

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.

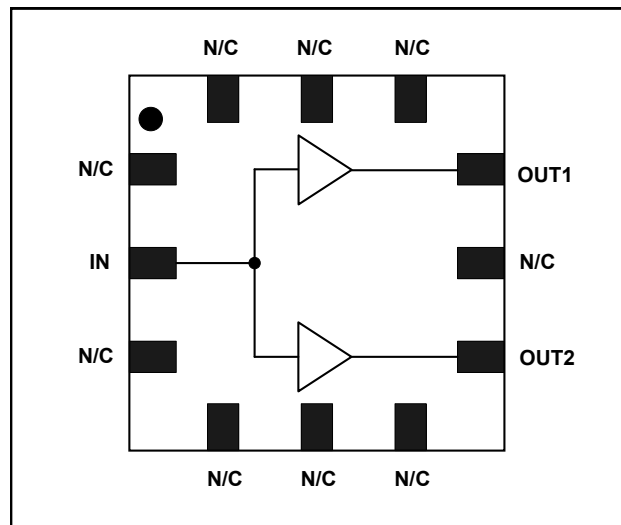
The MAAM-007805 is fabricated using M/A-COM Technology Solutions’ pHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

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}

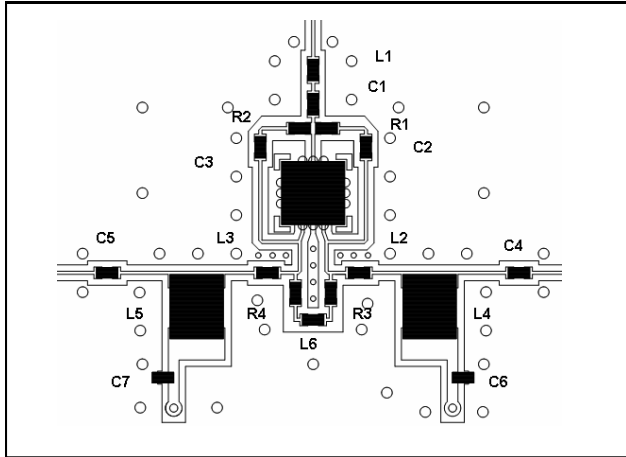
Parameter	Absolute Maximum
Max Input Power	+8 dBm
V _{bias}	+10.0 V
Operating Temperature	-40°C to +85°C
Junction Temperature ⁷	+150°C
Storage Temperature	-65°C to +150°C

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

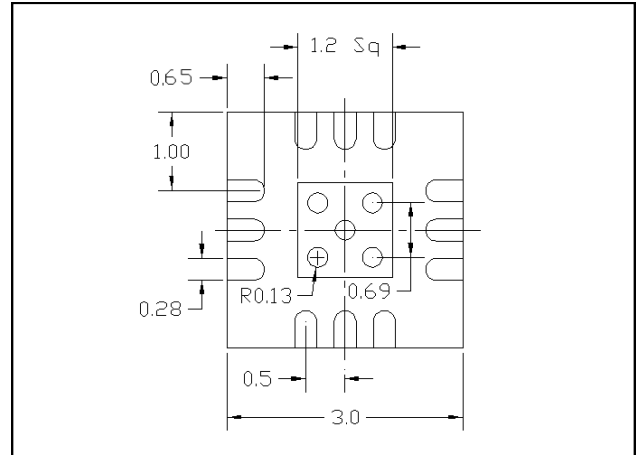
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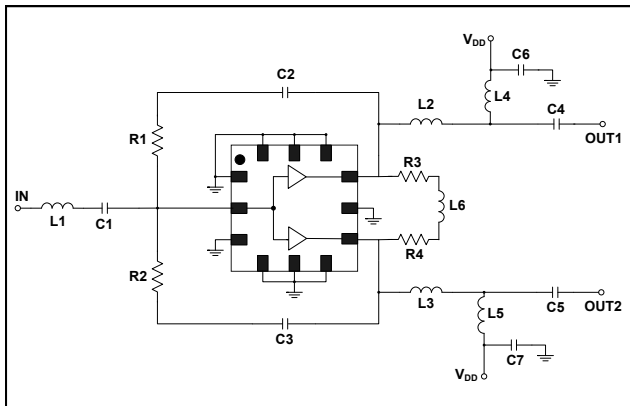
Recommended PCB Configuration



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

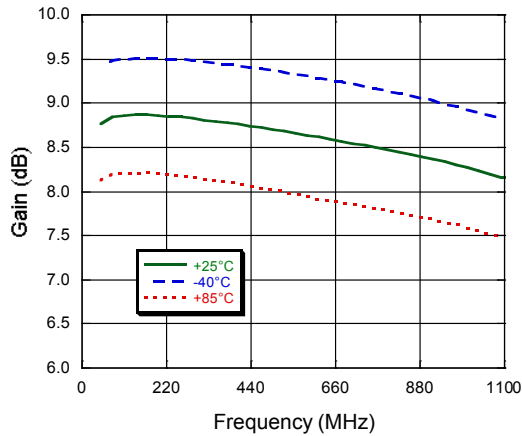
8. L4 - L5 supplied from EPCOS, part number B82422A1102K100.

