b>22</b>	<b>SM-106</b>
2110 - 2170	134 - 246	MAMXES0050	7	10	22	1	SM-87
2400 - 6000	0 - 2000	M8H-7, M8HC-7	7	6	40	0	TO-8, SMA
2500 - 5500	0 - 1500	M63, M63C	9	5.5	40	2	Minpac, SMA
2500 - 6500	0 - 1500	M63H, M63HC	20	6	37	14	Minpac, SMA
2500 - 6500	0 - 1500	MY63H, MY63HC	20	7.5	26	14	Versapac, SMA

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## Mixers

Frequency (RF/LO) (MHz)	Frequency (IF) (MHz)	Part Number	LO Drive (dBm)	Conversion Loss (dB)	Isol. (LO/RF) (dB)	Input P1dB (dBm)	Package
<b>Packaged Products</b>							
3000 - 4000	0 - 1050	MA4EX370H-1225	15	6.8	27.5	8	SOT-25
3000 - 4000	0 - 1050	MA4EX370L-1225	5	7.5	14	2	SOT-25
3000 - 4000	0 - 1050	MA4EX370M-1225	10	6.3	27	5	SOT-25
3500 - 18000	0 - 3000	M86, M86C	7	7	34	3	Minpac, SMA
3700 - 4200	0 - 2000	M8H-3, M8HC-3	7	5	40	0	TO-8, SMA
4000 - 18000	0 - 3000	M80, M80C	7	6.5	34	3	Minipac, SMA
4000 - 20000	0 - 4000	MC4520	20	7	30	11	Open Carrier
4200 - 6000	0 - 2000	MA4EX600H-1225	15	5.8	28	6.9	SOT-25
4200 - 6000	0 - 2000	MA4EX600L-1225T	5	6.4	26	0.3	SOT-25
4500 - 9500	0 - 2000	M76, M76C	10	6	35	3	Minpac, SMA
4500 - 9500	0 - 2000	M76H, M76HC	20	7	35	15	Minpac, SMA
4500 - 9500	0 - 2000	MY76, MY76C	10	6	35	3	Versapac, SMA
4500 - 9500	0 - 2000	MY76H, MY76HC	20	7	35	15	Versapac, SMA
<b>4700 - 6000</b>	<b>0 - 1050</b>	<b>MA4EX580L-1225</b>	<b>5</b>	<b>7.6</b>	<b>23</b>	<b>1.5</b>	<b>SOT-25</b>
5000 - 18000	0 - 3000	M79, M79C	10	7	32	4	Minpac, SMA
5000 - 18000	0 - 3000	M79H, M79HC	20	7.5	33	15	Minpac, SMA
5600 - 6000	2300 - 2700	MA4EX585L-1225T	5	8.3	28	1.1	SOT-25
6000 - 14000	0 - 2000	M14A	7	6.5	32	2	SMA
6000 - 18000	0 - 3000	MZ7407, MZ7407C	7	6.5	34	3	Versapac, SMA
6000 - 18000	0 - 3000	MZ7410, MZ7410C	10	6.5	34	4	Versapac, SMA
6000 - 18000	0 - 3000	MZ7420, MZ7420C	20	7.5	33	15	Versapac, SMA
7000 - 18000	0 - 3000	M74, M74C	10	6.5	35	4	Minpac, SMA
8000 - 12500	0 - 2500	M77, M77C	10	5.5	35	4	Minpac, SMA
<b>8000 - 12500</b>	<b>0 - 2500</b>	<b>MY77, MY77C</b>	<b>10</b>	<b>5.5</b>	<b>35</b>	<b>4</b>	<b>Versapac, SMA</b>
9000 - 15000	0 - 2500	M67, M67C	10	6.5	35	4	Minpac, SMA

## Up/Down Converters

Frequency (MHz)	Part Number	Gain (dB)	NF (dB)	Input IP3 (dBm)	Carrier Suppression (dBc)	Idd (ma)	Package
<b>Packaged Products</b>							
824	MD59-0054	28	—	—	—	50	PQFN 4mm, 20 lead
869	MADCSM0001	10	8	10	—	10	PQFN, 4mm, 20 Lead
869	MADCSM0011	12.5	7.5	8	—	12	PQFN, 3mm, 12 Lead
1500	SA65-0003	8	1.5	25	—	45	QSOP-16
1710	MD59-0062	25	10	—	—	66	PQFN 4mm, 20 lead
1800	MADCSM0012	25	2.3	-9	—	25	PQFN, 3mm, 16 Lead
1800	MD59-0049	25	2.3	-8	—	26	PQFN 4mm, 20 lead

## Vector Modulators

Part Number	I.L. (dB)	Phase Shift (Degrees)	Amplitude Flatness (dB)	Dev. from Linear Phase (deg)	Return Loss (-dB)	Output IP3 (dBm)	Package
<b>Packaged Products</b>							
MAMDCC0002	11.5	360	0.1	0.2	17	41	CSP-6
MAMDCC0005	—	360	0.05	0.75	18	—	CSP-6
<b>SA90-0001</b>	<b>15</b>	<b>360</b>	<b>0.25</b>	<b>0.5</b>	<b>17</b>	<b>—</b>	<b>CSP-5</b>

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Electronics

## M/A-COM Passives

### M/A-COM Couplers

Couplers are used extensively in a wide range of Aerospace & Defense, wireless and wireline communications applications. M/A-COM offers a variety of connectorized and surface mount packages with a broad range of coupling values for these markets.

#### Hybrid Couplers

- Magic Tee (1800) and Quadrature (900) configurations
- Products available in subsets of the 2-3000 MHz frequency range
- Available as TO-cans, flatpacks, surface mount and connectorized

#### Directional Couplers

- Coupling values of 6-30 dB
- Products available in subsets of the 2 MHz to 18 GHz frequency range
- 75W products available for CATV, DTV and DBS applications

### Filters/Diplexers

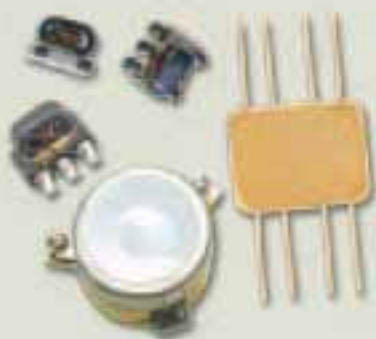
M/A-COM offers a variety of highpass, lowpass and diplex filter components and assemblies used in common wireless communications standards and CATV, DBS and DTV applications.

- 50W and 75W diplexers
- Low cost surface mount packaging
- Multi-chip and MMIC products
- Higher functionality assemblies available

### Circulators/Isolators

M/A-COM circulators and isolators are used in a variety of wireless communications and Aerospace & Defense applications.

- Single and dual junction devices
- Surface mount and drop-in packaging available for standard components





## M/A-COM Passives

### Splitters/Combiners

Splitters and combiners are used in a wide range of Aerospace & Defense, wireless and wireline communications applications. M/A-COM offers a variety of connectorized and surface mount packages for these markets.

- 50W and 75W devices
- Products available in subsets of the 400 KHz to 26 GHz frequency range
- 2, 3, 4, 5, 6 and 8 channel versions available

### Transformers

M/A-COM offers many standard transformers used for a variety of wireless, wireline and Aerospace & Defense communications applications.

- Available in a variety of surface mount, flat pack and connectorized packages
- Standard impedance ratios up to 4:1
- Balanced/unbalanced versions available
- 50W and 75W nominal impedance devices available

### Inductors

M/A-COM offers a line of high Q toroidal inductors useful for any application requiring RF or electromagnetic suppression.

- Standard devices are in the 53 to 273 nH inductance range
- Q of 90 minimum
- Surface mount wire wound toroid construction

### MNS Microwave Chip Capacitors

- Suitable for D.C. blocking and RF bias networks in a variety of control and filter circuits
- Capacitance-temperature coefficient provides < 200 ppm/C
- Insertion loss < 0.1 dB at 15 GHz
- Ideal for chip and wire/ribbon microwave high performance circuits



## Transformers

Frequency (MHz)	Part Number	Impedance (Ohms)	Impedance Ratio	I.L. (dB)	RF Power (W)	Package
<b>Packaged Products</b>						
0.05 - 3	ETC1-1T-2	50	1:1	2	0.25	SM-22
0.06 - 60	ET16-6T-SM1	50	16:1	3	0.25	SM-1
<b>0.3 - 200</b>	<b>ETC1-1T</b>	<b>50</b>	<b>1:1</b>	<b>1.5</b>	<b>0.25</b>	<b>SM-22</b>
0.3 - 200	MABACT0012	75	1:1	0.8	0.25	SM-22B
0.3 - 200	MABACT0036	75	1:1	0.5	0.25	SM-155
<b>0.3 - 200</b>	<b>MABAES0060</b>	<b>50</b>	<b>1:1</b>	<b>1.5</b>	<b>0.25</b>	<b>SM-22</b>
<b>0.5 - 1000</b>	<b>TP-103</b>	—	<b>4:1</b>	<b>0.6</b>	<b>3</b>	<b>FP</b>
0.5 - 1000	TP-105	—	1.4:1	0.5	1.5	FP
<b>0.5 - 1500</b>	<b>TP-101</b>	—	<b>1.6:1</b>	<b>0.5</b>	<b>3</b>	<b>FP</b>
<b>0.75 - 400</b>	<b>TP-104</b>	—	<b>2:1</b>	<b>0.55</b>	<b>0.4</b>	<b>FP</b>
<b>1 - 350</b>	<b>ETC4-1</b>	<b>50</b>	<b>4:1</b>	<b>3</b>	<b>0.25</b>	<b>SM-22</b>
1 - 350	MABACT0011	75	4:1	1.6	0.25	SM-22B
1 - 350	MABACT0035	75	4:1	1.1	0.25	SM-155
1 - 350	MABAES0008	75	4:1	3	0.25	SM-22
1 - 350	MABAES0040	50	2:1	2.6	0.25	SM-138
1 - 500	TP-102	—	4:1	0.75	1	FP
<b>1 - 650</b>	<b>MABAES0031</b>	<b>75</b>	<b>4:1</b>	<b>3</b>	<b>0.25</b>	<b>SM-138</b>
2 - 200	TP-75	—	1.5:1	0.25	10	SMA
<b>2 - 800</b>	<b>ETC4-1-2</b>	<b>50</b>	<b>4:1</b>	<b>3</b>	<b>0.25</b>	<b>SM-22</b>
<b>2 - 800</b>	<b>MABAES0061</b>	<b>50</b>	<b>4:1</b>	<b>3</b>	<b>0.25</b>	<b>SM-22</b>
2 - 800	MABAES0010	50	4:1	2.2	0.25	SM-119
2 - 800	MABAES0015	50	4:1	3.5	0.25	SM-52
2 - 1000	ETK4-2T	50	4:1	3	0.25	SM-22
4.5 - 1000	MABACT0010	75	1:1	0.8	0.25	SM-22B
4.5 - 2000	MABAES0018	75	1:1	3.5	0.25	SM-136
4.5 - 3000	MABACT0034	75	1:1	1.6	0.25	SM-155
<b>4.5 - 3000</b>	<b>ETC1-1-13</b>	<b>50</b>	<b>1:1</b>	<b>2</b>	<b>0.25</b>	<b>SM-22</b>
5 - 50	MABACT0022	75	1:1	0.3	1	SM-138
5 - 65	MABAES0017	75	2.56:1	0.8	0.25	SM-138
5 - 200	MABACT0018	75	1:4	0.9	0.05	SM-138-A
5 - 220	MABAES0022	75	9:1	0.8	0.25	SM-55
5 - 350	MABAES0025	75	1.5:1	1.4	0.25	SM-138
<b>5 - 1000</b>	<b>ETC1.5-4</b>	<b>75</b>	<b>1.5:1</b>	<b>1</b>	<b>0.25</b>	<b>SM-22</b>
5 - 1000	MABAES0032	75	1:1	1.03	0.25	SM-138
5 - 1000	MABAES0054	50	4:1	1.5	0.25	SM-138
5 - 3000	MABACT0039	75	1:1	0.8	0.25	SM-138
8 - 750	ETK4-1T	50	4:1	3	0.5	SM-22
10 - 1000	ETC1.5-7	50	1.5:1	1	0.25	SM-22
10 - 1500	TPX-75-4	—	1.5:1	0.25	2	SMA
20 - 1000	MABAES0034	50	4:1	2.2	0.25	SM-22
50 - 870	MABACT0017	75	4:1	1.5	1	SM-152
50 - 2150	MABACT0013	75	1:1	1.2	0.25	SM-152
<b>50 - 1200</b>	<b>MABAES0029</b>	<b>75</b>	<b>1:1</b>	<b>0.8</b>	<b>0.25</b>	<b>SM-138</b>
350 - 1125	TP-108	—	2.5:1	1	3	FP
<b>500 - 2500</b>	<b>ETC1.6-4-2-3</b>	<b>50</b>	<b>4:1</b>	<b>3</b>	<b>0.25</b>	<b>SM-22</b>
760 - 960	ETC1-1-6	50	1:1	2	0.25	SM-22
1710 - 1910	ETC1-1-10	50	1:1	2	0.5	SM-22



## Circulators/Isolators

Frequency (MHz)	Part Number	Junctions	Isol. (dB)	I.L. (dB)	Size	Package
<b>Packaged Products</b>						
869 - 894	FR11-0001	1	22	0.3	1	Drop In
869 - 894	FR12-0001	1	24	0.3	1	Drop In
869 - 894	FR31-0001	1	24	0.25	0.883	FR31
869 - 894	FR32-0001	1	24	0.25	0.883	Surface Mount
925 - 960	FR11-0002	1	22	0.3	1	Drop In
<b>925 - 960</b>	<b>FR12-0002</b>	<b>1</b>	<b>24</b>	<b>0.3</b>	<b>1</b>	<b>Drop In</b>
925 - 960	FR31-0002	1	24	0.25	0.883	Surface Mount
925 - 960	FR32-0002	1	24	0.25	0.883	Surface Mount
1805 - 1880	FR11-0003	1	22	0.3	1	Drop In
1805 - 1880	FR12-0003	1	24	0.3	1	Drop In
1805 - 1880	FR31-0003	1	24	0.25	0.883	Surface Mount
1805 - 1880	FR32-0003	1	24	0.25	0.883	Surface Mount
1805 - 1880	MAFRIN0164	1	20	0.3	1 x 1.25	Drop In
1805 - 1880	MAFRIN0203	1	20	0.35	0.6	Surface Mount
1930 - 1990	FR11-0004	1	22	0.3	1	Drop In
1930 - 1990	FR12-0004	1	24	0.3	1	Drop In
1930 - 1990	FR31-0004	1	24	0.25	0.883	Surface Mount
1930 - 1990	FR32-0004	1	24	0.25	0.883	Surface Mount
1930 - 1990	MAFRIN0165	1	20	0.3	1 x 1.25	Drop In
1930 - 1990	MAFRIN0204	1	20	0.35	0.6	Surface Mount
2110 - 2170	FR11-0009	1	22	0.3	1	Drop-In
2110 - 2170	FR12-0009	1	24	0.25	1	Drop-In
2110 - 2170	FR31-0009	1	24	0.25	0.883	FR31
2110 - 2170	FR32-0009	1	24	0.25	0.883	Surface Mount
2110 - 2170	MAFRIN0166	1	20	0.3	1 x 1.25	Drop In
2110 - 2170	MAFRIN0205	1	20	0.35	0.6	Surface Mount

