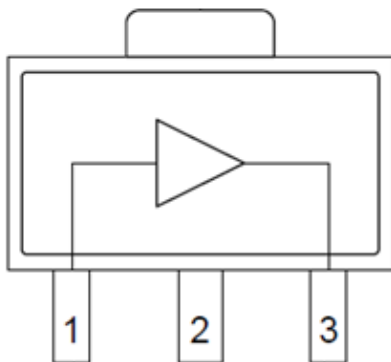


### Product Overview

The QPL1816 is a GaAs pHEMT single ended RF amplifier IC featuring 10dB of gain and low noise. The balance of low noise and distortion provides an ideal solution for a wide range of broadband amplifiers used in Cable TV applications such as Optical Receivers and low noise front ends. QPL1816 is packaged in a SOT-89 package for convenient layout and design in set top and infrastructure projects for 75 Ω CATV and satellite applications.



### Functional Block Diagram



Top View

### Key Features

- 50 MHz to 1800 MHz Operation
- 6 V Single Power Supply
- Gain: 10 dB Typical
- Noise Figure: 2.5 dB Typical at 1250 MHz
- Convenient SOT-89 Package
- RoHS Compliant

### Applications

- FTTH GPON and GEPON
- DOCSIS 4.0
- Head End CMTS Equipment
- Optical Node
- Satellite Low Noise Amplifier
- Cable Modem and Set Top Box
- Single Ended Gain Block

### Ordering Information

Part Number	Description
QPL1816SB	Sample bag with 5 pieces
QPL1816SR	7" Reel with 100 pieces
QPL1816TR13	13" Reel with 2500 pieces
QPL1816EVB-01	Evaluation Board



### Absolute Maximum Ratings

Parameter	Rating
Supply Voltage (V <sub>DD</sub> )	+8 V
Supply Current (I <sub>DD</sub> )	170 mA
Maximum Input Level	60 dBmV
Operating Temperature Range	-40 to +100 °C
Storage Temperature Range	-65 to +150 °C
Maximum Junction Temperature	+150 °C

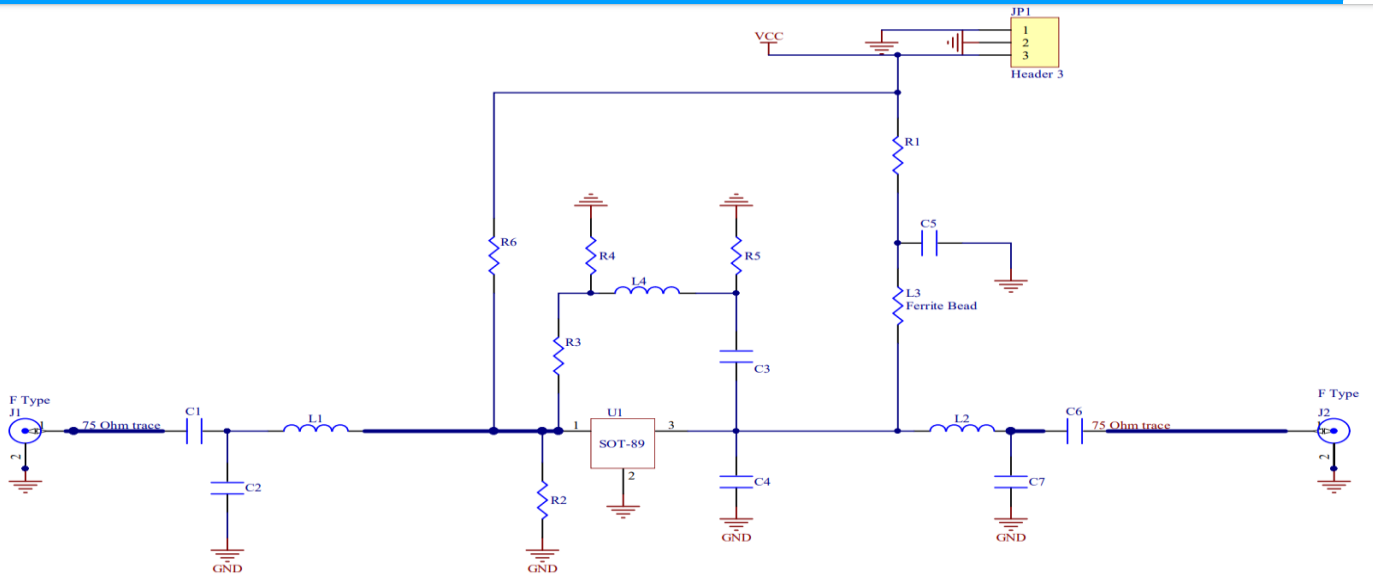
Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

