MAAM-008970

Satellite Communications Single Ended 2-Way Active Splitter
950 - 2150 MHz

Rev. V2

Features

- 2-Way Splitter
- Single Ended Input and Outputs
- 75 Ω Impedance
- 4.8 dB Gain
- 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

The MAAM-008970 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 inputs and outputs.

The MAAM-008970 is ideally suited for satellite communications multi-tuner set top boxes, and other broadband based appliances.

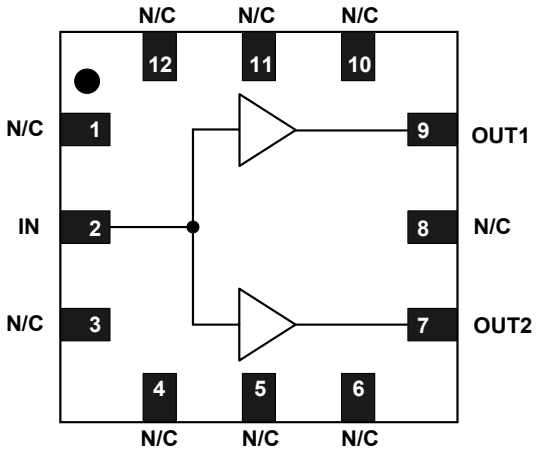
The MAAM-008970 is fabricated using MACOMs' pHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

Ordering Information[1,2]

Part Number	Package
MAAM-008970-TR1000	1000 piece reel
MAAM-008970-TR3000	3000 piece reel
MAAM-008970-001SMB	Sample Test Board

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

Functional Schematic



Pin Configuration[3]

Pin No.	Pin Name	Description
1	N/C	No Connection
2	IN	RF Input
3	N/C	No Connection
4	N/C	No Connection
5	N/C	No Connection
6	N/C	No Connection
7	OUT2	RF Output 2
8	N/C	No Connection
9	OUT1	RF Output 1
10	N/C	No Connection
11	N/C	No Connection
12	N/C	No Connection
13	Paddle[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 2011/65/EU.

Satellite Communications Single Ended 2-Way Active Splitter 950 - 2150 MHz

Rev. V2

Electrical Specifications: Freq: 2150 MHz, T_A = 25°C, V_{DD} = +5 Volts, Z_0 = 75 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	In to Out1, In to Out2	dB	4.0	4.8	5.8
Gain Flatness	In to Out1, In to Out2	dB	—	0.3	—
Noise Figure	In to Out1, In to Out2	dB	—	5.0	—
Input Return Loss	Input	dB	—	12	—
Output Return Loss	Output	dB	—	12	—
Reverse Isolation	Out1 to In, Out2 to In	dB	—	18	—
Output to Output Isolation	Out1 to Out2	dB	—	23	—
Output Power at 1 dB Compression, P1dB	1450 MHz	dBm	—	7	—
Output 3rd Order Intercept Point, OIP3	1450 MHz, P_{IN} = 0 dBm, 6 MHz Spacing	dBm	—	17	—
Output 2nd Order Intercept Point, OIP2	1450 MHz, P_{IN} = 0 dBm, 6 MHz Spacing	dBm	—	30	—
I_{DD}	V_{DD} = + 5 Volts	mA	—	60	75

Absolute Maximum Ratings [4,5,6]

Parameter	Absolute Maximum
Input Power	12 dBm
Vbias	10 V
Operating Temperature	0°C to +85°C
Junction Temperature [7]	+150°C
Storage Temperature	-65°C to +125°C

4. Exceeding any one or combination of these limits may cause permanent damage to this device.
5. MACOM does not recommend sustained operation near these survivability limits.
6. These operating conditions will ensure MTTF > 1 x 10^6 hours.
7. Junction Temperature (T_J) = T_A + Θjc * (V * I)
   Typical thermal resistance (Θjc) = 148 °C/W.
   a) For T_A = 25°C,
   T_J = 69 °C @ 5.0 V, 60 mA
   b) For T_A = 85°C,
   T_J = 126 °C @ 5.0 V, 55 mA

