

## Broadband CATV Single Ended 3-Way Active Splitter 50 - 1100 MHz

Rev. V1

### Features

- 3-Way Splitter
- Single Ended Input and Outputs
- 1.3 dB Gain at output port 1
- 4.5 dB Gain at output ports 2 & 3
- +15 dBmV /Channel Input
- 4.5 dB Noise Figure at output port 1
- 4.0 dB Noise Figure at output ports 2 & 3
- Single +5 Volt Supply
- Lead-Free 2 mm 8-Lead PDFN Package
- Halogen-Free “Green” Mold Compound
- RoHS\* Compliant and 260°C Reflow Compatible

### Description

M/A-COM’s MAAM-008822 CATV 3-way active splitter is a GaAs MMIC which exhibits low noise figure and distortion in a lead-free 2mm 8-lead PDFN plastic package. The design features 75  $\Omega$  inputs and outputs.

The MAAM-008822 is ideally suited for multi-tuner set top boxes, home gateways, and other broadband internet based appliances.

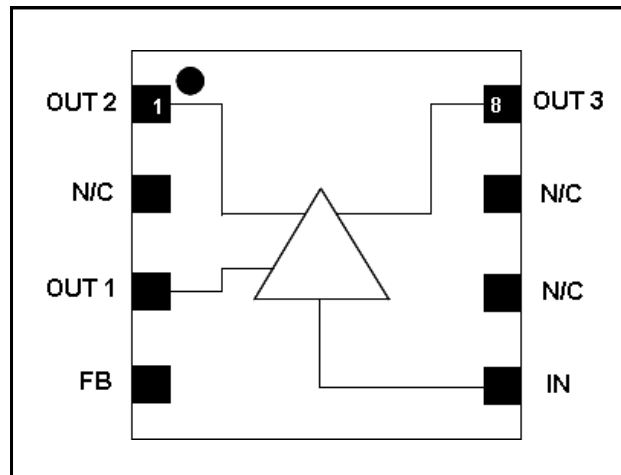
The MAAM-008822 is fabricated using M/A-COM’s PHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

### Ordering Information <sup>1,2</sup>

Part Number	Package
MAAM-008822-TR1000	1000 piece reel
MAAM-008822-TR3000	3000 piece reel
MAAM-008822-001SMB	Sample Test Board

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

### Functional Schematic



### Pin Configuration

Pin No.	Pin Name	Description
1	OUT2	RF Output 2
2	N/C	No Connection
3	OUT1	RF Output 1
4	FB	Feedback/Bias
5	IN	RF Input
6	N/C	No Connection
7	N/C	No Connection
8	OUT3	RF Output 3
9	Paddle <sup>3</sup>	RF and DC Ground

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: Freq. = 1000 MHz, T<sub>A</sub> = 25°C, V<sub>DD</sub> = +5 Volts, Z<sub>0</sub> = 75 Ω**

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	IN to OUT1 IN to OUT2, IN to OUT3	dB	1 3	1.3 4.5	3 5.5
Gain Flatness	IN to OUT1, IN to OUT2, IN to OUT3	dB	-	0.5	-
Noise Figure	IN to OUT1 IN to OUT2; IN to OUT3	dB	- -	4.5 4.0	- -
Input Return Loss	IN	dB	-	16	-
Output Return Loss	OUT1 OUT2, OUT3	dB	- -	8 19	- -
Composite Triple Beat, CTB	132 channels, +15 dBmV/channel at the input All Outputs	dBc	-	-63	-
Composite Second Order, CSO	132 channels, +15 dBmV/channel at the input All Outputs	dBc	-	-60	-
Reverse Isolation	OUT1 to IN OUT2 to IN, OUT3 to IN	dB	- -	-30 -27	- -
Output to Output Isolation	OUT1 to OUT2; OUT1 to OUT3 OUT2 to OUT3	dB	- -	21 18	- -
Output Power at 1dB Compression, P1dB	OUT1 OUT2, OUT3	dBm	- -	7.5 11	- -
Output 3rd Order Intercept Point, OIP3	500 MHz, 2-tone, 6 MHz spacing, -15 dBm Pout OUT1 OUT2, OUT3	dBm	- -	23 24	- -
Output 2nd Order Intercept Point, OIP2	500 MHz, 2-tone, 6 MHz spacing, -15 dBm Pout OUT1 OUT2, OUT3	dBm	- -	45 48	- -
IDD	VDD= +5 Volts	mA	-	120	150

