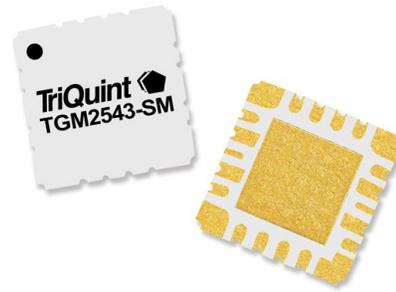


TGM2543-SM

4-20 GHz Limiter/LNA

Applications

- Receiver front end building block



QFN 7x7mm 22L

Product Features

- Frequency Range: 4 - 20 GHz
- Input Power CW Survivability: 4 W
- Gain: 17 dB
- Noise Figure: 2 dB
- OIP3: 28 dBm
- Adjustable gain
- Bias: $V_d = 5\text{ V}$, $I_d = 100\text{ mA}$, $V_{g1} = -0.6\text{ V}$ typical, $V_{g2} = 1.3\text{ V}$
- Hermetically sealed (MIL-STD-883H TM 1014.13 cond. A₁/C₁)

General Description

The TriQuint TGM2543-SM is a combination limiter/LNA which provides 4W CW survivability, 17 dB mid-band gain, and 2 dB mid-band noise figure, with operation across 4-20 GHz. This product features adjustable gain and uses a high performance ceramic package. The TGM2543-SM limiter is designed using TriQuint's proven standard GaAs VPIN product process, and the LNA function is fabricated with the GaAs pHEMT 0.15 μm gate production process.

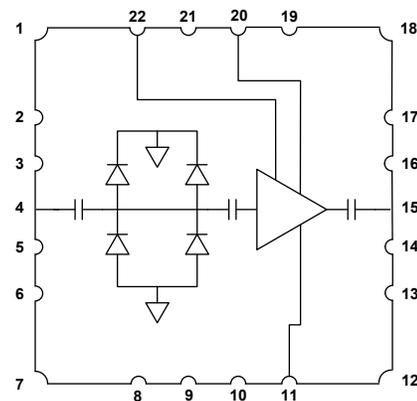
The TGM2543-SM features flat gain and low noise figure in a hermetically sealed ceramic QFN designed for surface mount to a printed circuit board.

Fully matched to 50 ohms and with integrated DC blocking capacitors on both I/O ports, the TGM2543-SM is ideally suited to support both commercial and defense related applications

Lead-free and RoHS compliant.

Evaluation Boards are available upon request.

Functional Block Diagram



Pin Configuration

Pin #	Symbol
1,2,3,5,6,7,8,9,12,13,14,16,17,18,19,21	Gnd
4	RF In
10	N/C
11	Vg1
15	RF Out
20	Vd
22	Vg2

Ordering Information

Part No.	ECCN	Description
TGM2543-SM	EAR99	Wideband Limiter/LNA

TGM2543-SM

4-20 GHz Limiter/LNA



Specifications

Absolute Maximum Ratings

Parameter	Rating
Drain Voltage, Vd	7 V
Gate Voltage 1, Vg1	-2 to 0 V
Gate Voltage 2, Vg2	-2 to +3 V
Drain Current, Id	144 mA
Gate 1 Current range, Ig1	-24 to 24 mA
Gate 2 Current range, Ig2	-24 to 24 mA
RF Input Power, CW, 50Ω, T = 25°C	36 dBm
Channel Temperature, Tch	200°C
Mounting Temperature (30 Seconds)	260 °C
Storage Temperature	-40 to 150 °C

Operation of this device outside the parameter ranges given above may cause permanent damage. These are stress ratings only, and functional operation of the device at these conditions is not implied.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
Vd		5		V
Id_drive (at -10 dBm RF input drive)		100		mA
Vg1		-0.6		V
Vg2		1.3		V

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions

Electrical Specifications

Test conditions unless otherwise noted: 25°C, Vd = 5 V, Id = 100 mA, Vg1 = -0.6 V typical, Vg2 = 1.3 V