## Power Splitters/Combiners: Space Products

Frequency (MHz)	Part Number	Channels	Isolation (dB)	Phase Balance (degrees)	Amplitude Balance (dB)	Package
<b>Packaged Products</b>						
0.4 - 400	PD10-0041-S	2	25	1	0.15	FP-2
10 - 500	PD10-0040-S	2	25	1	1.3	FP-2
10 - 2000	PD10-0042-S	2	23	6	0.4	FP-2
25 - 1000	PD20-0010-S	3	24	4	0.4	FP-3

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Green listings indicate RoHS Compliant parts

## Power Splitters/Combiners

Frequency (MHz)	Part Number	Impedance (Ohms)	Channels	Isolation (dB)	Phase Balance (degrees)	Amplitude Balance (dB)	Package
<b>Die Products</b>							
1000 - 5000	MAPDGM0001-DIE	50	2	15	—	—	DIE
<b>Packaged Products</b>							
0.2 - 300	DS-310	50	4	25	4	0.2	FP-5
0.4 - 400	DS-113	50	2	25	1	0.15	FP-2
0.4 - 400	DSS-113	50	2	25	1.5	0.15	SF-1
1 - 100	M3H-50	50	3	55	0.5	0.1	TO-5
1 - 100	MTH-50	50	2	30	1	0.1	TO-5-1
1 - 300	DS-117	50	3	20	4	0.25	FP-3
1 - 300	DS-308	50	3	20	4	0.25	C-8
2 - 200	THV-50	50	2	35	0.5	0.1	Conn
2 - 2000	DS-4-4	50	4	30	2	0.5	Conn
2 - 2000	H-8-4	50	2	35	1	0.05	Conn
3 - 700	DS-328	50	3	20	4	0.4	TO-8-2
5 - 100	MAPDCT0010	75	2	32	2.5	0.25	SM-150
5 - 120	ESSM-2-9-75	75	2	21	2	0.5	SM-53
5 - 120	ESSM-3-1-75	75	3	36	2	0.2	SM-4
5 - 500	DS-309	50	8	30	2	0.15	C-18
5 - 500	DS-318	50	2	18	2	0.2	RH-1
5 - 500	ESML-2-1	50	2	30	5	0.6	SM-24
5 - 750	ESML-2-7	50	2	27	3	1	SM-24
5 - 900	ESSM-2-6	50	2	28	3	0.3	SM-1
<b>5 - 1000</b>	<b>DS-327</b>	<b>50</b>	<b>2</b>	<b>20</b>	<b>3</b>	<b>0.2</b>	<b>FP-2</b>
5 - 1000	DSS-327	50	2	16	3	0.3	SF-1
<b>5 - 1000</b>	<b>ELPD-20-1</b>	<b>75</b>	<b>2</b>	<b>22</b>	<b>4</b>	<b>0.5</b>	<b>SM-93</b>
<b>5 - 1000</b>	<b>ESSMJ-2-10-75</b>	<b>75</b>	<b>2</b>	<b>29</b>	—	<b>0.3</b>	<b>SM-44</b>
<b>5 - 1000</b>	<b>ESSMJ-2-12-75</b>	<b>75</b>	<b>2</b>	<b>30</b>	—	<b>0.3</b>	<b>SM-44</b>
5 - 1000	ESSM-2-2-75	75	2	18	6	0.6	SM-55
5 - 1000	H-81-4	50	2	25	2	0.1	Conn
5 - 1000	MACPES0007	75	—	26	—	—	Surface Mount
5 - 1000	MAPDCT0002	75	2	32	1.5	0.4	SM-150
5 - 1000	MAPDCT0005	75	3	22	4	0.3	SM-4
5 - 2400	MAPDCT0012	75	2	18	2	0.2	SM-156
<b>10 - 500</b>	<b>DS-109</b>	<b>50</b>	<b>2</b>	<b>35</b>	<b>1</b>	<b>0.15</b>	<b>FP-2</b>
10 - 500	DS-112	50	4	25	5	0.2	FP-5
10 - 500	DS-312	50	4	25	2	0.2	C-14
<b>10 - 500</b>	<b>DS-319</b>	<b>50</b>	<b>2</b>	<b>25</b>	<b>1</b>	<b>0.2</b>	<b>TO-8-2</b>
10 - 500	DSS-333	50	2	25	2	0.15	SF-1
10 - 1000	T-1000	50	2	45	1	0.1	Conn
10 - 1000	ESML-2-4	50	2	15	5	0.7	SM-24
<b>10 - 2000</b>	<b>DS-409-4</b>	<b>50</b>	<b>4</b>	<b>30</b>	<b>2</b>	<b>0.1</b>	<b>Conn</b>
<b>10 - 2000</b>	<b>DSS-313</b>	<b>50</b>	<b>2</b>	<b>22</b>	<b>5</b>	<b>0.3</b>	<b>SF-1</b>
<b>10 - 2000</b>	<b>DS-313</b>	<b>50</b>	<b>2</b>	<b>23</b>	<b>4</b>	<b>0.3</b>	<b>FP-2</b>
10 - 2000	PD10-0042-S	50	2	23	6	0.4	FP-2
20 - 400	TU-50	50	2	40	1	0.1	Conn

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## Power Splitters/Combiners

Frequency (MHz)	Part Number	Impedance (Ohms)	Channels	Isolation (dB)	Phase Balance (degrees)	Amplitude Balance (dB)	Package
<b>Packaged Products</b>							
20 - 2000	DS-808-4	50	8	30	2	0.1	Conn
<b>25 - 1000</b>	<b>DS-323</b>	<b>50</b>	<b>3</b>	<b>24</b>	<b>4</b>	<b>0.4</b>	<b>FP-3</b>
<b>25 - 1000</b>	<b>DS-324</b>	<b>50</b>	<b>4</b>	<b>20</b>	<b>6</b>	<b>0.25</b>	<b>FP-5</b>
40 - 400	MTV-50	50	2	30	2	0.2	TO-5-1
400 - 820	MAPDCT0004	75	2	40	0.5	0.5	SM-55
40 - 870	ESSM-3-3-75	75	3	20	6	0.6	SM-4
40 - 1000	MACPES0045	75	2	14	3	0.35	SM-138
50 - 300	M3V-50	50	3	40	1	0.1	TO-5
750 - 1500	DS-331	50	2	10	6	0.2	TO-8
800 - 900	QH01-0016-G	50	2	17	1.5	0.3	SOT-26
820 - 980	ELPD-290	50	2	20	7	1.2	SM-88
824 - 896	DS55-0004	50	5	26	5	0.2	SOIC-16
<b>824 - 960</b>	<b>DS52-0001</b>	<b>50</b>	<b>2</b>	<b>23</b>	<b>0.5</b>	<b>0.05</b>	<b>SOIC-8</b>
824 - 960	DS52-0008	50	2	15	3	0.1	SOT-26
<b>824 - 960</b>	<b>DS53-0001</b>	<b>50</b>	<b>3</b>	<b>18</b>	<b>2</b>	<b>0.6</b>	<b>SOIC-8</b>
<b>824 - 960</b>	<b>DS54-0001</b>	<b>50</b>	<b>4</b>	<b>23</b>	<b>2</b>	<b>0.3</b>	<b>SOW-16</b>
824 - 960	DS54-0005	50	4	24	3	0.3	SOIC-8
824 - 960	DS56-0001	50	6	25	6	0.2	SOW-16
824 - 960	DS56-0005	50	6	25	4	0.5	SOIC-16
824 - 960	DS58-0001	50	8	30	5	0.4	SSOP-20
1000 - 2000	DS-332	50	2	10	6	0.2	TO-8
1000 - 18000	2089 Series	50	2	20	4	0.2	Conn
1000 - 18000	2090-6204-00	50	2	23	5	0.3	Conn
1000 - 26000	2090 Series	50	2	20	5	0.3	Conn
<b>1510 - 1660</b>	<b>DS52-0004</b>	<b>50</b>	<b>2</b>	<b>20</b>	<b>1</b>	<b>0.05</b>	<b>SOIC-8</b>
<b>1700 - 1900</b>	<b>DS52-0005</b>	<b>50</b>	<b>2</b>	<b>20</b>	<b>2</b>	<b>0.1</b>	<b>SOIC-8</b>
1700 - 2000	DS52-0014	50	2	20	1.5	0.2	SOT-26
<b>1700 - 2000</b>	<b>DS54-0002</b>	<b>50</b>	<b>4</b>	<b>18</b>	<b>4</b>	<b>0.1</b>	<b>SOW-16</b>
1700 - 2000	DS54-0006	50	4	23	5	0.8	SOIC-16
1700 - 2000	DS56-0002	50	6	22	8	0.5	SOW-16
1700 - 2000	DS56-0006	50	6	25	4	0.5	SOIC-16
<b>1850 - 1990</b>	<b>DS52-0002</b>	<b>50</b>	<b>2</b>	<b>21</b>	<b>1</b>	<b>0.05</b>	<b>SOIC-8</b>
1850 - 1990	DS53-0005	50	3	18	7	0.3	SOIC-8
1850 - 1990	DS55-0003	50	5	28	6	0.2	SOIC-16
2000 - 18000	2090-6205-00	50	2	23	5	0.3	Conn
<b>2200 - 2500</b>	<b>DS52-0007</b>	<b>50</b>	<b>2</b>	<b>22</b>	<b>2</b>	<b>0.1</b>	<b>SOT-25</b>
8000 - 18000	2090-6210-00	50	2	18	5	0.3	Conn

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Green listings indicate RoHS Compliant parts

## Couplers

Frequency (MHz)	Part Number	Impedance (Ohms)	Coupling (dB)	I.L. (dB)	Max. Power (W)	Isol. (dB)	Package
<b>Packaged Products</b>							
0.2 - 35	HH-108	50	3.5	0.1	25	40	SMA
0.5 - 400	CH-137	50	20	0.5	3	30	RH
0.5 - 400	CHS-137	50	20	0.5	3	30	SMT
1 - 1000	CH-132	50	20	0.7	5	20	SMA/BNC
2 - 32	CD-920-4	50	20	0.2	50	40	BNC
2 - 32	CH-130-4	50	30	0.1	500	30	SMA/BNC
2 - 200	HH-106	50	—	1	1	30	FD
2 - 200	HH-107	50	—	1	1	30	SMA/BNC
<b>2 - 2000</b>	<b>H-9</b>	<b>50</b>	<b>4</b>	<b>0.4</b>	<b>25</b>	<b>55</b>	<b>SMA/N</b>
5 - 40	EMDC-17-2-75	75	17	0.45	0.25	45	SM-22
5 - 120	MACPCT0017	75	17.3	—	—	45	Surface Mount
5 - 200	HH-109	50	—	1.4	0.5	30	FP
5 - 200	HHS-109	50	—	1.4	0.5	30	SMA
5 - 870	ELDC-10	75	10	1	0.25	21	SM-55
5 - 870	ELDC-12LI	75	12	1.8	0.25	28	SM-115
5 - 870	ELDC-16LI	75	16	0.8	0.25	31	SM-103
<b>5 - 870</b>	<b>ELDC-17LI</b>	<b>75</b>	<b>17</b>	<b>0.6</b>	<b>0.25</b>	<b>32</b>	<b>SM-103</b>
5 - 870	ELDC-8LI-1	75	8	1.8	0.25	18	SM-115
5 - 870	MACPES0004	75	10	1.3	0.25	28	SM-132
5 - 900	EMDC-8-1-75	75	8.5	1.6	0.25	22.5	SM-22
5 - 1000	ELDC-17	75	17	0.6	0.25	12	SM-55
5 - 1000	ELDC-14	75	14.3	1	0.25	34	SM-55
5 - 1000	ELDC-16	75	16	0.9	0.25	28	SM-55
5 - 1000	ELDC-12	75	11.8	1.2	0.25	12	SM-55
5 - 1000	CH-140	50	19.75	0.3	3	20	FP
<b>5 - 1000</b>	<b>ELDC-20</b>	<b>75</b>	<b>20</b>	<b>0.6</b>	<b>0.25</b>	<b>29</b>	<b>SM-55</b>
5 - 1000	ELDC-7	75	7	2.5	0.25	22	SM-55
5 - 1000	ELDC-8	75	8	1.5	0.25	21	SM-55
5 - 1000	ELDC-8X1	75	8	2.1	0.25	13.5	SM-55
5 - 1000	EMDC-10-1	50	10	1.2	0.25	17	SM-22
<b>5 - 1000</b>	<b>EMDC-10-1-75</b>	<b>75</b>	<b>10</b>	<b>1.5</b>	<b>0.25</b>	<b>12</b>	<b>SM-22</b>
5 - 1000	EMDC-13-1-75	75	13	1.5	0.25	13	SM-22
5 - 1000	EMDC-13-2	75	13	1.4	0.25	13	SM-22
5 - 1000	EMDC-17-1-75	75	17	0.9	0.25	24	SM-22
5 - 1000	EMDC-17-5-75	75	17	0.8	0.25	29	SM-127
5 - 1000	EMDC-17-8-75	75	17	0.8	0.25	29	SM-127
5 - 1000	H-1-4	50	4	1.2	7	45	SMA/BNC
5 - 1000	MACPES0034	75	10	1.6	0.25	23	SM-138
5 - 1000	MACPES0050	75	20	0.8	0.25	37	SM-55
6 - 600	EMDC-16-1	50	16	0.6	0.25	21	SM-22
7 - 14	JH-113	50	—	0.5	4	20	FP
7 - 14	JHS-113	50	—	0.5	4	20	SMA
10 - 500	CH-134	50	10.8	1.6	1	20	FP
10 - 500	CH-138	50	10.8	1.6	1	17	TO-8