### Absolute Maximum Ratings <sup>4,5,6,7</sup>

Parameter	Absolute Maximum
Max Input Power	+12 dBm
Vbias	+10.0 V
Operating Temperature	-20°C to +85°C
Junction Temperature	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 does not recommend sustained operation near these survivability limits.
6. These operating conditions will ensure MTTF > 1 x 10<sup>6</sup> hours.
7. Junction Temperature (T<sub>J</sub>) = T<sub>C</sub> + Θ<sub>JC</sub> \* ((V \* I) - (P<sub>OUT</sub> - P<sub>IN</sub>))  
Typical thermal resistance (Θ<sub>JC</sub>) = 77° C/W.
  - a) For T<sub>C</sub> = 25°C,  
T<sub>J</sub> = 71 °C @ 5 V, 120 mA
  - b) For T<sub>C</sub> = 85°C,  
T<sub>J</sub> = 127 °C @ 5 V, 110 mA

### Handling Procedures

Please observe the following precautions to avoid damage:

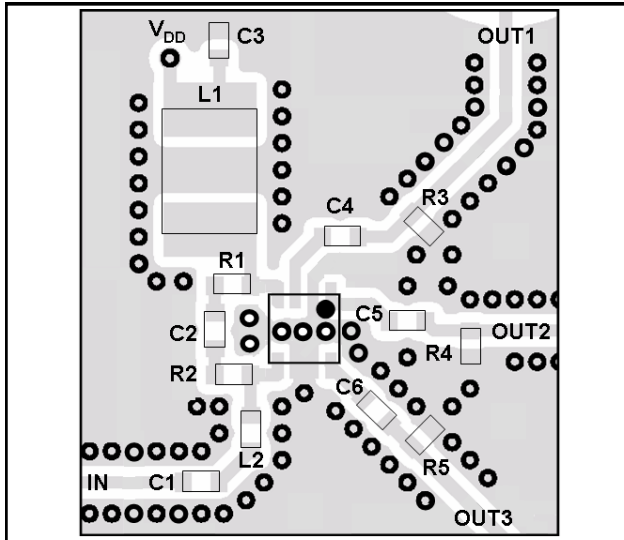
### Static Sensitivity

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.

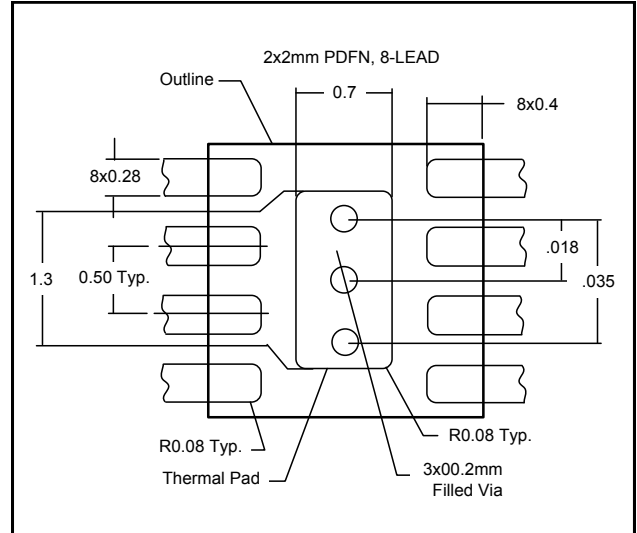
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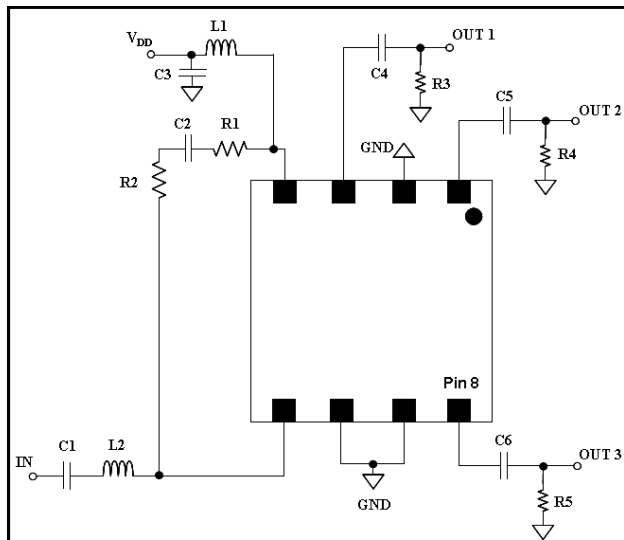
### Recommended PCB