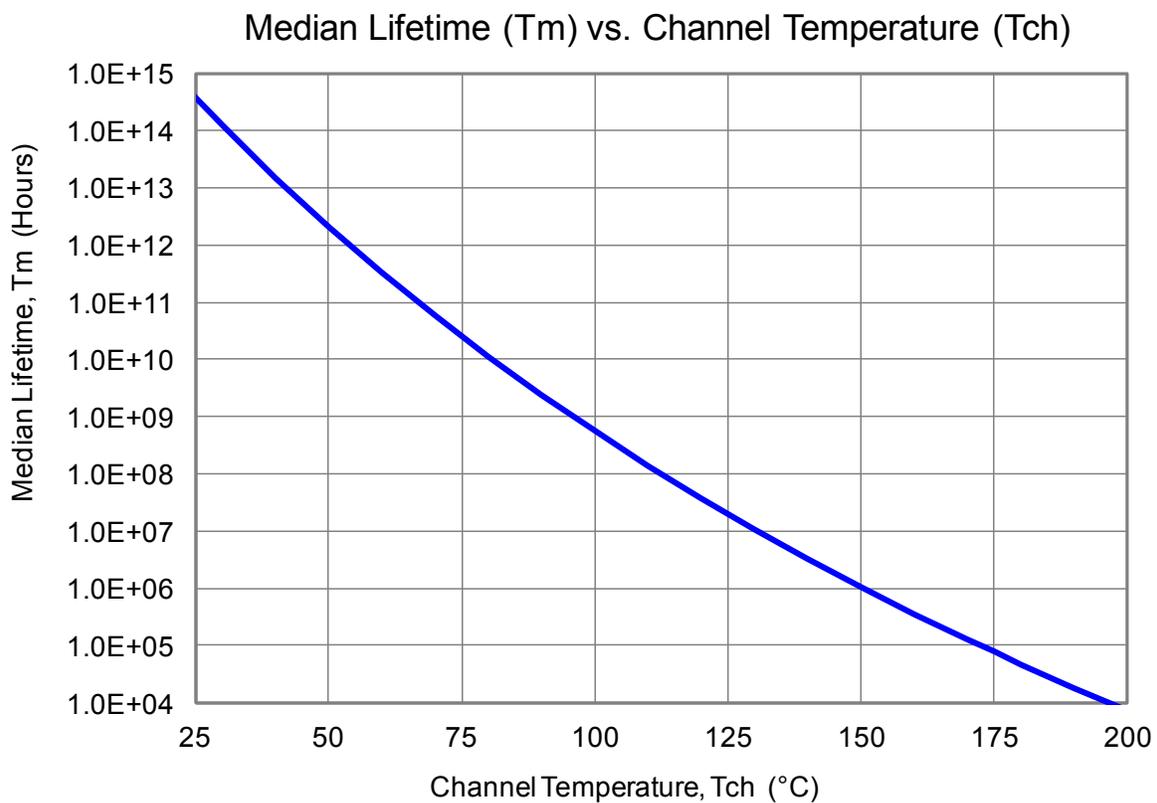
Parameter	Min	Typ	Max	Units
Operational Frequency Range	4		20	GHz
Small Signal Gain		17		dB
Input Return Loss		-15		dB
Output Return Loss		-15		dB
Noise Figure		2		dB
Output Third Order Intercept, 10 MHz tone separation		28		dBm
Output Power @ Saturation		21		dBm
Output Power @ 1 dB compression		18		dBm
Gain Temperature Coefficient		-0.014		dB/°C
Noise Figure Temperature Coefficient		0.011		dB/°C
Output Power Temperature Coefficient		-0.012		dB/°C

Specifications (cont'd)

Thermal and Reliability Information

Parameter	Condition	Rating
Channel Temperature (Tch), Median Lifetime (Tm), Thermal Resistance*	Tbase = 85 °C, Vd = 5V, Id = 100 mA, Pdiss = 0.5 W, -10 dBm RF input power, CW	Tch = 99 °C Tm = 5.6E+8 Hours θJC = 28.6°C/W

