

GNSS L1/L2/L5/L6 SMD Multilayer Diplexer



ADID-R-0019

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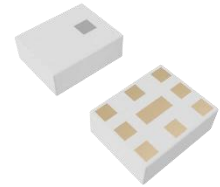
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2.5 x 2.0 x 0.9 mm
RoHS Compliant
MSL Level = 1

Description

This multilayer diplexer delivers comprehensive multi-band GNSS coverage for next-generation positioning systems. Supporting L1 alongside combined L2/L5/L6 bands in an ultra-compact 2.5 x 2.0 x 0.9 mm package. Supporting L1 alongside L2/L5/L6 bands with low insertion loss of 0.9 dB (L1) and 1.28 dB (L2/L5/L6), it delivers excellent band separation with 18 dB minimum out-of-band rejection. Rated for high-power 3W operation across -40 to +105 °C, this RoHS-compliant MSL Level 1 component enables centimeter-level accuracy for automotive telematics, RTK systems, autonomous vehicles, and precision agriculture where robust multi-frequency performance in harsh environments is essential.



Features

- GNSS L1/L2/L5/L6 Multilayer Diplexer
- Compact Size: 2.5 x 2.0 x 0.9 mm
- Insertion Loss: 0.9 dB (L1) / 1.28 dB (L2/L5/L6) Max.
- Out-of-Band Rejection: 18 dB Min.
- Maximum Input Power: 3W
- Extended Temperature -40 to +105 °C
- [RoHS Compliant](#) | [MSL Level 1](#)

Applications

- High-Precision GNSS Modules
- RTK Systems
- Automotive Transportation & Telematics
- Asset Tracking / Fleet Management
- UAVs, Robotics & Autonomous Vehicles
- Micro-Mobility Solutions
- Precision Agriculture

Ordering Information

Part Number	Description
ADID-R-0019	GNSS L1/L2/L5/L6 SMD Multilayer Diplexer on Cut Tape
ADID-R-0019-T	GNSS L1/L2/L5/L6 SMD Multilayer Diplexer on Tape & Reel

Note: Other options not listed may be available upon request via [Abracon online support](#)



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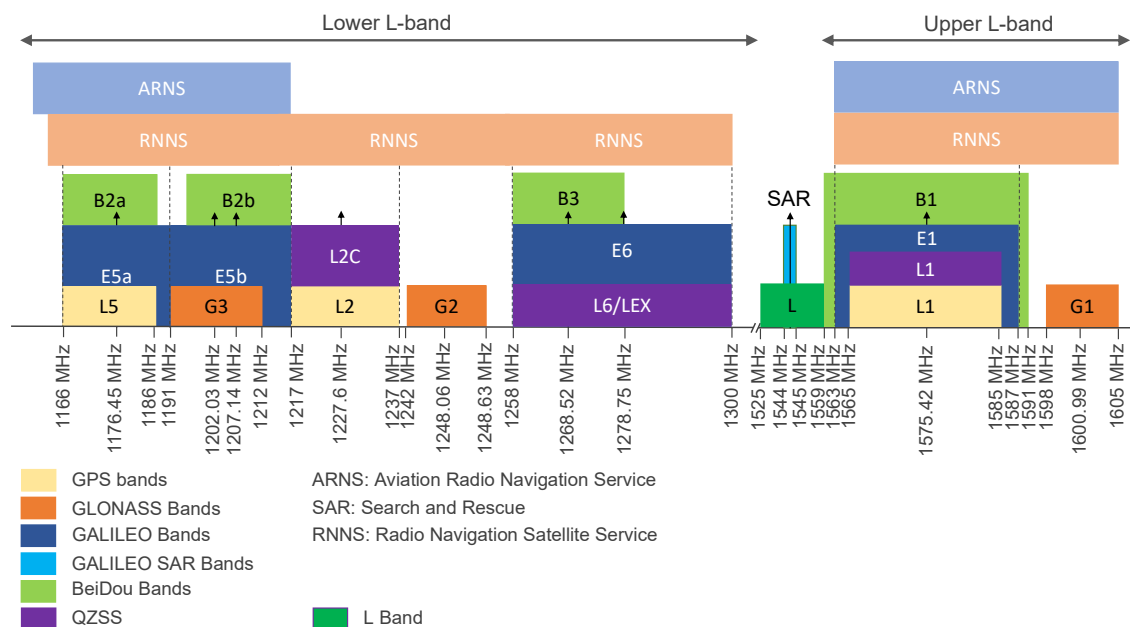
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GNSS Frequency Bands Covered