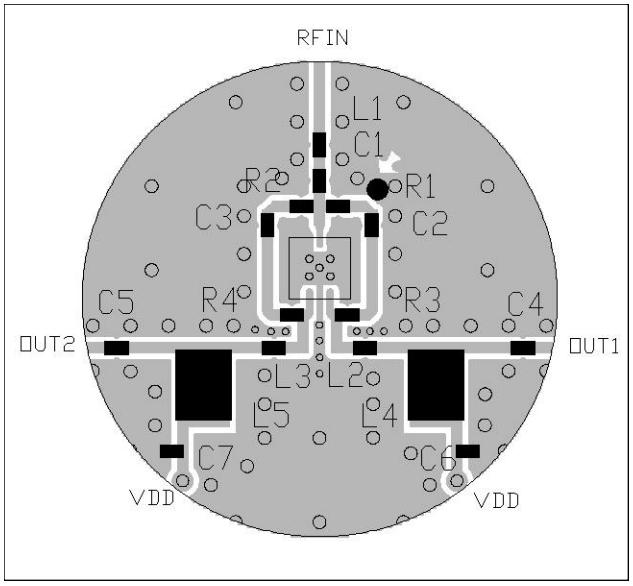
Handling Procedures

Please observe the following precautions to avoid damage:

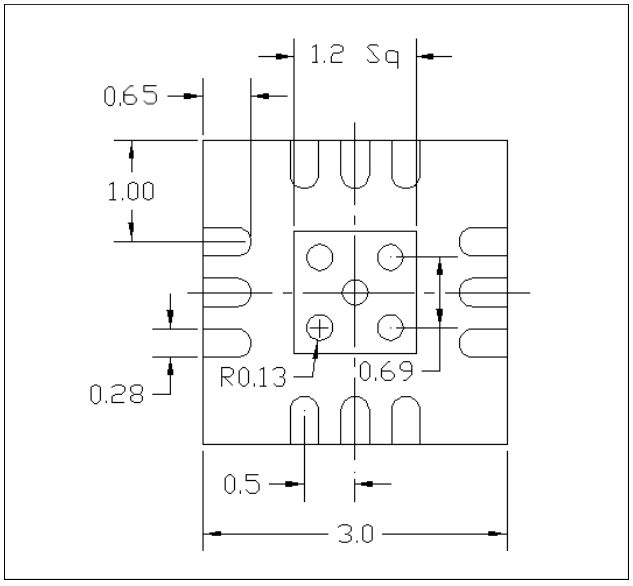
Static Sensitivity

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.

