



CL3010

Limiter + LNA with mid band gain
from 4-20 GHz.

Qorvo TGM2543-SM replacement a,b

Criteria Labs CL3010 is a combination limiter and LNA which provides 4W CW survivability from 4-20 GHz. This unique device has gain performance of 17 dB and 2 dB noise figure. The CL3010 has adjustable gain and is packaged in a space qualified 7x7mm hermetic package.

The CL3010 device is matched to 50 ohms with integrated DC blocking capacitors on both the inputs and outputs and is qualified for military and space applications.



Package: Hermetic, 22-pin, 7.0mm x 7.0mm x 1.27mm

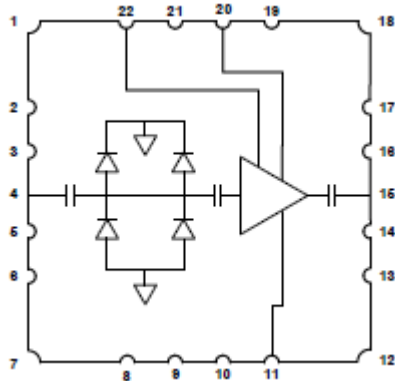
Product Features

- Frequency range: 4 -20 GHz
- Input power CW survivability: 4.0W
- Gain: 17 dB
- Noise Figure: 2.0 dB
- Adjustable Gain
- Bias: $V_d=5V$, $I_{dq}=100mA$, $V_{g1}=-0.6V$, $V_{g2}=1.3V$

Applications:

- Electronic Countermeasures (ECM)
- Phased Arrays
- Wideband Gain Blocks / Low Noise Amplifiers (LNAs)

Functional Block Diagram



Pin Configuration

Pin #	Symbol
1,2,3,5,6,7,9,10,12, 13, 14, 16,17,18,20,21	GND
23 (pkg base)	GND
4	RF In
15	RF Out
8	V_{g1}
11	V_{d1}
22	V_{g2}
19	V_{d2}

- Suitability for model replacement within a system must be determined and is solely the responsibility of the customer.
- The Qorvo TGM2543-SM part number is used for identification and comparison purposes only.



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40-0006 Rev B

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Absolute Maximum Ratings		
Parameter	Rating	Units
Device Current (Id)	144	mA
Drain Voltage	7	V
Gate Voltage 1, Vg1	-2.0 to 0.0	V
Gate Voltage 2, Vg2	-2.0 to +3.0	V
Gate 1 current range, Ig1	-24 to +24	mA
Gate 2 current range, Ig2	-24 to +24	mA
RF Input Power, CW, 50 ohms, T=25°C	+36	dBm
Channel Temperature (Tch)	200	°C
Operating Temperature Range	-40 to +85	°C
Storage Temperature Range	-40 to +150	°C
Moisture Sensitivity Level	Hermetic	
ESD Rating - Human body Model (HBM) *	Class 0	
Package Thermal Resistance	28.6	°C / W

Recommended Operating Conditions				
Parameter	CL3010 Specifications			Units
	Min	typ	Max	
Vd		5		V
Id drive (at -10dBm RF input drive)		100		mA
Vg1		-0.6		V
Vg2		+1.3		V



Caution! ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

Electrical Specifications				
Test conditions unless otherwise noted: 25°C, Vd=5V, Id=100mA, Vg1= -0.6V, Vg2= +1.3V				
Parameter	CL3010 Specifications			Units
	Min	typ	Max	
Operational Frequency Range	4		20	GHz
Small Signal Gain		17		dB
Input Return Loss		-15		dB
Output Return Loss		-15		dB
Noise Figure		2		dB
Output Third Order Intercept, 11 Mhz tone separation		28		dBm
Output Power @ Saturation		21		dBm
Output Power @ 1 dB compression		18		dBm
Gain Temperature Coefficient		-0.014		dB/°C
Noise Figure Temperature Coefficient		+0.011		dB/°C
Output Power Temperature Coefficient		-0.012		dB/°C



