

MMA-053223-M4 500 - 3200 MHz Fully Matched High Dynamic Range Amplifier

Features:

- Ideal for 500 – 3200 MHz High Linearity / High Dynamic Range Applications
- Excellent RF Performance:
 - 42 dBm OIP3
 - 24 dBm P1dB
 - 68 dBc ACPR @ channel power 11 dBm
 - 13 dB SSG @ 900 - 2700 MHz
 - 3 dB NF @ 900 - 2700 MHz
- Single +6 V Supply
- MTTF > 100 years @ 85 °C ambient temperature
- Lead Free RoHS Compliant Surface-Mount QFN 4 x 4 mm Package

Description:

The MMA-053223-M4 is a high linearity broadband MMIC amplifier utilizing MWT's proprietary linear MESFET technology. Packaged in low cost QFN 4 x 4mm lead-free Green Package, the MMIC is ideally suited for high linearity driver and high dynamic range LNA applications. The applications include 2G, 2.5G, and 3G wireless infrastructure standards, such as GSM, TDMA, CDMA, EDGE, CDMA2000, WCDMA, TD-SCDMA, and UMTS base stations. The third order intercept point performance is excellent, typically 18 dB above the 1 dB gain compression point.

Electrical Specifications: $V_{ds} = 6.0\text{ V}$, $I_{ds} = 150\text{ mA}$, $T_a = 25\text{ }^{\circ}\text{C}$, $Z_0 = 50\text{ }\Omega$

Parameter	Units	Typical Data	
Frequency Range	MHz	900 - 2700	500 - 3200
Gain (Typ / Min)	dB	13 / 11	12 / -
Gain Flatness (Typ / Min)	±dB	0.8 / 1.2	1.5 / -
Input Return Loss (Typ)	dB	10	10
Output Return Loss (Typ)	dB	10	10
Output P1dB (Typ)	dBm	24	23
Output IP3 (Typ / Min) ⁽¹⁾	dBm	42 / 38	42 / -
Noise Figure	dB	3.0	3.5
Operating Current Range (Min / Max)	mA	120 / 200	
Thermal Resistance (Typ)	°C / W	30	

(1) Output IP3 is measured with two tones at output power of 13 dBm / tone separated by 10 MHz