* Thermal Resistance, θJC, measured to center bottom of package

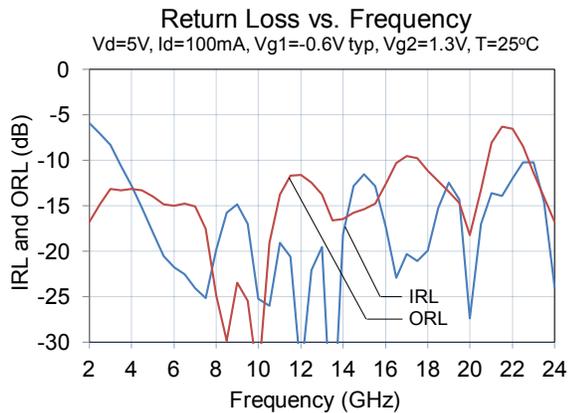
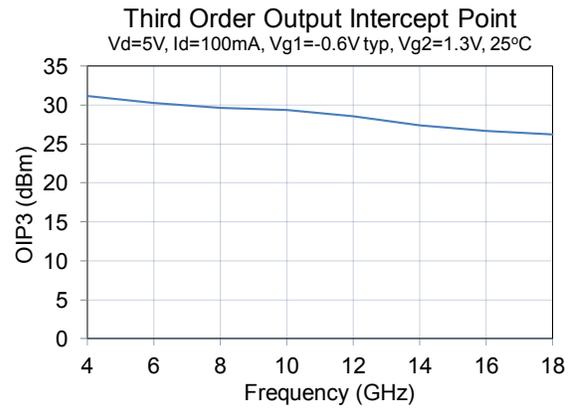
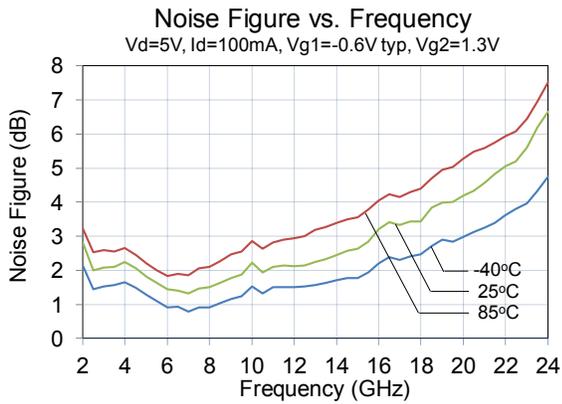
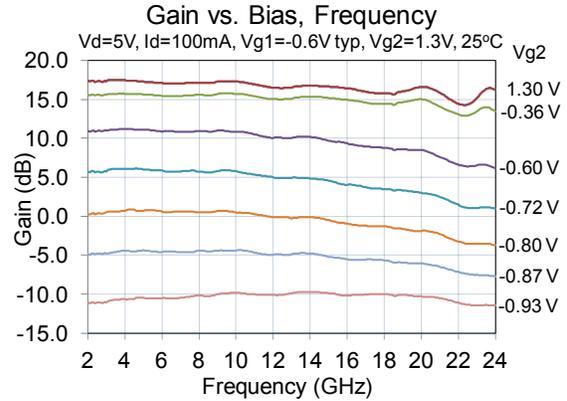
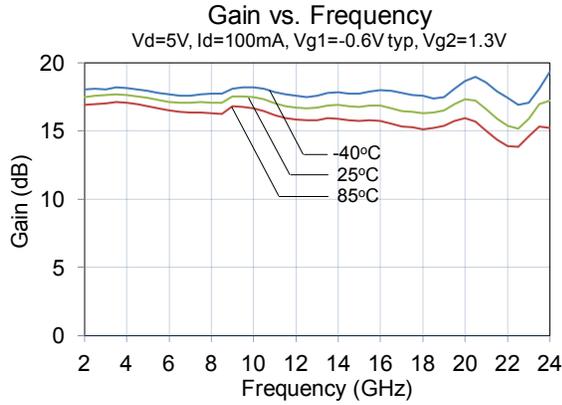


