890085

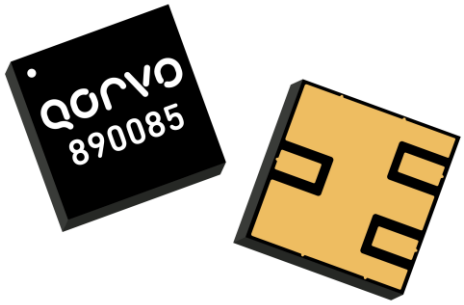
L1/L2 Low Loss GPS SAW Diplexer

General Description

890085 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.

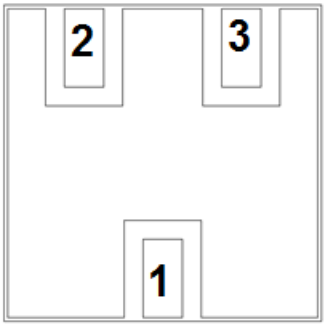
Housed in a 5.0 x 5.0 mm laminate with over mold package, this device allows for a compact and cost effective diplexer solution for GPS applications.

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



5.0 X 5.0 X 1.1 mm

Functional Block Diagram



Top View

Pin Configuration - Single Ended

Pin No.	Label
1	Antenna
2	L1 Band Output
3	L2 Band Output

Product Features

- Usable bandwidth 20.46 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 1.1mm

Applications

- General purpose GPS
- Communication Systems

Ordering Information

Part No.	Description
890085TR13	13” Taped Reel with 1000 pieces
890085SR	Sample Reel with 100 pieces
1115868	Evaluation board

Absolute Maximum Ratings (1)

Parameter	Rating
Operating Temperature	−55 to +85 °C
Storage Temperature	−55 to +105 °C
RF Input Power	+16.5 dBm

Notes:
1. Operation of this device outside the parameter ranges given may cause permanent damage.

Electrical Specifications (1,2)

L1 Band GPS					
Parameter (3)	**Conditions**	**Min**	**Typical (4)**	**Max**	**Units**
Center Frequency		-	1575.42	-	MHz
Maximum Insertion Loss	1574.397 – 1576.443 MHz	-	1.5	1.9	dB
	1565.190 – 1585.650 MHz	-	1.6	2.1	
Amplitude Variation	1574.397 – 1576.443 MHz	-	0.08	0.1	dB
	1565.190 – 1585.650 MHz	-	0.08	0.5	
Group Delay Variation	1574.397 – 1576.443 MHz	-	0.7	2.4	ns
	1565.190 – 1585.650 MHz	-	2.8	6.3	
Absolute Attenuation	824.000 – 960.000 MHz	20	32	-	dB
	1500.000 – 1525.420 MHz	25	31	-	
	1625.420 – 1650.000 MHz	28	31	-	
	1710.000 – 2170.000 MHz	20	23	-	
Return Loss at Port 2	1574.397 – 1576.443 MHz	10	12	-	dB
	1565.190 – 1585.650 MHz	10	12	-	
Nominal Impedance (5)	Single Ended	-	50	-	Ohm

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 manufacture 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 [1,2]

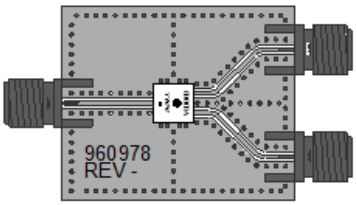
L2 Band GPS					
Parameter [3]	**Conditions**	**Min**	**Typical [4]**	**Max**	**Units**
Center Frequency		-	1227.6	-	MHz
Maximum Insertion Loss	1226.577 – 1228.623 MHz	-	1.4	-	dB
	1217.370 – 1237.830 MHz	-	1.5	2.5	
Amplitude Variation	1226.577 – 1228.623 MHz	-	0.1	0.2	dB
	1217.370 – 1237.830 MHz	-	0.4	1.3	
Group Delay Variation	1226.577 – 1228.623 MHz	-	1.2	6	ns
	1217.370 – 1237.830 MHz	-	6	21	
Absolute Attenuation	464.000 – 600.000 MHz	29	31	-	dB
	1150.000 – 1177.600 MHz	20	25	-	
	1277.600 – 1300.000 MHz	26	29	-	
	1360.000 – 1820.000 MHz	20	23	-	
Return Loss at Port 3	1226.577– 1228.623 MHz	10	17	-	dB
	1217.370 – 1237.830 MHz	9	14	-	
Nominal Impedance [5]	Single Ended	-	50	-	Ohm

