CMD226

Passive Frequency Doubler, 7-11 GHz Input

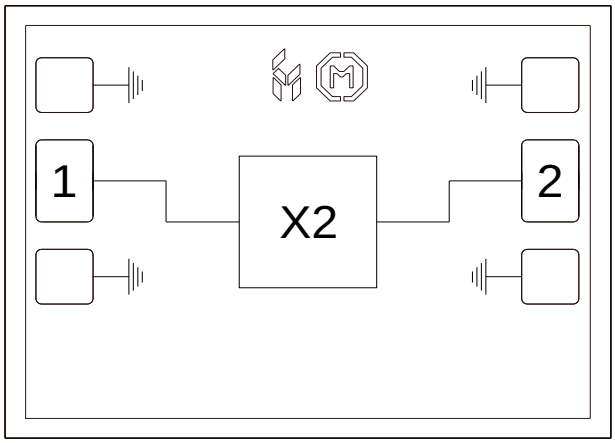
Product Overview

The CMD226 die is a broadband MMIC GaAs x2 passive frequency multiplier. When driven by a +15 dBm signal, the multiplier provides 10.5 dB conversion loss at an output frequency of 18 GHz. The Fo and 3Fo isolations are 44 dBc and 46 dBc respectively. The CMD226 is a 50 ohm matched design eliminating the need for RF port matching.

Key Features

- Low Conversion Loss
- Excellent Fo Isolation
- Broadband Performance
- No Bias Required
- Small Die Size: 1060 um x 790 um

Functional Block Diagram



Ordering Information

Part No.	Description
CMD226	Passive Frequency Doubler, 7-11 GHz Input, 100 Piece Gel Pack

Electrical Performance (T_A = 25 °C, Pin = +15 dBm, Fin = 9 GHz)

Parameter	Min	Typ	Max	Units
Frequency Range, Input		7 - 11		GHz
Frequency Range, Output		14 - 22		GHz
Conversion Loss		10.5		dB
Fo Isolation (with respect to input level)		44		dB
3Fo Isolation (with respect to input level)		46		dB
4Fo Isolation (with respect to input level)		50		dB

Absolute Maximum Ratings

Parameter	Rating
RF Input Power	+22 dBm
Operating Temperature	-55 to 85 °C
Storage Temperature	-55 to 150 °C
Thermal Resistance, θ_{JC}	605 ºC/W

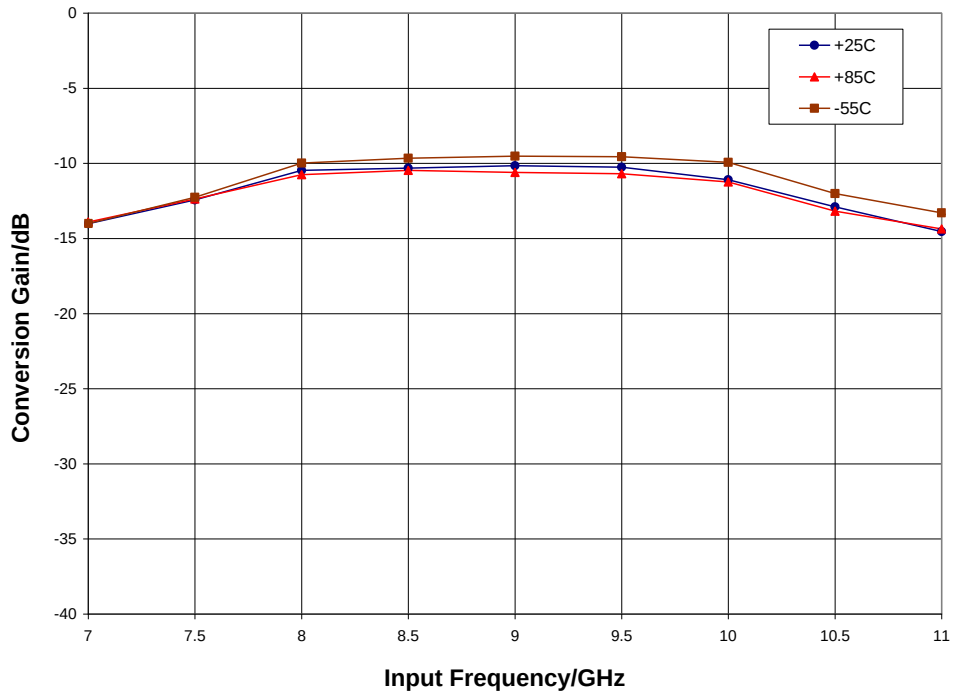
Exceeding any one or combination of the maximum ratings may cause permanent damage to the device.