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## Couplers

Frequency (MHz)	Part Number	Impedance (Ohms)	Coupling (dB)	I.L. (dB)	Max. Power (W)	Isol. (dB)	Package
<b>Packaged Products</b>							
<b>10 - 500</b>	<b>CHS-134</b>	<b>50</b>	<b>10.8</b>	<b>1.6</b>	<b>1</b>	<b>20</b>	<b>SMA</b>
10 - 500	HH-110	50	—	1.4	1	20	FP-2
10 - 500	HH-127	50	—	1.4	1	20	TO-8-2
10 - 500	HHS-110	50	—	1.4	1	20	SF-1
20 - 40	JH-114	50	3	0.5	5	20	FP
20 - 40	JH-133	50	3	0.5	5	20	TO-8
20 - 40	JHS-114	50	—	0.5	5	20	SMT
20 - 140	JH-10-4	50	1	0.6	4	20	SMA
20 - 200	JH-131	50	—	1	0.25	20	SMA
20 - 300	HH-105	50	—	1	0.5	28	TO-5
20 - 1000	EMDC-16-1-75	75	16	0.5	0.25	25	SM-55
20 - 2000	HH-128	50	—	3	0.5	15	FP
30 - 1000	DCG-10-4	50	11	1.5	5	30	SMA
<b>30 - 3000</b>	<b>H-183-4</b>	<b>50</b>	<b>4.5</b>	<b>0.7</b>	<b>5</b>	<b>35</b>	<b>SMA</b>
40 - 80	JH-115	50	3	0.5	5	20	FP
40 - 80	JHS-115	50	3	0.5	1	20	SMT
40 - 870	ELDC-10LI	75	10	1.3	0.25	24	SM-103
40 - 1000	EMDC-16-2-75	75	16	0.6	0.25	23	SM-55
40 - 1000	MACPES0028	75	7	1.9	0.25	22	SM-137
80 - 160	JH-119	50	3	0.75	4	20	FP
80 - 160	JHS-119	50	3	0.75	4	20	SMT
100 - 200	JH-121	50	—	0.75	4	20	FP
100 - 200	JHS-121	50	—	0.75	4	20	SMT
175 - 350	JH-136	50	—	0.5	4	20	FP
175 - 350	JHS-136	50	—	0.5	4	20	SMT
200 - 400	JHS-142	50	0	0.5	5	18	SMT
<b>250 - 500</b>	<b>JH-139</b>	<b>50</b>	<b>—</b>	<b>0.5</b>	<b>4</b>	<b>15</b>	<b>FP</b>
250 - 500	JHS-139	50	—	0.5	4	15	SMT
350 - 450	EMDC-20-1	50	20	0.25	0.25	38	SM-22
500 - 1000	2020-6600-06	50	6	0.15	50	31	Conn
500 - 1000	2020-6601-10	50	10	0.15	50	35	Conn
500 - 1000	2020-6602-20	50	20	0.15	50	45	Conn
500 - 1000	2020-6603-30	50	30	0.15	50	55	Conn
<b>500 - 1000</b>	<b>JH-140</b>	<b>50</b>	<b>—</b>	<b>0.3</b>	<b>25</b>	<b>18</b>	<b>FP</b>
500 - 18000	2025Series	50	20	0.3	50	22	Conn
500 - 18000	2026-6010-10	50	10	0.9	50	15	Conn
500 - 18000	2026-6012-20	50	20	0.9	50	15	Conn
500 - 18000	203XSeries	50	3	0.2	—	25	Conn
<b>824 - 960</b>	<b>CH20-0032-17G</b>	<b>50</b>	<b>17</b>	<b>0.3</b>	<b>2</b>	<b>32</b>	<b>SOIC-8</b>
1000 - 2000	2020-4015-06	50	6	0.2	50	31	Conn
1000 - 2000	2020-4015-10	50	10	0.2	50	35	Conn
1000 - 2000	2020-4015-20	50	20	0.2	50	45	Conn
1000 - 2000	2020-4015-30	50	30	0.2	50	55	Conn
1000 - 2000	2020-6604-06	50	6	0.2	50	31	Conn

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## Couplers

Frequency (MHz)	Part Number	Impedance (Ohms)	Coupling (dB)	I.L. (dB)	Max. Power (W)	Isol. (dB)	Package
<b>Packaged Products</b>							
1000 - 2000	2020-6605-10	50	10	0.2	50	35	Conn
1000 - 2000	2020-6606-20	50	20	0.2	50	45	Conn
1000 - 2000	2020-6607-30	50	30	0.2	50	55	Conn
1000 - 2000	JH-141	50	—	0.3	25	18	FP
1000 - 12400	2026-6001-10	50	10	0.35	50	18	Conn
1000 - 12400	2026-6003-20	50	20	0.35	50	17	Conn
1000 - 18000	2023Series	50	20	0.2	50	20	Conn
1000 - 18000	2026-6007-10	50	10	0.3	50	15	Conn
1000 - 18000	2026-6009-20	50	20	0.3	50	17	Conn
<b>1700 - 2000</b>	<b>CH20-0033-17G</b>	<b>50</b>	<b>17</b>	<b>0.3</b>	<b>2</b>	<b>34</b>	<b>SOIC-8</b>
2000 - 4000	2020-4016-06	50	6	0.2	50	28	Conn
2000 - 4000	2020-4016-10	50	10	0.2	50	32	Conn
2000 - 4000	2020-4016-20	50	20	0.2	50	42	Conn
2000 - 4000	2020-4016-30	50	30	0.2	50	52	Conn
2000 - 4000	2020-6608-06	50	6	0.2	50	28	Conn
2000 - 4000	2020-6609-10	50	10	0.2	50	32	Conn
2000 - 4000	2020-6610-20	50	20	0.2	50	42	Conn
2000 - 4000	2020-6611-30	50	30	0.2	50	52	Conn
2000 - 18000	2026-6004-10	50	10	30	50	15	Conn
2000 - 18000	2026-6006-20	50	20	30	50	18	Conn
2600 - 5200	2020-6612-06	50	6	0.25	50	26	Conn
2600 - 5200	2020-6613-10	50	10	0.25	50	30	Conn
2600 - 5200	2020-6614-20	50	20	0.25	50	40	Conn
2600 - 5200	2020-6615-30	50	30	0.25	50	50	Conn
4000 - 8000	2020-4017-06	50	6	0.25	50	28	Conn
4000 - 8000	2020-4017-10	50	10	0.25	50	30	Conn
4000 - 8000	2020-4017-20	50	20	0.25	50	40	Conn
4000 - 8000	2020-6616-06	50	6	0.25	50	28	Conn
4000 - 8000	2020-6617-10	50	10	0.25	50	30	Conn
4000 - 8000	2020-6618-20	50	20	0.25	50	40	Conn
4000 - 8000	2020-6619-30	50	30	0.25	50	50	Conn
7000 - 12400	2020-4018-06	50	6	0.4	50	21	Conn
7000 - 12400	2020-4018-10	50	10	0.4	50	30	Conn
7000 - 12400	2020-4018-20	50	20	0.3	50	38	Conn
7000 - 12400	2020-4018-30	50	30	0.3	50	47	Conn
7000 - 12400	2020-6620-06	50	6	0.4	50	21	Conn
7000 - 12400	2020-6621-10	50	10	0.4	50	30	Conn
7000 - 12400	2020-6622-20	50	20	0.3	50	38	Conn
7000 - 12400	2020-6623-30	50	30	0.3	50	47	Conn
7000 - 18000	2020-6624-06	50	6	0.6	50	21	Conn
7000 - 18000	2020-6625-10	50	10	0.4	50	30	Conn
7000 - 18000	2020-6626-20	50	20	0.5	50	35	Conn
7000 - 18000	2020-6627-30	50	30	0.5	50	45	Conn
12400 - 18000	2020-4114-20	50	20	0.5	50	35	Conn

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## Couplers

Frequency (MHz)	Part Number	Impedance (Ohms)	Coupling (dB)	I.L. (dB)	Max. Power (W)	Isol. (dB)	Package
<b>Packaged Products</b>							
12400 - 18000	2020-6628-06	50	6	0.6	50	21	Conn
12400 - 18000	2020-6629-10	50	10	0.4	50	30	Conn
12400 - 18000	2020-6630-20	50	20	0.5	50	35	Conn
12400 - 18000	2020-6631-30	50	30	0.5	50	42	Conn

## Couplers: Space Products

Frequency (MHz)	Part Number	Coupling (dB)	I.L. (dB)	Max. Power (W)	Isol. (dB)	Package
<b>Packaged Products</b>						
5 - 1000	CH35-0008-S	19.75	—	3	—	FP-2
10 - 500	CH35-0009-S	10.8	—	1	—	FP-2
500 - 1000	CH20-0059-S	10.8	—	1	—	FP-1
1500 - 2000	CH20-0058-S	10.8	—	1	—	FP-1

## Inductors

Self Resonant Frequency (MHz)	Part Number	Inductance (nH)	Qmin	Package
<b>Packaged Products</b>				
480	EIN8	273	90	SM-52
570	EIN9	246	90	SM-52
580	EIN11	165	90	SM-52
635	EIN12	193	90	SM-52
700	EIN10	180	90	SM-52
800	EIN14	146	90	SM-52
840	EIN15	123	90	SM-52
970	EIN13	97	90	SM-52
1440	EIN16	53	90	SM-52

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## Capacitors

Capacitance (pF)	Part Number	Types	Standoff Voltage (V)	Package
<b>Die Products</b>				
10	MA4M3010	Square Bonding Pad	200	Die
30	MA4M3030	Square Bonding Pad	200	Die
50	MA4M3050	Square Bonding Pad	200	Die
100	MA4M3100	Square Bonding Pad	50	Die
150	MA4M3150	Square Bonding Pad	50	Die

## CATV Diplexers

Frequency (GHz)	Part Number	Crossover Isol. (dB)	LP/HP Isol. (dB)	LP/HP RL (dB)	Common RL (dB)	Flatness (dB)	LP Ins Loss (dB)	HP Ins Loss (dB)	Package
<b>Packaged Products</b>									
5 - 30/46 - 1000 MHz	MAFLCT0032	—	47/20/46	18/18	18	—	0.7	0.75	SMT
5 - 40/52 - 870 MHz	MAFLCT0031	—	55/55	22/20	22/20	—	0.5	0.5	SMT-142
5 - 40/52 - 870 MHz	MAFLES0122	41	50	22/22	22	0.85	1	1	Vertical plug-in
5 - 42/53 - 870 MHz	MAFLES0118	34	55/50	24/24	24	0.85	1	1.1	Horizontal Plug-in
5 - 42/54 - 870 MHz	MAFLES0102	—	45/45	18/18	18	—	0.5	0.5	SMT
<b>5 - 42/54 - 900 MHz</b>	<b>MAFLES0083</b>	<b>15</b>	<b>50/50</b>	<b>21/21</b>	<b>21</b>	<b>0.5</b>	<b>1.2</b>	<b>1.1</b>	<b>SM-85</b>
5 - 55/70 - 870 MHz	MAFLCT0010	30	50/50	25	25	0.85	1	1	Horizontal Plug-in
5 - 65/85 - 870 MHz	MAFLCT0006	36	55/55	22/24	22	0.85	1	1.1	Horizontal Plug-in
5 - 65/88 - 1000 MHz	MAFLCT0027	—	50/50	20	20	—	0.5	0.5	SMT

## Filters/Diplexers

Frequency (MHz)	Part Number	Impedance (Ohms)	Passband (MHz)	I.L. (dB)	Rejection (dB)	Rejection BW (dB)	Package
<b>Packaged Products</b>							
0 - 1000	FL07-0001-G	50	1000	0.5	20	1700	SOIC-8
0 - 2000	FL07-0002-G	50	2000	0.6	20	2500	SOIC-8
<b>5 - 1000</b>	<b>EDF-2E</b>	<b>75</b>	<b>—</b>	<b>0.5</b>	<b>45</b>	<b>—</b>	<b>SM-85</b>
5 - 1000	MAFLCT0027	75	—	0.5	50	—	Surface Mount
<b>5 - 1000</b>	<b>MAFLES0083</b>	<b>75</b>	<b>42</b>	<b>1.1</b>	<b>45</b>	<b>54</b>	<b>SM-85</b>
800 - 3000	FL05-0001-G	50	2200	0.5	20	400	SOIC-8
<b>824 - 1990</b>	<b>DP52-0002</b>	<b>50</b>	<b>140</b>	<b>0.5</b>	<b>18</b>	<b>—</b>	<b>SOIC-8</b>
<b>824 - 1990</b>	<b>DP52-0005</b>	<b>50</b>	<b>140</b>	<b>0.7</b>	<b>19</b>	<b>—</b>	<b>SOT-26</b>
825 - 1990	MA4DP918-1277	50	280	0.9	28	270	3mm sq MLP
843 - 925	CDMA 900	50	27	0.5	105	0	Conn
1700 - 3000	FL05-0002-G	50	2300	0.5	20	1000	SOIC-8

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## M/A-COM Signal Generation

M/A-COM offers a variety of synthesizers and Voltage Controlled Oscillators (VCOs) used to generate frequency references in Aerospace and Defense, as well as commercial wireless communications applications.

### Synthesizers

- Incorporates PLL circuitry with VCO
- Standard components available to cover wireless interfaces from 109 – 1854 MHz
- Variety of different step sizes available
- Available in hybrid, surface mount packaging

### VCOs

- Low phase noise performance
- Highly linear tuning capability
- Standard components available to cover wireless interfaces from 920 – 2300 MHz

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## Synthesizers

Frequency (MHz)	Part Number	Step Size (KHz)	Phase Noise (dBc/Hz)	Spurious Output (dBc)	Switching Time (ms)	Pout (dBm)	Package
<b>Packaged Products</b>							
805 - 844	MASYVS0061-0825	200	-150	-98	—	5	LSM6
1046 - 1085	MASYVS0061-1066	200	-157	-97	0	5	LSM6
1780 - 1860	MASYVS0006-1810	50	-140	-75	20	0	LSM6
1920 - 2000	MASYVS0006-1950	100	-138	-90	50	0	LSM6
2240 - 2310	MASYVS0006-2275	200	-133	-85	30	1.5	LSM6

## VCOs

Frequency (MHz)	Part Number	Phase Noise (dBc/Hz)	Tuning Sensitivity (MHz/V)	Pout (dBm)	Vcc (V)	Package
<b>Packaged Products</b>						
920 - 960	MLO80100-00940	-130	14	0	5	LSM1
1000 - 1040	MLO80100-01020	-127	17	0	5	LSM1
1435 - 1525	FE55-0005	—	60	10	3	4mm PQFN-16
1600 - 1700	MLO81100-01650	-120	44	0	5	LSM1
1650 - 1750	MLO81100-01700	-120	37	0	5	LSM1
1770 - 1850	MLO81100-01810	-120	31	0	5	LSM1
1800 - 1900	MLO81100-01850	-118	50	0	5	LSM1
1930 - 1990	MLO81100-01960	-118	31	0	5	LSM1
2200 - 2300	FE55-0006	—	60	10	3	4mm PQFN-16
2200 - 2300	MA05836	—	—	27	3	Board