GPS	L1 1575.42MHz	L2 1227.6MHz	L5 1176.45MHz	
	■	■	■	
GLONASS	G1 1598.06-1609.31MHz	G2 1242.93-1251.68MHz	G3 1202.025MHz	
	■	■	■	
Galileo	E1 1575.42MHz	E5a 1176.45MHz	E5b 1201.5MHz	E6 1278.75MHz
	■	■	■	■
BeiDou	B1 1561MHz	B2 1207.14MHz	B3 1268.52MHz	
	■	■	■	
QZSS	L1 1575.42MHz	L2 1227.6MHz	L5 1176.45MHz	L6 1278.75MHz
	■	■	■	■
IRNSS/NAVIC			L5 1176.45MHz	
			■	
SBAS	L1/E1/B1 1575.42MHz		L5/B2a/E5a 1176.45MHz	
	■		■	



Frequency allocation: GNSS systems, upper L bands and lower L bands



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Electrical Specification

Parameters	Minimum	Typical	Maximum	Units	Notes
Frequency	1525		1606	MHz	GNSS L1/G1/B1I/L
Return Loss	23	26	-	dB	1525 ~ 1606 MHz
Insertion Loss ⁽¹⁾ (L)	-	0.69	0.80	dB	1525 ~ 1559 MHz
Insertion Loss ⁽¹⁾ (B1)	-	0.58	0.60		1559.052 ~ 1563.144 MHz
Insertion Loss ⁽¹⁾ (L1/E1)	-	0.57	0.67		1565.19 ~ 1585.65 MHz
Insertion Loss ⁽¹⁾ (G1)	-	0.50	0.51		1598.0625 ~ 1606 MHz
Amplitude Ripple ⁽¹⁾	-	0.09	0.19	dB	1525 ~ 1606 MHz
Group Delay Ripple ⁽¹⁾ (L)	-	1.51	2.61	ns	1525 ~ 1559 MHz
Group Delay Ripple ⁽¹⁾ (B1I)	-	0.45	0.89		1559.052 ~ 1563.144 MHz
Group Delay Ripple ⁽¹⁾ (L1/E1)	-	0.40	0.41		1565.19 ~ 1585.65 MHz
Group Delay Ripple ⁽¹⁾ (G1)	-	0.31	0.32		1598.0625 ~ 1606 MHz
Attenuation (Reference level from 0 dB)	18	-	-	dB	1166 ~ 1300 MHz
Isolation	20	-	-	dB	1166 ~ 1300 MHz
Source Impedance ⁽²⁾ (single ended)	-	50	-	Ω	-
Load Impedance ⁽²⁾ (single ended)	-	50	-	Ω	-
RF Power Dissipation	-	3	-	W	-

Notes: (1) Averaged values of linear S-Parameters at +25°C

(2) No matching network is required (see Measurement Circuits section).



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Parameters	Minimum	Typical	Maximum	Units	Notes
Frequency	1164.45	-	1299.75	MHz	GNSS L2/B2b/L5/E5/L6
Return Loss	18	20	-	:1	1166.22 ~ 1299.75 MHz
Insertion Loss ⁽¹⁾ (L5)	-	0.51	0.54	dB	1166.22 ~ 1186.68 MHz
Insertion Loss ⁽¹⁾ (B2b/E5b)	-	0.61	0.65		1196.91 ~ 1217.37 MHz
Insertion Loss ⁽¹⁾ (L2)	-	0.70	0.75		1217.37 ~ 1237.83 MHz
Insertion Loss ⁽¹⁾ (L6)	-	1.06	1.28		1257.75 ~ 1299.75 MHz
Amplitude Ripple	-	0.21	0.50	dB	1166.22 ~ 1299.75 MHz
Group Delay Ripple ⁽¹⁾ (L5)	-	0.36	0.54	ns	1166.22 ~ 1186.68 MHz
Group Delay Ripple ⁽¹⁾ (B2b/E5b)	-	0.48	0.71		1196.91 ~ 1217.37 MHz
Group Delay Ripple ⁽¹⁾ (L2)	-	0.86	0.57		1217.37 ~ 1237.83 MHz
Group Delay Ripple ⁽¹⁾ (L6)	-	1.98	3.46		1257.75 ~ 1299.75 MHz
Attenuation (Reference level from 0 dB)	24	-	-	dB	1525 ~ 1606 MHz
Isolation	26	-	-	dB	1525 ~ 1606 MHz
Source Impedance ⁽²⁾ (single ended)	-	50	-	Ω	-
Load Impedance ⁽²⁾ (single ended)	-	50	-	Ω	-
RF Power Dissipation	-	3	-	W	-