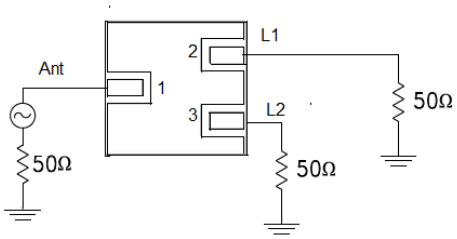
L1 Band – L2 Band Specifications					
Parameter [3]	**Conditions**	**Min**	**Typical [4]**	**Max**	**Units**
Nominal Impedance [5]	Single Ended	-	50	-	dB
Antenna Return Loss	1574.397 – 1576.443 MHz	11	13	-	
	1565.190 – 1585.650 MHz	11	13	-	
	1226.577 – 1228.623 MHz	11	15	-	
	1217.370 – 1237.830 MHz	9	15	-	
Isolation	1574.397 – 1576.443 MHz	22	29	-	dB
	1565.190 – 1585.650 MHz	25	29	-	
	1226.577 – 1228.623 MHz	27	29	-	
	1217.370 – 1237.830 MHz	27	29	-	

Notes:

5. All specifications are based on the Qorvo schematics for the reference designs shown on page 4.
6. In production, devices will be tested at room temperature to a guard banded specification to ensure electrical compliance over temperature.
7. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacture tolerances.
8. 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 – 890085-EVB





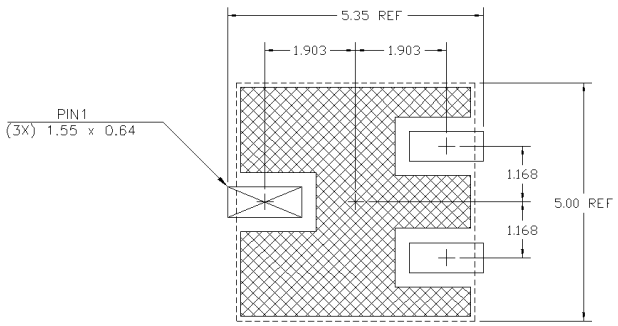
Notes:

1. No Impedance matching required. Value adjustment may be required in end user product circuits depending on component manufacturer and PCB material.
2. PCB: .500 x.500 x .062; Construction: ½ oz *Cu* Top Layer; *TLY-5A* (.0075) ½ oz *Cu* Middle Layer, *FR4*; ½ oz *Cu* Bottom Layer. (dimensions are in inches)

Bill of Material – 890085-EVB

Reference Des.	Value	Description	Manuf.	Part Number
DUT	-	L1/L2 Low Loss GPS SAW Diplexer	Qorvo	890085
SMA	-	SMA connector	Radiall USA Inc.	9602-1111-018
PCB	-	3-Layer	Qorvo	960978

