QPQ1063

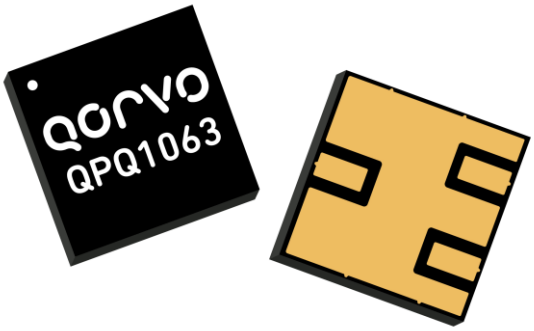
L1/L2 Low Loss GPS SAW Diplexer

General Description

QPQ1063 is a L1/L2 GPS diplexer in a compact size for use in any GPS application. Designed for rejection of unwanted GPS signals, this SAW diplexer also has excellent power handling capability for low power transmitters.

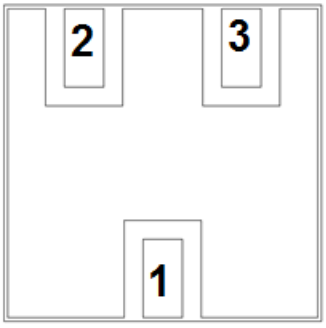
Housed in a 5.0 x 5.0 mm laminate with over mold package, this device allows for a compact and cost-effective diplexer solution for GPS applications.

No matching components are required, making the PCB design and implementation easy.



5.0 X 5.0 X 0.84 mm

Functional Block Diagram



Top View

Pin Configuration - Single Ended

Pin No.	Label
1	Antenna, Common Port
2	L1 Band Output Port
3	L2 Band Output Port
Pkg Base	Ground connection

Blocking capacitors are required on any ports where a DC voltage may be present.

Product Features

- Usable Bandwidth 21 MHz for each Band
- No matching required for operation at 50Ω
- Excellent rejection for GPS operation
- High Isolation
- High Rejection
- Laminate with Over Mold Surface Mount Package (SMP)
- Small Size: 5.0 x 5.0 x 0.84mm

Performance is typical across frequency. Please reference electrical specification table and data plots for more details.

Applications

- General purpose GPS
- Communication Systems

Ordering Information

Part No.	Description
QPQ1063TR7	7” Taped Reel with 1000 pieces
QPQ1063EVB01	Evaluation board

Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	-55 to +105°C
Operation Temperature	-55 to +85°C
RF Input Power on L1 Port or L2 Port with another port terminated PW = 200ms; DC = 50% @ +25 °C	+33 dBm

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.

Minimum Lifetime Ratings

Conditions	Rating
RF Input Power +25dBm, CW @ Pin 1 (Antenna Port), Pin 2 (L1 Port) or Pin 3 (L2 Port)	>10 years @ +95°C
	>5 years @ +105°C

Electrical Specifications - L1 GPS Frequency Band

Test conditions unless otherwise noted: Temperature Range = -55 °C to +85 °C, 50 Ω system

Parameter [3]	Conditions [1] [2]	Min	Typical [4]	Max	Units
Center Frequency		-	1575.42	-	MHz
Maximum Insertion Loss	1574.397 - 1576.443 MHz	-	1.5	2.0	dB
	1565.19 - 1585.65 MHz	-	1.6	2.1	
	1563.42– 1587.42 MHz	-	1.7	2.2	
Amplitude Variation	1574.397 - 1576.443 MHz	-	0.1	0.4	dB
	1565.19 - 1585.65 MHz	-	0.2	0.7	
	1563.42– 1587.42 MHz	-	0.2	0.8	
Group Delay Variation	1574.397 - 1576.443 MHz	-	4	14	ns
	1565.19 - 1585.65 MHz	-	7	18	
	1563.42– 1587.42 MHz	-	7	20	
Absolute Attenuation (Relative to 0 dB)	824 - 960 MHz	43	51	-	dB
	1500 - 1520 MHz	29	34	-	
	1520 - 1525.42 MHz	28	32	-	
	1625.42 – 1630 MHz	26	45	-	
	1630 – 1650 MHz	30	54	-	
	1710 - 2170 MHz	40	48	-	
Return Loss at Port 2	1574.397 - 1576.443 MHz	10	18	-	dB
	1565.19 - 1585.65 MHz	10	16	-	
	1563.42– 1587.42 MHz	10	15	-	
Nominal Impedance [5]	Single Ended	-	50	-	Ω