Notes: (1) Averaged values of linear S-Parameters at +25°C

(2) No matching network is required (see Measurement Circuits section).

Mechanical Specification

Parameters	Specifications
Filter Dimension	2.5 x 2.0 x 0.9 mm
Mounting Type	Surface Mount
Additional Resources	Download STEP File, Package Drawing, 3D PDF

Environmental Specification

Parameters	Specifications
Operating & Storage Temperature (Unpackaged Component)	-40°C ~ +105°C
Storage Temperature in Packaging	-10°C ~ +40°C
Packaging Storage Relative Humidity	70% (Max.)
MSL level	1
RoHS Compliant	Yes



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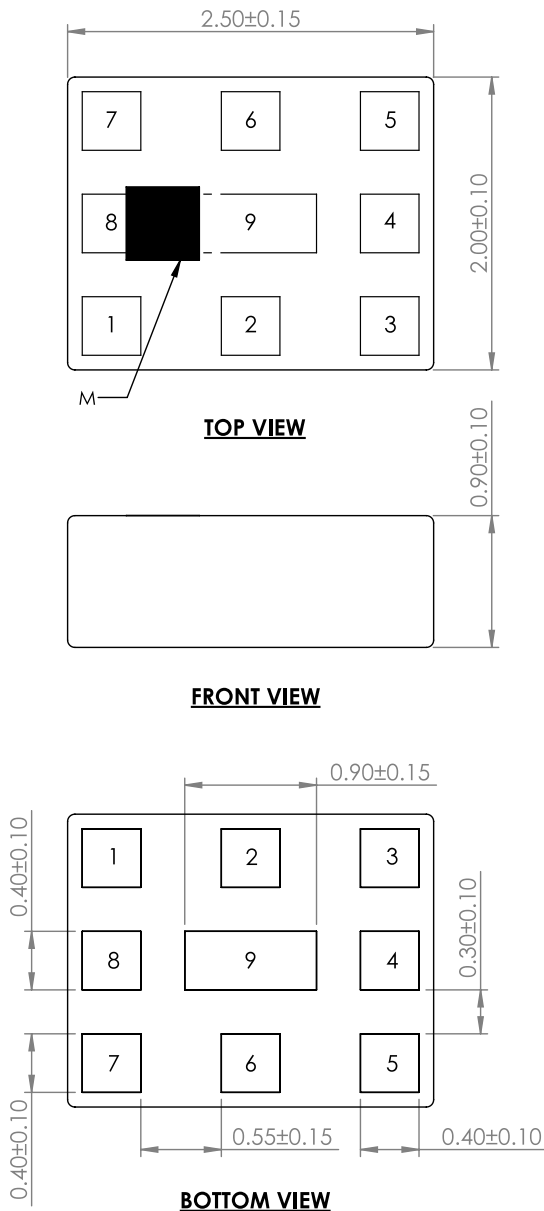


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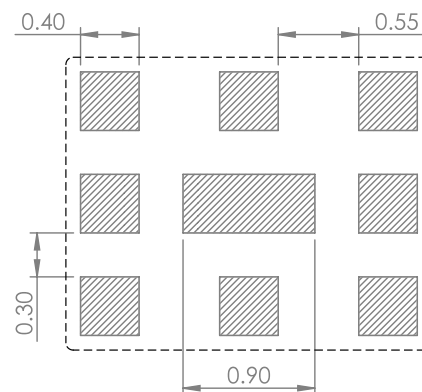
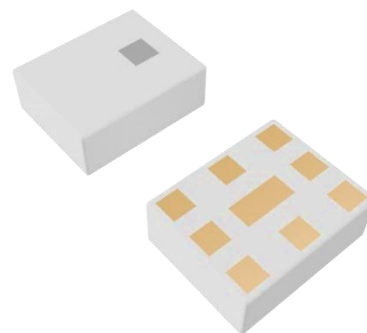