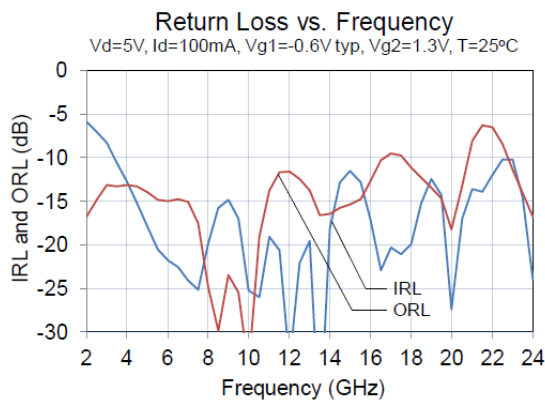
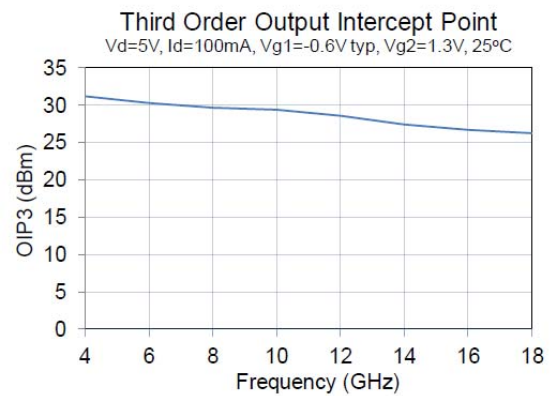
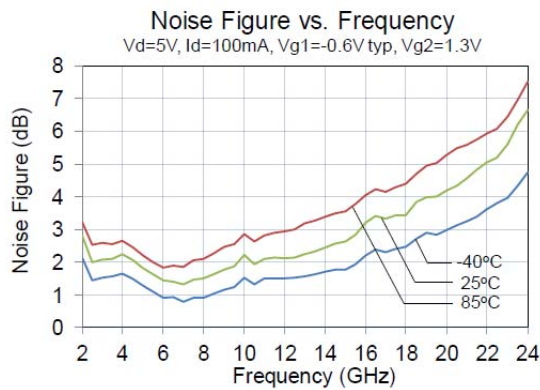
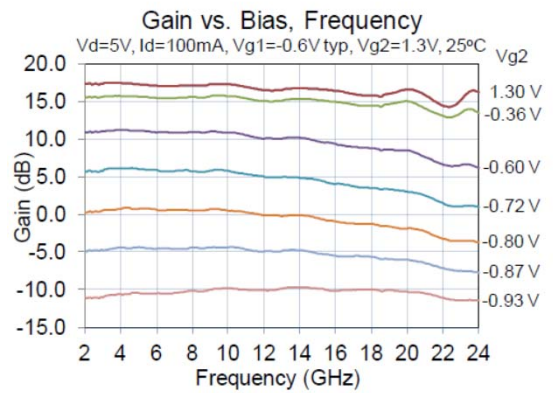
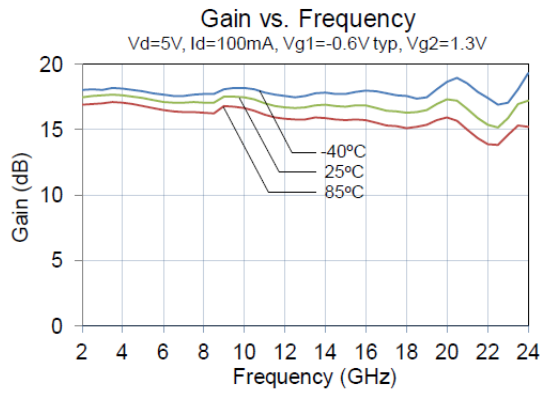
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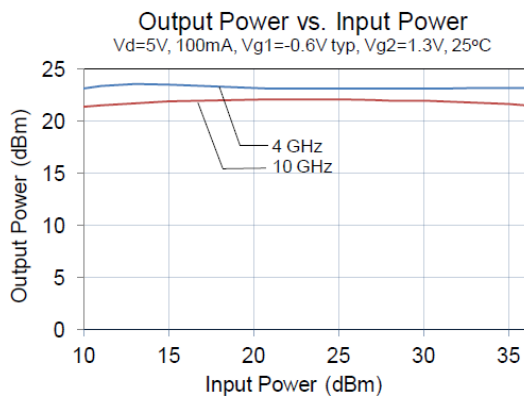
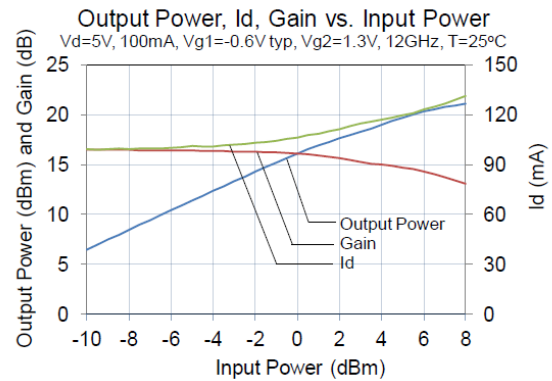
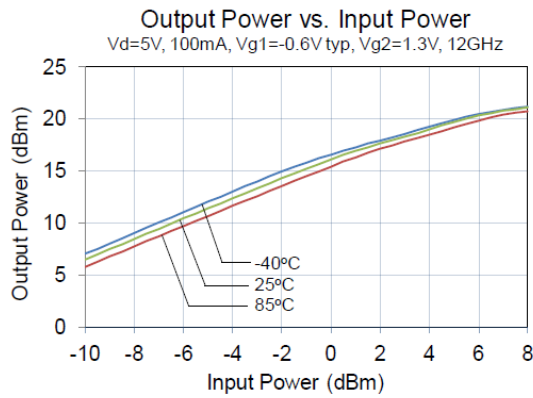
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Typical Performance