Notes:
1. All specifications are based on the Qorvo schematics for the reference designs shown on page 4.
2. In production, devices will be tested at room temperature to a guard banded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances.
4. Typical values are based on average measurements at room temperature on PCB (+25 °C ±5 °C)
5. Optimum impedance to achieve the performance shown

Electrical Specifications – L2 GPS Frequency Band

Test conditions unless otherwise noted: Temperature Range = -55 °C to +85 °C, 50 Ω system

Parameter [3]	Conditions [1] [2]	Min	Typical [4]	Max	Units
Center Frequency		-	1227.6	-	MHz
Maximum Insertion Loss	1226.577 - 1228.623 MHz	-	1.2	1.6	dB
	1217.370 - 1237.830 MHz	-	1.3	1.7	
	1215.6 – 1239.6 MHz	-	1.4	1.8	
Amplitude Variation	1226.577 - 1228.623 MHz	-	0.1	0.4	dB
	1217.370 - 1237.830 MHz	-	0.2	0.5	
	1215.6 – 1239.6 MHz	-	0.2	0.6	
Group Delay Variation	1226.577 - 1228.623 MHz	-	3	15	ns
	1217.370 - 1237.830 MHz	-	7	22	
	1215.6 – 1239.6 MHz	-	11	29	
Absolute Attenuation, Relative to 0 dB	464 - 600 MHz	37	40	-	dB
	1150 - 1177.6 MHz	40	48	-	
	1277.6 - 1300 MHz	40	49		
	1360 - 1820 MHz	39	46	-	
Return Loss at Port 3	1226.577 - 1228.623 MHz	10	24	-	dB
	1217.370 - 1237.830 MHz	10	24	-	
	1215.6 – 1239.6 MHz	10	20	-	
Nominal Impedance [5]	Single Ended	-	50	-	Ω

Electrical Specifications – L1 & L2 GPS Frequency Bands

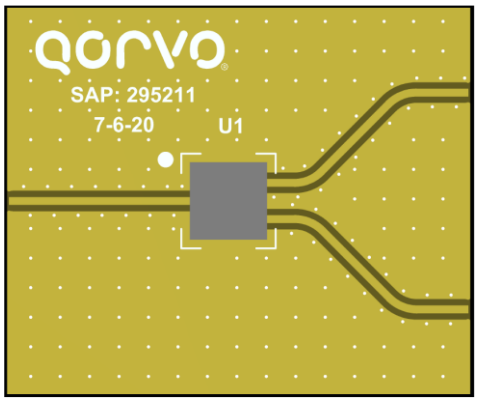
Test conditions unless otherwise noted: Temperature Range = -55 °C to +85 °C, 50 Ω system

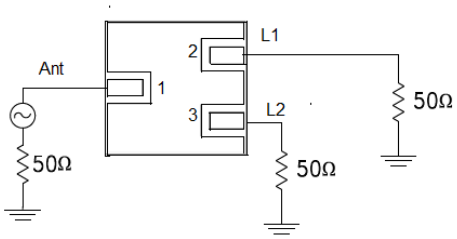
Parameter [3]	Conditions [1] [2]	Min	Typical [4]	Max	Units
Nominal Impedance [5]	Single Ended	-	50	-	Ω
Antenna Return Loss	1574.397 - 1576.443 MHz	11	19	-	dB
	1565.19 – 1585.65 MHz	11	19	-	
	1563.42– 1587.42 MHz	11	19	-	
	1226.577 - 1228.623 MHz	11	24	-	
	1217.370 - 1237.830 MHz	11	18	-	
	1215.6 – 1239.6 MHz	11	17	-	
Isolation	1574.397 - 1576.443 MHz	41	53	-	dB
	1565.19 – 1585.65 MHz	39	48	-	
	1226.577 - 1228.623 MHz	47	58	-	
	1217.370 - 1237.830 MHz	45	48	-	

Notes:

1. All specifications are based on the Qorvo schematics for the reference designs shown on page 4.
2. In production, devices will be tested at room temperature to a guard banded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances.
4. Typical values are based on average measurements at room temperature on PCB (+25 °C ±5 °C)
5. Optimum impedance to achieve the performance shown.