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## Aerospace/Defense VCOs

Frequency (MHz)	Part Number	Tuning Voltage	Phase Noise +25°C (dBc/Hz)	Power dBm (min)	Harmonics dBc (max)	Temp Range (Operating)	Power Supply V & mA	Package
<b>Packaged Products</b>								
400 - 600	MAVCML0059	0V - 15V	-110 @ 100KHz	10 (min)	-10	-30 to 70°C	+15V, 50mA	TO8
420 - 550	MAVCML0025	2V - 12V	-100 @ 100 KHz	12+/-1.0	-10	-45 to 85°C	8V/50mA	TO8
600 - 860	MAVCML0026	1.5V - 13V	-110 @ 100KHz	13+/-1.5	-15	-35 to 85°C	15V/50mA	TO8
600 - 860	MAVCML0027	1V - 13V	-113 @ 100KHz	3.5+/-3.5	-15	-35 to 85°C	5V/18mA	SMT TO8
700 - 900	MAVCML0028	0V - 30V	-105 @ 100KHz	13+/-3.0	-13	-35 to 100°C	12V/50mA	TO8
1100 - 2100	MAVCML0030	0V - 20v	-98 @ 100kHz	10+/-2.5	-10	-40 to 85°C	15V/100mA	TO8
1200 - 1300	MAVCML0029	2V - 12V	-100 @ 100 KHz	10+/-1.0	-10	-40 to 85°C	8V/40mA	TO8
1550 - 2250	MAVCML0031	3V - 20V	-100 @ 100KHz	9+/-2.5	-10	-40 to 100°C	12V/50mA	TO8
2850 - 4350	MAVCML0032	0V - 15V	-100 @ 100KHz	10+/-2.0	-10	-40 to 85°C	15V/125mA	SMT TO8
3020 - 4410	MAVCML0033	4V - 11V	-98 @ 100kHz	12+/-1.0	-13	-40 to 85°C	15V/120mA	SMT TO8
4200 - 4400	MAVCML0034	0V - 10V	-100 @ 100KHz	7.5+/-2.5	-12	-40 to 85°C	9V/50mA	LCC1
4230 - 4370	MAVCML0035	1V - 7V	-100 @ 100KHz	15+/-2.5	-25	-55 to 75°C	10V/130mA	SMT TO8
4510 - 5740	MAVCML0036	1V - 13V	-98 @ 100KHz	12.5+/-1.5	-15	-35 to 85°C	5V/100mA	SMT TO8
5010 - 5110	MAVCML0038	2V - 10V	-105 @ 100KHz	3.5+/-1.5	-15	-45 to 85°C	12V/150mA	VCO B
5700 - 5900	MAVCML0058	0V - 15V	-100 @ 100KHz	10 (min)	-12	-55 to 85°C	+15V, 50mA	TO8
5790 - 5820	MAVCML0039	0.5V - 4.5V	-100 @ 100KHz	10+/-2.0	-12	-45 to 85°C	15V/100mA	TO8
8570 - 9530	MAVCML0057	0V - 15V	-100 @ 100KHz	13 (min)	-15	-55 to 85°C	+15V, 135 mA -15V, 75mA	Co-ax SMA VCO B
8650 - 9250	MAVCML0041	5V -15V	-95 @ 100KHz	19.5+/-1.5	-30	-40 to 85°C	+/-15V 175/125mA	Custom Co-ax SMA
8650 - 9250	MAVCML0042	5V - 15V	-80 @ 100KHz	7.5+/-1.5	-30	-40 to 85°C	+/-15V 85/55mA	Custom Co-ax SMA
8950 - 9550	MAVCML0040	-10 to +10	-85 @ 100KHz	16+/-2.0	-20	-55 to 85°C	-24V/250 mA	VCO B
9000 - 9500	MAVCML0056	-10V / 10v	-87 @ 100KHz	16+/-2	-20	0 to +70°C	-15V, 150 mA	Co-ax SMA VCO A
10000 - 11000	MAVCML0043	2V - 12V	-65 @ 100KHz	16+/-2	-30	-45 to 85°C	8V/110mA	Leadless
13000 - 17000	MAVCML0044	2V - 12V	-63 @ 100KHz	13.5+/-1.5	-30	-45 to 85°C	8V/125mA	Leadless
14600 - 15100	MAVCML0055	3.5V - 10.0V	-92 @ 100 KHz	8+/-2	-30	-42 to 75°C	+7V, 100mA -12V, 175 mA	Custom Co-ax SMA

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Electronics

# Switches



## M/A-COM Switches

M/A-COM IC based switches are used extensively in commercial and military electronics applications. The switches range from DC to 20 GHz designed specifically for voice and data applications.

- Cordless and mobile phones
- Cellular base stations
- Satellite radio
- GPS & DAB
- 2.4 GHz and 5.0 GHz WLAN
- VSAT
- CATV and broadband
- Bluetooth
- RFID
- Fixed Wireless Access (FWA)
- Instrumentation
- Commercial and military radar
- Aerospace and Defense products

M/A-COM diode based HMIC silicon series-shunt PIN diode switches provide outstanding frequency performance from 50 MHz to 26.5 GHz. M/A-COM AlGaAs series-shunt PIN diode switches provide remarkable frequency performance from 50 MHz to 50 GHz.

- HMIC & AlGaAs switches are suitable for microwave and millimeter wave control circuits for military, instrumentation, and optoelectronic applications.
- HMIC switches: 1.0 dB Loss & 35 dB isolation at 18 GHz
- AlGaAs switches: 0.7 dB Loss & 35 dB isolation at 50 GHz



## Delay Lines

Frequency (MHz)	Part Number	I.L. (dB)	Input IP3 (dBm)	Min. Delay (ps)	Return Loss (dB)	Package
<b>Die Products</b>						
<b>1000</b>	<b>MAPCGM0001-DIE</b>	<b>5.5</b>	<b>37</b>	–	<b>15</b>	<b>Die</b>
<b>2300</b>	<b>MAPCGM0003-DIE</b>	<b>5.7</b>	<b>36</b>	–	<b>14</b>	<b>Die</b>
<b>3500</b>	<b>MAPCGM0002-DIE</b>	<b>6</b>	<b>32</b>	–	<b>12</b>	<b>Die</b>
<b>6000</b>	<b>MAPCGM0004-DIE</b>	<b>12</b>	<b>30</b>	–	<b>12</b>	<b>Die</b>
7000	MAPCGM0005-DIE	10	35	–	10	Die
<b>Packaged Products</b>						
<b>1000</b>	<b>MAPCGM0001</b>	<b>5.5</b>	<b>37</b>	–	<b>15</b>	<b>6mm PQFN</b>
1800	MAMUSM0008	5	–	50	20	BGA
<b>2300</b>	<b>MAPCGM0003</b>	<b>6</b>	<b>36</b>	–	<b>15</b>	<b>6mm PQFN</b>
3500	MAPCGM0002	6.5	–	–	–	6mm PQFN
7000 - 12000	MAPCGM0005	10	35	–	10	5x5mm PQFN

## Switches with Drivers

Frequency (MHz)	Part Number	Type	I.L. (dB)	Isol. (dB)	Switching Speed (ns)	Input IP3 (dBm)	Package
<b>Die Products</b>							
<b>0 - 8000</b>	<b>MASWGM0003-DIE</b>	<b>SPDT</b>	<b>2</b>	<b>45</b>	<b>15</b>	<b>35</b>	<b>Die</b>
<b>0 - 14000</b>	<b>MASWGM0001-DIE</b>	<b>SPDT</b>	<b>3</b>	<b>40</b>	–	<b>33</b>	<b>Die</b>
<b>Packaged Products</b>							
10 - 3000	SW65-0014	SPST	2.2	35	50	46	SOW-24
2000 - 500	S10	SPST	2	55	5000	25	TO-8
2000 - 500	S11	SPST	2	55	20000	25	TO-8
0 - 3000	SW-313	SPDT	1.2	35	18	46	CR-9
<b>10 - 3000</b>	<b>SW65-0114</b>	<b>SPDT</b>	<b>2.2</b>	<b>33</b>	<b>50</b>	<b>46</b>	<b>SOW-24</b>
0 - 3000	SW65-0313	SP2T	1.45	21	50	46	SO-16
0 - 3000	SW65-0214	SP3T	2.3	30	50	46	SOW-24
0 - 3000	SW-314	SP4T	1.8	30	25	46	CR-14
0 - 3000	SW65-0314	SP4T	2.3	25	50	46	SOW-24
<b>0 - 3000</b>	<b>SW65-0440</b>	<b>SP4T</b>	<b>2.5</b>	<b>25</b>	<b>50</b>	<b>46</b>	<b>QSOP-24</b>

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## Aerospace/Defense Switches

Frequency (MHz)	Part Number	Type	I.L. (dB)	Isol. (dB)	R.L. (DB)	Switching Speed (ns)	I/P Power (mw)	Power Supply V & mA	Dimensions	
<b>Packaged Products</b>										
0.01 - 6 6 - 9 9 - 10	MASWML0002 (MMIC)	SPST	2.7 4 4	50 50 45	12 9.5 9.5	50	100	+5 -5 50 50	13.5x6.2x3.3 1110135-4	
8 - 10	MASWML0004	SPST	1.9	60	12	50	100	+5 -15 50 10	16.4x13.5x5.6	
6 - 18	MASWML0005	SPST	2.3	60	10	15	500	+5 -15 50 10	38.1x33.6x10.3 30801-4	
0.5 - 18	MASWML0010 (N/R & Miniature)	SPDT	3.3	55	9.5	30	100	+5 -15 70 50	22x16x8 1110775-4	
0.5 - 2 2 - 8 8 - 18	MASWML0011 (MMIC & MMIC)	SPDT	1.8 2.5 2.9	50 40 32	11.7 9.5 9.5	15	100	+5 -12 25 25	22x16x8 1110506-4	
0.5 - 18	MASWML0012 (Miniature)	SPDT	2.6	55	9.5	30	100	+5 -15 70 50	22x16x8 1110634-4	
6.4 - 18	MASWML0013	SPDT	3.85	52	7.4	10 micro Second	2w (CW)	+5 -15 250 50	40.7x40.7x12.9	
6 - 12	MASWML0014 (Miniature)	SPDT	2.2	60	11	30	100	+5 -15 70 50	22x16x8 1110775-4	
10.5 - 13.5	MASWML0017	SPDT	1.7	65	11.7	30	3 W (CW)	-5 to -15 0.5 50	22x16x8 1104260	
0.5 - 2.0	MASWML0021	SP3T	1	50	14	250	100	5 -15 100 50	38.1x38.1x19.1 A4-30805-4	
0.5 - 18.0	MASWML0022	SP3T	3.4	60	9.5	250	500	5 -15 100 50	38.1x39.1x19.1 A4-30805-4	
0.5 - 18.0	MASWML0023 (Miniature)	SP3T	2.9	60	9.5	30	100	5 -15 100 50	24.5x24.5x6.1	
0.5 - 17.0 17.0 - 18.0	MASWML0024 (Miniature)	SP4T	3.6 4	50	9	30	100	5 -5 120 50	24.5x24.5x6.1 1110770-4	
0.5 - 18.0	MASWML0025	SP4T	4.5	60	9.5	500 (100 typ)	100	5 -15 180 100	38.1x32.1x19.1	
0.5 - 18.0	MASWML0026 (Miniature)	SP5T	3.3	60	9.5	30	100	5 -15 140 50	21.5x24.5x6.1 1110771-4	
0.5 - 2.0	MASWML0027	SP5T	1.8	65	15.5	30	100	5 -15 140 50	38.1x38.1x19.1	
0.85 - 18.0	MASWML0028	SP6T	4	55	9.5	900	100	5 -5.2V 190 50	38.1x38.1x19.1	

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Frequency (MHz)	Part Number	Type	I.L. (dB)	Isol. (dB)	Input IP3 (dBm)	Package
<b>Die Products</b>						
0 - 2000	MASW2040	DPDT	0.4	20	46	Die
0 - 6000	MASW6020G	SPST	0.9	64	46	Die
<b>50 - 70000</b>	<b>MA4AGSW1</b>	<b>SPST</b>	<b>0.35</b>	<b>46</b>	<b>40</b>	<b>Die</b>
<b>200 - 26500</b>	<b>MA4SW110</b>	<b>SPST</b>	<b>0.3</b>	<b>68</b>	<b>75</b>	<b>Die</b>
<b>10000 - 70000</b>	<b>MA4AGSW1A</b>	<b>SPST</b>	<b>1.2</b>	<b>30</b>	<b>40</b>	<b>Die</b>
<b>0 - 3000</b>	<b>MASW2000</b>	<b>SPDT</b>	<b>0.6</b>	<b>35</b>	<b>53</b>	<b>Die</b>
0 - 5000	MASWGM0005-DIE	SPDT	1.6	58	—	Die
0 - 4000	MASW4030G	SPDT	0.8	50	46	Die
0 - 6000	MASW6010	SPDT	0.5	45	46	DIE
<b>0 - 6000</b>	<b>MASW6010G</b>	<b>SPDT</b>	<b>0.5</b>	<b>45</b>	<b>46</b>	<b>Die</b>
0 - 8000	MASW8000	SPDT	0.8	37	52	Die
<b>0 - 20000</b>	<b>MASW20000</b>	<b>SPDT</b>	<b>1.7</b>	<b>50</b>	<b>43</b>	<b>Die</b>
<b>50 - 70000</b>	<b>MA4AGSW2</b>	<b>SPDT</b>	<b>0.5</b>	<b>33</b>	<b>40</b>	<b>Die</b>
<b>200 - 26500</b>	<b>MA4SW210</b>	<b>SPDT</b>	<b>0.4</b>	<b>70</b>	<b>75</b>	<b>Die</b>
<b>2000 - 20000</b>	<b>MASWGM0002-DIE</b>	<b>SPDT</b>	<b>4</b>	<b>40</b>	<b>29</b>	<b>Die</b>
74000 - 80000	MA4GC6773	SPDT	1.2	24	40	Die
<b>2000 - 26000</b>	<b>MA4SW210B-1</b>	<b>SP2T with Bias</b>	<b>1.5</b>	<b>40</b>	<b>60</b>	<b>Die</b>
<b>50 - 70000</b>	<b>MA4AGSW3</b>	<b>SP3T</b>	<b>0.8</b>	<b>31</b>	<b>40</b>	<b>Die</b>
<b>200 - 26500</b>	<b>MA4SW310</b>	<b>SP3T</b>	<b>0.45</b>	<b>65</b>	<b>75</b>	<b>Die</b>
500 - 2500	MASWSS0100	SP3T	0.5	20	69	Die
<b>2000 - 26000</b>	<b>MA4SW310B-1</b>	<b>SP3T with Bias</b>	<b>1.7</b>	<b>40</b>	<b>60</b>	<b>Die</b>
74000 - 80000	MA4GC6774	SP3T	1.4	24	40	Die
<b>50 - 26000</b>	<b>MA4SW410</b>	<b>SP4T</b>	<b>0.6</b>	<b>48</b>	<b>55</b>	<b>Die</b>
<b>50 - 70000</b>	<b>MA4AGSW4</b>	<b>SP4T</b>	<b>1</b>	<b>32</b>	<b>40</b>	<b>Die</b>
<b>2000 - 18000</b>	<b>MA4SW410B-1</b>	<b>SP4T with Bias</b>	<b>1.4</b>	<b>35</b>	<b>60</b>	<b>Die</b>
22000 - 26000	MA4SW424B-1	SP4T	3	40	40	Die
50 - 26000	MA4SW510	SP5T	0.9	38	60	Die
<b>50 - 50000</b>	<b>MA4AGSW5</b>	<b>SP5T</b>	<b>1.7</b>	<b>35</b>	<b>40</b>	<b>Die</b>
<b>2000 - 18000</b>	<b>MA4SW510B-1</b>	<b>SP5T</b>	<b>1.8</b>	<b>35</b>	<b>60</b>	<b>Die</b>
75000 - 79000	MA4GC6772	SP5T	4	24	35	Die
<b>500 - 2500</b>	<b>MASWSS0091</b>	<b>SP6T</b>	<b>0.5</b>	<b>38</b>	<b>70</b>	<b>Die</b>
<b>2000 - 18000</b>	<b>MA4SW610B-1</b>	<b>SP6T</b>	<b>1.9</b>	<b>35</b>	<b>60</b>	<b>Die</b>
<b>50 - 50000</b>	<b>MA4AGSW8-1</b>	<b>SP8T</b>	<b>2</b>	<b>30</b>	<b>35</b>	<b>Die</b>
<b>50 - 50000</b>	<b>MA4AGSW8-2</b>	<b>SP8T</b>	<b>1.9</b>	<b>34</b>	<b>35</b>	<b>Die</b>
1800 - 4000	MA4BN1840-1	Bias Network	0.15	35		Die
1800 - 4000	MA4BN1840-2	Bias Network	0.25	35		Die
<b>Packaged Products</b>						
<b>0 - 4000</b>	<b>MASWSS0184</b>	<b>DPDT</b>	<b>0.7</b>	<b>36</b>	<b>61.5</b>	<b>3 mm PQFN 12</b>
<b>0 - 6000</b>	<b>MASWSS0094</b>	<b>DPDT</b>	<b>0.8</b>	<b>43</b>	<b>45</b>	<b>3 mm PQFN 12</b>
<b>0 - 6000</b>	<b>MASWSS0107</b>	<b>DPDT</b>	<b>0.95</b>	<b>22</b>	<b>52</b>	<b>3 mm PQFN 12</b>
<b>0 - 6000</b>	<b>MASWSS0129</b>	<b>DPDT</b>	<b>0.75</b>	<b>30</b>	<b>49</b>	<b>3 mm PQFN 12</b>
500 - 3000	MASWSS0040	DPDT	0.8	19	55	3 mm PQFN 12
<b>500 - 6000</b>	<b>MASWSS0130</b>	<b>DPDT</b>	<b>0.6</b>	<b>25</b>	<b>55</b>	<b>3 mm PQFN 12</b>
<b>4500 - 6000</b>	<b>MASWSS0039</b>	<b>DPDT</b>	<b>0.8</b>	<b>30</b>	<b>52</b>	<b>3 mm PQFN 12</b>