Electrical Specifications (T_A = 25 ºC, Pin = +15 dBm)

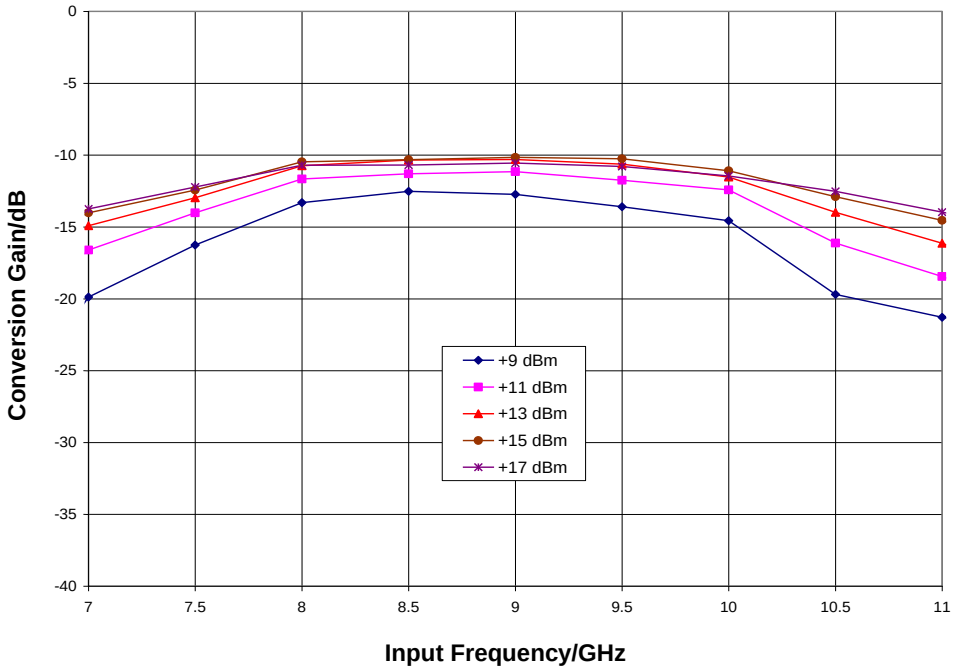
Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range, Input		7 - 11			8 - 10		GHz
Frequency Range, Output		14 - 22			16 - 20		GHz
Conversion Loss		11	16		10.5	13	dB
Fo Isolation (with respect to input level)	33	44		33	44		dB
3Fo Isolation (with respect to input level)	37	48		40	48		dB
4Fo Isolation (with respect to input level)	25	45		33	45		dB

