

Broadband CATV Single Ended 2-Way Active Splitter 50 - 1100 MHz

Rev. V2

Features

- 2-Way Splitter, 8.5 dB Gain
- Single Ended Input and Outputs
- 75 Ω Impedance
- 4.0 dB Noise Figure
- Single +5 Volt Supply
- Lead-Free 3 mm 12-Lead PQFN Package
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description and Applications

The MAAM-007805 CATV 2-way active splitter is a GaAs MMIC which exhibits low noise figure and distortion in a lead-free PQFN plastic package. This device employs a low noise, high linearity amplifier and power splitter functionality. The design features 75 Ω input and outputs.

The MAAM-007805 is ideally suited for multi-tuner set top boxes, home gateways, and other broadband internet based appliances.

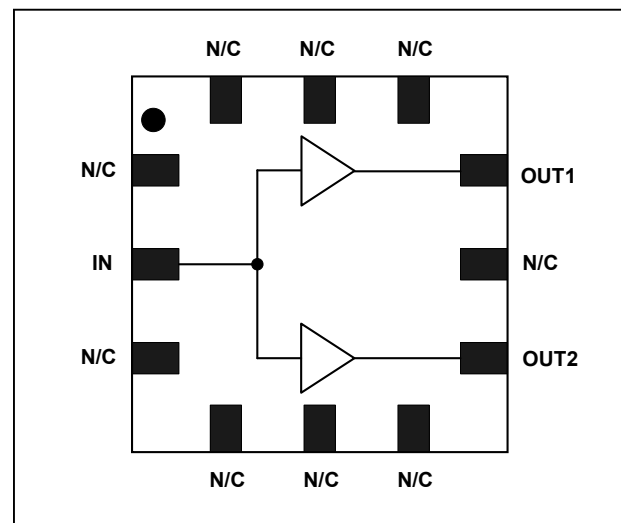
The MAAM-007805 is fabricated using M/A-COM Technology Solutions' pHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

Ordering Information ^{1,2}

Part Number	Package
MAAM-007805-TR1000	1000 piece reel
MAAM-007805-TR3000	3000 piece reel
MAAM-007805-001SMB	Sample Board, 50 - 1100 MHz Tuning

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

Functional Schematic



Pin Configuration

Pin No.	Function	Pin No.	Function
1	No Connection	7	RF Output 2
2	RF Input	8	No Connection
3	No Connection	9	RF Output 1
4	No Connection	10	No Connection
5	No Connection	11	No Connection
6	No Connection	12	No Connection
13	RF and DC Ground ³		

3. The exposed pad centered on the package bottom must be connected to RF and DC ground.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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Electrical Specifications: F = 50 - 1000 MHz, T_A = 25°C, V_{DD} = +5 Volts, Z₀ = 75 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	In to Out1, In to Out2	dB	7.3	8.5	9.5
Gain Flatness	In to Out1, In to Out2	dB	—	0.75	1.2
Noise Figure	In to Out1, In to Out2	dB	—	4.0	4.5
Input Return Loss	Input	dB	—	19	—
Output Return Loss	Output	dB	—	18	—
Composite Triple Beat, CTB	132 channels, +15 dBmV/channel at the input.	dBc	—	-75	—
Composite Second Order, CSO	132 channels, +15 dBmV/channel at the input.	dBc	—	-60	—
Crossmodulation, XMOD	132 channels, +15 dBmV/channel at the input.	dBc	—	-60	—
Reverse Isolation	Out1 to In, Out2 to In	dB	—	20	—
Output to Output Isolation	Out1 to Out2	dB	—	25	—
P1dB	400 MHz	dBm	—	17	—
OIP3	Two tones at 1 MHz spacing, Pin at -10 dBm per tone 400 MHz	dBm	—	33	—
OIP2	Two tones at 1 MHz spacing, Pin at -10 dBm per tone 400 MHz	dBm	—	55	—
I _{DD}	V _{DD} = + 5 Volts	mA	—	100	120