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<b>Packaged Products</b>						
<b>4500 - 6000</b>	<b>MASWSS0175</b>	<b>DPDT</b>	<b>0.8</b>	<b>30</b>	<b>52</b>	<b>3 mm PQFN 12</b>
<b>0 - 2500</b>	<b>SW-259</b>	<b>SPST</b>	<b>1</b>	<b>70</b>	<b>46</b>	<b>SOIC-8</b>
<b>0 - 2500</b>	<b>MASWSS0162</b>	<b>SPST</b>	<b>1</b>	<b>70</b>	<b>46</b>	<b>SOIC-8</b>
0 - 3000	SW-214	SPST	1.3	25	46	FP-13
<b>0 - 3000</b>	<b>SW-311</b>	<b>SPST</b>	<b>1.3</b>	<b>27</b>	<b>46</b>	<b>CR-9</b>
0 - 3000	SW05-0311	SPST	1.3	25	46	CR-9
0 - 4000	SW90-0001	SPST	0.85	25	48	CSP-1
5 - 1000	MASWSS0067	SPST	0.62	54	52	3 mm PQFN 12
5 - 1000	MASWSS0102	SPST	0.9	63	55	4 mm PQFN 20
5 - 3000	SW-215	SPST	2.9	27	46	DI-1
5 - 3000	SW-216	SPST	2.9	27	46	DI-1
5 - 4000	SW-231	SPST	2.8	22	46	FP-16
10 - 1000	SW-121	SPST	1	40	30	DI-1
50 - 6000	MA4AGSW900-287T	SPST	0.8	33	40	SOT-23
200 - 4000	MA4SW101-287T	SPST	0.4	38	75	SOT-23
<b>300 - 4000</b>	<b>MASWSS0148</b>	<b>SPST</b>	<b>55</b>	<b>1.6</b>	<b>49</b>	<b>3 mm PQFN 12</b>
500 - 2000	SW-393	SPST	1.6	42	39	SOIC-8
0 - 2000	SW-224	SPDT	0.8	30	46	TO-5-3
0 - 2000	SW-225	SPDT	0.8	30	46	FP-13
0 - 2000	SW-229	SPDT	1.5	25	46	C-34
<b>0 - 2000</b>	<b>SW-395</b>	<b>SPDT</b>	<b>0.5</b>	<b>20</b>	<b>45</b>	<b>SOT-26</b>
<b>0 - 2000</b>	<b>MASWSS0179</b>	<b>SPDT</b>	<b>0.5</b>	<b>20</b>	<b>45</b>	<b>SOT-26</b>
<b>0 - 2500</b>	<b>SW-239</b>	<b>SPDT</b>	<b>0.6</b>	<b>70</b>	<b>46</b>	<b>SOIC-8</b>
<b>0 - 2500</b>	<b>MASWSS0157</b>	<b>SPDT</b>	<b>0.6</b>	<b>70</b>	<b>46</b>	<b>SOIC-8</b>
<b>0 - 2500</b>	<b>SW-277</b>	<b>SPDT</b>	<b>0.5</b>	<b>40</b>	<b>61</b>	<b>SOIC-8</b>
<b>0 - 2500</b>	<b>MASWSS0161</b>	<b>SPDT</b>	<b>0.5</b>	<b>40</b>	<b>61</b>	<b>SOIC-8</b>
<b>0 - 2500</b>	<b>SW-338</b>	<b>SPDT</b>	<b>0.5</b>	<b>33</b>	<b>46</b>	<b>SOIC-8</b>
<b>0 - 2500</b>	<b>MASWSS0180</b>	<b>SPDT</b>	<b>0.5</b>	<b>33</b>	<b>46</b>	<b>SOIC-8</b>
<b>0 - 3000</b>	<b>MASWSS0115</b>	<b>SPDT</b>	<b>0.3</b>	<b>22</b>	<b>46</b>	<b>SC-70 (SOT-363)</b>
<b>0 - 3000</b>	<b>MASWSS0005</b>	<b>SPDT</b>	<b>0.3</b>	<b>21</b>	<b>45</b>	<b>SOT-26</b>
<b>0 - 3000</b>	<b>MASWSS0136</b>	<b>SPDT</b>	<b>27</b>	<b>0.4</b>	<b>51.5</b>	<b>SC-70 (SOT-363)</b>
<b>0 - 3000</b>	<b>MASWSS0176</b>	<b>SPDT</b>	<b>0.3</b>	<b>21</b>	<b>45</b>	<b>SOT-26</b>
0 - 3000	MASWSS0006	SPDT	0.4	20	60	SOT-26
<b>0 - 3000</b>	<b>MASWSS0181</b>	<b>SPDT</b>	<b>0.4</b>	<b>20</b>	<b>60</b>	<b>SOT-26</b>
0 - 3000	MASWSS0029	SPDT	0.4	24.5	60	SOT-26
0 - 3000	SW-110	SPDT	1.1	18	46	CR-9
<b>0 - 3000</b>	<b>SW-219</b>	<b>SPDT</b>	<b>0.5</b>	<b>60</b>	<b>46</b>	<b>CR-3</b>
<b>0 - 3000</b>	<b>SW-276</b>	<b>SPDT</b>	<b>0.4</b>	<b>70</b>	<b>61</b>	<b>CR-2</b>
0 - 3000	SW-312	SPDT	1.2	30	48	CR-9
<b>0 - 3000</b>	<b>SW-313</b>	<b>SPDT</b>	<b>1.2</b>	<b>35</b>	<b>46</b>	<b>CR-9</b>
<b>0 - 3000</b>	<b>SW-425</b>	<b>SPDT</b>	<b>0.4</b>	<b>20</b>	<b>53</b>	<b>SOT-26</b>
<b>0 - 3000</b>	<b>MASWSS0143</b>	<b>SPDT</b>	<b>0.4</b>	<b>20</b>	<b>53</b>	<b>SOT-26</b>
<b>0 - 3000</b>	<b>SW-437</b>	<b>SPDT</b>	<b>0.3</b>	<b>21</b>	<b>55</b>	<b>SC-70 (SOT-363)</b>
0 - 3000	SW-437	SPDT	0.3	21	55	SC-70 (SOT-363)

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## General

Frequency (MHz)	Part Number	Type	I.L. (dB)	Isol. (dB)	Input IP3 (dBm)	Package
<b>Packaged Products</b>						
<b>0 - 3000</b>	<b>MASWSS0166</b>	<b>SPDT</b>	<b>0.3</b>	<b>21</b>	<b>55</b>	<b>SC-70 (SOT-363)</b>
<b>0 - 3000</b>	<b>SW-438</b>	<b>SPDT</b>	<b>0.7</b>	<b>25</b>	<b>55</b>	<b>SC-70 (SOT-363)</b>
<b>0 - 3000</b>	<b>MASWSS0151</b>	<b>SPDT</b>	<b>0.7</b>	<b>25</b>	<b>55</b>	<b>SC-70 (SOT-363)</b>
<b>0 - 3000</b>	<b>SW-439</b>	<b>SPDT</b>	<b>0.8</b>	<b>50</b>	<b>85</b>	<b>MSOP-10</b>
<b>0 - 3000</b>	<b>MASWSS0169</b>	<b>SPDT</b>	<b>0.8</b>	<b>50</b>	<b>85</b>	<b>MSOP-10</b>
0 - 3000	SW-442	SPDT	28	0.8	50	SOT-26
<b>0 - 3000</b>	<b>SW-456</b>	<b>SPDT</b>	<b>0.3</b>	<b>22</b>	<b>52</b>	<b>SC-70 (SOT-363)</b>
0 - 3000	SW10-0312	SPDT	1.2	27	46	CR-9
0 - 3000	SW10-0313	SPDT	1.2	35	46	CR-9
<b>0 - 4000</b>	<b>SW-226</b>	<b>SPDT</b>	<b>1.5</b>	<b>25</b>	<b>46</b>	<b>CR-2</b>
<b>0 - 4000</b>	<b>SW-227</b>	<b>SPDT</b>	<b>1.4</b>	<b>35</b>	<b>46</b>	<b>CR-2</b>
<b>0 - 4000</b>	<b>SW-228</b>	<b>SPDT</b>	<b>1</b>	<b>22</b>	<b>46</b>	<b>CR-2</b>
0 - 4000	SW90-0002	SPDT	1.8	30	46	CSP-1
<b>0 - 6000</b>	<b>MASWSS0070</b>	<b>SPDT</b>	<b>0.55</b>	<b>24</b>	<b>52</b>	<b>3 mm PQFN 12</b>
<b>0 - 6000</b>	<b>MASWSS0093</b>	<b>SPDT</b>	<b>0.85</b>	<b>28</b>	<b>53</b>	<b>3 mm PQFN 12</b>
5 - 1000	MASWSS0068	SPDT	0.6	51	52	4 mm PQFN 20
5 - 1000	MASWSS0069	SPDT	0.74	57	53	4 mm PQFN 20
5 - 1000	MASWSS0103	SPDT	1	63	52	4 mm PQFN 20
5 - 2000	SW-233	SPDT	1.5	40	46	FP-16
5 - 2000	SW-236	SPDT	1.5	40	46	FP-16
5 - 3000	SW-205	SPDT	2.6	35	46	DI-1
5 - 3000	SW-206	SPDT	2.6	35	46	DI-1
5 - 3000	SW-207	SPDT	2.3	18	46	DI-1
10 - 3000	SW-137	SPDT	1.6	32	46	DI-1
20 - 1500	SW-162	SPDT	1.5	40	25	DI-1
20 - 2000	SW-112	SPDT	2.2	50	30	DI-1
<b>50 - 3000</b>	<b>SW-485</b>	<b>SPDT</b>	<b>0.25</b>	<b>23</b>	<b>46</b>	<b>SC-70 (SOT-363)</b>
200 - 2000	SW-132	SPDT	1	35	30	DI-1
200 - 3000	MA4SW201-1061T	SPDT	0.45	34	75	SOIC-8
<b>500 - 3000</b>	<b>MASWSS0167</b>	<b>SPDT</b>	<b>25</b>	<b>0.3</b>	<b>48</b>	<b>1.2x1.5 mm PQFN 6</b>
500 - 2000	SW-394	SPDT	1.5	35	47	SOIC-8
<b>500 - 3000</b>	<b>MASWSS0024</b>	<b>SPDT</b>	<b>0.7</b>	<b>50</b>	<b>43</b>	<b>MSOP-8-EP</b>
<b>500 - 3000</b>	<b>MASWSS0178</b>	<b>SPDT</b>	<b>0.7</b>	<b>50</b>	<b>43</b>	<b>MSOP-8-EP</b>
<b>500 - 3000</b>	<b>SW-475</b>	<b>SPDT</b>	<b>0.6</b>	<b>54</b>	<b>43</b>	<b>4 mm PQFN 16</b>
<b>500 - 3000</b>	<b>MASWSS0121</b>	<b>SPDT</b>	<b>0.6</b>	<b>54</b>	<b>43</b>	<b>4 mm PQFN 16</b>
800 - 2000	SW-335	SPDT	0.8	50	50	SOIC-8
2000 - 20000	MASWGM0002	SPDT	4.3	50		4x4 mm PQFN
5150 - 5350	MASWSM0002	SPDT	1	21	51	4 mm PQFN 16
0 - 3000	MASWSS0117	SP2T	0.3	25	56	SC-70
0 - 2500	MASWSS0060	SP3T	0.55	21	62	3 mm PQFN 12
0 - 2500	MASWSS0065	SP3T	0.5	20	59	3 mm PQFN 12
<b>0 - 2500</b>	<b>MASWSS0199</b>	<b>SP3T</b>	<b>0.5</b>	<b>20</b>	<b>59</b>	<b>3 mm PQFN 12</b>
0 - 2500	SW-489	SP3T	0.5	18.5	66	3 mm PQFN 12
<b>0 - 3000</b>	<b>MASWSS0144</b>	<b>SP3T</b>	<b>24</b>	<b>0.6</b>	<b>55</b>	<b>3 mm PQFN 12</b>