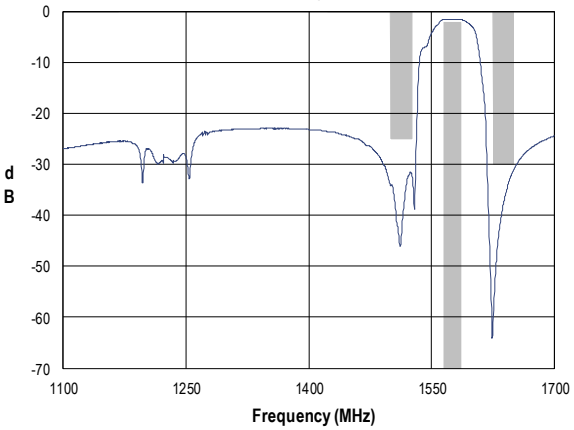
PCB Mounting Pattern



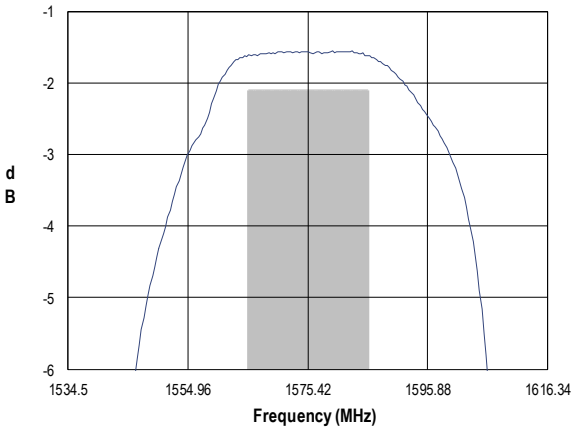
1. All dimensions are in millimeters. Angles are in degrees.
2. This drawing specifies the mounting pattern used on the Qorvo evaluation board for this product. Some modification may be necessary to suit end user assembly materials and processes.

L1 Typical Performance (at room temperature)