Evaluation Board – QPQ1063EVB01





Notes:

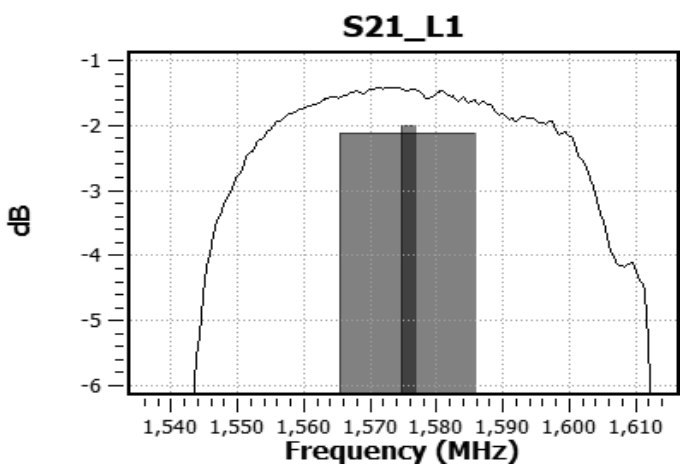
1. Blocking capacitors are required on any RF ports where a DC voltage may be present.
2. The back side of the package should be connected to the ground plan. Multiple vias should be used on PCB under the device are recommended.

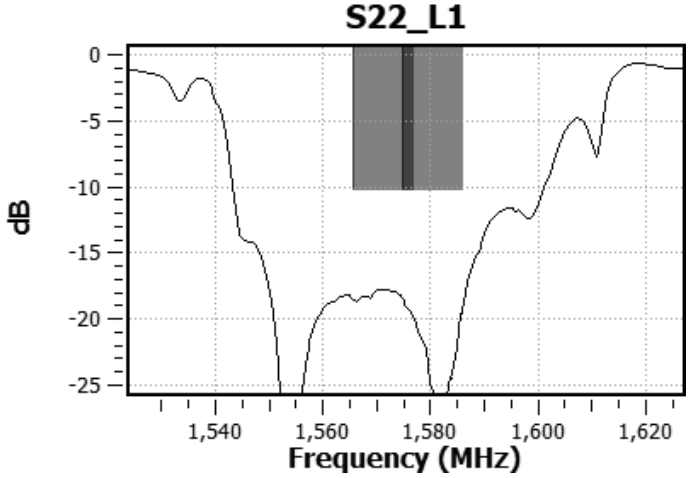
Bill of Material – QPQ1063EVB01

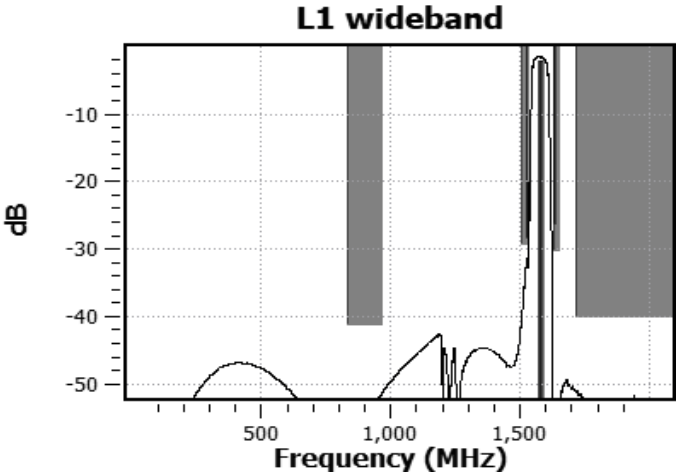
Reference Des.	Value	Description	Manuf.	Part Number
DUT	-	L1/L2 Low Loss GPS SAW Diplexer	Qorvo	QPQ1063
SMA	-	SMA connector	Various	
PCB	-	Printed Circuit Board	Various	