### Electrical Specifications at +6 V

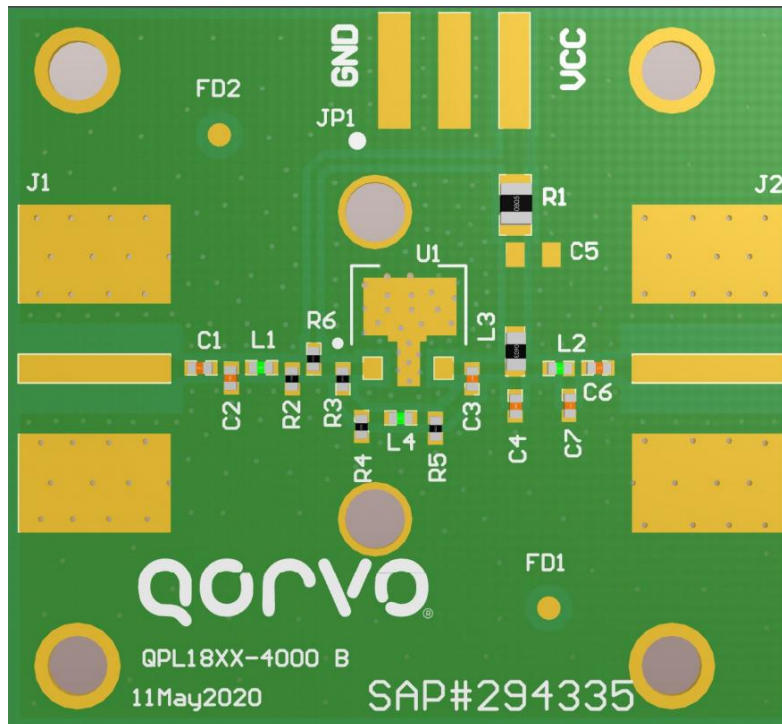
Parameter	Condition <sup>(1)</sup>	Min	Typ	Max	Unit
Supply Voltage (V <sub>DD</sub> )			6		V
Supply Current (I <sub>DD</sub> )			120		mA
Frequency Range		50		1800	MHz
Gain			10		dB
Gain Flatness			±1		dB
Reverse Isolation			17		dB
Input Return Loss			16		dB
Output Return Loss			16		dB
Noise Figure			2.5		dB
OIP2 (Lower)	0 dBm / tone output		60		dBm
OIP2 (Upper)	0 dBm / tone output		50		dBm
OIP3	0 dBm / tone output		36		dBm
OP1dB			19		dBm
Thermal Resistance	Θ <sub>JC</sub>		+42		°C/W

Note: Typical performance at these conditions: Temp = +25 °C, V<sub>DD</sub> = +6 V, 75 Ω system, Full band unless otherwise noted