TGM2543-SM

4-20 GHz Limiter/LNA



Typical Performance

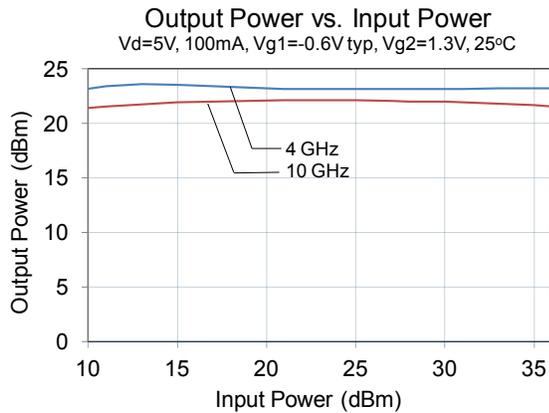
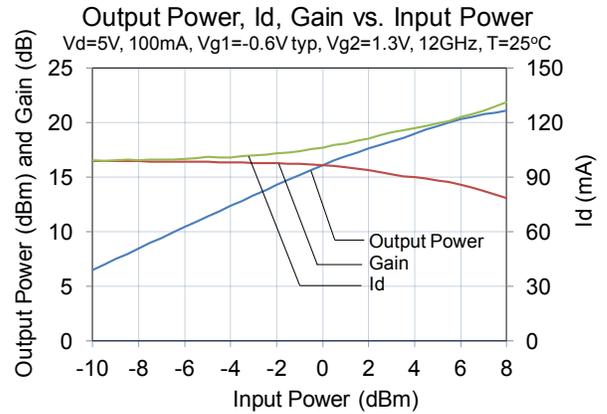
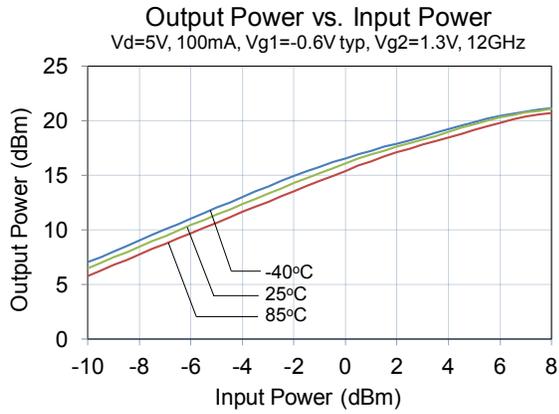