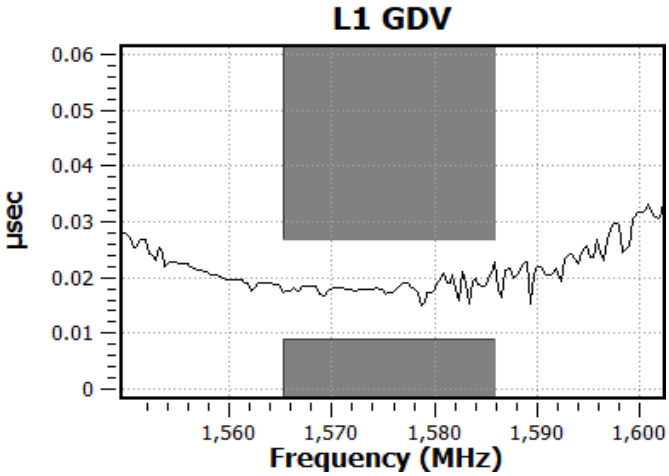
L1 Band Typical Performance Plots

Test conditions unless otherwise noted: Temp = +25 °C, 50 Ω system



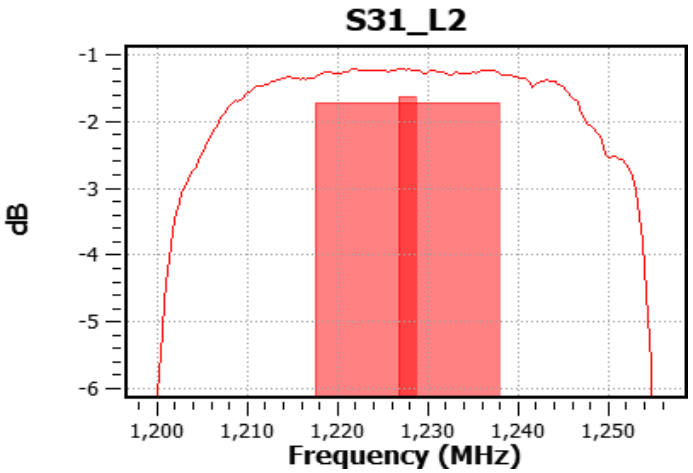


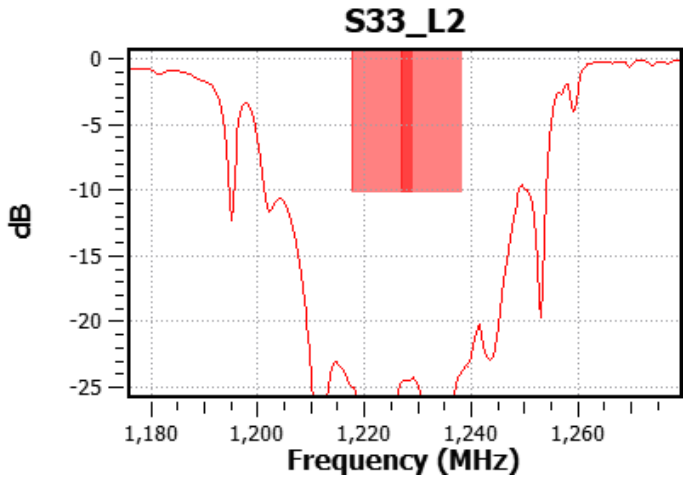


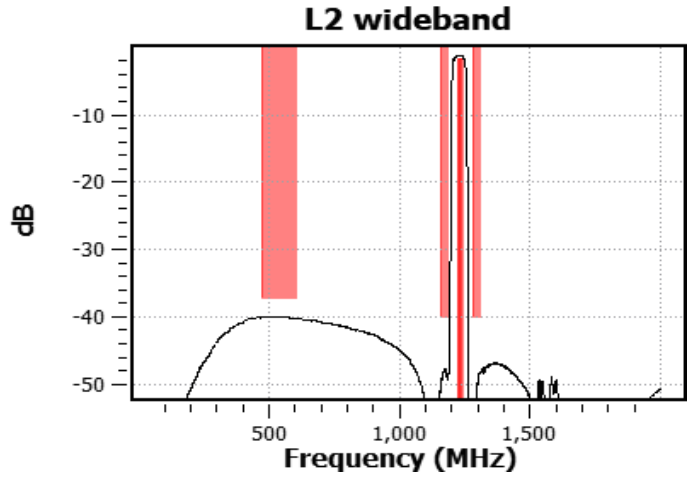


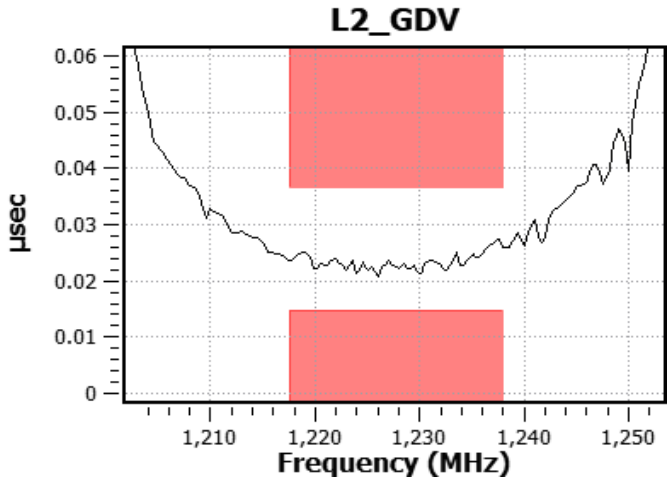
L2 Band Typical Performance Plots

Test conditions unless otherwise noted: Temp = +25 °C, 50 Ω system