Absolute Maximum Ratings^{4,5,6,7}

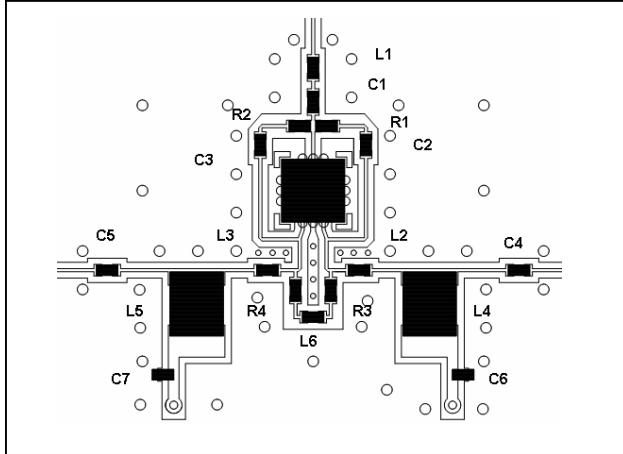
Parameter	Absolute Maximum
Max Input Power	+8 dBm
V _{bias}	+10.0 V
Operating Temperature	-40°C to +85°C
Junction Temperature ⁷	+150°C
Storage Temperature	-65°C to +150°C

4. Exceeding any one or combination of these limits may cause permanent damage to this device.
5. M/A-COM Technology Solutions does not recommend sustained operation near these survivability limits.
6. These operating conditions will ensure MTTF > 1 x 10⁶ hours.
7. Junction Temperature (T_J) = T_A + Θ_{JC} * (V * I)
Typical thermal resistance (Θ_{JC}) = 85 °C/W.
 - a) For T_C = 25°C,
T_J = 68 °C @ 5.0 V, 100 mA
 - b) For T_C = 85°C,
T_J = 123 °C @ 5.0 V, 90 mA

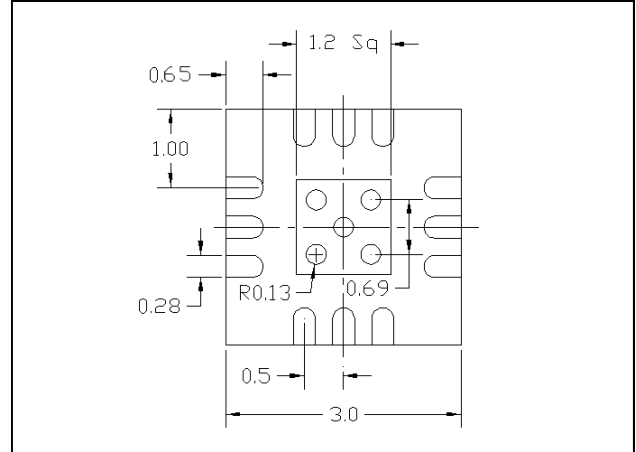
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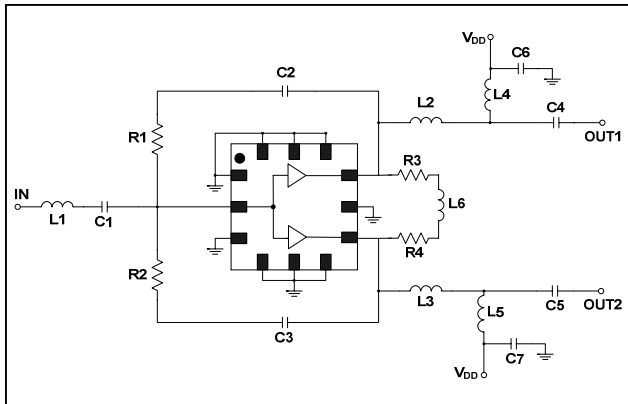
Recommended PCB Configuration