TGM2543-SM

4-20 GHz Limiter/LNA



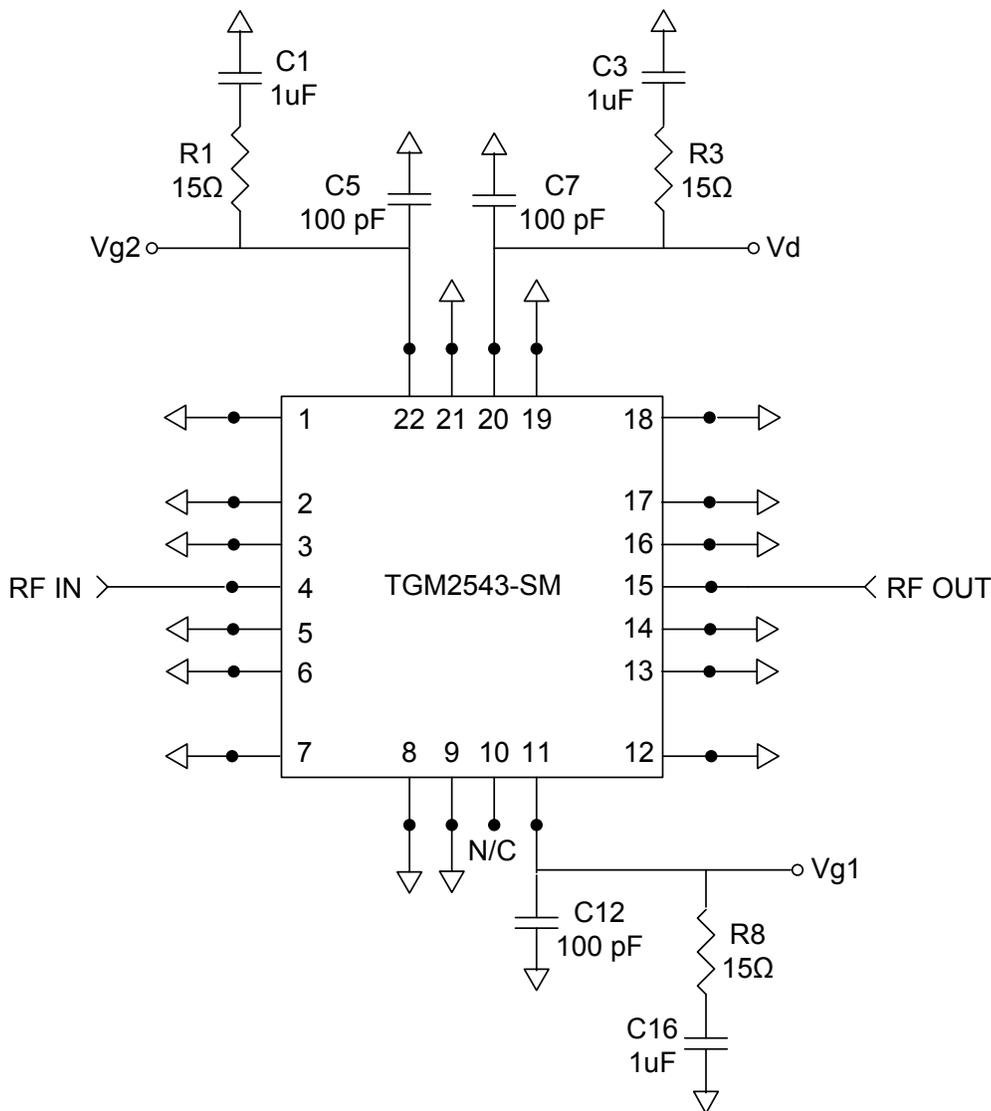
Typical Performance



TGM2543-SM

4-20 GHz Limiter/LNA

Application Circuit



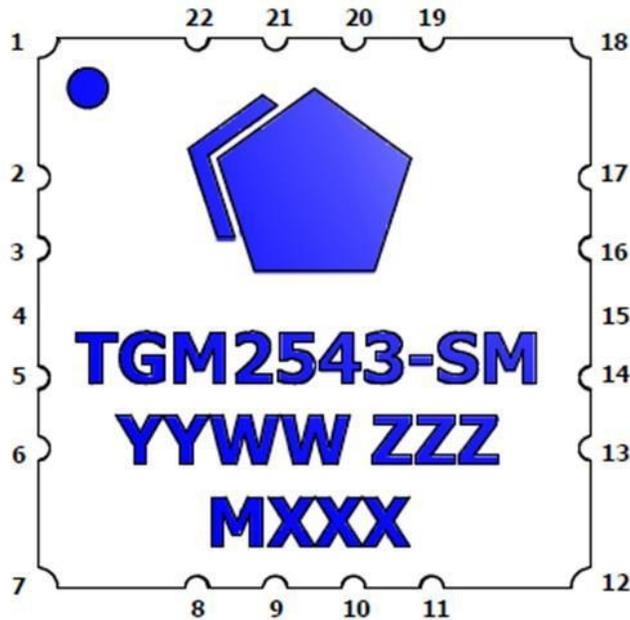
Bias-up Procedure

- Turn Vg1 to -1.5 V
- Turn Vd to 5 V
- Turn Vg2 to 1.3 V
- Adjust Vg1 more positive until Id is 100 mA. This will be Vg1 ~ -0.6 V typical
- Apply RF signal

Bias-down Procedure

- Turn off RF signal
- Reduce Vg1 to -1.5 V. Ensure Id ~ 0 mA
- Turn Vg2 to 0 V
- Turn Vd to 0 V
- Turn Vg1 to 0 V

Pin Description



Pin #	Symbol	Description
1,2,3,5,6,7,8,9, 12,13,14,16,17,18, 19,21	Gnd	Connect to Ground
4	RF In	Input, matched to 50Ω
10	N/C	No internal connection; may be left open
11	Vg1	Gate 1 voltage. Bias network is required
15	RF Out	Output, matched to 50Ω
20	Vd	Drain voltage. Bias network is required
22	Vg2	Gate 2 voltage. Bias network is required