### PCB Land Pattern



### Schematic Including Off-Chip Components<sup>8</sup>



8. The exposed pad centered on the package bottom must be connected to ground for RF, DC and thermal considerations.

### Off-Chip Component Values<sup>9</sup>

Component	Value	Package
C1 - C6	0.01 $\mu$ F	0402
L1 <sup>7</sup>	1 $\mu$ H	1210
L2	3.9 nH	0402
R1, R2	180 ohm	0402
R3	750 ohm	0402
R4, R5	270 ohm	0402

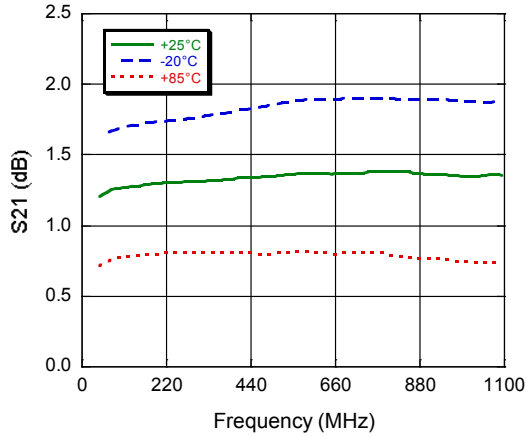
9. L1 supplied from EPCOS, part number B82422A1102K100.

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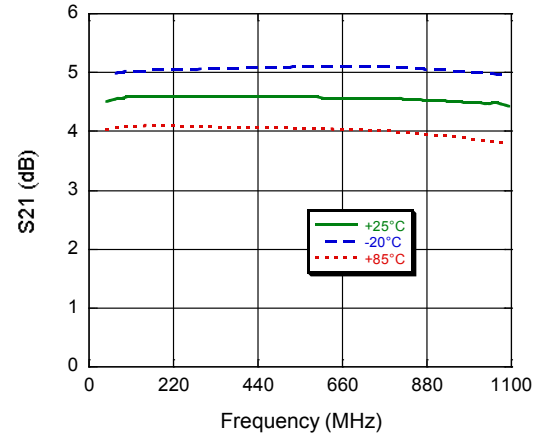
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### Typical Performance Curves