ESD Caution

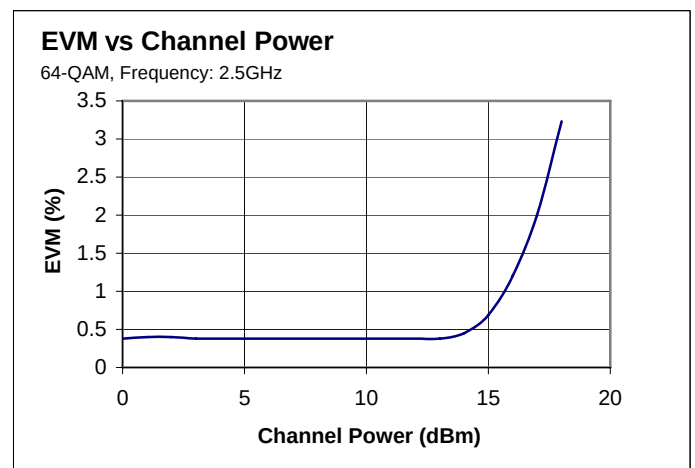
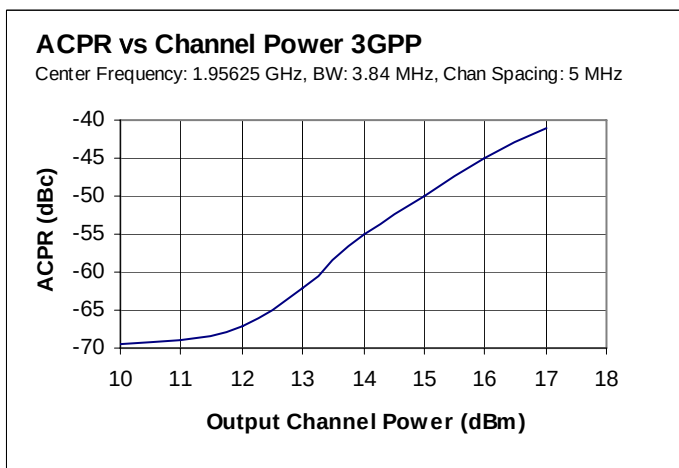
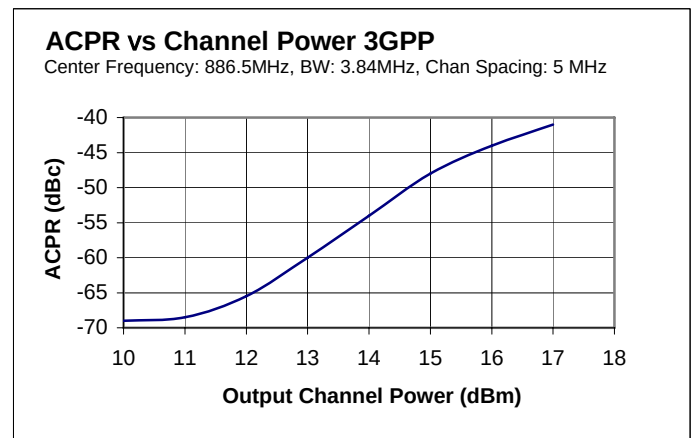
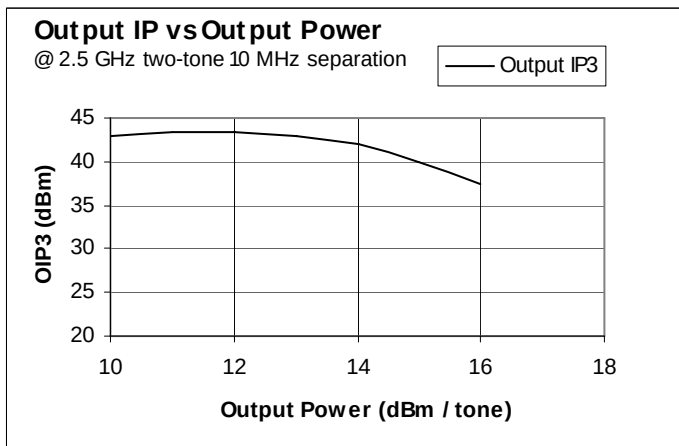
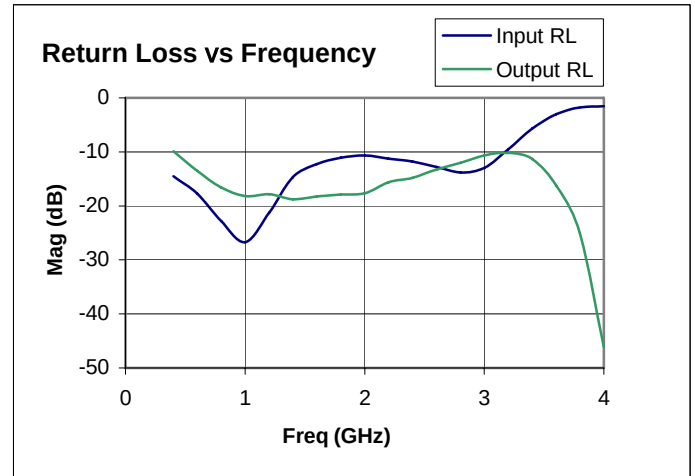
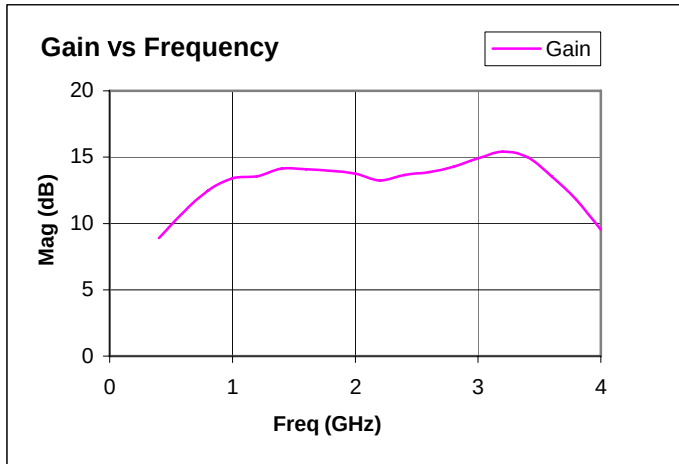


High-performance RF integrated circuits are highly sensitive to electrostatic discharge (ESD) and may contain unprotected inputs and outputs. Handling and assembly should be conducted in an ESD-controlled environment. It is recommended that ESD precautions and protocols are adopted to minimise the risk of electrostatic discharge and protect product integrity.