Note: See Application Circuit on page 6 as an example

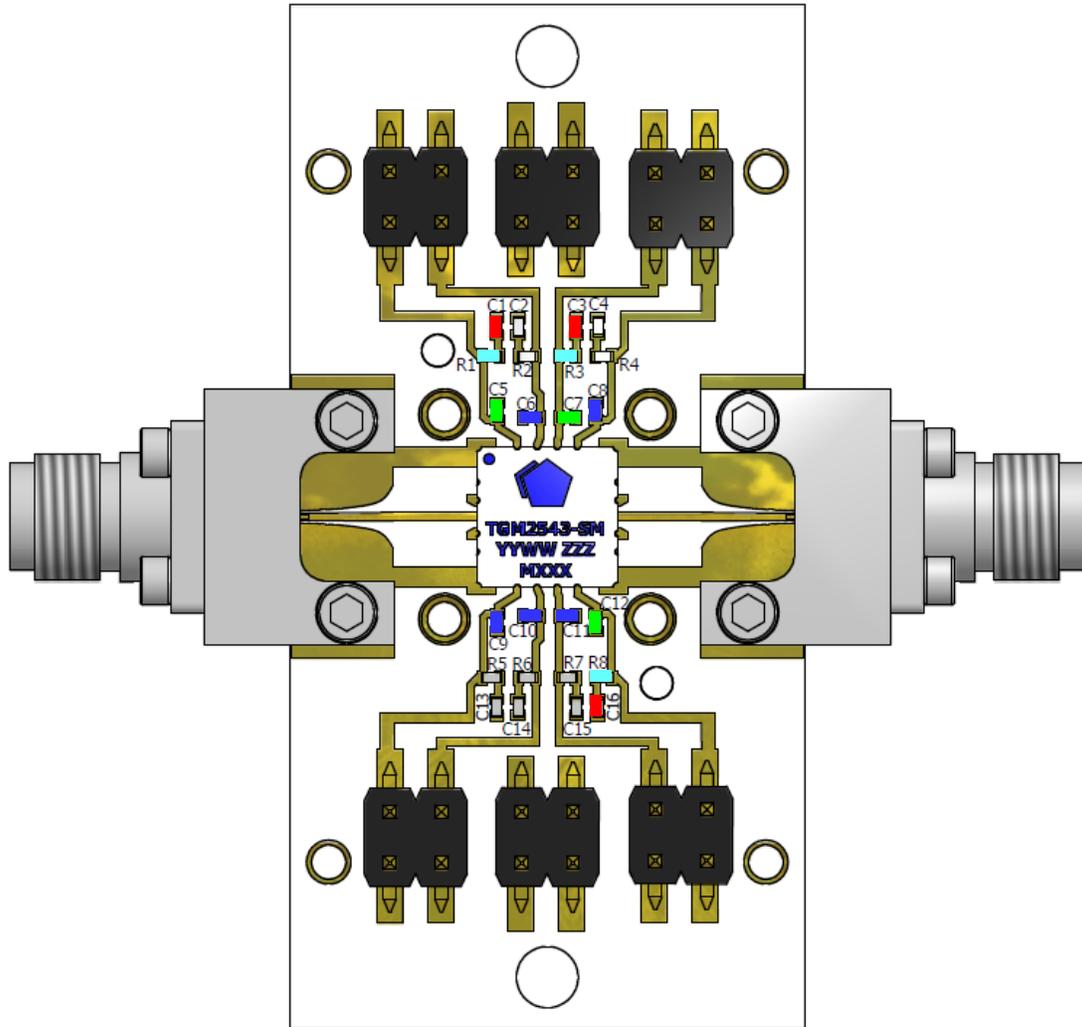
TGM2543-SM

4-20 GHz Limiter/LNA

Evaluation Board Layout

PC Board Layout

Board material is RO4003 0.008" thickness with ½ oz copper cladding.