2.5 x 2.0 x 0.9 mm
RoHS Compliant
MSL Level = 1

Product Dimensions



RECOMMENDED LAND PATTERN



Unit : mm

Pin No.	Description
2	Common Input
5	GNSS L2/L5/L6 Output
7	GNSS L1 Output
1, 3, 4, 6, 8, 9	Ground

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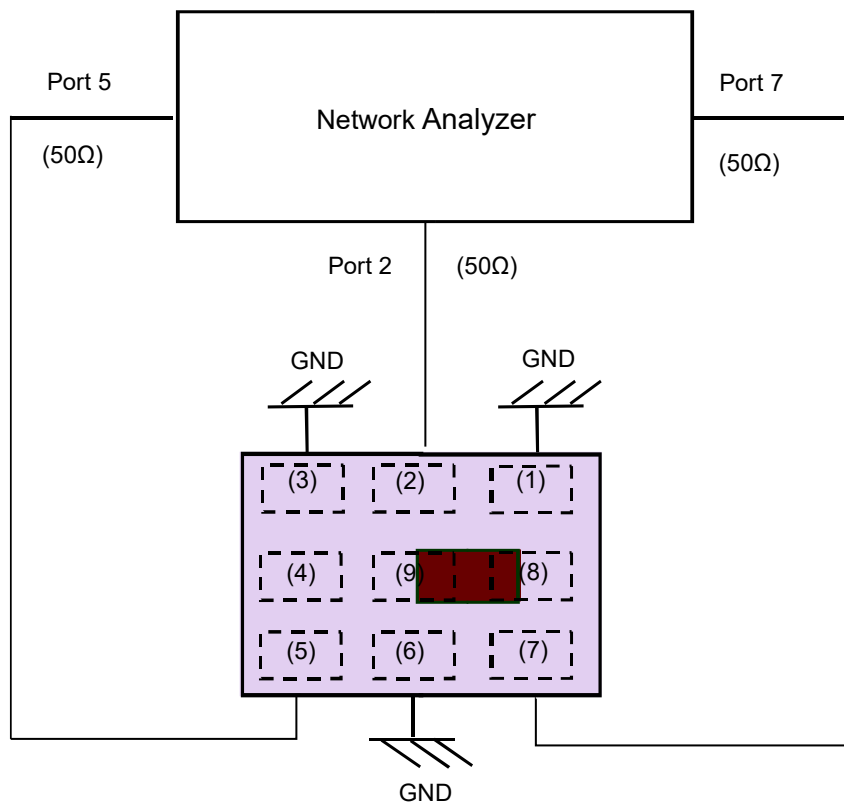


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2.5 x 2.0 x 0.9 mm
RoHS Compliant
MSL Level = 1

Measurement Circuit



Port	Matching Value
Input (Pin 2)	50 Ω
GNSS L1 Output (Pin 7)	50 Ω
GNSS L2/L5/L6 Output (Pin 5)	50 Ω