PCB Land Pattern



Schematic PWB Layout



Off-Chip Component Values ⁸

Component	Value	Package
C1 - C7	0.01 μ F	0402
L1	4.7 nH	0402
L2 - L3	7.5 nH	0402
L4 - L5	1.0 μ H	1210
L6	18 nH	0402
R1 - R2	560 ohms	0402
R3 - R4	91 ohms	0402

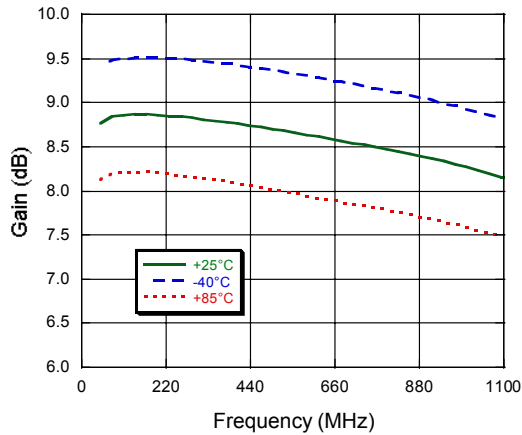
8. L4 - L5 supplied from EPCOS, part number B82422A1102K100.

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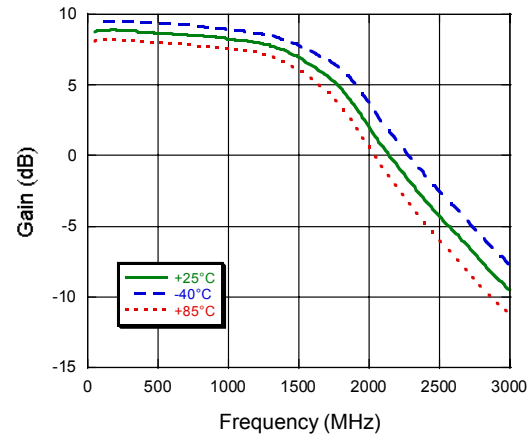
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Typical Performance Curves

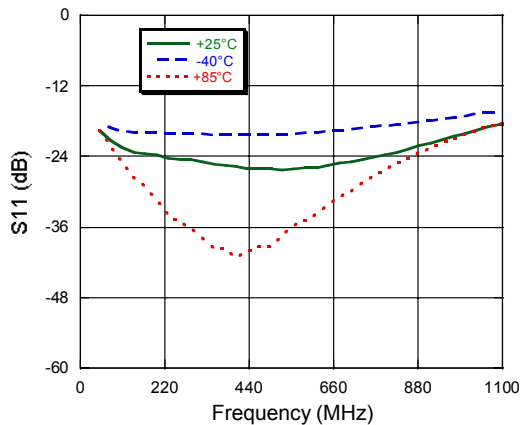
Gain vs. Frequency over Temperature



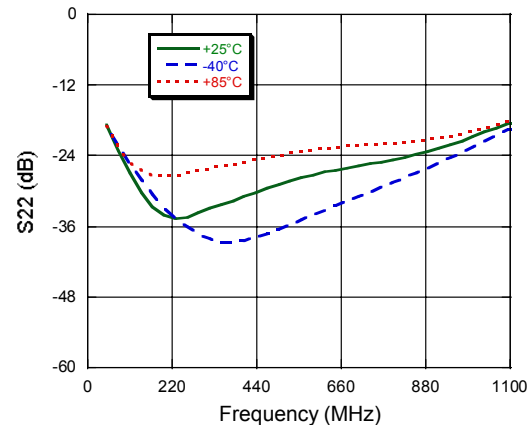
Gain vs. Frequency over Temperature to 3 GHz