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## General

Frequency (MHz)	Part Number	Type	I.L. (dB)	Isol. (dB)	Input IP3 (dBm)	Package
<b>Packaged Products</b>						
0 - 3000	MASWSS0028	SP3T	0.3	24	50	2 mm PDSO-N 8
5 - 2000	SW-241	SP3T	2.5	35	46	DI-5
20 - 1500	SW-163	SP3T	2	35	25	DI-2
200 - 3000	MA4SW301-1061T	SP3T	0.5	30	75	SOIC-8
0 - 2000	SW-415	SP4T	1.8	37	46	FP-25
<b>0 - 2000</b>	<b>SW-419</b>	<b>SP4T</b>	<b>1</b>	<b>39</b>	<b>46</b>	<b>SO-24</b>
0 - 3000	MASWSS0118	SP4T	0.65	23	57	4 mm PQFN 16
<b>0 - 3000</b>	<b>SW-314</b>	<b>SP4T</b>	<b>1.8</b>	<b>30</b>	<b>46</b>	<b>CR-14</b>
0 - 3000	SW15-0314	SP4T	1.8	25	46	CR-14
0 - 4000	SW-243	SP4T	0.7	35	46	CR-4
0 - 4000	SW90-0003	SP4T	2.3	38	40	CSP-2
5 - 2000	SW-254	SP4T	2.1	35	46	DI-5
5 - 2000	SW-255	SP4T	2.1	35	68	DI-5
5 - 2000	SW-261	SP4T	2.1	35	46	FP-17
10 - 1000	SW-124	SP4T	1.4	40	30	DI-2
10 - 2000	SW-114	SP4T	2.8	35	30	DI-2
20 - 1500	SW-164	SP4T	2	35	25	DI-2
20 - 2000	SW-369	SP4T	2.8	40	44	FP-26
<b>0 - 2000</b>	<b>SW-284</b>	<b>SP6T</b>	<b>2.8</b>	<b>28</b>	<b>46</b>	<b>FP-27</b>
0 - 4000	SW90-0004A	SP6T	2.1	25	40	CSP-2
0 - 3000	SW-283	Transfer	2.1	20	50	CR-4
5000 - 6000	MA0S506AJ	T/R	1.4	28	44	MSOP-8

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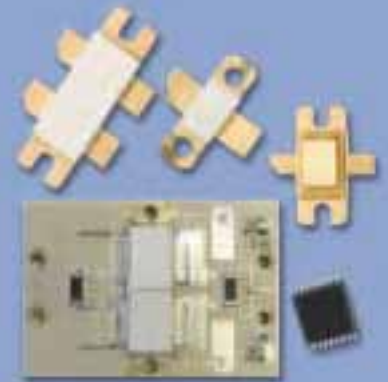


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## Bipolar

Frequency (MHz)	Part Number	Vdc	Pout (Watts)	Min. Gain (dB)	Min. Efficiency (%)	Package
<b>Packaged Products</b>						
2300	PH2323-1	28	1	8	30	Ceramic
2300	PH2323-14	28	14	7.6	35	Ceramic
2300	PH2323-3	28	3	8	30	Ceramic
2300	PH2323-5	28	5	8	35	Ceramic
2856	PH2856-160	40	160	7.5	40	Ceramic
1 - 30	MRF421	12.5	100	10	40	P208
1.5 - 30	MRF422	28	150	10	40	P208
1.5 - 30	MRF426	28	25	22	35	P-222
1.5 - 30	MRF428	50	150	13	45	P-208
2 - 60	MRF429	50	150	13	45	P-208
2 - 30	MRF448	50	250	12	45	P208
2 - 30	MRF454	12.5	80	12	50	P-208A
2 - 30	MRF455	12.5	60	13	55	P-222
30 - 200	MRF314	28	30	10	50	P-222A
30 - 200	MRF316	28	80	10	55	P209
30 - 200	MRF317	28	100	9	55	P-210
30 - 400	PH0104-16	27	16	9	40	Ceramic
30 - 400	PH0104-85	27	85	7.3	45	Ceramic
100 - 400	MRF313	28	1	15	45	P-227
100 - 400	MRF392	28	125	10	55	P-226
100 - 500	MRF393	28	100	9.5	55	P-226
100 - 500	MRF587	15	—	13	—	Ceramic
150 - 400	MRF321	28	10	12	50	P-232
150 - 400	MRF323	28	20	10	50	P-221
225 - 400	2N6439	28	60	7.8	55	P209
225 - 400	MRF327	28	80	7.3	50	P209
850 - 960	PH0810-15	24	15	12	50	P-126
850 - 960	PH0810-35	24	35	10	55	P-126
850 - 960	PH0814-40	28	42	6.8	40	Ceramic
960-1215	MAPRST0912-300	50	300	9.5	40	P-133A
960-1215	MAPRST0912-350	50	350	9.4	40	P-94C
960 - 1215	MRF10005	28	5	8.5	45	P-213
960 - 1215	MRF1000MB	18	0.7	10	—	P-224
960 - 1215	MRF10031	36	30	9	40	P-203
960 - 1215	MRF1004MB	35	4	10	40	P-224
960 - 1215	MRF10120	36	120	8	50	P-217
960 - 1215	MRF1090MA	50	90	8.4	35	P-230
960 - 1215	MRF1090MB	50	90	8.4	35	P-224
960 - 1215	MRF1150MA	50	150	7.8	35	P-230
960 - 1215	MRF1150MB	50	150	7.8	35	P-224
1025 - 1150	MRF10150	50	150	9.5	40	P-203
1025 - 1150	MRF10350	50	350	8.5	40	P-219
1025 - 1150	MRF10502	50	500	8.5	40	P-212
1030 - 1090	PH1090-15L	45	15	9	40	P-8TF

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## Bipolar

Frequency (MHz)	Part Number	Vdc	Pout (Watts)	Min. Gain (dB)	Min. Efficiency (%)	Package
<b>Packaged Products</b>						
1030 - 1090	PH1090-175L	45	175	8.3	55	P-51F
1030 - 1090	PH1090-350L	45	350	8	55	P-94C
1030 - 1090	PH1090-550S	50	550	7.4	55	P-94C
1030 - 1090	PH1090-700B	50	700	7.5	50	P-154C
1030 - 1090	PH1090-75L	45	75	9	45	P-51D
1100 - 1300	PH1113-100	32	100	8	52	P-23C
1200 - 1400	MAPRST0002	40	50	9.5	50	P-8T
1200 - 1400	MAPRST1214-6UF	36	6	8.75	40	P-8TF
1200 - 1400	MAPRST1214-30UF	36	30	7.5	45	P-51H
1200 - 1400	MAPRST1214-150UF	36	150	7.4	45	P-94C
1200 - 1400	PH1214-0.85L	11.5	0.85	9.3	30	P-8TA
1200 - 1400	PH1214-100EL	28	100	6	52	P-51I
1200 - 1400	PH1214-110M	40	110	7.4	50	P-23C
1200 - 1400	PH1214-12M	28	12	9	45	P-8TF
1200 - 1400	PH1214-20EL	28	20	9.5	50	P-8TA
1200 - 1400	PH1214-220M	40	220	7.4	50	P-94C
1200 - 1400	PH1214-25L	28	25	9.5	50	P-8TA
1200 - 1400	PH1214-25M	28	25	9.5	50	P-8TA
1200 - 1400	PH1214-25S	28	25	9.5	50	P-8TA
1200 - 1400	PH1214-2M	28	2	7	45	P-8TA
1200 - 1400	PH1214-300M	40	300	8.75	50	P-94C
1200 - 1400	PH1214-30EL	28	30	7.8	50	P-8TA
1200 - 1400	PH1214-3L	16.5	3	5.7	40	P-8TA
1200 - 1400	PH1214-40M	40	40	8.5	50	P-8TA
1200 - 1400	PH1214-4M	28	4	7	45	P-8TF
1200 - 1400	PH1214-55EL	28	55	6.6	50	P-98
1200 - 1400	PH1214-6M	28	6	7	45	P-8TF
1200 - 1400	PH1214-80M	40	80	7.5	50	P-51D
1200 - 1400	PH1214-8M	28	8	7	45	P-8TF
1450 - 1600	PH1516-10	25	10	10	40	Ceramic
1450 - 1500	PH1516-100	26	100	8	30	Ceramic
1450 - 1500	PH1516-60	26	60	8	30	Ceramic
1600 - 1640	MRF16006	28	6	7.4	40	P-206
1600 - 1640	MRF16030	28	30	7.5	40	P-207
1600 - 1640	MRF3104	20	0.5	10.5	—	P-228
1600 - 1700	PH1617-2	25	2	10	35	Ceramic
1600 - 1700	PH1617-30	25	30	10	40	Ceramic
1780 - 1900	PH1819-10	25	10	9	40	Ceramic
1780 - 1900	PH1819-15N	26	15	7.9	25	Ceramic
1780 - 1900	PH1819-2	25	2	10	35	Ceramic
1780 - 1900	PH1819-4N	26	4	10	25	Ceramic
1805 - 1880	PH1819-60	26	60	8	40	P-145E
1805 - 1880	PH1819-33	25	33	7	40	Ceramic
1805 - 1880	PH1819-45	25	45	8	40	Ceramic

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## Bipolar



Frequency (MHz)	Part Number	Vdc	Pout (Watts)	Min. Gain (dB)	Min. Efficiency (%)	Package
<b>Packaged Products</b>						
1930 - 1990	PH1920-33	25	33	7	40	Ceramic
1930 - 1990	PH1920-45	25	45	8	40	Ceramic
1930 - 1990	PH1920-60	26	60	8	40	P-145E
2200 - 2600	PH2226-110M	36	110	8	45	P-94D
2200 - 2600	PH2226-50M	36	50	8	45	P-51D
2700 - 2900	PH2729-110M	36	110	6.8	35	P-94D
2700 - 2900	PH2729-130M	36	130	7.5	40	P-51G
2700 - 2900	PH2729-150M	38	150	8.3	38	PH1214-M
2700 - 2900	PH2729-25M	36	25	9.2	45	P-98
2700 - 2900	PH2729-65M	36	65	8.5	40	P-51E
2700 - 2900	PH2729-8.5M	36	8.5	8.1	35	P-51D
2700 - 3100	PH2731-20M	36	20	8.2	45	P-98
2700 - 3100	PH2731-5M	36	5	7	30	P-51D
2700 - 3100	PH2731-75L	36	75	7	40	P-51G
2856	MAPRST2856-200	40	200	7.5	38	P-94C
2900 - 3100	PH2931-135S	42	135	7.5	40	P-94D
2900 - 3100	PH2931-20M	36	20	8.2	45	P-98
2900 - 3100	PH2931-5M	36	5	7	30	P-51D
2900 - 3300	MAPRST2933-100	36	100	8	38	P-51G
3100 - 3400	PH3134-11S	36	11	8	35	P-8TF
3100 - 3400	PH3134-20L	36	20	7.5	35	P-51D
3100 - 3400	PH3134-30S	36	30	7.5	35	P-51D
3100 - 3400	PH3134-55L	36	55	7.5	35	P-51E
3100 - 3400	PH3134-65M	36	65	7.5	35	P-51E
3100 - 3400	PH3134-75S	36	75	7.5	35	P-51E
3100 - 3400	PH3134-9L	36	9	8	35	P-8TF
3100 - 3500	PH3135-20M	36	20	7.5	35	P-51D
3100 - 3500	PH3135-25S	36	25	7.5	35	P-51D
3100 - 3500	PH3135-30M	36	30	7.5	35	P-51D
3100 - 3500	PH3135-5M	33	5	8.5	30	P-51D
3100 - 3500	PH3135-5S	33	5	8.5	30	P-51D
3100 - 3500	PH3135-65M	36	65	7.5	35	P-51E
3100 - 3500	PH3135-90S	36	90	7.5	35	P-51E

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## High Power Transistor Modules

Frequency (MHz)	Part Number	Vdc	Pout (Watts)	Min. Gain (dB)	Min. Efficiency (%)	Package
Packaged Products						
30 - 400	PHA4000-1	27	13	28	25	Pallet
30 - 400	PHA4000-2	27	64	7	35	Pallet
1615 - 1685	PH1617-60	26	60	9	40	Pallet
1805 - 1880	PH1819-45A	25	45	9	50	Pallet
1805 - 1880	PHM1880-15	26	15	30	25	Pallet
2700 - 2900	PHA2729-300M	38	300	7.5	36	Pallet
2700 - 3100	PHA2731-140L	36	140	7	35	Pallet
2700 - 3100	PHA2731-190M	38	190	7.5	33	Pallet
2900 - 3300	MAPPST2933-190	36	190	7.5	35	Pallet
3100 - 3500	PHA3135-130M	36	130	7	35	Pallet

## LDMOS

Frequency (MHz)	Part Number	Vdc	Pout (Watts)	Min. Gain (dB)	Min. Efficiency (%)	Package
Packaged Products						
<b>800 - 1000</b>	<b>MAPLST0810-030CF</b>	<b>26V</b>	<b>30W</b>	<b>17</b>	<b>50</b>	<b>P-239</b>
<b>800 - 1000</b>	<b>MAPLST0810-045CF</b>	<b>26V</b>	<b>45W</b>	<b>17</b>	<b>50</b>	<b>P-239</b>
<b>800 - 1000</b>	<b>MAPLST0810-090CF</b>	<b>26V</b>	<b>90W</b>	<b>17</b>	<b>50</b>	<b>P-238</b>
800 - 1700	MAPLST0817-015PP	26V	15W	15	40	PPF-16
800 - 2200	MAPLST0822-002PP	28V	2W	14	40	PPF-16
1600 - 1700	MAPLST1617-030CF	26V	30W	14	40	P-237
1600 - 1700	MAPLST1617-045CF	26V	30W	14	40	P-237
<b>1880 - 1920</b>	<b>MAPLST1900-030CF</b>	<b>26V</b>	<b>30W</b>	<b>13</b>	<b>40</b>	<b>P-237</b>
<b>1880 - 1920</b>	<b>MAPLST1900-060CF</b>	<b>26V</b>	<b>60W</b>	<b>13</b>	<b>40</b>	<b>P-238</b>
<b>1800 - 2000</b>	<b>MAPLST1820-030CF</b>	<b>26V</b>	<b>30W</b>	<b>13</b>	<b>40</b>	<b>P-237</b>
<b>1800 - 2000</b>	<b>MAPLST1820-060CF</b>	<b>26V</b>	<b>60W</b>	<b>13</b>	<b>40</b>	<b>P-238</b>
<b>1800 - 2000</b>	<b>MAPLST1820-090CF</b>	<b>26V</b>	<b>90W</b>	<b>13</b>	<b>40</b>	<b>P-240</b>
<b>2100 - 2200</b>	<b>MAPLST2122-15CF</b>	<b>28V</b>	<b>15W</b>	<b>13</b>	<b>40</b>	<b>P-239</b>
<b>2100 - 2200</b>	<b>MAPLST2122-30CF</b>	<b>28V</b>	<b>30W</b>	<b>12.</b>	<b>40</b>	<b>P-237</b>
<b>2100 - 2200</b>	<b>MAPLST2122-60CF</b>	<b>28V</b>	<b>60W</b>	<b>12.5</b>	<b>40</b>	<b>P-238</b>
<b>2100 - 2200</b>	<b>MAPLST2122-90CF</b>	<b>28V</b>	<b>90W</b>	<b>12</b>	<b>40</b>	<b>P-240</b>