MMA-053223-M4

500 - 3200 MHz Fully Matched High Dynamic Range Amplifier

Typical RF Performance: $V_{ds} = 6\text{ V}$, $I_{ds} = 150\text{ mA}$, $T_a = 25^\circ\text{C}$, $50\ \Omega$ system



MMA-053223-M4

500 - 3200 MHz Fully Matched High Dynamic Range Amplifier

Typical Scattering Parameters:

$V_{ds} = 6.0\text{ V}$, $I_{ds} = 150\text{ mA}$, $T_a = 25\text{ }^{\circ}\text{C}$, Reference Planes at Leads

F [GHz]	S11 Mag - Ang	S21 Mag - Ang	S12 Mag - Ang	S22 Mag - Ang
0.4	0.19 98.66	2.79 176.94	0.01 63.23	0.32 83.88
0.6	0.13 47.98	3.48 136.87	0.01 26.17	0.21 77.22
0.8	0.07 -2.92	4.21 98.46	0.02 -7.36	0.15 59.34
1.0	0.05 -127.00	4.69 59.73	0.02 -40.77	0.12 53.51
1.2	0.09 151.81	4.76 21.49	0.02 -75.24	0.13 35.24
1.4	0.18 109.75	5.09 -13.87	0.03 -106.14	0.11 26.45
1.6	0.24 66.92	5.06 -49.72	0.03 -138.13	0.12 1.20
1.8	0.28 27.21	4.99 -84.02	0.04 -170.03	0.13 -33.37
2.0	0.29 -11.18	4.86 -118.22	0.04 157.74	0.13 -71.80
2.2	0.27 -52.17	4.59 -146.97	0.04 130.96	0.17 -113.51
2.4	0.26 -92.11	4.82 -179.59	0.04 99.51	0.18 -152.37
2.6	0.23 -140.62	4.94 148.31	0.05 68.70	0.22 174.78
2.8	0.20 159.07	5.18 114.91	0.05 36.56	0.25 144.42
3.0	0.22 82.13	5.57 79.84	0.06 3.12	0.29 114.41
3.2	0.33 -3.09	5.90 38.94	0.07 -36.79	0.31 78.48
3.4	0.52 -76.15	5.62 -5.47	0.07 -81.39	0.27 36.78
3.6	0.70 -136.79	4.75 -48.16	0.06 -120.63	0.15 -11.94
3.8	0.81 170.37	3.89 -86.16	0.05 -165.18	0.06 -21.34
4.0	0.84 128.82	3.00 -119.64	0.04 160.57	0.00 119.74

Absolute Maximum Ratings: ($T_a = 25\text{ }^{\circ}\text{C}$)*

SYMBOL	PARAMETERS	UNITS	ABSOLUTE MAXIMUM
V_{ds}	Drain-Source Voltage	V	8
V_{gs}	Gate-Source Voltage	V	-6 to +0.8
I_{ds}	Drain Current	mA	300
I_{gs}	Gate Current	mA	3
P_{diss}	DC Power Dissipation	W	2.4
$P_{in\ max}$	RF Input Power	dBm	+24
T_{oper}	Operating Temperature	$^{\circ}\text{C}$	-40 to +85
T_{ch}	Channel Temperature	$^{\circ}\text{C}$	150
T_{stg}	Storage Temperature	$^{\circ}\text{C}$	-60 to 150