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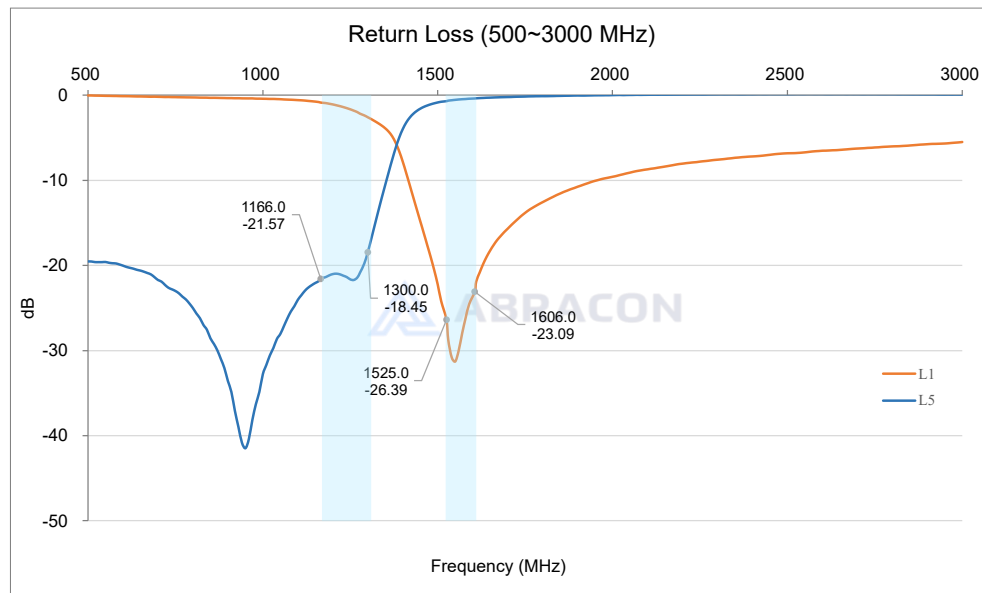
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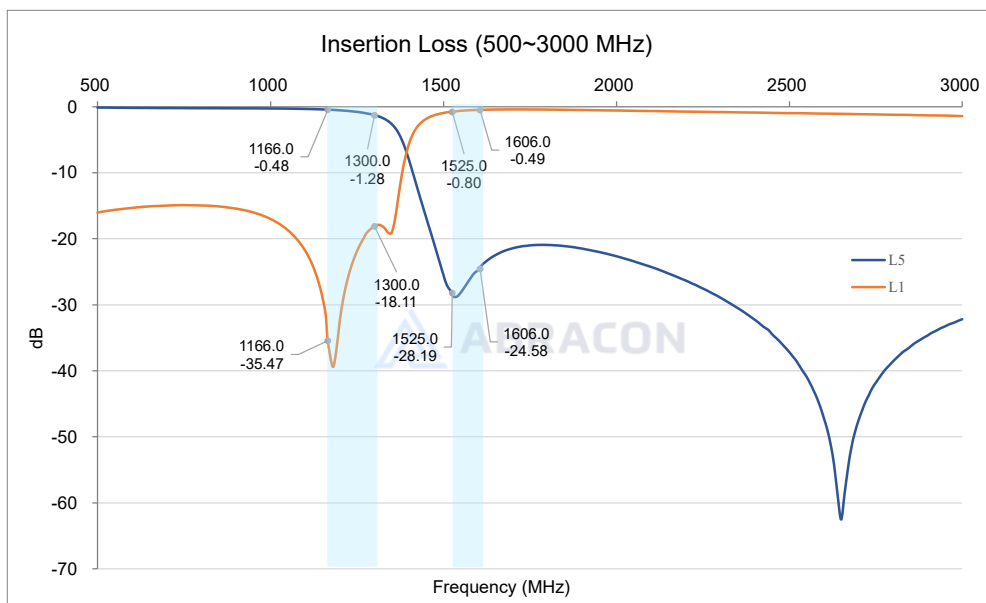
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RoHS Compliant
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Frequency Characteristics

Return Loss 500 – 3000 MHz



Insertion Loss 500 – 3000 MHz



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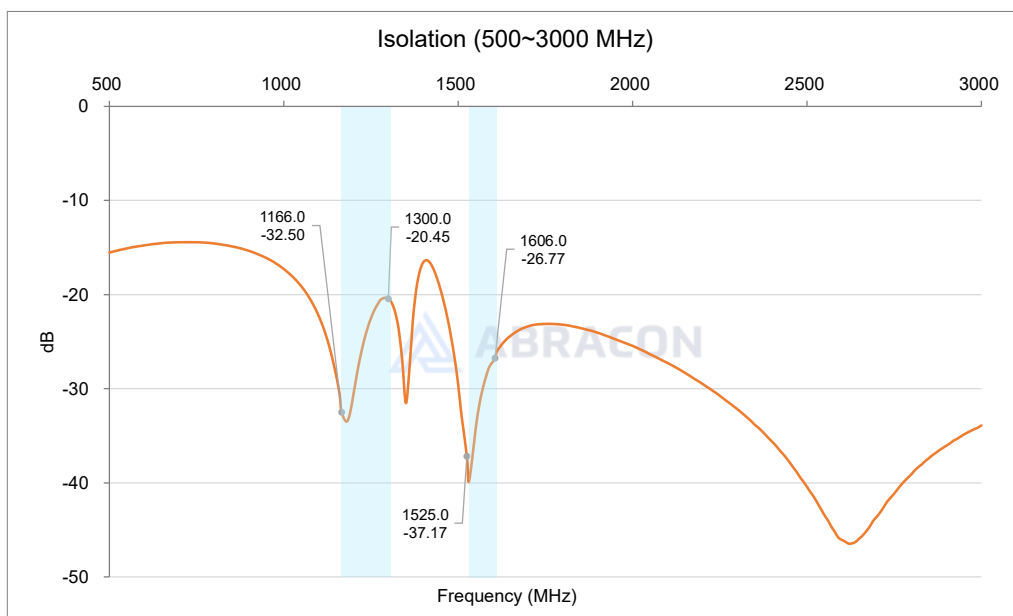