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## MOSFET

Frequency (MHz)	Part Number	Vdc	Pout (Watts)	Min. Gain (dB)	Min. Efficiency (%)	Package
<b>Packaged Products</b>						
<b>30 - 88</b>	<b>FH2114</b>	<b>24</b>	<b>75</b>	<b>13</b>	<b>65</b>	<b>P58</b>
<b>30 - 88</b>	<b>FH2164</b>	<b>12</b>	<b>8</b>	<b>13</b>	<b>55</b>	<b>P-82</b>
<b>30 - 175</b>	<b>DU1215S</b>	<b>12</b>	<b>15</b>	<b>9.5</b>	<b>60</b>	<b>P54</b>
<b>30 - 175</b>	<b>DU1230S</b>	<b>12</b>	<b>30</b>	<b>10</b>	<b>60</b>	<b>P54</b>
<b>30 - 175</b>	<b>DU1260T</b>	<b>12</b>	<b>60</b>	<b>8</b>	<b>60</b>	<b>P70</b>
<b>30 - 175</b>	<b>DU2805S</b>	<b>28</b>	<b>5</b>	<b>11</b>	<b>55</b>	<b>P54</b>
30 - 175	DU2810S	28	10	13	55	P54
30 - 175	DU28120T	28	120	13	60	P-70
30 - 175	DU28120V	28	120	13	60	P-34A
<b>30 - 175</b>	<b>DU28200M</b>	<b>28</b>	<b>200</b>	<b>13</b>	<b>55</b>	<b>P-25</b>
<b>30 - 175</b>	<b>DU2820S</b>	<b>28</b>	<b>20</b>	<b>13</b>	<b>60</b>	<b>P-54</b>
30 - 175	DU2840S	28	40	13	60	P54
<b>30 - 175</b>	<b>DU2860T</b>	<b>28</b>	<b>60</b>	<b>13</b>	<b>60</b>	<b>P70</b>
<b>30 - 175</b>	<b>DU2860U</b>	<b>28</b>	<b>60</b>	<b>13</b>	<b>60</b>	<b>P-90</b>
<b>30 - 175</b>	<b>DU2880T</b>	<b>28</b>	<b>80</b>	<b>13</b>	<b>60</b>	<b>P-58</b>
<b>30 - 175</b>	<b>DU2880U</b>	<b>28</b>	<b>80</b>	<b>13</b>	<b>60</b>	<b>P90</b>
<b>30 - 175</b>	<b>DU2880V</b>	<b>28</b>	<b>80</b>	<b>13</b>	<b>60</b>	<b>P34A</b>
<b>100 - 500</b>	<b>UF2805B</b>	<b>28</b>	<b>5</b>	<b>10</b>	<b>50</b>	<b>P-83B</b>
<b>100 - 500</b>	<b>UF28100H</b>	<b>28</b>	<b>100</b>	<b>10</b>	<b>50</b>	<b>BAL-3</b>
<b>100 - 500</b>	<b>UF28100M</b>	<b>28</b>	<b>100</b>	<b>10</b>	<b>50</b>	<b>P-25</b>
<b>100 - 500</b>	<b>UF28100V</b>	<b>28</b>	<b>100</b>	<b>10</b>	<b>50</b>	<b>P-34A</b>
<b>100 - 500</b>	<b>UF2810P</b>	<b>28</b>	<b>10</b>	<b>10</b>	<b>50</b>	<b>P-82</b>
<b>100 - 500</b>	<b>UF28150J</b>	<b>28</b>	<b>150</b>	<b>8</b>	<b>55</b>	<b>P-84</b>
<b>100 - 500</b>	<b>UF2815B</b>	<b>28</b>	<b>15</b>	<b>10</b>	<b>50</b>	<b>P-83B</b>
<b>100 - 500</b>	<b>UF2820P</b>	<b>28</b>	<b>20</b>	<b>10</b>	<b>50</b>	<b>P-82</b>
<b>100 - 500</b>	<b>UF2820R</b>	<b>28</b>	<b>20</b>	<b>10</b>	<b>50</b>	<b>P-56</b>
100 - 500	UF2840G	28	40	10	50	SS-1E
<b>100 - 500</b>	<b>UF2840P</b>	<b>28</b>	<b>40</b>	<b>10</b>	<b>50</b>	<b>P-82</b>
500 - 1000	LF2802A	28	2	10	40	SS-1D
500 - 1000	LF2805A	28	5	10	50	SS-1D
500 - 1000	LF2810A	28	10	10	50	SS-1D

Blue listings indicate standard stock items widely available from our franchised distribution partners. Detailed specifications for our standard parts can be found quickly on our web site at [www.macom.com](http://www.macom.com) by typing the part number into the search box.

Green listings indicate RoHS Compliant parts



# TMOS

Frequency (MHz)	Part Number	Vdc	Pout (Watts)	Min. Gain (dB)	Min. Efficiency (%)	Package
<b>Packaged Products</b>						
5 - 80	MRF154	50	600	17	45	P-214
5 - 80	MRF157	50	600	21	45	P-214
5 - 150	MRF140	28	150	15	40	P208
5 - 150	MRF150	50	150	17	45	P208
5 - 175	MRF141	28	150	18	40	P208
5 - 175	MRF141G	28	300	12	50	P-217
5 - 175	MRF148A	50	30	18	40	P-216
5 - 175	MRF151	50	150	13	40	P208
5 - 175	MRF151G	50	300	14	50	P-217
5 - 175	MRF173	28	80	11	60	P208
5 - 175	MRF173CQ	28	80	13	60	P209
5 - 200	MRF174	28	125	9	50	P208
5 - 225	MRF175GV	28	200	14	65	P-218
5 - 225	MRF176GV	50	200	17	55	P-218
5 - 400	MRF175GU	28	150	12	55	P-218
5 - 400	MRF134	28	5	11	50	P-222
5 - 400	MRF136	28	15	16	60	P-222
5 - 400	MRF136Y	28	30	14	54	P-215
5 - 400	MRF137	28	30	13	60	P-222
5 - 400	MRF175LU	28	100	10	55	P-225
5 - 400	MRF176GU	50	150	14	50	P-218
5 - 400	MRF177	28	100	12	60	P-226
5 - 500	MRF158	28	2	16	55	P-228
5 - 500	MRF160	28	4	16	55	P-221
5 - 500	MRF166C	28	20	13.5	50	P-204
5 - 500	MRF166W	28	40	14	50	P-202
5 - 500	MRF275G	28	150	10	50	P-218
5 - 500	MRF275L	28	100	8.8	55	P-225
100 - 200	MRF171A	28	45	17	60	P-216

Blue listings indicate standard stock items widely available from our franchised distribution partners. Detailed specifications for our standard parts can be found quickly on our web site at [www.macom.com](http://www.macom.com) by typing the part number into the search box.

Green listings indicate RoHS Compliant parts

## Package Selection Guide

Plastic Leadless Packages		
Package Type	Approx Outline Dimensions (mm)	
1.2 x 1.5 mm PDSO-N	1.2 x 1.5 x 0.8	
2 mm 8LD PDSO	2 x 2 x 0.9	
3 mm 12LD PQFN	3 x 3 x 0.9	
3 mm 16LD PQFN	3 x 3 x 0.9	
4 mm 16LD PQFN	4 x 4 x 0.9	
4 mm 20LD PQFN	4 x 4 x 0.9	
4 mm 20LD PQFN (LP)	4 x 4 x 0.75	
5 mm 20LD PQFN	5 x 5 x 0.9	
5 mm 28LD PQFN	5 x 5 x 0.9	
6 mm 28LD PQFN	6 x 6 x 0.9	
4 x 6 mm 28LD PQFN	4 x 6 x 0.8	
4 x 7 mm 36LD PQFN	4 x 7 x 0.9	

Plastic Leaded Packages		
SC-79	0.8 x 1.6 x 0.6	
SOD-323	1.3 x 2.5 x 1.2	
SOT-23	2.9 x 2.4 x 1	
SOT-25	2.9 x 2.8 x 1.3	
SOT-26	2.9 x 2.8 x 1.3	
SOT-89	4.5 x 2.2 x 1.5	

Plastic Leaded Packages		
Package Type	Approx Outline Dimensions (mm)	
SOT-143	2.9 x 2.4 x 1	
SC70 3LD (SOT-323)	2.9 x 2.4 x 1	
SC70 6LD (SOT-323)	2 x 2.1 x 0.95	
SOIC-8	4.9 x 6 x 1.6	
SOIC-14	8.65 x 6 x 1.55	
SOIC-16	9.9 x 6 x 1.6	
SOW-16	10.3 x 10.3 x 2.5	
TSSOP-16	5 x 6.4 x 1.1	
SSOP-20	7.2 x 7.8 x 1.9	
MSOP-8	7.2 x 7.8 x 1.9	
MSOP-8ep	3 x 4.9 x 1	
MSOP-10	3 x 4.9 x 1	
QSOP-16	4.9 x 6 x 1.55	
QSOP-24	8.65 x 6 x 1.55	
QSOP-28	9.9 x 6 x 1.55	

The examples shown above are some of the commonly used packages. M/A-COM manufactures components in hundreds of types of packages to meet almost any need.

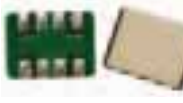




## Package Selection Guide





Ceramic/Chip Diode Packages		
Package Type	Approx Outline Dimensions (mm)	
30 Ceramic	3.2 dia. x 5.7	
132 Ceramic	0.6 x 0.6 x 0.2	
134 Die	0.4 x 0.4 x 0.2	
186 Ceramic	11.2 x 2.5 x 1.1	
401 Axial Lead	2.3 dia. x 55	
1027 Ceramic	8 dia. x 6.9	
1056 Ceramic	1.9 x 1.9 x 1	
1072 Ceramic	2.4 x 2.4 x 3.4	
1073 Ceramic	12.3 dia. x 10	
1038 Ceramic	8 dia. x 17	
1080 Ceramic	8 dia. x 22.2	
1082 Ceramic	8 dia. x 19.8	
1088 Ceramic	2.4 x 1.3 x 1	
1246 Surmount	1.2 x 0.5 x 0.2	












Transistor Packages		
Package Type	Approx Outline Dimensions (mm)	
211-11, Style 2 Ceramic	26 x 26 x 7	
P-237 Ceramic	20 x 15 x 4	
P-238 Ceramic	34 x 19.6 x 4	
P-239 Ceramic	21 x 1 x 4	
355E-01, Style 1 Ceramic	23 x 21 x 5	
375-04, Style 2 Ceramic	34 x 21 x 5	
368-03, Style 2 Ceramic	38 x 50 x 9	
PH1214-M Series Ceramic	23 x 10 x 4.5	
PFP-16 (actual size)	7 x 7 x 2	

The examples shown above are some of the commonly used packages.  
M/A-COM manufactures components in hundreds of types of packages to meet almost any need.

## Package Selection Guide

Passive Packages	
Package Type	Approx Outline Dimensions (mm)
SM-4	12.4 x 9.4 x 5.8 
SM-22	3.8 x 3.8 x 3.8 
SM-55	7.1 x 6.4 x 3.6 
SM-85 (3/4 size)	30 x 30 x 9 
SM-138	4.2 x 5.3 x 3.9 
SM-152	4.2 x 5.3 x 4.3 

Metal/Ceramic Packages	
Package Type	Approx Outline Dimensions (mm)
CR-15	17.8 x 13.7 x 2.3 
CSM	12.5 x 9.4 x 4.8 
FP	13 x 9.8 x 3.6 
MOD1	14.2 x 13.2 x 4.8 

Metal/Ceramic Packages	
Package Type	Approx Outline Dimensions (mm)
MOD2 (3/4 size)	20.3 x 15 x 6.6 
MOD3 (3/4 size)	20.3 x 15 x 4.8 
SMA-AMP (3/4 size)	23.4 x 27.9 x 13.3 
SMA-MXR (3/4 size)	22.9 x 22.9 x 14 
SMT-01	11.4 x 11.4 x 4.3 
SMT-02	10 x 13 x 4 
SMT-88	13.4 x 13.4 x 4.3 
SMT-88F	11.4 x 11.4 x 4.3 
TO-8-01	12.7 dia. x 11 
TO-8-02	12.7 dia. x 9.7 
TO-8-03	15.2 dia. x 9.7 

The examples shown above are some of the commonly used packages. M/A-COM manufactures components in hundreds of types of packages to meet almost any need.



## Decibels – Volts – Watts Conversion Table

Decibels – Volts – Watts Conversion Table

50-Ohm System Terminated											
dBm	V	P <sub>o</sub>	dBm	V	P <sub>o</sub>	dBm	mV	P <sub>o</sub>	dBm	μV	P <sub>o</sub>
53	100	200W									
50	70.7	100W	0	0.225	1 mW	-49	0.8		-97	3.2	
49	64	80W	-1	0.2	0.8 mW	-50	0.71	.01 μW	-98	2.9	
48	58	64W	-2	0.18	0.64 mW	-51	0.64		-99	2.51	
47	50	50W	-3	0.16	0.5 mW	-52	0.57		-100	2.25	0.1 pW
46	44.5	40W	-4	0.141	0.4 mW	-53	0.5		-101	2	
45	40	32W	-5	0.125	0.32 mW	-54	0.45		-102	1.8	
44	32.5	25W	-6	0.115	0.25 mW	-55	0.4		-103	1.6	
43	32	20W	-7	0.1	0.2 mW	-56	0.351		-104	1.41	
42	28	16W	-8	0.09	0.16 mW	-57	0.32		-105	1.27	
41	26.2	12.5W	-9	0.08	0.125 mW	-58	0.286		-106	1.18	
40	22.5	10W	-10	0.071	0.1 mW	-59	0.251				
39	20	8W	-11	0.064		-60	0.225	0.001 μW	dBm	nV	
38	18	6.4W	-12	0.058		-61	0.2		-107	1000	
37	16	5W	-13	0.05		-62	0.18		-108	900	
36	14.1	4W	-14	0.045		-63	0.16		-109	800	
35	12.5	3.2W	-15	0.04		-64	0.141		-110	710	0.01 pW
34	11.5	2.5W	-16	0.0355					-111	640	
33	10	2W				dBm	μV		-112	580	
32	9	1.6W	dBm	mV		-65	128		-113	500	
31	8	1.25W	-17	31.5		-66	115		-114	450	
30	7.1	1W	-18	28.5		-67	100		-115	400	
29	6.4	800 mW	-19	25.1		-68	90		-116	355	
28	5.8	640 mW	-20	22.5	.01 mW	-69	80		-117	825	
27	5	500 mW	-21	20		-70	71	0.1 nW	-118	285	
26	4.45	400 mW	-22	17.9		-71	65		-119	251	
25	4	320 mW	-23	15.9		-72	58		-120	225	0.001 pW
24	3.55	250 mW	-24	14.1		-73	50		-121	200	
23	3.2	200 mW	-25	12.8		-74	45		-122	180	
22	2.8	160 mW	-26	11.5		-75	40		-123	160	
21	2.52	125 mW	-27	10		-76	35		-124	141	
20	2.25	100 mW	-28	8.9		-77	32		-125	128	
19	2	80 mW	-29	8		-78	29		-126	117	
18	1.8	64 mW	-30	7.1	.001 mW	-79	25		-127	100	
17	1.6	50 mW	-31	6.25		-80	22.5	0.01 nW	-128	90	
16	1.41	40 mW	-32	5.8		-81	20		-129	80	0.1 fW
15	1.25	32 mW	-33	5		-82	18		-130	71	
14	1.15	25 mW	-34	4.5		-83	16		-131	61	
13	1	20 mW	-35	4		-84	11.1		-132	58	
12	0.9	16 mW	-36	3.5		-85	12.9		-133	50	
11	0.8	12.5 mW	-37	3.2		-86	11.5		-134	45	
10	0.71	10 mW	-38	2.85		-87	10		-135	40	
9	0.64	8 mW	-39	2.5		-88	9		-136	35	
8	0.58	6.4 mW	-40	2.25	1 μW	-89	8		-137	33	
7	0.5	5 mW	-41	2		-90	7.1	0.001 nW	-138	29	
6	0.445	4 mW	-42	1.8		-91	6.1		-139	25	
5	0.4	3.2 mW	-43	1.6		-92	5.75		-140	23	0.01 fW
4	0.355	2.5 mW	-44	1.4		-93	5				
3	0.32	2 mW	-45	1.25		-94	4.5				
2	0.28	1.6 mW	-46	1.18		-95	4				
1	0.252	1.25 mW	-47	1		-96	3.51				
			-48	0.9							