Typical Performance

Conversion Gain vs. Temperature @ +15 dBm Drive Level

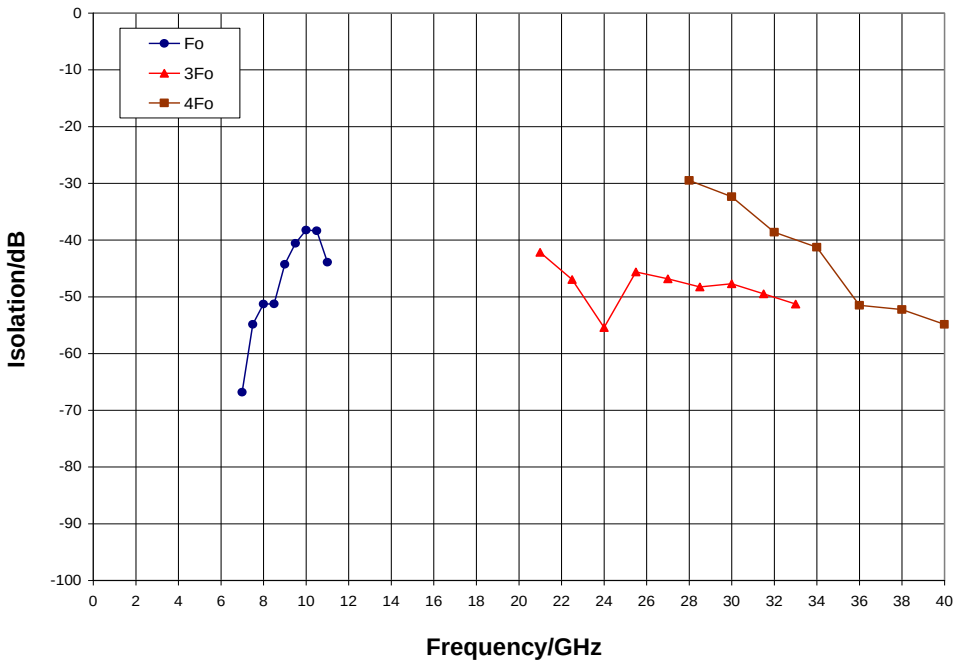


Conversion Gain vs. Drive Level, T_A = 25 °C

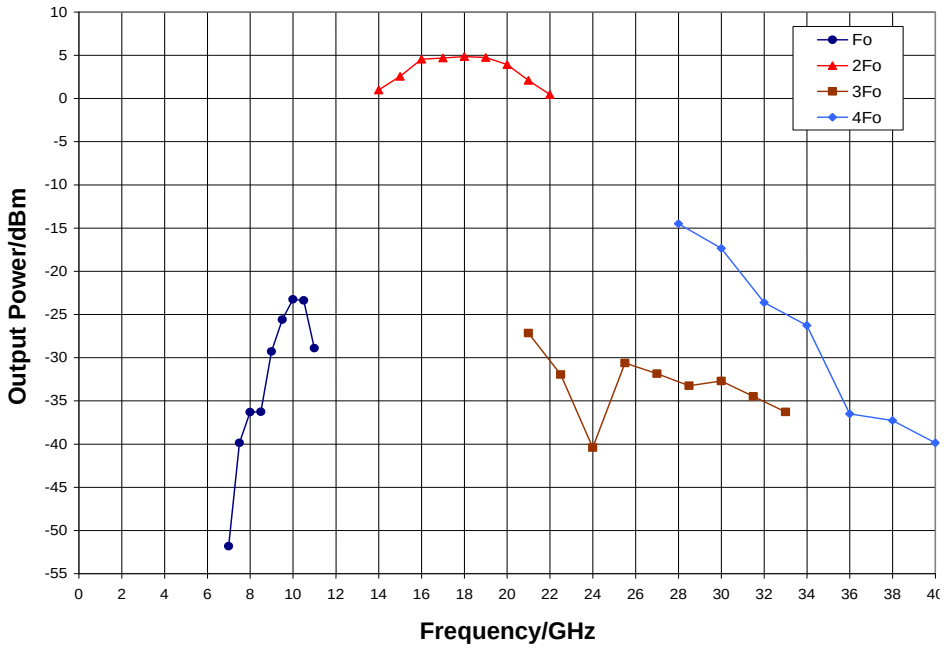


Typical Performance