### Evaluation Board Schematic 50 MHz – 1800 MHz



### Evaluation Board Assembly Drawing

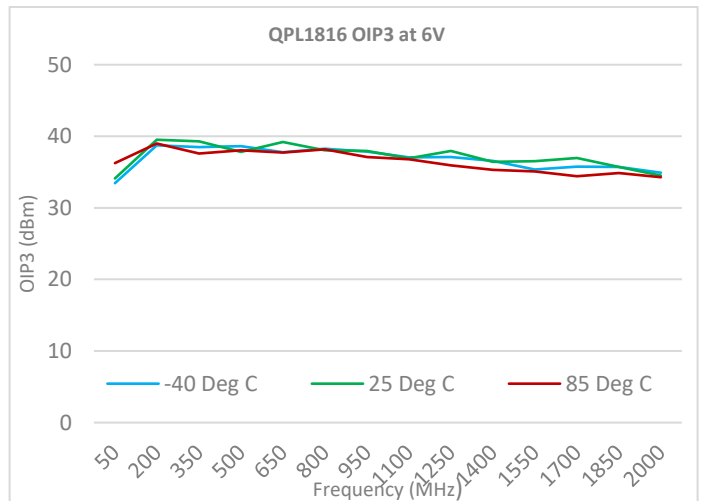
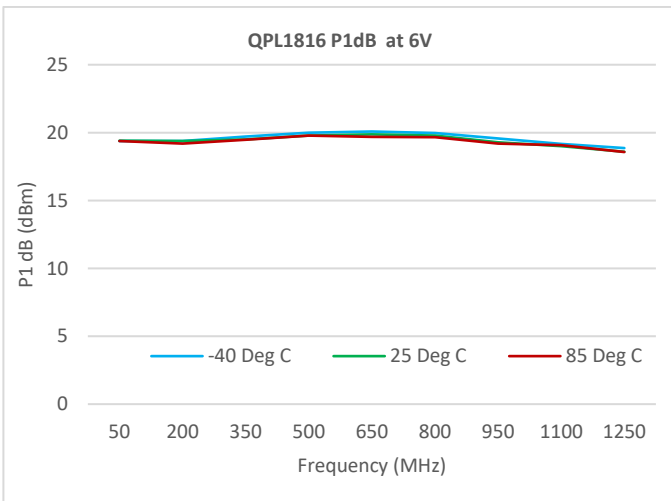
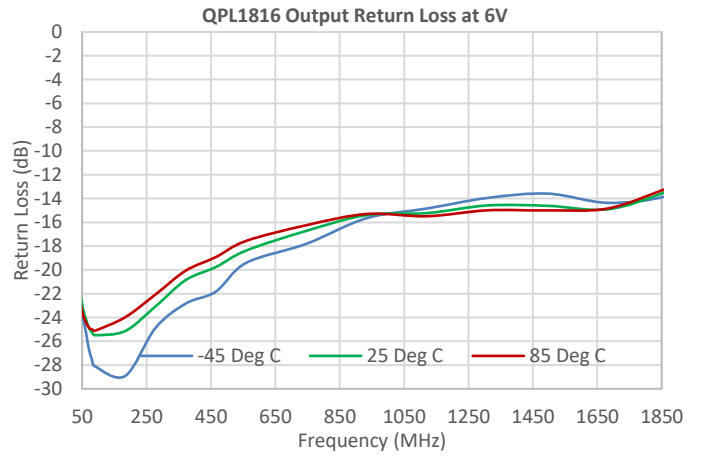
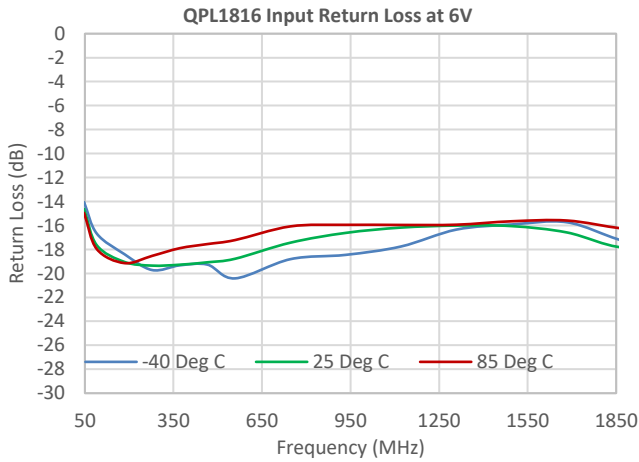
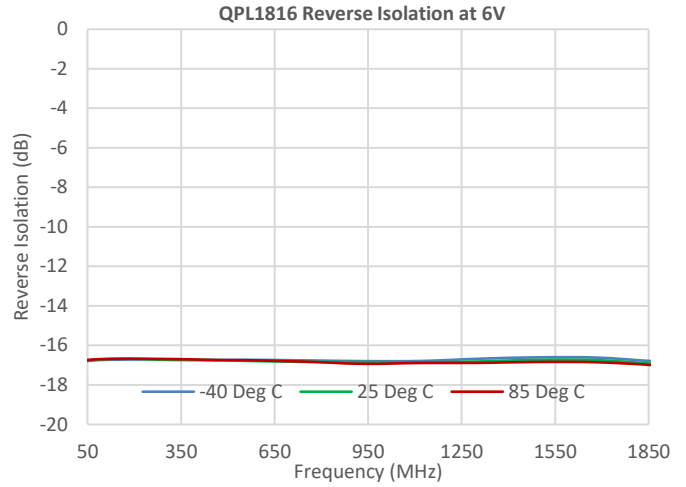
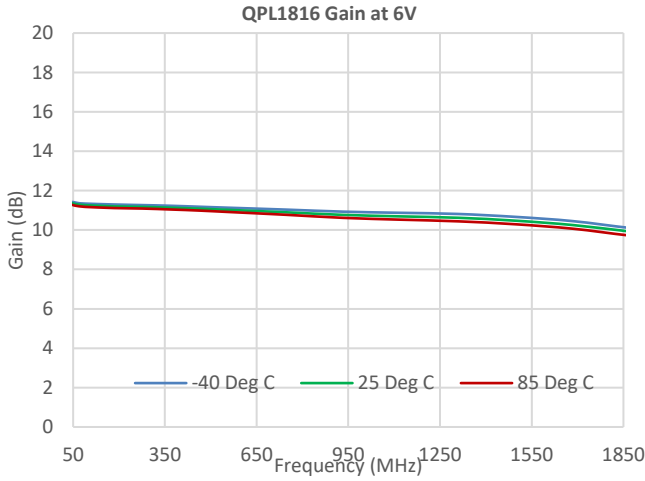