Typical Performance



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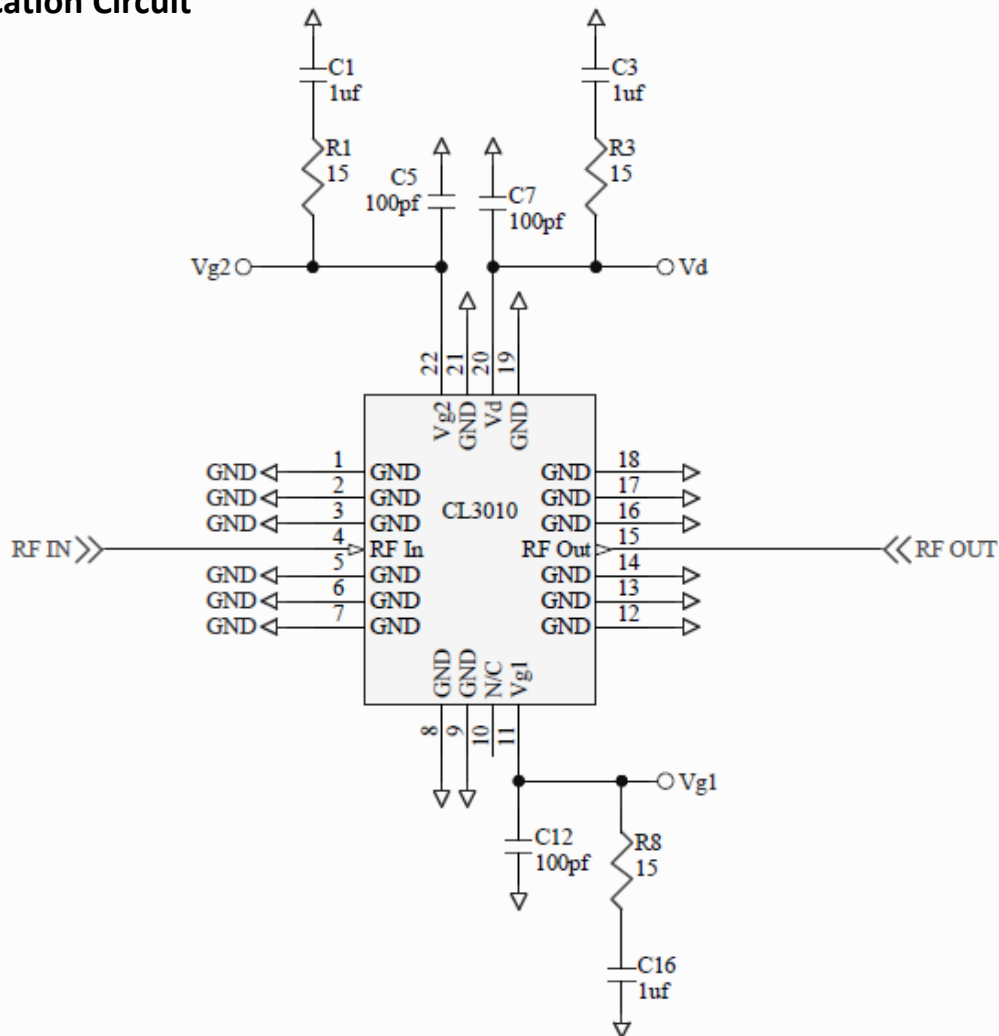
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Application Circuit