## Wavelength and Frequency

### Frequency Band Designations

<b>Previous Frequency Designations</b>	<b>P</b>	<b>L</b>	<b>S</b>	<b>C</b>	<b>X</b>	<b>Ku</b>	<b>K</b>	<b>Ka</b>					
<b>Current Frequency Designations</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>				
	0.5	1.0	2.0	3.0	4.0	6.0	8.0	10.0	12.4	18.0	20.0	26.5	40.0
	<b>FREQUENCY (GHz)</b>												

### Wavelength and Frequency

For all forms of wave, the velocity, wavelength, and frequency are related such that

$$\lambda F \sqrt{\epsilon_r \mu_r} = c$$

- $\lambda$  = wavelength in meters (m)
- $F$  = frequency in hertz (Hz)
- $\epsilon_r$  = relative dielectric constant of propagation medium
- $c$  = velocity of light (300,000,000 m/s)
- $\mu_r$  = relative permeability of propagation medium

The dielectric ( $\epsilon$ ) is a property of the medium in which the wave propagates. The value of  $\epsilon$  is defined as 1.000 for a perfect vacuum, and very nearly 1.0 for dry air (typically 1.006). In most practical applications, the value of  $\epsilon$  in dry air is taken to be 1.000. For mediums other than air or vacuum, however, the velocity of propagation is slower, and the value of  $\epsilon$  relative to a vacuum is higher. Teflon<sup>®</sup>, for example, can be made with dielectric constant values ( $\epsilon$ ) from about 2 to 11.

### Frequency vs. Wavelength

Frequency	Wavelength
1 MHz	300 meters (m)
10 MHz	30 m
100 MHz	3 m
300 MHz	1 m—100 centimeters (cm)
1 GHz	30 cm
10 GHz	3 cm
100 GHz	3 millimeters (mm)
300 GHz	1 mm—10 <sup>-3</sup> m
3 x 10 <sup>14</sup>	1 micron—10 <sup>-6</sup> m



## The Effect of VSWR on Transmitted Power

VSWR Effect on Power

VSWR	VSWR (dB)	Return Loss (dB)	Trans. Loss (dB)	Volt. Refl. Coeff.	Power Trans. (%)	Power Refl. (%)
1.00	.0	∞	.000	.00	100	.0
1.01	.1	46.1	.000	.00	100	.0
1.02	.2	40.1	.000	.01	100	.0
1.03	.3	36.6	.001	.01	100	.0
1.04	.4	34.2	.002	.02	100	.0
1.05	.4	32.3	.003	.02	99.9	.1
1.06	.5	30.7	.004	.03	99.9	.1
1.07	.6	29.4	.005	.03	99.9	.1
1.08	.7	28.3	.006	.04	99.9	.1
1.09	.7	27.3	.008	.04	99.8	.2
1.10	.8	26.4	.010	.05	99.8	.2
1.11	.9	25.7	.012	.05	99.7	.3
1.12	1	24.9	.014	.06	99.7	.3
1.13	1.1	24.3	.016	.06	99.6	.4
1.14	1.1	23.7	.019	.07	99.6	.4
1.15	1.2	23.1	.021	.07	99.5	.5
1.16	1.3	22.6	.024	.07	99.5	.5
1.17	1.4	22.1	.027	.08	99.4	.6
1.18	1.4	21.7	.030	.08	99.3	.7
1.19	1.5	21.2	.033	.09	99.2	.8
1.20	1.6	20.8	.036	.09	99.2	.8
1.21	1.7	20.4	.039	.1	99.1	.9
1.22	1.7	20.1	.043	.1	99	1
1.23	1.8	19.7	.046	.1	98.9	1.1
1.24	1.9	19.4	.05	.11	98.9	1.1
1.25	1.9	19.1	.054	.11	98.8	1.2
1.26	2	18.8	.058	.12	98.7	1.3
1.27	2.1	18.5	.062	.12	98.6	1.4
1.28	2.1	18.2	.066	.12	98.5	1.5
1.29	2.2	17.9	.07	.13	98.4	1.6
1.3	2.3	17.7	.075	.13	98.3	1.7
1.32	2.4	17.2	.083	.14	98.1	1.9
1.34	2.5	16.8	.093	.15	97.9	2.1
1.36	2.7	16.3	.102	.15	97.7	2.3
1.38	2.8	15.9	.112	.16	97.5	2.5
1.4	2.9	15.6	.122	.17	97.2	2.8
1.42	3	15.2	.133	.17	97	3
1.44	3.2	14.9	.144	.18	96.7	3.3
1.46	3.3	14.6	.155	.19	96.5	3.5
1.48	3.4	14.3	.166	.19	96.3	3.7
1.5	3.5	14	.177	.2	96	4
1.52	3.6	13.7	.189	.21	95.7	4.3
1.54	3.8	13.4	.201	.21	95.5	4.5
1.56	3.9	13.2	.213	.22	95.2	4.8
1.58	4	13	.225	.22	94.9	5.1
1.6	4.1	12.7	.238	.23	94.7	5.3
1.62	4.2	12.5	.25	.24	94.4	5.6

## The Effect of VSWR on Transmitted Power

VSWR Effect on Power

VSWR	VSWR (dB)	Return Loss (dB)	Trans. Loss (dB)	Volt. Refl. Coeff.	Power Trans. (%)	Power Refl. (%)
1.64	4.3	12.3	.263	.24	94.1	5.9
1.66	4.4	12.1	.276	.25	93.8	6.2
1.68	4.5	11.9	.289	.25	93.6	6.4
1.7	4.6	11.7	.302	.26	93.3	6.7
1.72	4.7	11.5	.315	.26	93	7
1.74	4.8	11.4	.329	.27	92.7	7.3
1.76	4.9	11.2	.342	.28	92.4	7.6
1.78	5	11	.356	.28	92.1	7.9
1.8	5.1	10.9	.37	.29	91.8	8.2
1.82	5.2	10.7	.384	.29	91.5	8.5
1.84	5.3	10.6	.398	.30	91.3	8.7
1.86	5.4	10.4	.412	.3	91	9
1.88	5.5	10.3	.426	.31	90.7	9.3
1.9	5.6	10.2	.440	.31	90.4	9.6
1.92	5.7	10	.454	.32	90.1	9.9
1.94	5.8	9.9	.468	.32	89.9	10.2
1.96	5.8	9.8	.483	.32	89.5	10.5
1.98	5.9	9.7	.497	.33	89.2	10.8
2	6	9.5	.512	.33	88.9	11.1
2.5	8	7.4	.881	.43	81.6	18.4
3	9.5	6	1.249	.5	75	25
3.5	10.9	5.1	1.603	.56	69.1	30.9
4	12	4.4	1.938	.6	64	36
4.5	13.1	3.9	2.255	.64	59.5	40.5
5	14	3.5	2.553	.67	55.6	44.4
5.5	14.8	3.2	2.834	.69	52.1	47.9
6	15.6	2.9	3.1	.71	49	51
6.5	16.3	2.7	3.351	.73	46.2	53.8
7	16.9	2.5	3.59	.75	43.7	56.2
7.5	17.5	2.3	3.817	.76	41.5	58.5
8	18.1	2.2	4.033	.78	39.5	60.5
8.5	18.6	2.1	4.24	.79	37.7	62.3
9	19.1	1.9	4.437	.8	36	64
9.5	19.6	1.8	4.626	.81	34.5	65.5
10	20	1.7	4.807	.82	33.1	66.9
11	20.8	1.6	5.149	.83	30.6	69.4
12	21.6	1.5	5.466	.85	28.4	71.6
13	22.3	1.3	5.762	.86	26.5	73.5
14	22.9	1.2	6.04	.87	24.9	75.1
15	23.5	1.2	6.301	.88	23.4	76.6
16	24.1	1.1	6.547	.88	22.1	77.9
17	24.6	1	6.78	.89	21	79
18	25.1	1	7.002	.89	19.9	80.1
19	25.6	.9	7.212	.9	19	81
20	26	.9	7.413	.90	18.1	81.9
25	28	.7	8.299	.92	14.8	85.2
30	29.5	.6	9.035	.94	12.5	87.5



## Worldwide Wireless Telecommunications Standards

Standard	Designation	Transmit Frequency Range (MHz)		Generation
		Handset	Base Station	
AMPS		824 - 849	869 - 894	Analog
TDMA	Cellular	824 - 849	869 - 894	2G
	PCS	1850 - 1910	1930 - 1990	2G
GSM	400	450.4 - 457.6	460.4 - 467.6	2G
	400	478.8 - 486	488.8 - 496	2G
	850	824 - 849	869 - 894	2G
	900	880 - 915	925 - 960	2G
	1800	1710 - 1785	1805 - 1880	2G
	1900	1850 - 1910	1930 - 1990	2G
CDMAone	Cellular	824 - 849	869 - 894	2G
	PCS	1850 - 1910	1930 - 1990	2G
GPRS/EDGE	400	450.4 - 457.6	460.4 - 467.6	2.5G
	400	478.8 - 486	488.8 - 496	2.5G
	850	824 - 849	869 - 894	2.5G
	900	880 - 915	925 - 960	2.5G
	1800	1710 - 1785	1805 - 1880	2.5G
	1900	1850 - 1910	1930 - 1990	2.5G
CDMA2000 1x	450	452.5 - 457.475	462.5 - 467.475	3G
EV-DO/EV-DV	800	824 - 849	869 - 894	3G
	1700	1750 - 1780	1840 - 1870	3G
	1900	1850 - 1910	1930 - 1990	3G
	2100	1920 - 1980	2110 - 2170	3G
W-CDMA (UMTS)		1920 - 1980	2110 - 2170	3G
TD-SCDMA <sup>1</sup>		2010 - 2025	2010 - 2025	3G

<sup>1</sup> Several additional frequency ranges have been set aside for use at the operator's or granting authority's discretion

## Cordless Telephone/Wireless Data

Standard	Frequency (MHz)
CT2 Cordless	864 - 868
CT2+ Cordless	944 - 948
DECT Cordless	1880 - 1900
Bluetooth	2402 - 2495
IEEE 802.11a	5150 - 5350
IEEE 802.11b	2401 - 2483
IEEE 802.11g	2401 - 2483
ISM (US)	902 - 928
ISM (US)	2400 - 2500
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1998	27	2026-6009-20	60	A28	13	A71	12
1999	27	2026-6010-10	59	A28-2	13	A72	12
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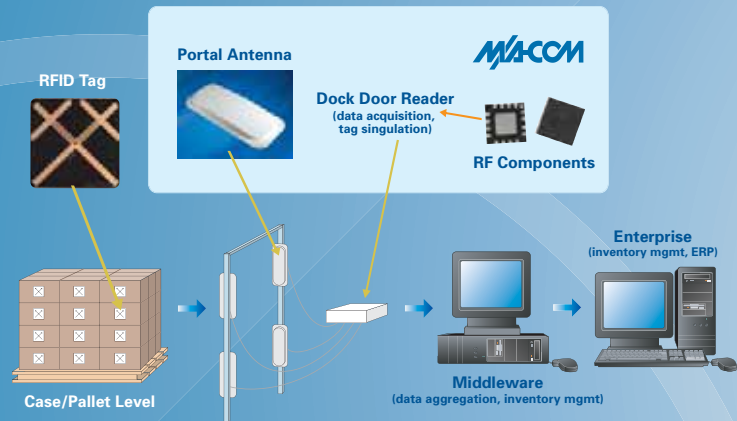
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# RFID by M/A-COM

- Small, ruggedized single and dual element RFID antennas
- A complete line of reliable RFID reader components including circulators, IQ demodulators, power amplifiers, driver amplifiers, power dividers, switches and mixers
- Value-added engineering/assembly services

## RFID System Architecture



### Antennas

Product	Frequency	Elements	Polarization	Size	Wgt	Gain
MAANAT0123	902 – 928 MHz	Dual	CP	19.6" x 8.8" x 1.6"	1.8 lbs.	8.9 dBic
MAANAT0133	950 – 960 MHz	Dual	CP	19.6" x 8.8" x 1.6"	1.8 lbs.	8.9 dBic
MAANAT0134	865 – 868 MHz	Dual	CP	19.6" x 8.8" x 1.6"	1.8 lbs.	8.9 dBic
MAANAT0144	902 – 928 MHz	Single	CP	8.5" x 8.5" x 1.0"	1.0 lbs.	9.0 dBic

### Circulators

Product	Frequency	Junctions	Insert. Loss	Isolation	Return Loss	Circ.
MAFRIN0332	902 – 928 MHz	Single	0.21 dB	29 dB	28 dB	CW
MAFRIN0449	864 – 870 MHz	Single	0.21 dB	29 dB	28 dB	CW
MAFRIN0453	950 – 956 MHz	Single	0.21 dB	29 dB	28 dB	CW
MAFRIN0370	860 – 960 MHz	Single	0.21 dB	29 dB	28 dB	CW

### IQ Modulators/Demodulators

Product	Frequency	LO Drive	Conv. Loss	LO Rejection	3x1	5x1
MA4IQP900L-1291T	850 – 960 MHz	9 – 12 dBm	6 dB	39 dB	-60 dB	-96 dB
MA4IQP900M-1291T	850 – 960 MHz	13 – 15 dBm	6 dB	39 dB	-60 dB	-96 dB
MA4IQP900H-1291T	850 – 960 MHz	15 – 19 dBm	6 dB	39 dB	-60 dB	-96 dB

### Amplifiers

Product	Frequency	Package	Gain (ss)	Power	Voltage	Current
MAAPSS0095	850 – 960 MHz	3mm 16-lead MLP	36 dB	32.5 dBm Psat	3.3V	0.98 A
MAAMSS0014	500 – 2400 MHz	SOT-89	14.5 dB	24 dBm P1dB	5.0V	110mA

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