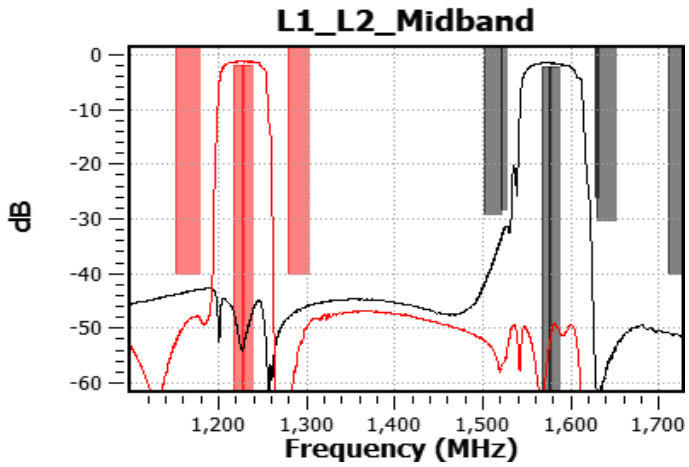


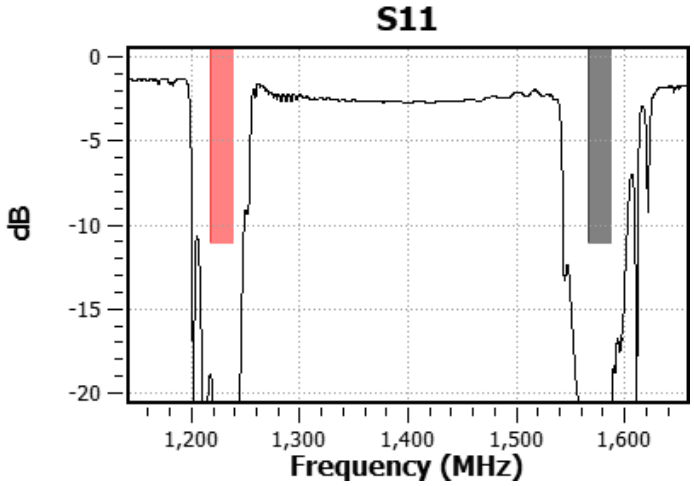


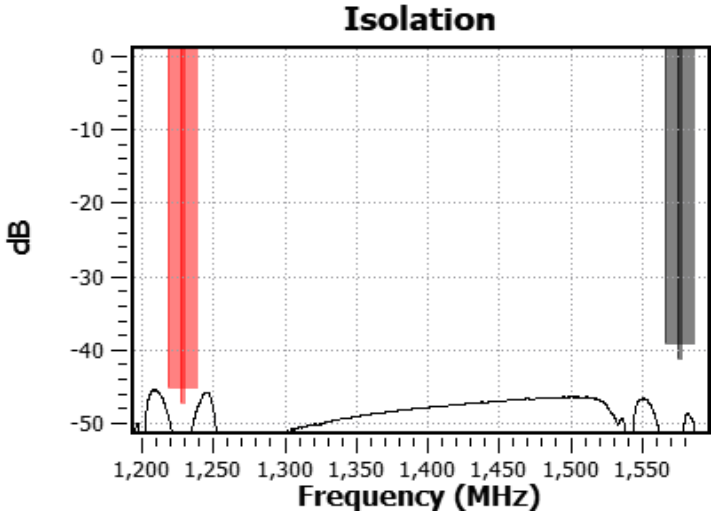


L1 - L2 Band Typical Performance Plots

Test conditions unless otherwise noted: Temp = +25 °C, 50 Ω system

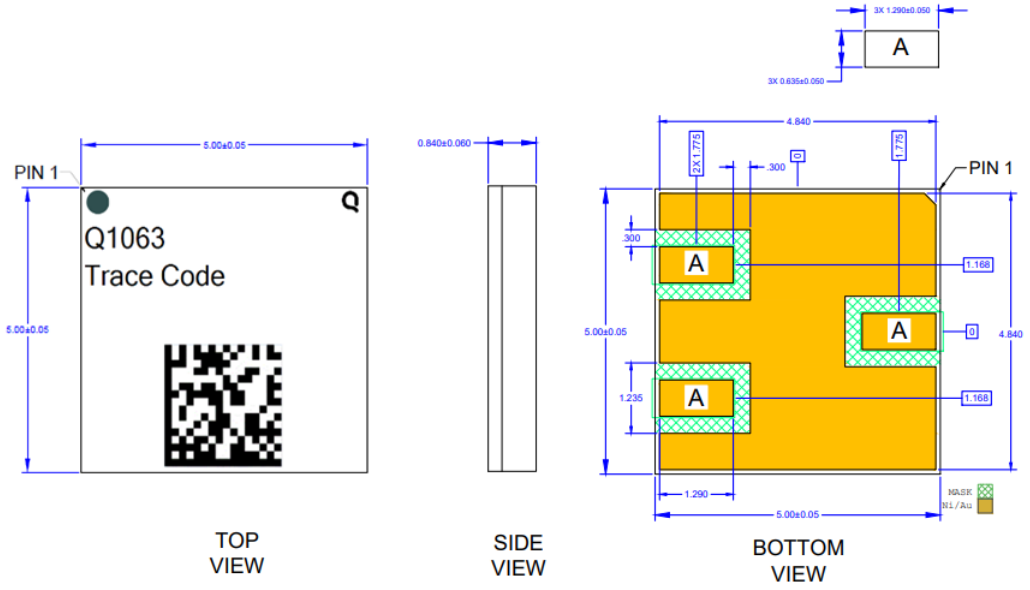






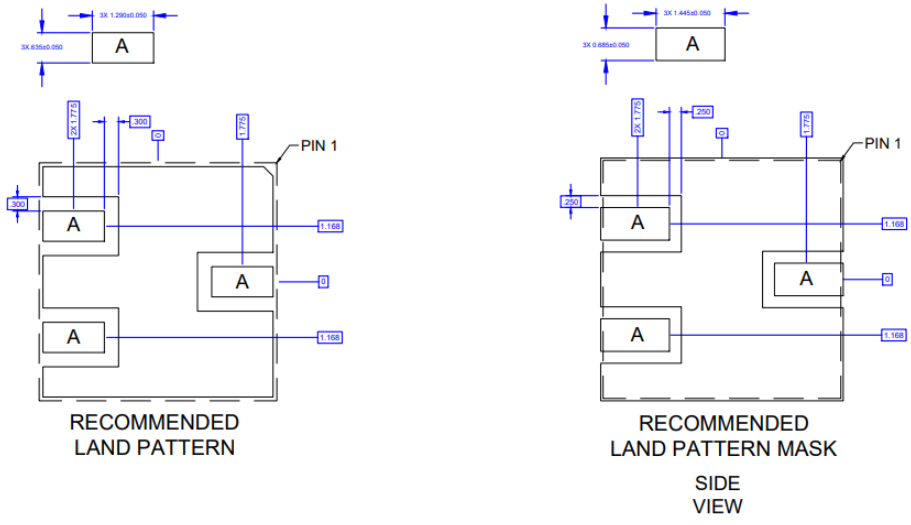
Package Marking and Dimensions

Marking: Qorvo Logo
Part Number – 1063