Bias-Up Procedure	Bias-Down Procedure
Turn Vg1 to -1.5V	turn off RF signal
Turn Vd to 5.0 V	Reduce Vg1 to -1.5 V. Ensure Id is approximately 0.0mA
Turn Vg2 to 1.3 V	Turn Vg2 to 0.0 V
Adjust Vg1 more positive until Id is 100 mA. Vg1 should be approximately - 0.6 V typical.	Turn Vd to 0.0 V
Apply RF signal	Turn Vg1 to 0.0 V



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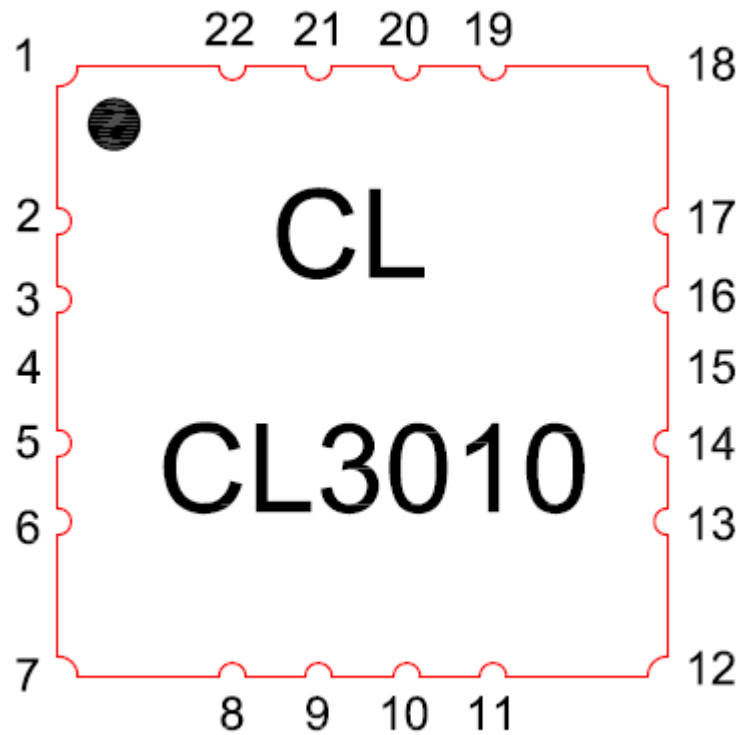
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Pin Description



Pin #	Symbol	
1,2,3,5,6,7,9,10,12, 13, 14, 16,17,18,20,21	GND	Connected to Ground
23 (pkg base)	GND	Package Base
4	RF In	Input, matched to 50 ohms
15	RF Out	Output, matched to 50 ohms
8	Vg1	Gate 1 voltage. Bias network is required
11	Vd1	Drain 1 voltage. Bias network is required.
22	Vg2	Gate 2 voltage. Bias network is required
19	Vd2	Drain 2 voltage. Bias network is required.