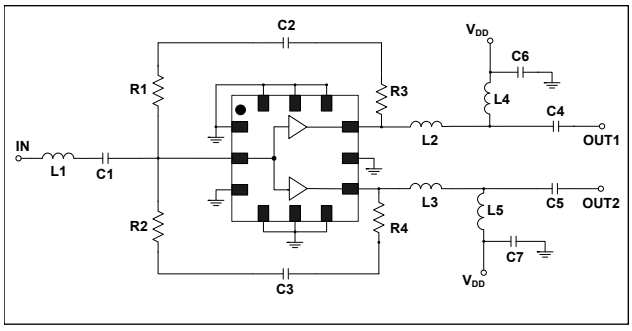
Recommended PCB



PCB Land Pattern



Schematic Including Off-Chip Components

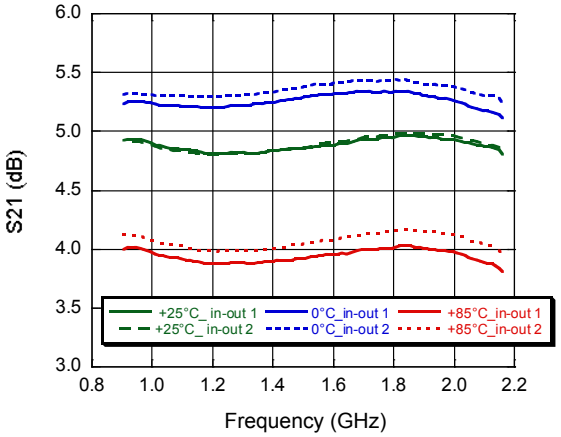


Off-Chip Component Values

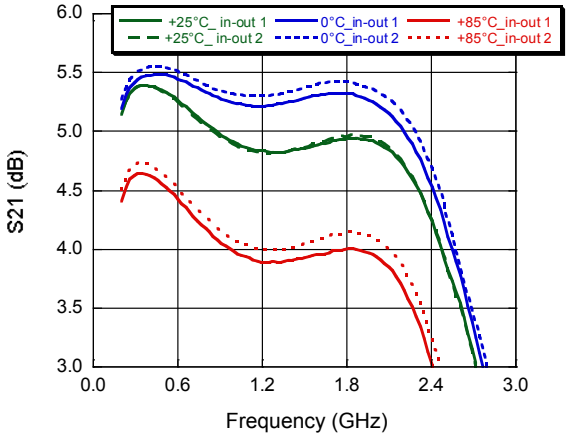
Component	Value	Package
C1 - C5	1000 pF	0402
C6 - C7	0.01 µF	0402
L1	4.7 nH	0402
L2, L3	2 nH	0402
L4, L5	100 nH	1008
R1, R2	480 Ω	0402
R3, R4	75 Ω	0402

Typical Performance Curves

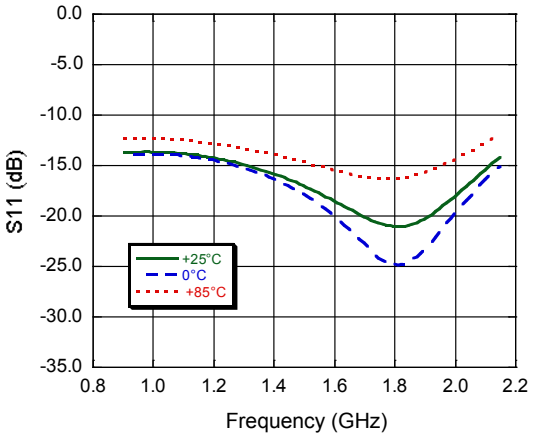
Gain__OUT1 & OUT2



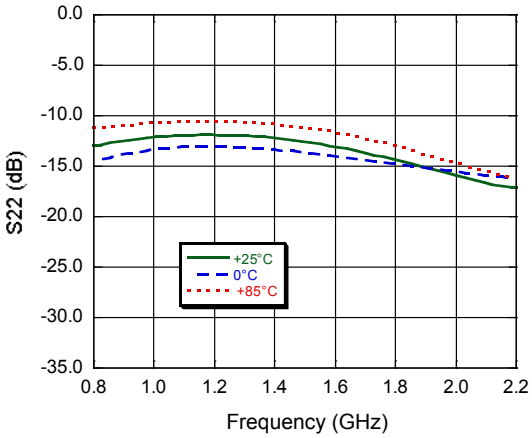
Gain__OUT1 & OUT2 to 3 GHz



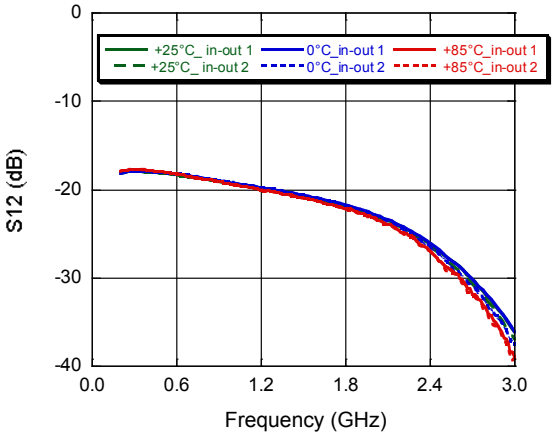
Input Return Loss



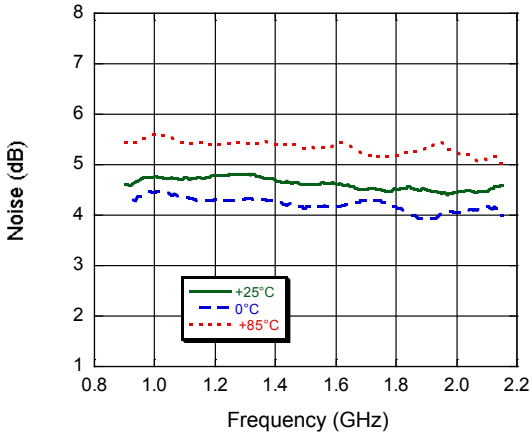
Output Return Loss (Typical both Outputs)