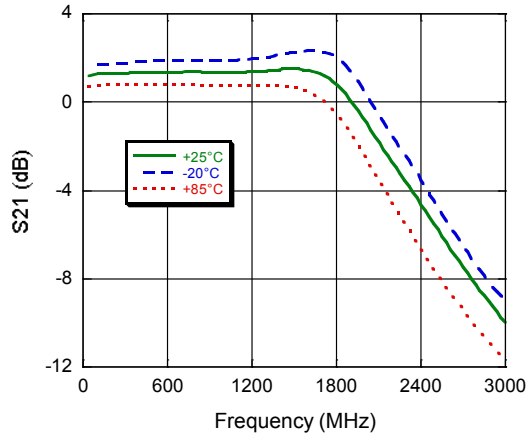
Gain to 1100 MHz\_\_OUT1



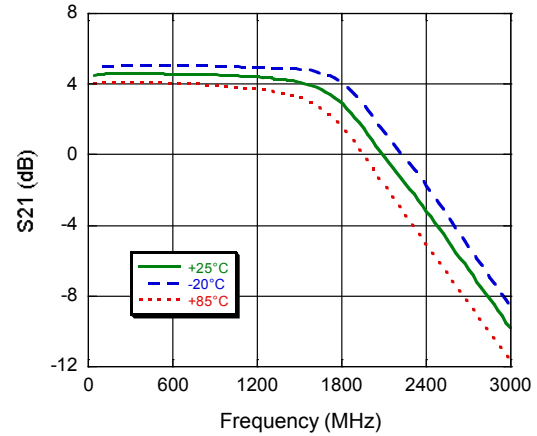
Gain to 1100 MHz\_\_OUT2 & OUT3



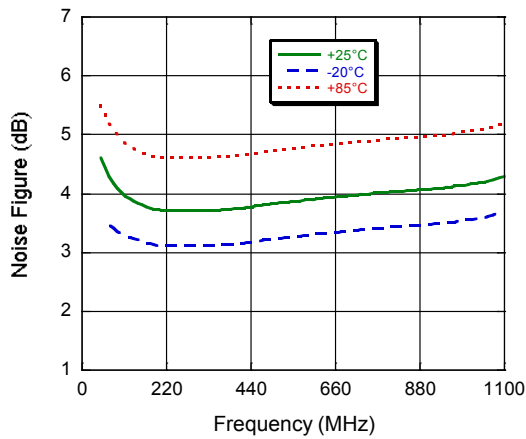
Gain to 3000 MHz\_\_OUT1



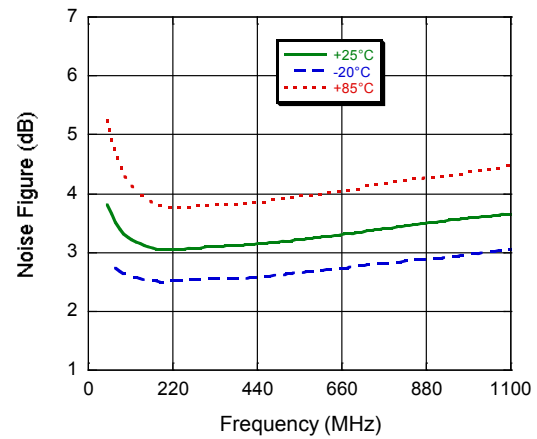
Gain to 3000 MHz\_\_OUT2 & OUT3



Noise Figure\_\_OUT1

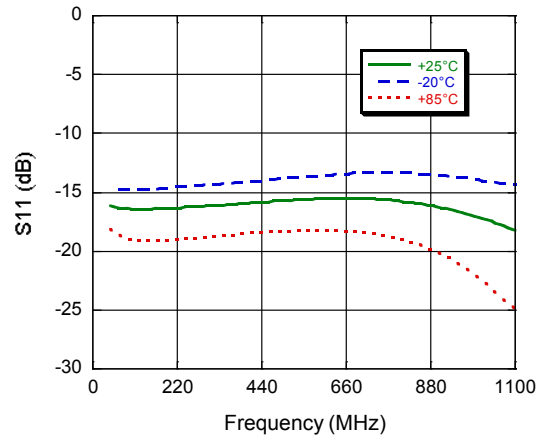


Noise Figure\_\_OUT2 & OUT3

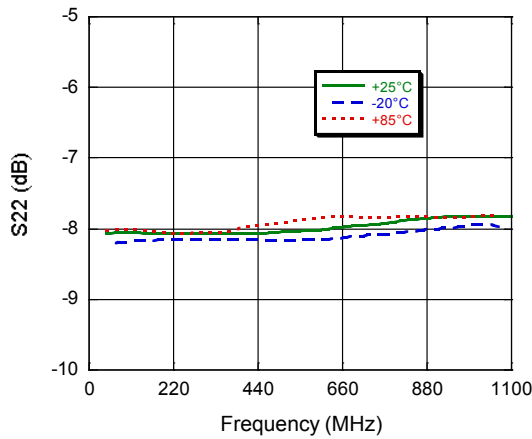


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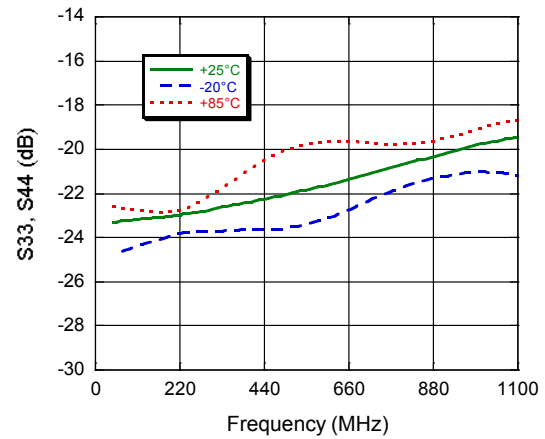
**Input Return Loss**