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RoHS Compliant
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Isolation 500 - 3000MHz



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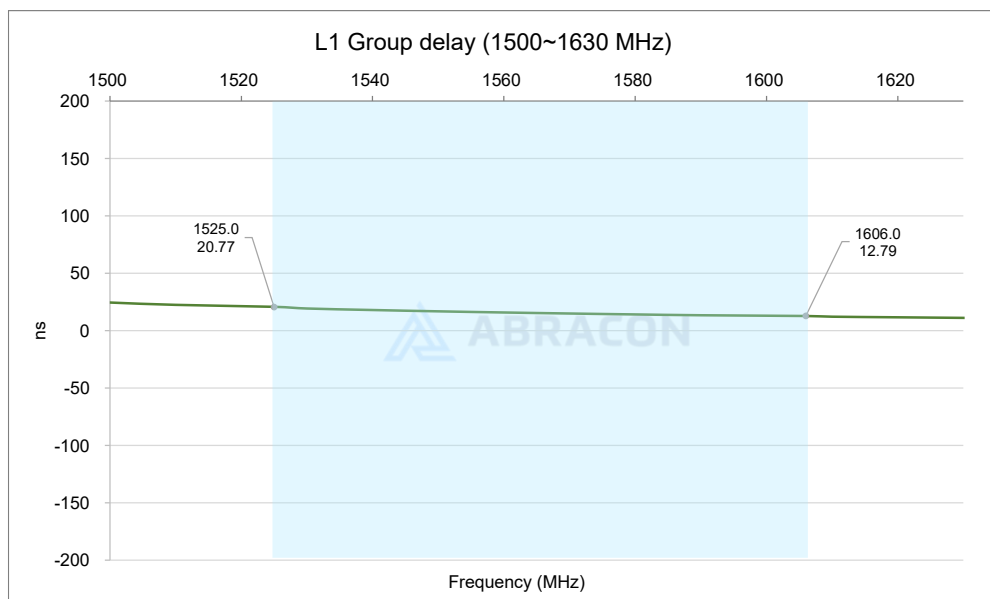


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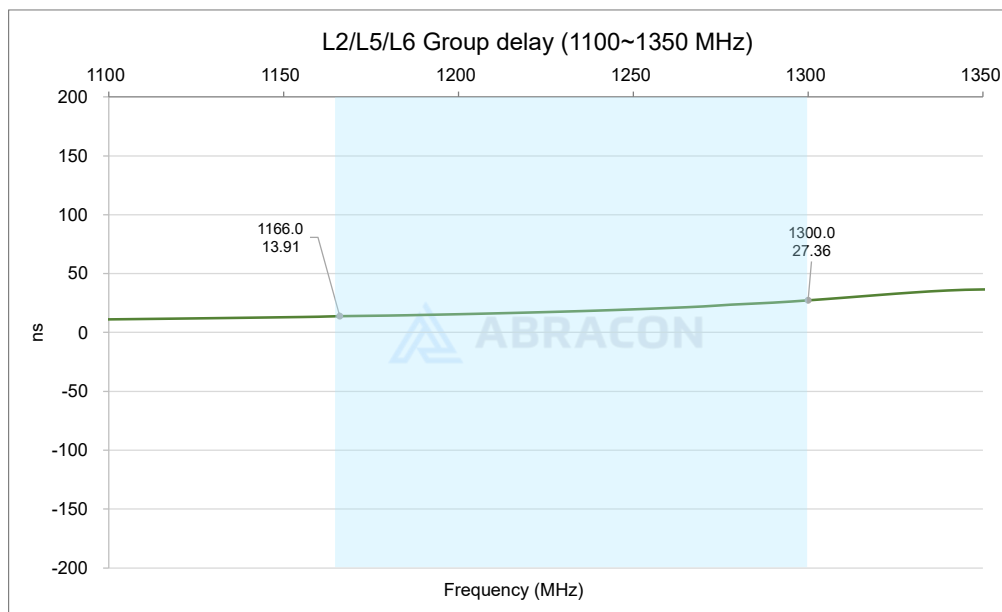