Reverse Isolation to 3 GHz

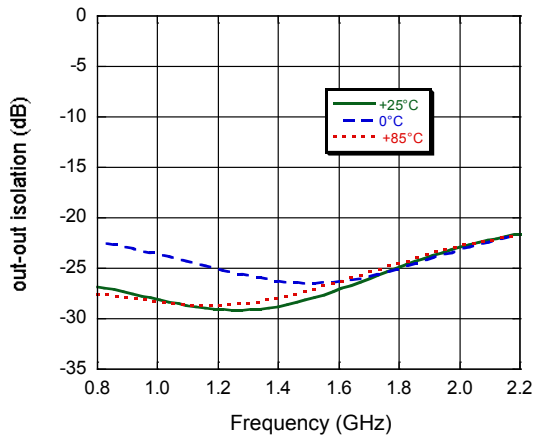


Noise Figure (Typical both Outputs)

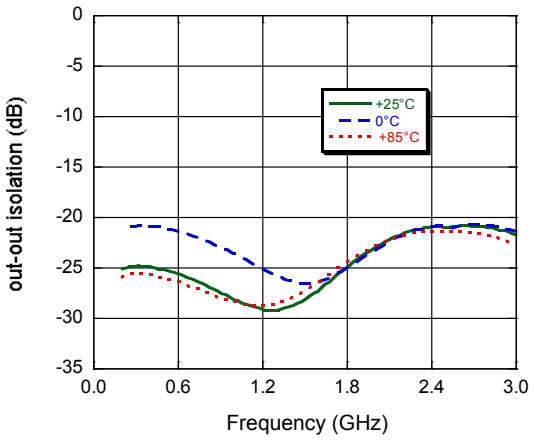


Typical Performance Curves

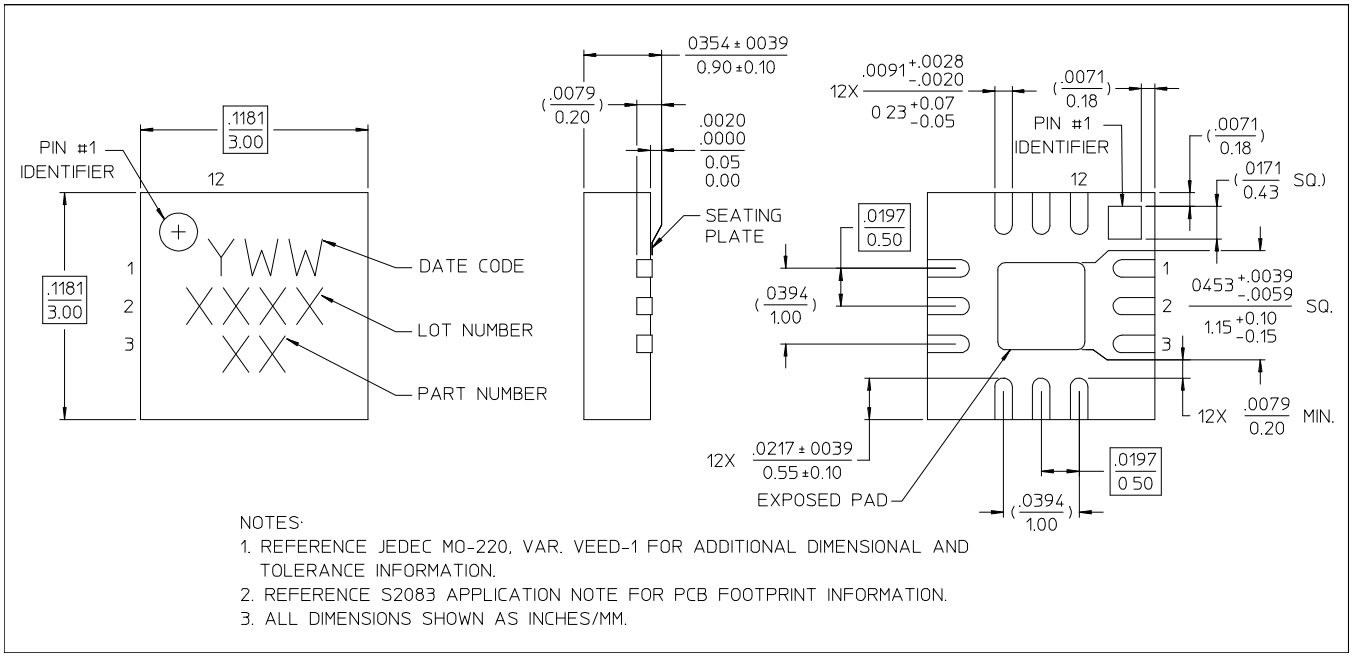
Out - Out Isolation



Out - Out Isolation to 3 GHz



Lead-Free 3 mm 12-Lead PQFN†



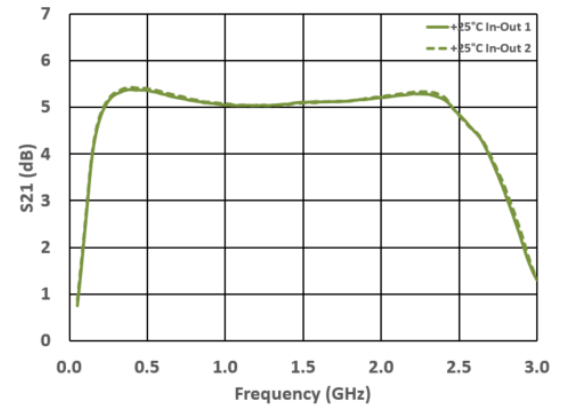
† Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.
Plating is 100% matte tin plating over copper.

Applications Section : 250 - 2350 MHz

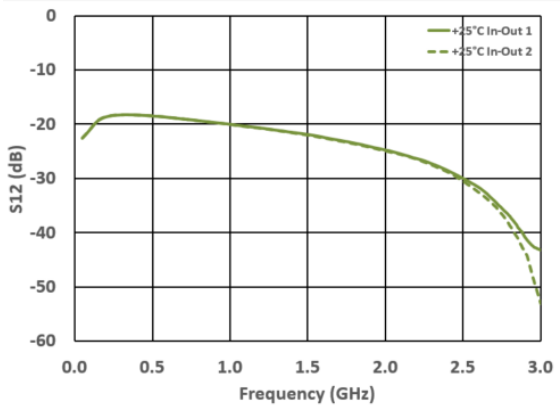
Electrical Specifications: Freq: 250 - 2350 MHz, T_A = 25°C, V_{DD} = +5 Volts, Z_0 = 75 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	In to Out1, In to Out2	dB		5	
Gain Flatness	In to Out1, In to Out2	dB	—	0.5	—
Noise Figure	In to Out1, In to Out2	dB	—	5.0	—
Input Return Loss	Input	dB	—	12	—
Output Return Loss	Output	dB	—	12	—
Reverse Isolation	Out1 to In, Out2 to In	dB	—	18	—
Output to Output Isolation	Out1 to Out2	dB	—	23	—
Output Power at 1 dB Compression, P1dB	1450 MHz	dBm	—	7	—
Output 3rd Order Intercept Point, OIP3	1450 MHz, P_{IN} = 0 dBm, 6 MHz Spacing	dBm	—	17	—
Output 2nd Order Intercept Point, OIP2	1450 MHz, P_{IN} = 0 dBm, 6 MHz Spacing	dBm	—	30	—
I_{DD}	V_{DD} = + 5 Volts	mA	—	60	75