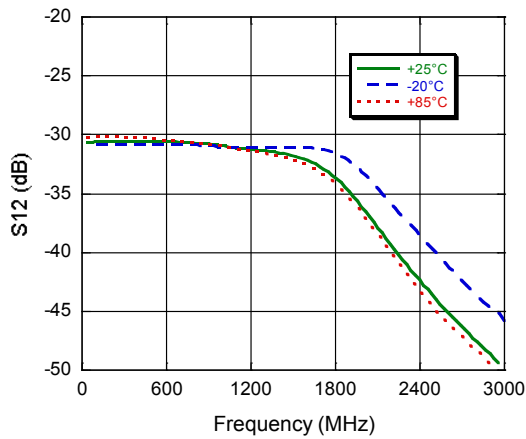
**Output Return Loss\_\_OUT1**



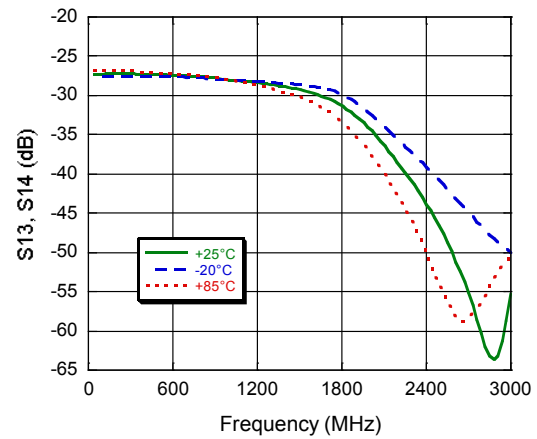
**Output Return Loss\_\_OUT2 & OUT3**



**Reverse Isolation\_\_OUT1-IN**

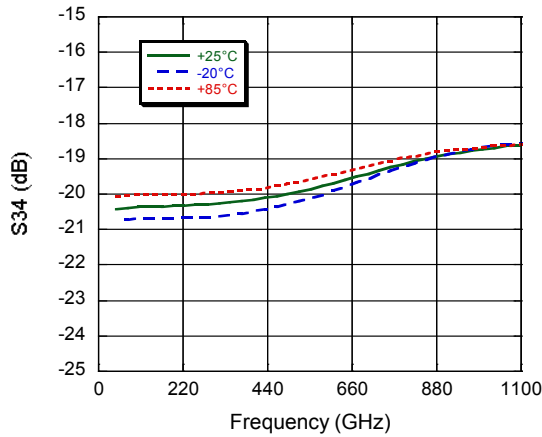


**Reverse Isolation\_\_OUT2-IN & OUT3-IN**

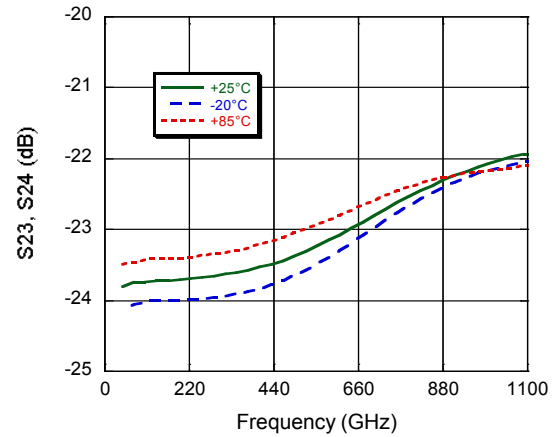


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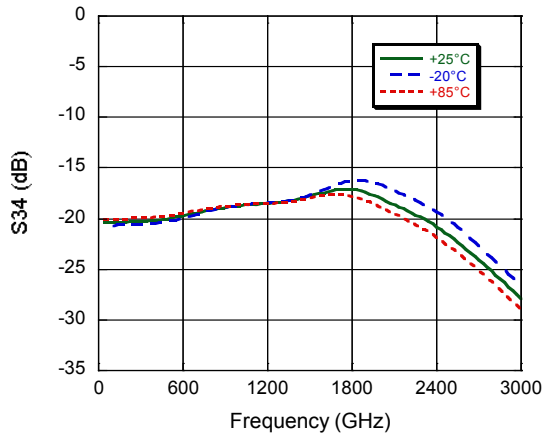
**OUT-OUT Isolation to 1100 MHz**  
**OUT2-OUT3**