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Group Delay (L1)



Group Delay (L2/L5/L6)



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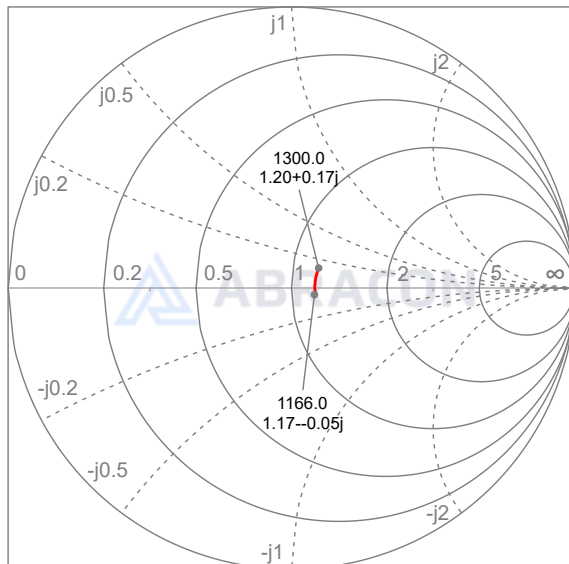
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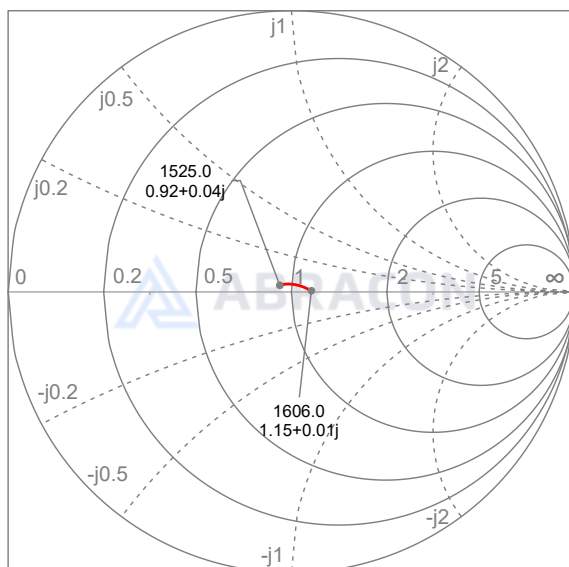
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Smith Chart (L1 & L2/L5/L6)

Smith chart S11 (1166~1300MHz)



Smith chart S11 (1525~1606MHz)



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RoHS Compliant
MSL Level = 1

Reflow Profile [JEDEC J-STD-020]

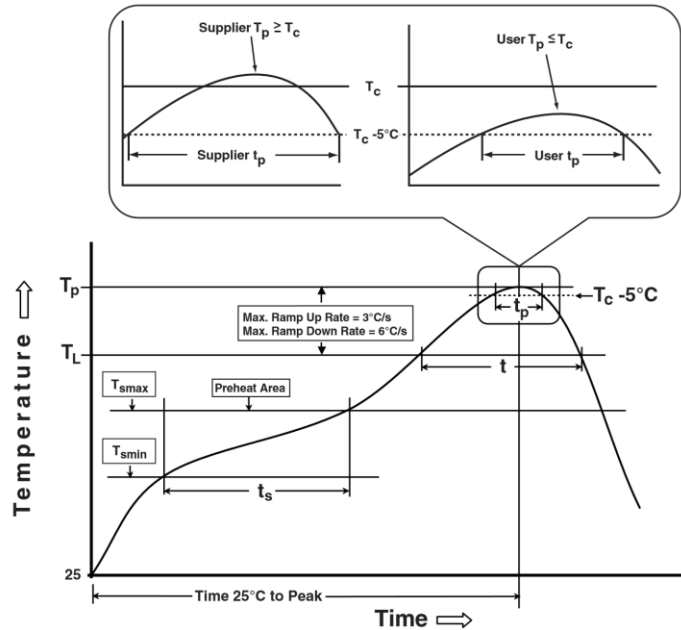


Table 1

SnPb Eutectic Process

Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5mm	235°C	220°C
≥2.5mm	220°C	220°C