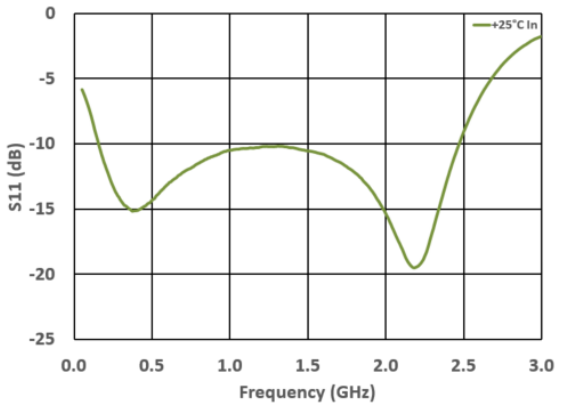
Gain__OUT1 & OUT2



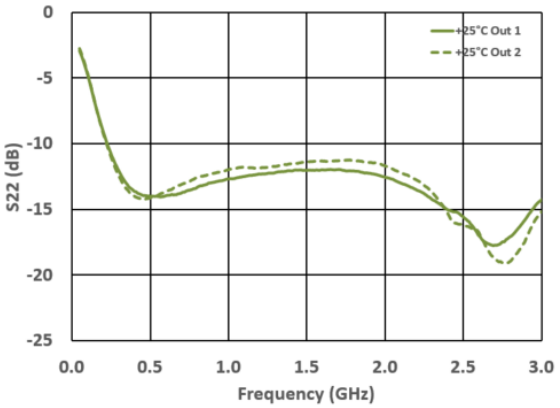
Reverse Isolation



Input Return Loss

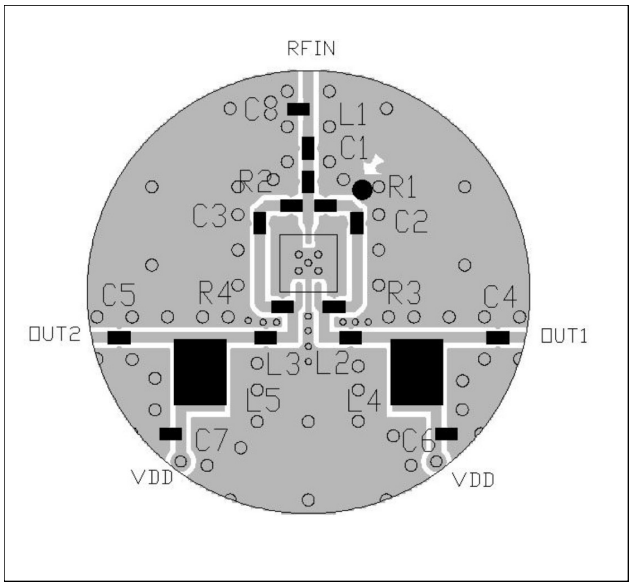


Output Return Loss (Typical both Outputs)



Applications Section : 250 - 2350 MHz

Recommended PCB



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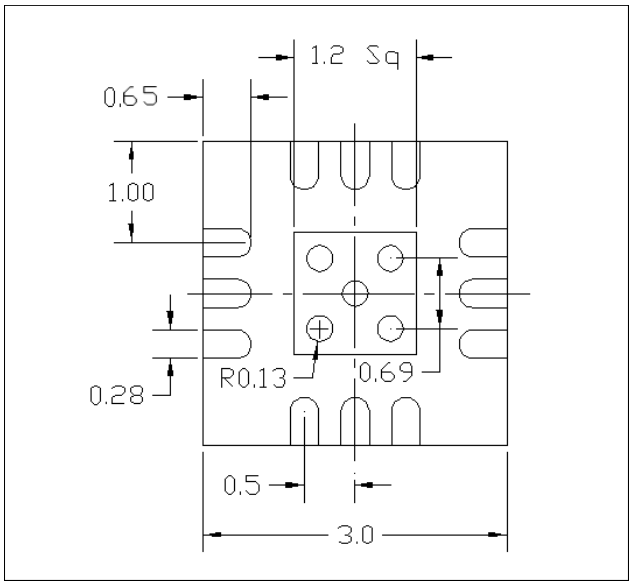

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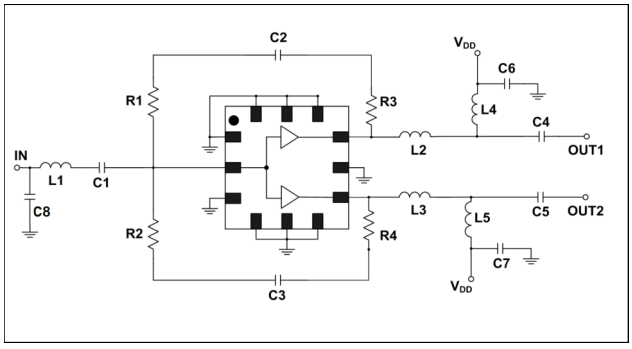

Off-Chip Component Values

Component	Value	Package
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C2- C5	1000 pF	0402
C6 - C7	0.01 µF	0402
C8	0.7pf	0402
L1	5.6 nH	0402
L2, L3	2 nH	0402
L4, L5	100 nH	1008
R1, R2	480 Ω	0402
R3, R4	100 Ω	0402