Evaluation Board Bill of Materials

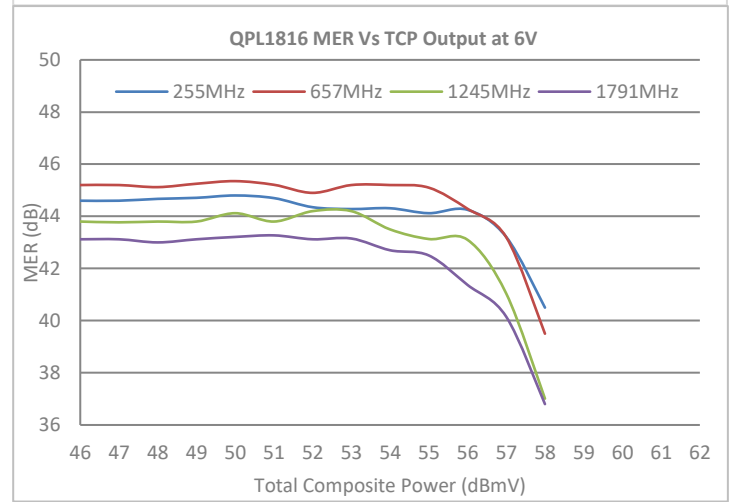
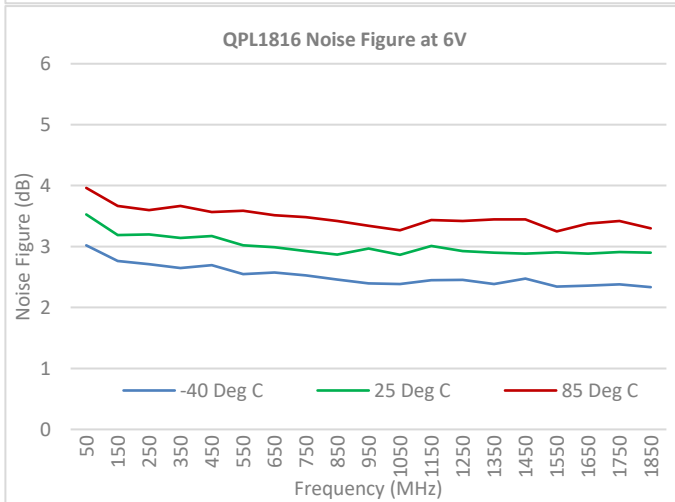
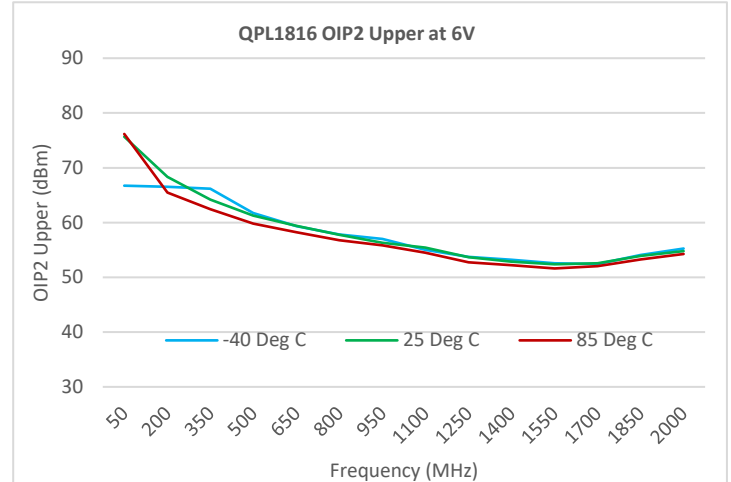
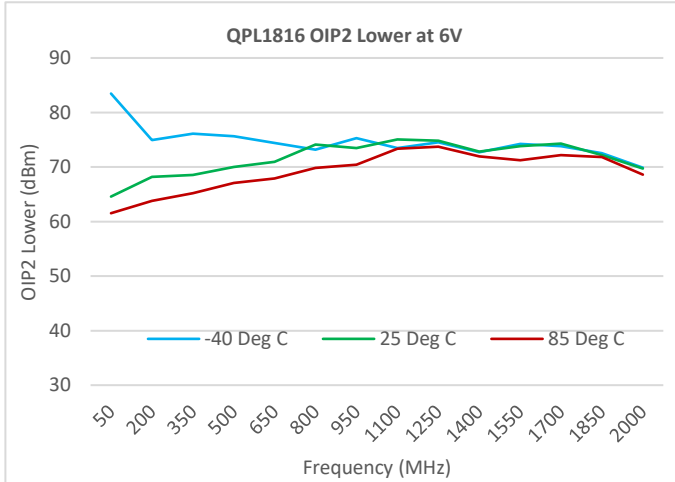
Ref Des.	Description	Mfg Name	Mfg Part #
U1	CATV DOCSIS 4.0 LNA, 5V, 1.8GHz, 75-ohm	Qorvo	QPL1816
C5	CAP, 1000 PF, 50V, 10%, 0603	AVX Asia Limited	06035C102KAT2A
C7	CAP, 0.5pF, +/-0.25pF, 50V, HI-Q, 0402	MURATA ELECTRONICS	GJM1555C1HR50CB01D
C1, C6	CAP, 1000pF, 5%, 50V, C0G, 0402	MURATA ELECTRONICS	GRM1555C1H102JA01D
C2	CAP, 0.3pF, +/-0.05pF, 50V, HI-Q, 0402	MURATA ELECTRONICS	GJM1555C1HR30WB01D
R1	RES, 0 OHM, 0603	Kamaya, Inc	RMC1/16JPTP
L1	IND, 3.9nH, +/-0.3nH, M/L, 0402	MURATA ELECTRONICS	LQG15HN3N9S02D
L2	IND, 4.3nH, +/-0.1nH, T/F, 0402	MURATA ELECTRONICS	LQP15MN4N3B02D
L3	FER, BEAD, 1500 OHM, 500mA, 0603	MURATA ELECTRONICS	BLM18HE152SN1D
JP1	CONN, HDR, ST, 3-PIN, 0.100"	SAMTEC INC.	TSW-103-07-G-S
J1, J2	CONN, F FEM EDGE MOUNT, 75 OHMS, 0.068"	Millimeter Wave Tech	MW-846-C-DD-75
R2, R6, R3, R4, R5, C3, C4, L4	NOT POPULATED ITEM-1		DUMMY PART