Table 2

Pb-Free Process

Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6mm	260°C	260°C	260°C
1.6mm - 2.5mm	260°C	250°C	245°C
>2.5mm	250°C	245°C	245°C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	180°C
Time (T_{smin} to T_{smax}) (t_s)	60 – 120 sec.	60 – 90 sec.
Average ramp-up rate (T_{smax} to T_p)	3°C/sec. max	3°C/sec. max
Liquidous temperature (T_L)	183°C	220°C
Time at Liquidous (T_L)	60 – 150 sec.	50 – 80 sec.
Peak package body temperature (T_p)*	See Table 1	See Table 2
Time (T_p)* within 5°C of the specified classification temperature (T_c)	20 sec.	20 ~ 40 sec.
Ramp-down rate (T_p to T_{smax})	6°C/sec. max	6°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	2 max	2 max

*Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

**Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

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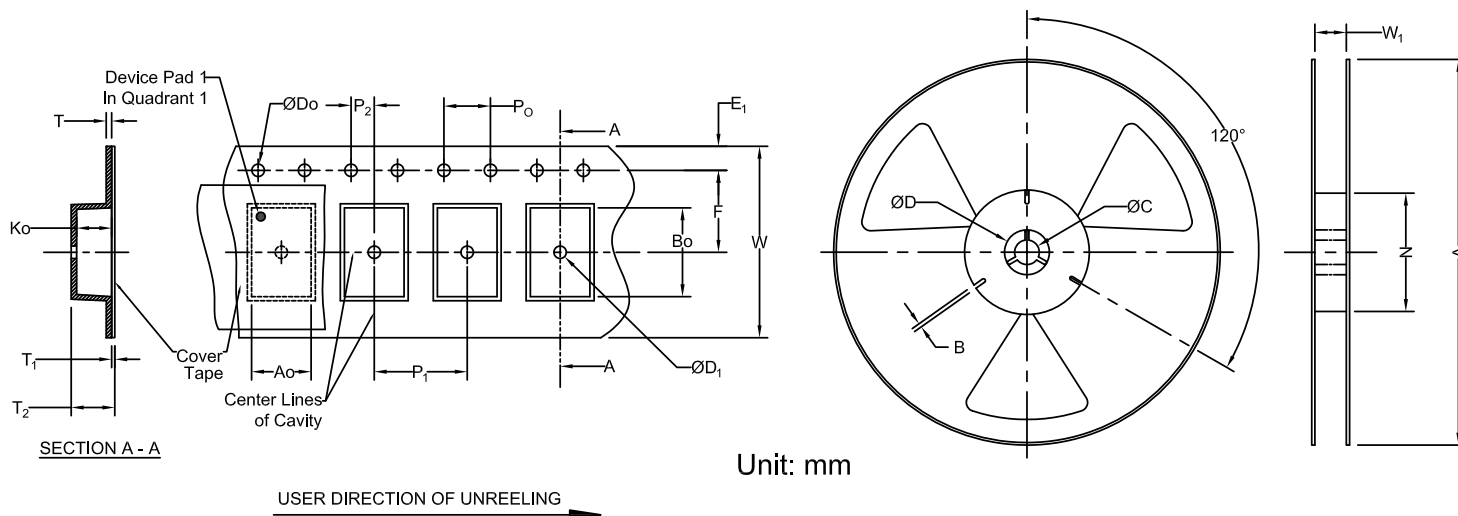
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MSL Level = 1

Packaging

Tape & Reel Dimension



Carrier Tape Specifications (mm)

Do	T	E ₁	P ₀	P ₂	F	P ₁	W	A ₀	B ₀	K ₀	Reel Qty
1.5 ± 0.1/-0	0.33 Max.	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	3.5 ± 0.05	4.0 ± 0.1	8.0 ± 0.3	2.3 ± 0.15	2.8 ± 0.15	1.25 Max.	3,000

Reel Specifications (mm)

A	W ₁	N	C	D
178.0 ± 2.0	9.5 ± 0.5	60 ± 0.5	13.5 ± 0.5	21 ± 0.8

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