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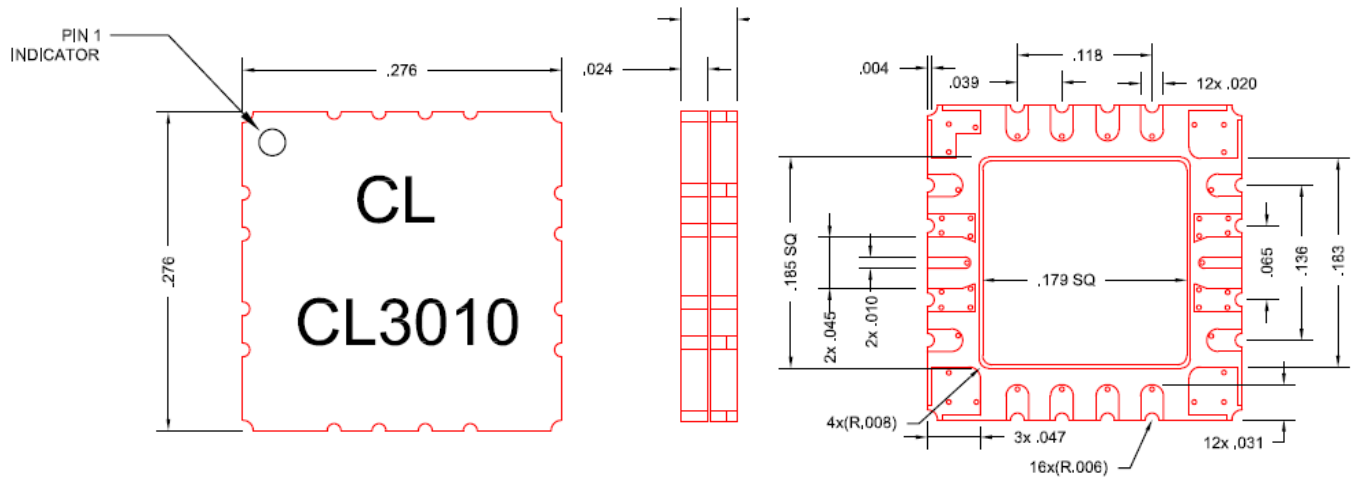
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Mechanical Information

Package Information and Dimensions

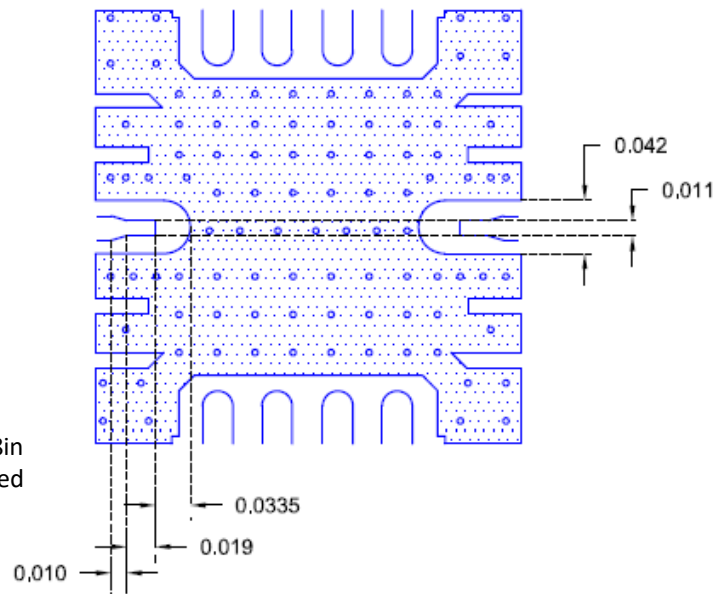
All dimensions in inches and are ± 0.006 " unless otherwise noted.



PCB Mounting Pattern

All dimensions in inches

1. The pad pattern shown has been developed and tested for optimized assembly. The PCB land pattern has been developed to accommodate lead and package tolerances. Since surface mount processes vary from company to company, careful process development is recommended.
2. Ground / thermal vias are critical for the proper performance of this device. Vias should use a 0.008in diameter drill, and they are solid filled, copper plated shut or silver filled paste with over plating.



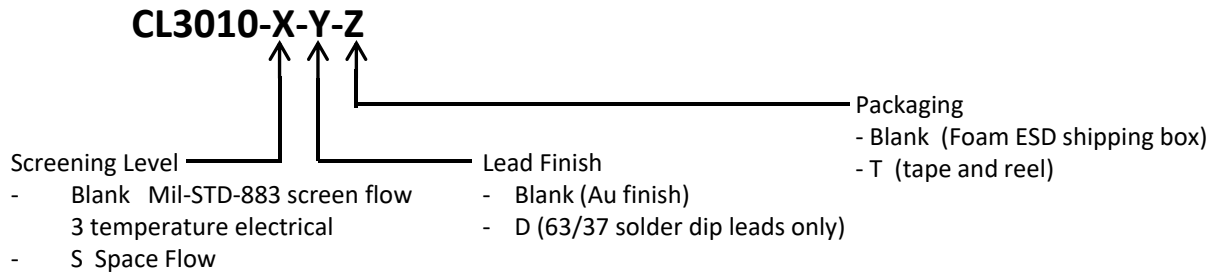
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