Isolation (with respect to input level) @ +15 dBm Drive Level, T_A = 25 °C

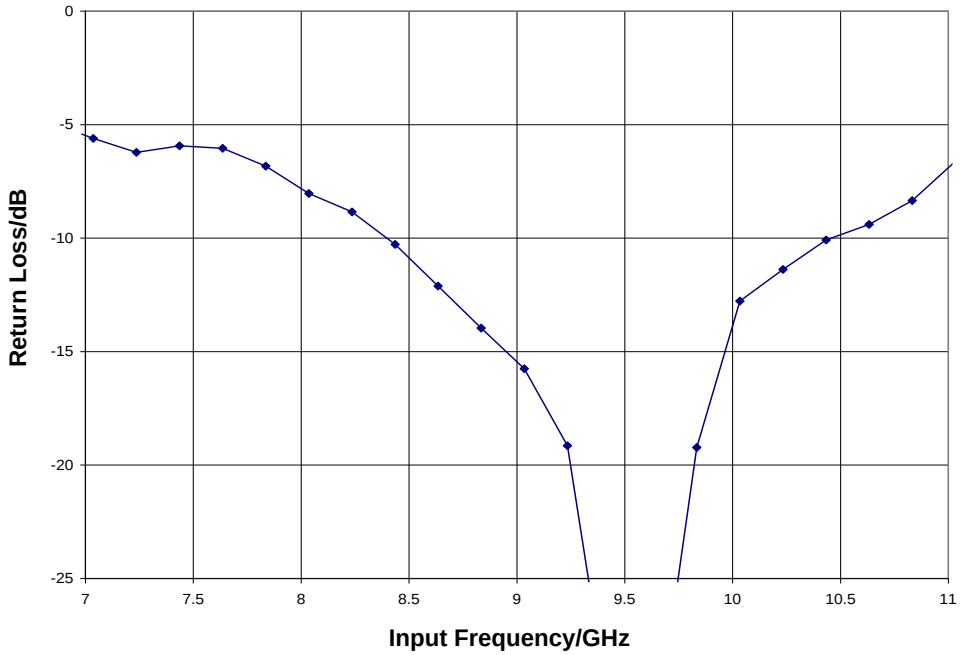


Output Spectrum @ +15 dBm Drive Level, T_A = 25 °C

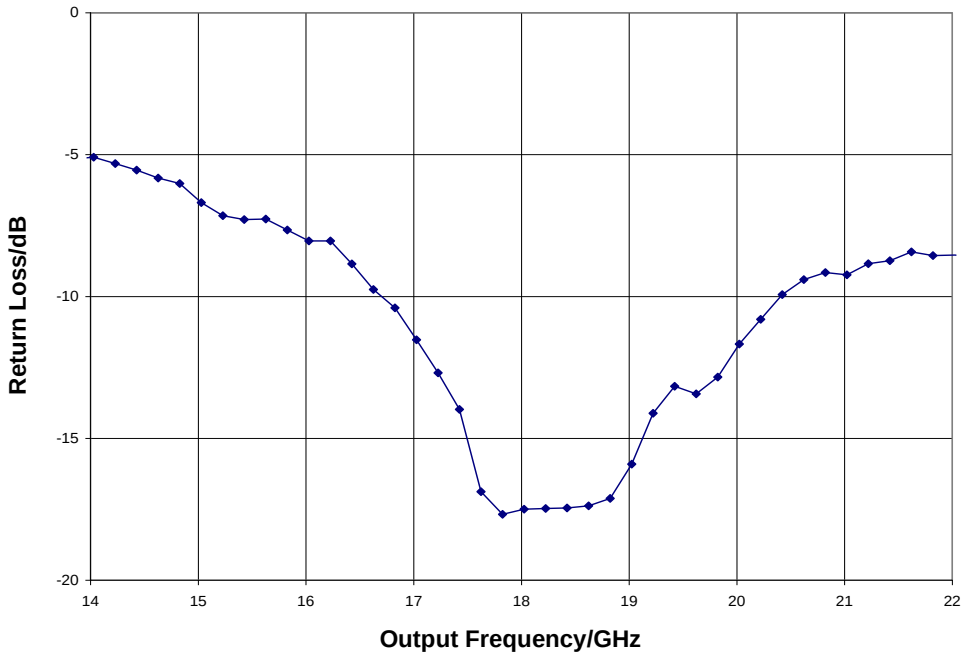


Typical Performance

Input Return Loss @ +15 dBm Drive Level, T_A = 25 °C