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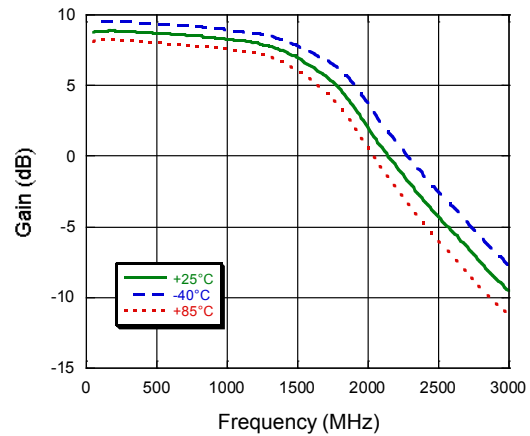
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Typical Performance Curves

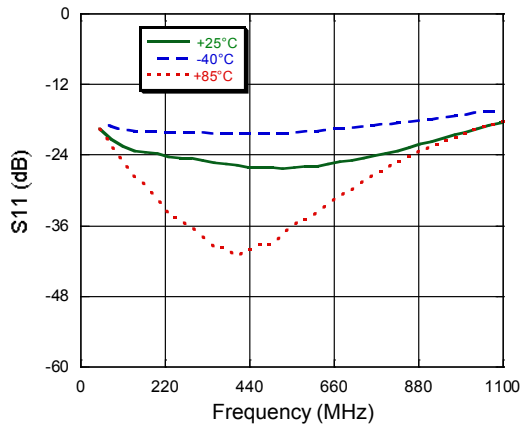
Gain vs. Frequency over Temperature



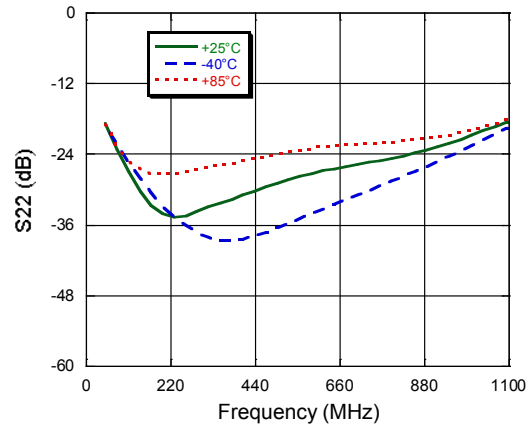
Gain vs. Frequency over Temperature to 3 GHz



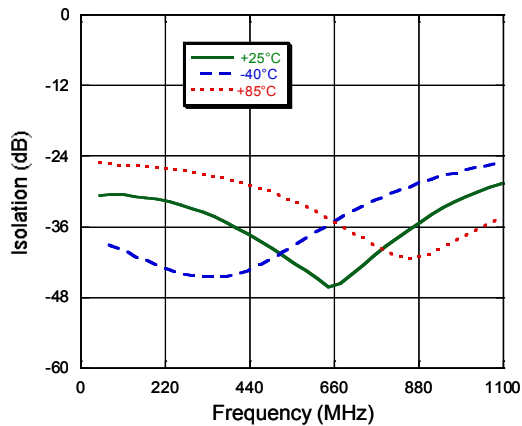
S11 vs. Frequency over Temperature



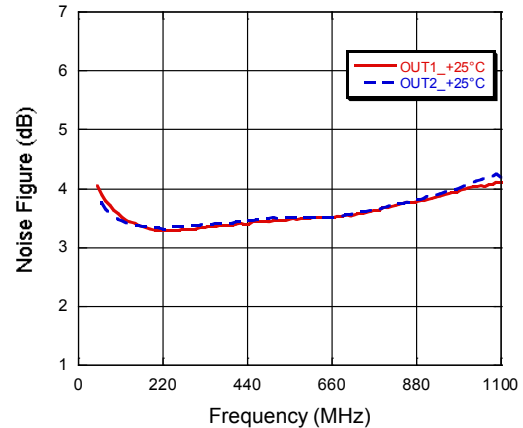
S22 vs. Frequency over Temperature



Isolation vs. Frequency over Temperature



Noise Figure



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