Bill of Material

Ref Des	Value	Description	Manufacturer	Part Number
C1,C3,C16	1 uF	Cap, 0402	TDK	C1005XR1C105M
C5,C7,C12	100 pF	Cap, 0402	AVX	04025C101KAT2A
R1,R3,R8	15Ω	Resistor, 0402	Panasonic	ERJ-2GEJ150X
C6,C8,C9, C10,C11	0Ω	Resistor, 0402	Various	

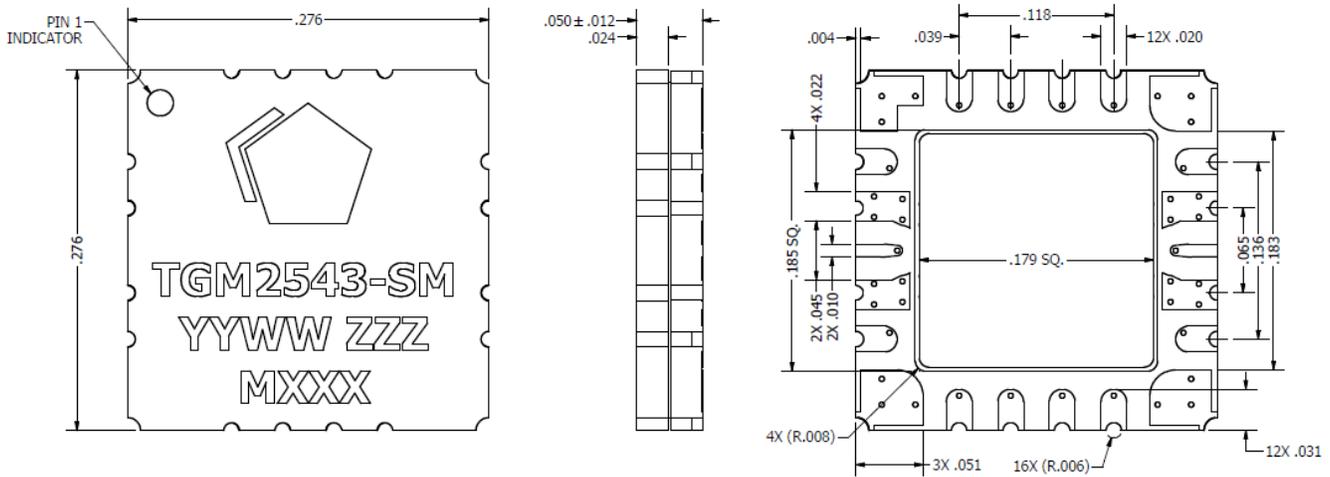
TGM2543-SM

4-20 GHz Limiter/LNA

Mechanical Information

Package Information and Dimensions

All dimensions in inches and are +/- 0.006in unless otherwise noted.



Part marking:

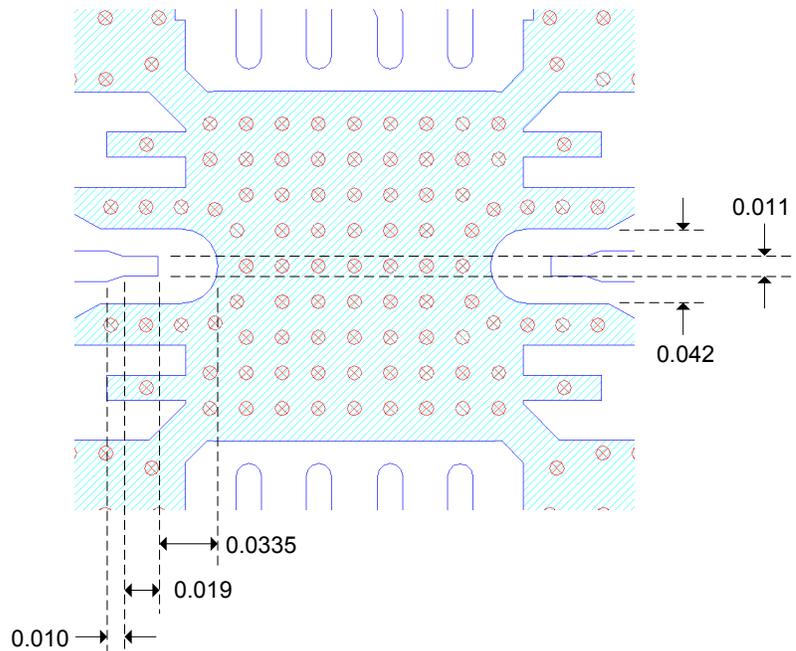
YY	assembly lot start year
WW	assembly lot start week
ZZZ	part serial number
MXXX	batch ID

PCB Mounting Pattern

All dimensions in inches

Notes:

- The pad pattern shown has been developed and tested for optimized assembly at TriQuint Semiconductor. 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.
- 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.