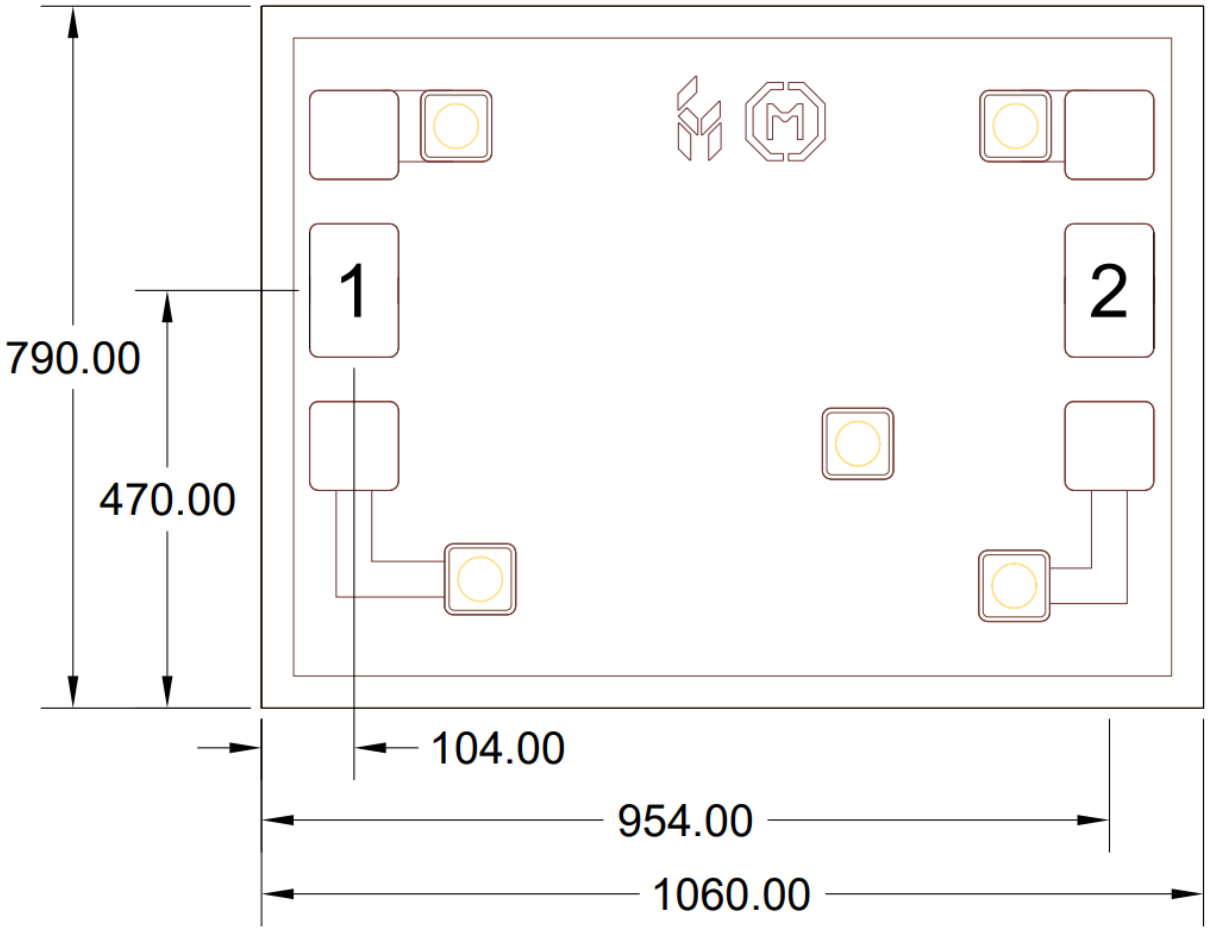


Output Return Loss @ +15 dBm Drive Level, F = 9 GHz Input, T_A = 25 °C



Mechanical Information

Die Outline (all dimensions in microns)

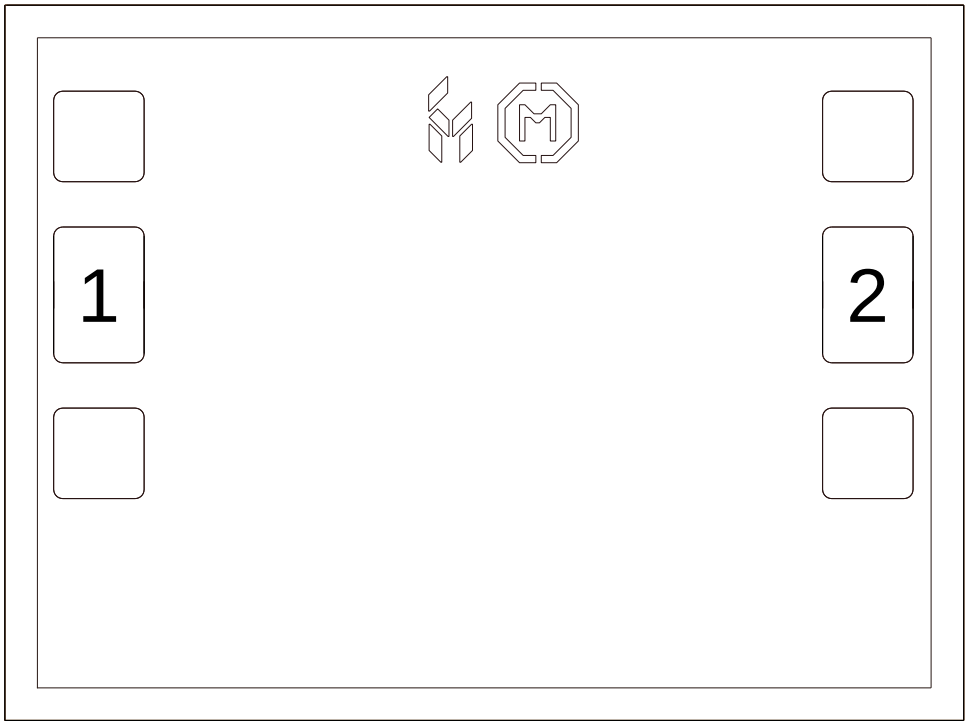


Notes:

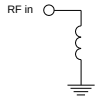
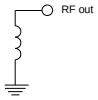
1. No connection required for unlabeled pads
2. Backside is RF and DC ground
3. Backside and bond pad metal: Gold
4. Die is 100 microns thick
5. RF bond pads (1, 2) are 100 x 150 microns

Pin Description

Pad Diagram



Functional Description

Pad	Function	Description	Schematic
1	RF in	Pad is DC coupled and 50 ohm matched	
2	RF out	Pad is DC coupled and 50 ohm matched	
Backside	Ground	Connect to RF / DC ground	

Applications Information

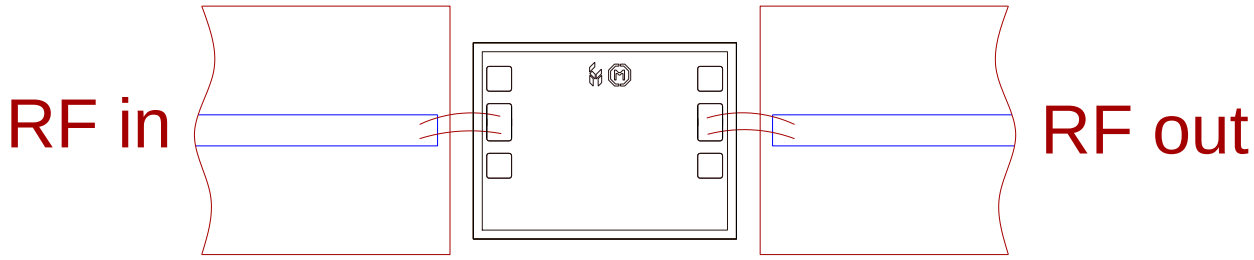
Assembly Guidelines

The backside of the CMD226 is RF ground. Die attach should be accomplished with electrically and thermally conductive epoxy. Eutectic attach is not recommended. Standard assembly procedures should be followed for high frequency devices. The top surface of the semiconductor should be made planar to the adjacent RF transmission lines.

RF connections should be made as short as possible to reduce the inductive effect of the bond wire. Use of a 0.8 mil thermosonic wedge bonding is highly recommended as the loop height will be minimized. The RF input and output require double bond wires as shown.

The semiconductor is 100 um thick and should be handled by the sides of the die or with a custom collet. Do not make contact directly with the die surface as this will damage the monolithic circuitry. Handle with care.

Assembly Diagram



GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1A	ESDA / JEDEC JS-001-2012

Caution!
ESD-Sensitive Device

RoHS Compliance

This part is compliant with 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment) as amended by Directive 2015/863/EU.

This product also has the following attributes:

- Lead Free
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- SVHC Free
- Halogen Free
- PFOS Free

Contact Information

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

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

Important Notice

The information contained in this Data Sheet and any associated documents (“Data Sheet Information”) is believed to be reliable; however, Qorvo makes no warranties regarding the Data Sheet Information and assumes no responsibility or liability whatsoever for the use of said information. All Data Sheet Information is subject to change without notice. Customers should obtain and verify the latest relevant Data Sheet Information before placing orders for Qorvo® products. Data Sheet Information or the use thereof does not grant, explicitly, implicitly or otherwise any rights or licenses to any third party with respect to patents or any other intellectual property whether with regard to such Data Sheet Information itself or anything described by such information.

DATA SHEET INFORMATION DOES NOT CONSTITUTE A WARRANTY WITH RESPECT TO THE PRODUCTS DESCRIBED HEREIN, AND QORVO HEREBY DISCLAIMS ANY AND ALL WARRANTIES WITH RESPECT TO SUCH PRODUCTS WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Without limiting the generality of the foregoing, Qorvo® products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death. Applications described in the Data Sheet Information are for illustrative purposes only. Customers are responsible for validating that a particular product described in the Data Sheet Information is suitable for use in a particular application.