### Performance Data at +6 V



Notes: (1) OIP3: 0dBm/tone output

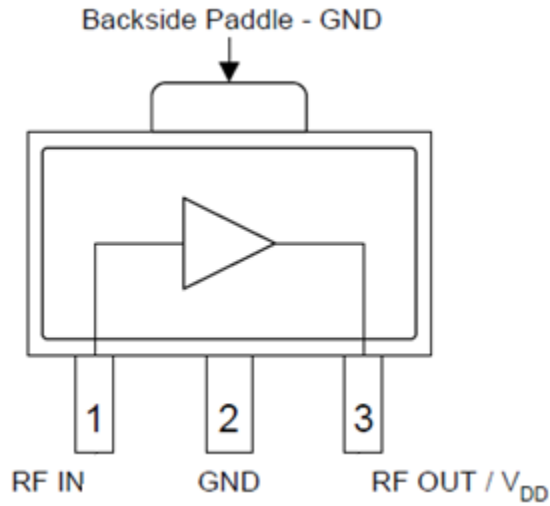
### Performance Data at +6 V



**Notes:**

- (1) OIP2: 0 dBm/ tone output
- (2) 54MHz to 1794MHz, 0dB tilt, 1 OFDM (54-246MHz) + 254 QAM (252-1794MHz) Channels.  
CCN Noise BW (ANSI/SCTE 17): 5.36MHz for J.83/B.
- (3) Tx Data: ITU-T, Annex B, QAM256, 5.36 MSymbols/s