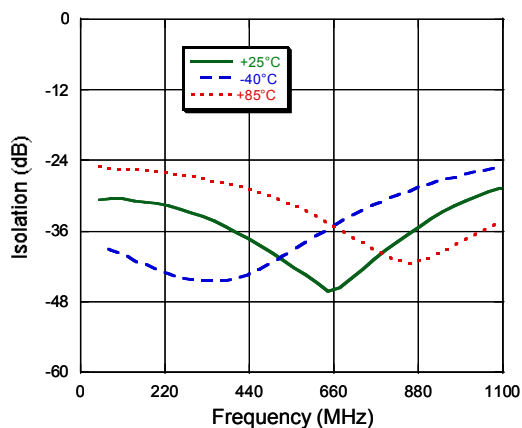
S11 vs. Frequency over Temperature



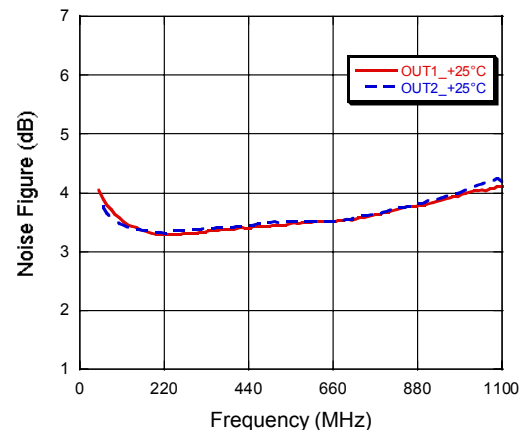
S22 vs. Frequency over Temperature



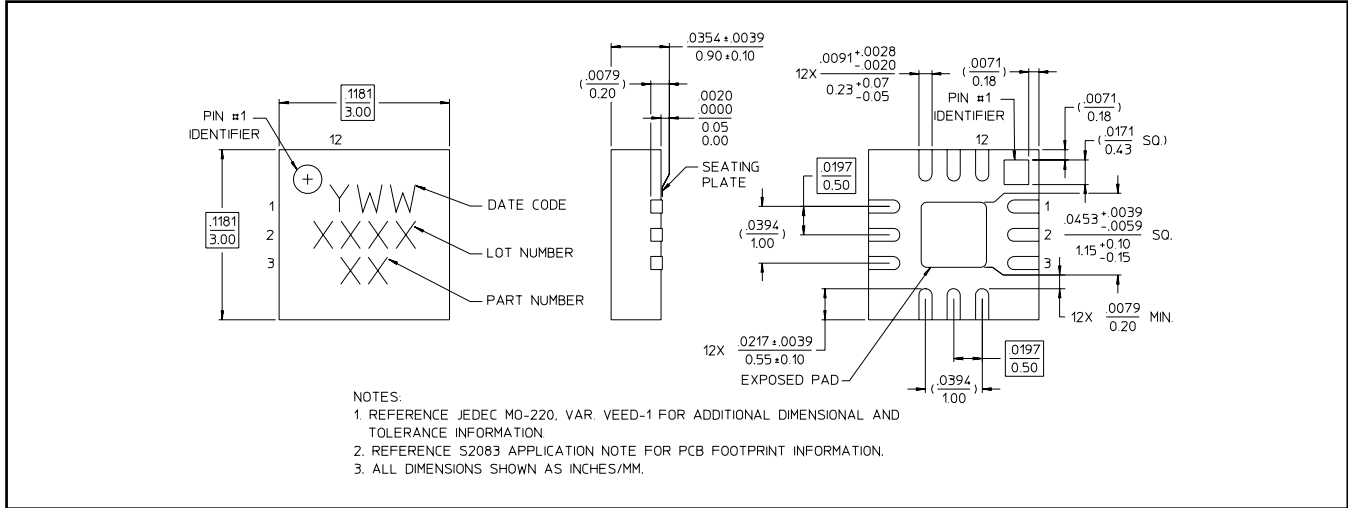
Isolation vs. Frequency over Temperature



Noise Figure



Lead-Free 3 mm 12-Lead PQFN[†]



[†] Reference Application Note S2083 for lead-free solder reflow recommendations.
 Meets JEDEC moisture sensitivity level1 requirements.
 Plating is 100% matte tin over copper.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices. An external protection circuit using an anti-parallel diode pair can be used to protect the IC.

Please reference application note AN3028 on <http://www.macomtech.com> for further detail