Trace Code – Assigned by subcontractor



Notes:
1. All dimensions are in millimeters. Angles are in degrees.
2. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012

PCB Mounting Pattern



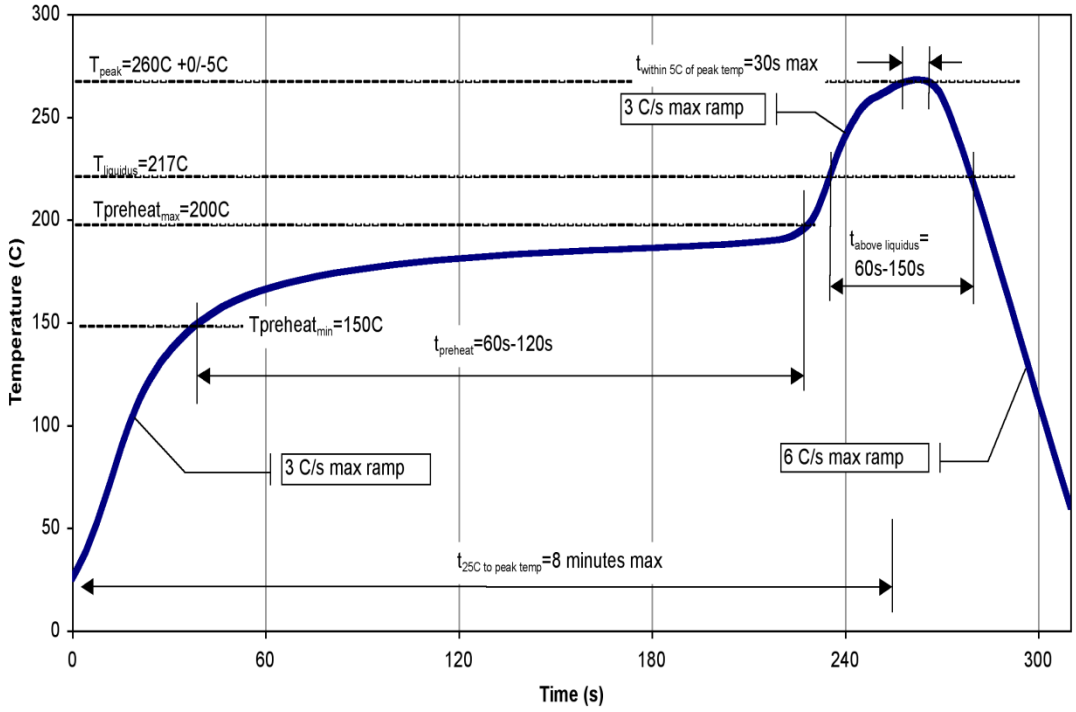
Notes:
1. All dimensions are in millimeters. Angles are in degrees.

Assembly Notes

Compatible with both Lead-free solder (260°C peak reflow temperature) and tin/lead (245°C peak reflow temp.) soldering processes.

Contact plating: ENEPIG

Recommended Soldering Profile



Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1A	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

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 ($C_{15}H_{12}Br_4O_2$) Free
- SVHC 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

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