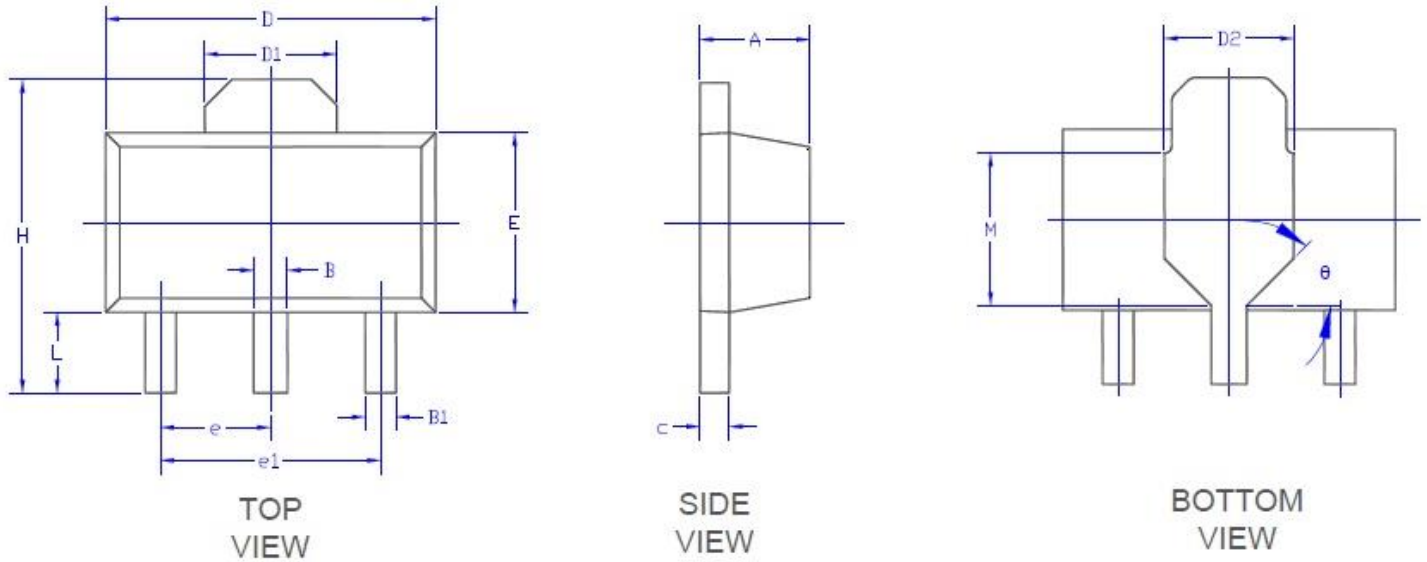
### Pin Configuration and Description



Top View

Pin Number	Label	Description
1	RF IN	RF Input, DC blocking capacitor required
2	GND	Internally Not Connected
3	RF OUT / VDD	RF Output – VDD bias choke required
Backside Paddle	GND	Ground. Use recommended via pattern to minimize inductance and thermal resistance. See PCB Mounting Pattern for suggested footprint.

#### Package Outline



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.400	1.600
B	0.400	0.580
B1	0.320	0.520
C	0.350	0.440
D	4.400	4.600
D1	1.550 REF.	
D2	1.600 REF.	

Symbol	Dimensions In Millimeters	
	Min.	Max.
E	2.300	2.600
e	1.500 TYP.	
e1	3.000 TYP.	
H	3.940	4.250
L	0.900	1.200
M	1.900 REF.	
$\theta$	45°	



## Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B	ESDA/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3	ESDA/JEDEC JS-002
MSL – Moisture Sensitivity Level	Level 3	IPC/JEDEC J-STD-020



Caution!  
ESD-Sensitive Device

## Solderability

Compatible with lead-free (260 °C max. reflow temp.) soldering processes.

Solder profiles available upon request.

Contact plating: Matte Sn

## 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
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C<sub>15</sub>H<sub>12</sub>Br<sub>4</sub>O<sub>2</sub>) Free
- SVHC Free
- PFOS Free



## Contact Information

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

Tel: **1-844-890-8163**

Web: [www.qorvo.com](http://www.qorvo.com)

Email: [customer.support@qorvo.com](mailto:customer.support@qorvo.com)

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