Product Compliance Information

ESD Information



Caution! ESD-Sensitive Device

ESD rating: Class 0
 Value: Passes < 250 V
 Test: Human Body Model (HBM)
 Standard: JEDEC Standard JESD22-A114

Solderability

This part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

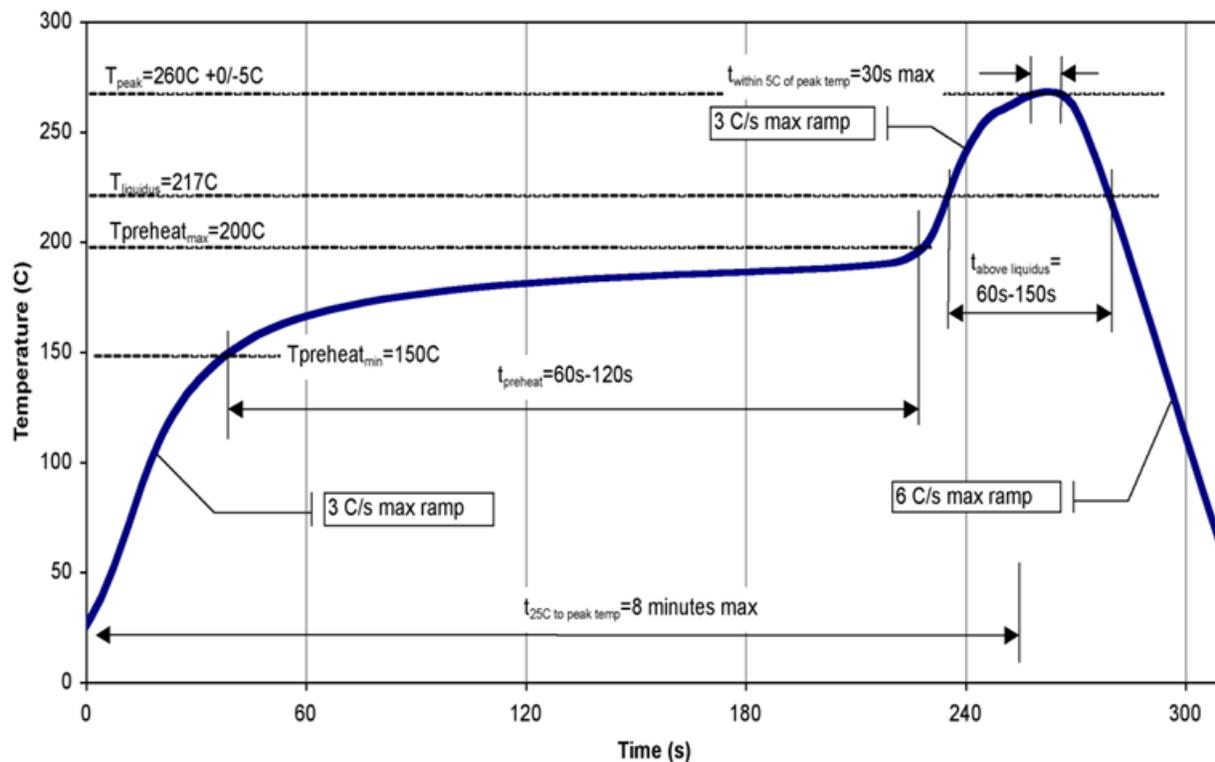
This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C₁₅H₁₂Br₄O₂) Free
- PFOS Free

ECCN

US Department of Commerce: EAR99

Recommended Soldering Temperature Profile



TGM2543-SM

4-20 GHz Limiter/LNA



Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations, and information about TriQuint:

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