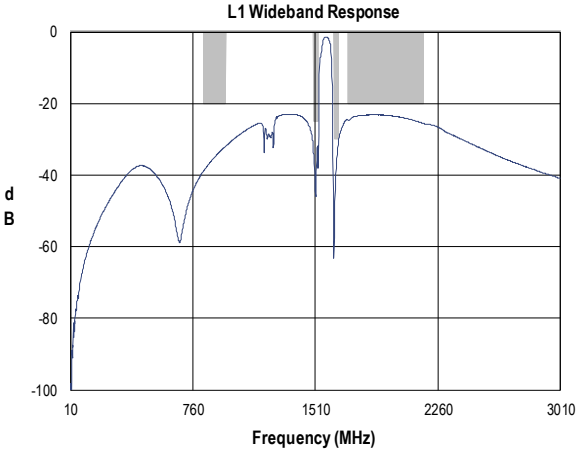
L1 Frequency Response



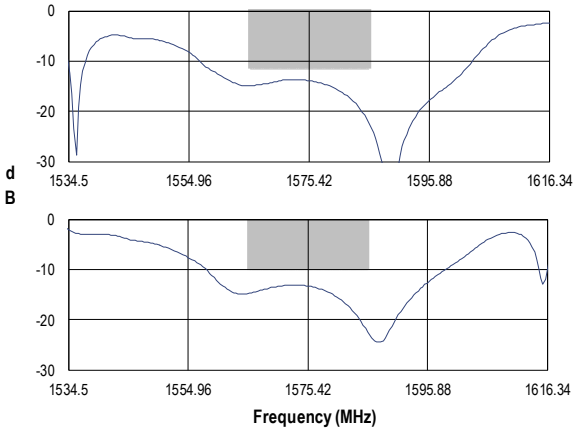
L1 Passband Response



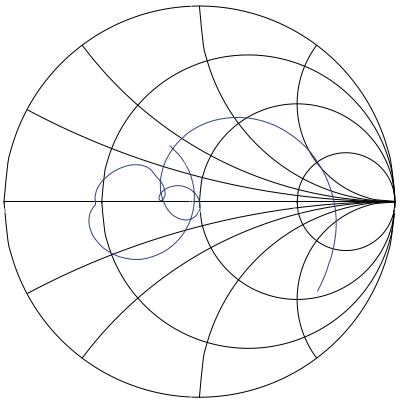
L1 Wideband Response



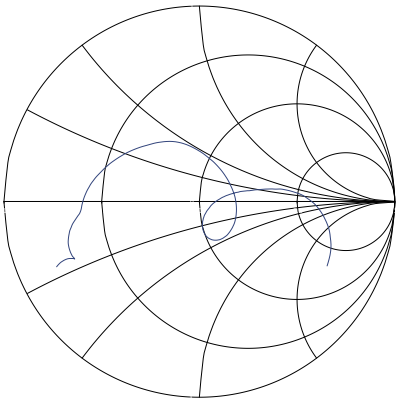
Ant/L1 Return Loss



L1 Path - Ant Port Impedance

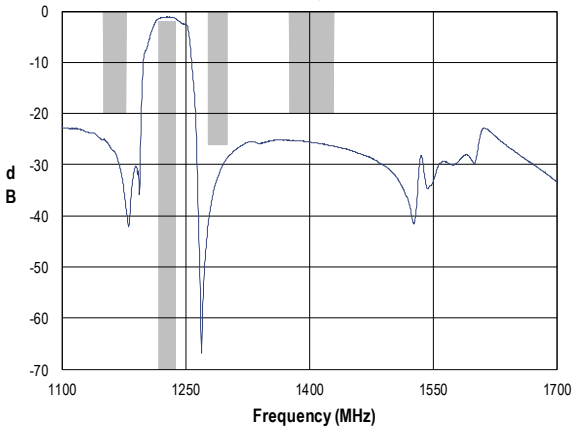


L1 Port Impedance

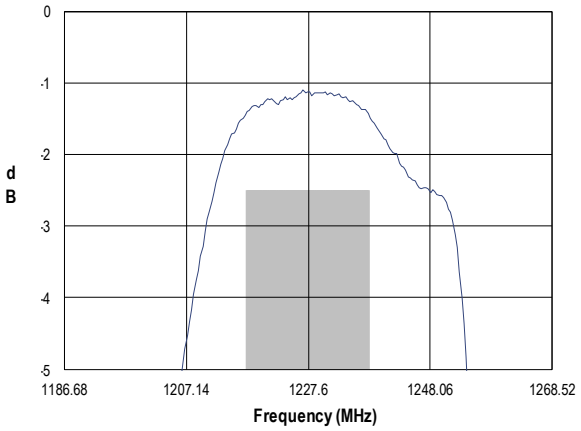


L2 Typical Performance (at room temperature)