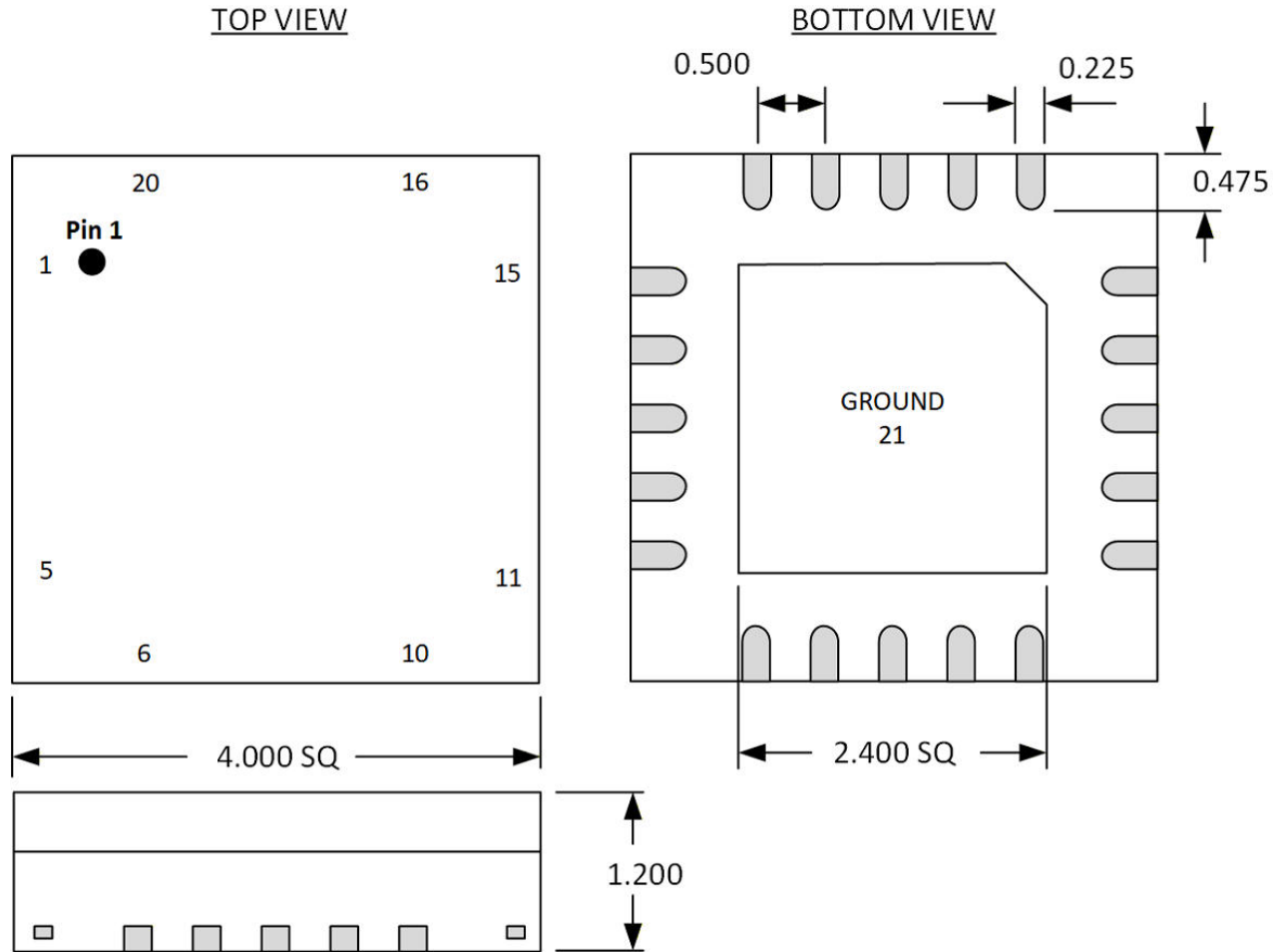
*Operation of this device above any one of these parameters may cause permanent damage.

MMA-053223-M4

500 - 3200 MHz Fully Matched High Dynamic Range Amplifier

Mechanical Information:

This Package is RoHS-compliant lead free Green Package



The units are in [mm].

Pin	Description
3	RF Input
13	RF Output / DC Input
2, 4, 12, 14, 21	GND
1, 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18, 19, 20	Floating

RoHS Compliance



CML Micro certifies, to the best of our knowledge, that its products comply with RoHS directive (2011/65/EU), as amended by Directive (EU) 2015/863.

REACH Compliance



CML Micro certifies, to the best of our knowledge, that its products do not contain any of the banned substances specified in the SVHC list at <https://echa.europa.eu/candidate-list-table>. CML Micro are committed to ensuring the safety of products and the compliance with regulations. Publications will be updated in the event that REACH control is compromised.

Contact Information

For further information please contact your local CML sales representative.
Contact details can be found at www.cmlmicro.com.

Important notice: The information provided in this document is believed to be accurate and reliable however, CML assumes no responsibility for any errors or omissions in this document. CML reserves the right to make changes to this document at any time without notice.

The product(s) referenced within this document are not designed, authorized, or warranted for use in life support, life-critical, surgical or nuclear applications, nor in any application where the failure of the product could create a situation where personal injury or death may occur. Customers using or selling the product for such applications do so entirely at their own risk and without any recourse to CML, financial or otherwise.

CML assumes no liability for applications assistance or the design of customers' products. Customers are solely responsible for the design, validation, and testing of customer products as well as compliance with all legal, regulatory, and safety-related requirements concerning their applications.

ALL SPECIFICATIONS AND DATA ARE PROVIDED "AS IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. PRODUCTS ARE PROVIDED UNDER THE TERMS OF CML'S CONDITIONS OF SALE.

Nothing in this document or any purchase of CML products shall be construed as granting any license, whether express or implied, under any patent, copyright, trade secret, or other intellectual property right owned or controlled by CML.