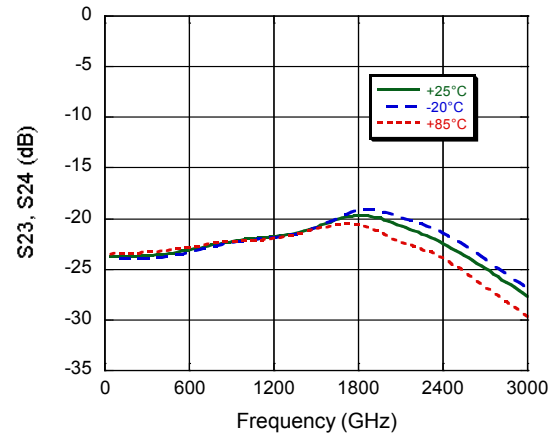
**OUT-OUT Isolation to 1100 MHz**  
**OUT1-OUT2 & OUT1-OUT3**



**OUT-OUT Isolation to 3000 MHz**  
**OUT2-OUT3**



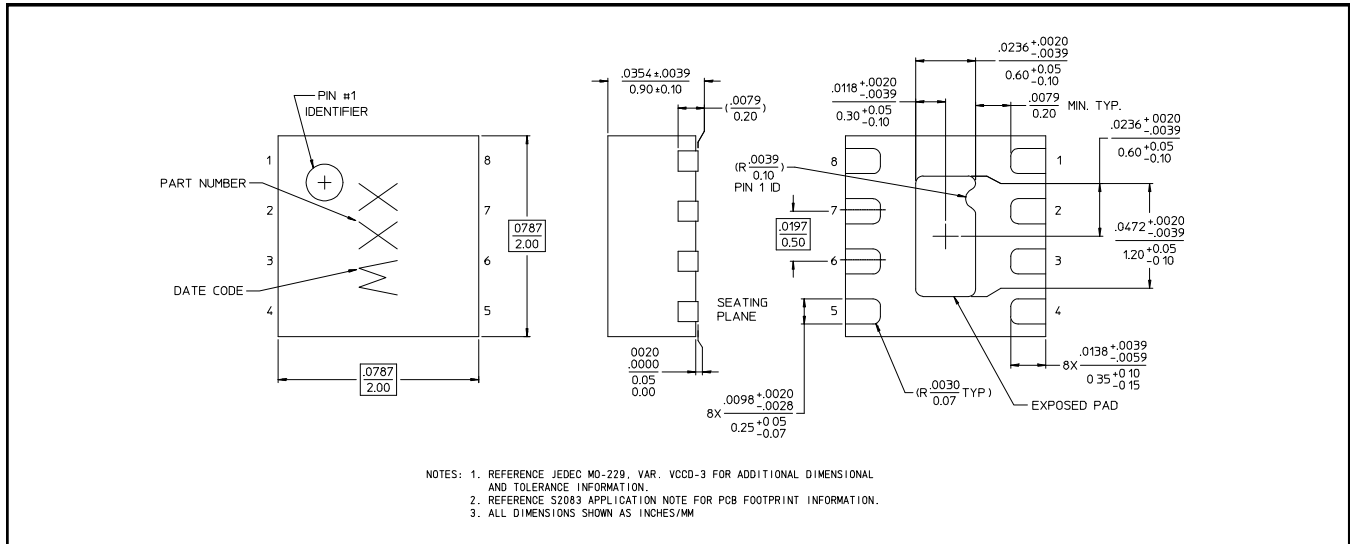
**OUT-OUT Isolation to 3000 MHz**  
**OUT1-OUT2 & OUT1-OUT3**



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### Lead-Free 2 mm 8-Lead PDFN<sup>†</sup>



<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.  
Meets JEDEC moisture sensitivity level 1 requirements.  
Plating is 100% matte tin over copper.

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