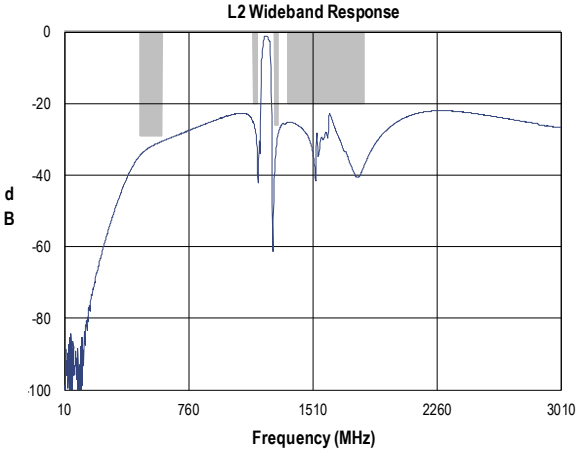
L2 Frequency Response



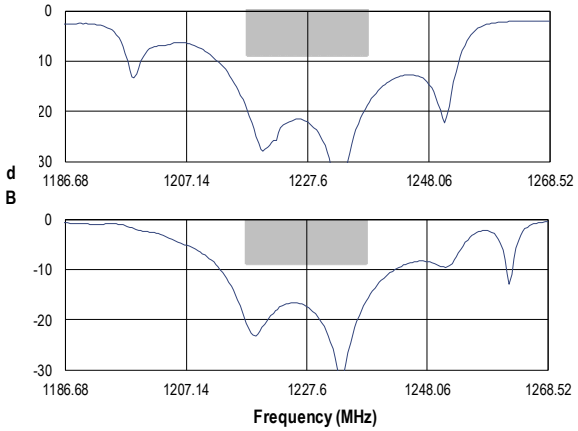
L2 Passband Response



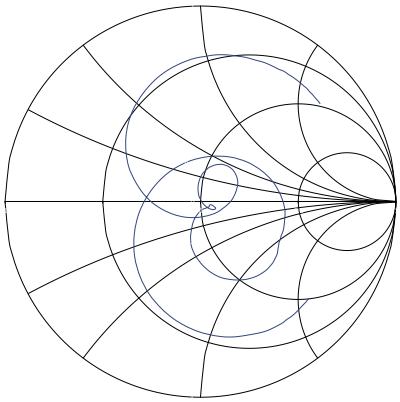
L2 Wideband Response



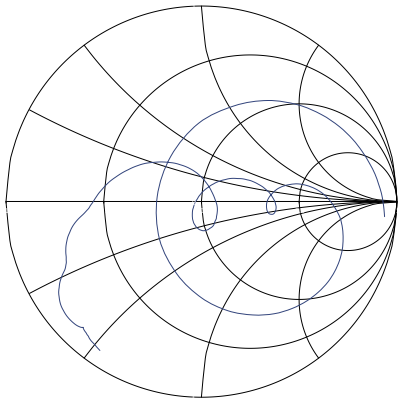
Ant/L2 Return Loss



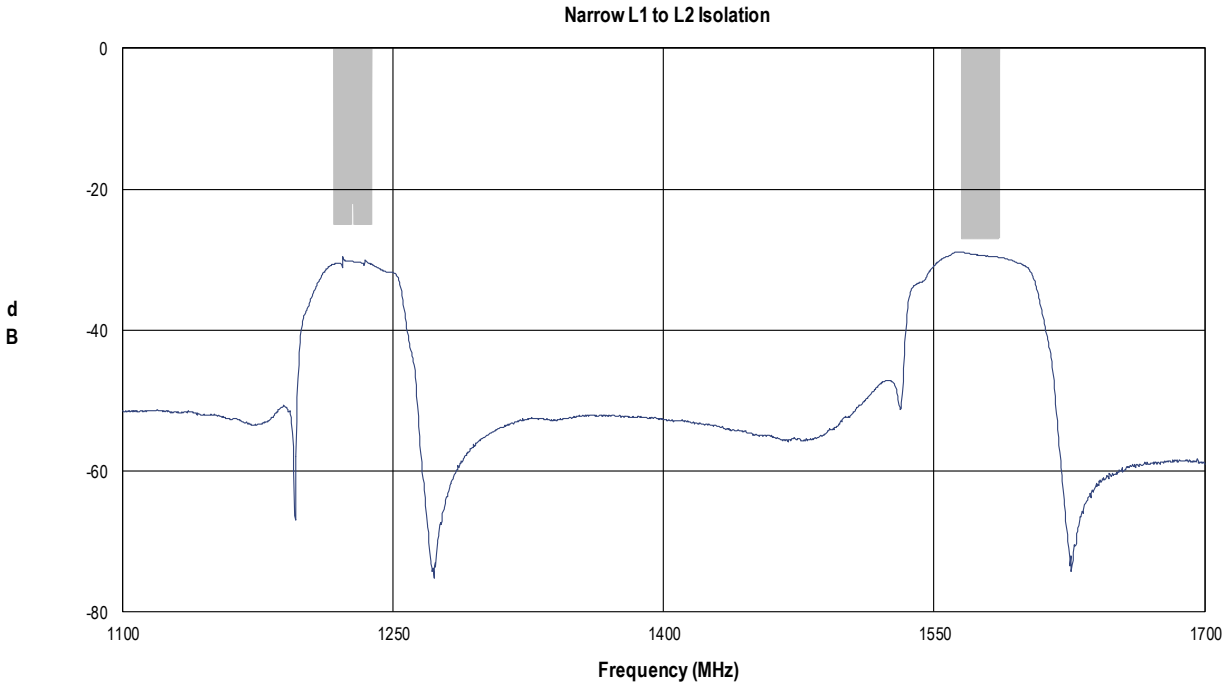
L2 Path - Ant Port Impedance



L2 Port Impedance

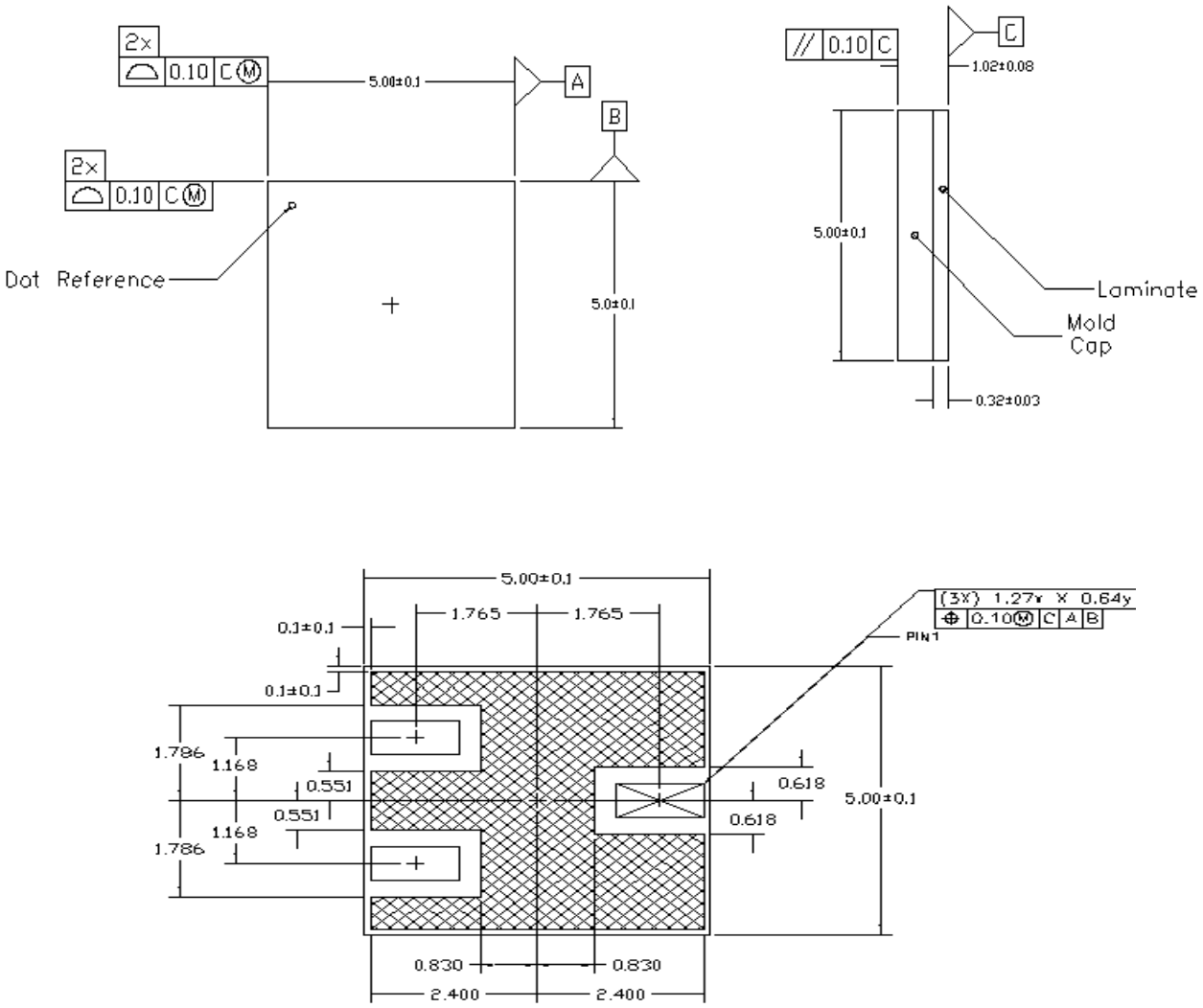


Isolation Performance

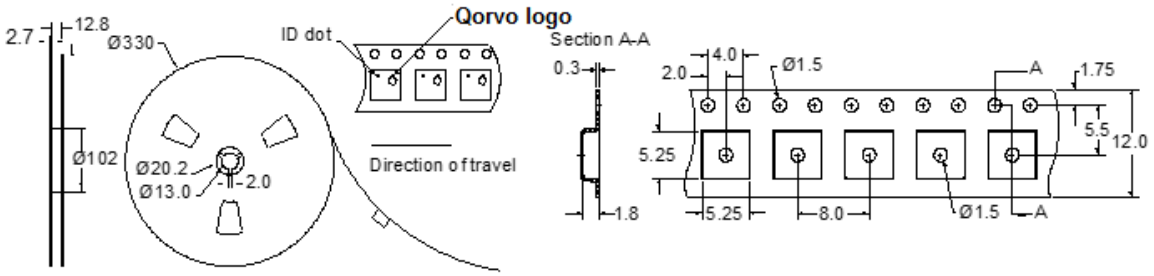


Package Information, Marking and Dimensions

All dimensions are in millimeters. Angles are in degrees



Tape and Reel Information



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-001
MSL – Moisture Sensitivity Level	Level 3	JEDEC Standard IPC/JEDEC J-STD-020

Caution!
ESD-Sensitive Device

Solderability

Compatible with both lead-free (260°C max. reflow temp.) and tin/lead (245°C max. reflow temp.) soldering processes per J-STD-002. Solder profiles available upon request.

Refer to **Soldering Profile** for recommended guidelines

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
- PFOS Free
- SVHC Free
- Qorvo Green

Contact Information

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Email: customer.support@qorvo.com

For technical questions and application information: **Email:** appsupport@qorvo.com

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