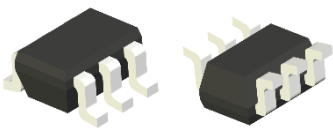


Description

The ASWD-S2-0003 is a GaAs MMIC single-pole double-throw (SPDT) reflective RF switch designed for high-performance switching applications. It features ±1.5kV HBM ESD protection and comes in a compact, low-cost SOT363-6 / SC70-6 package. Optimized for applications requiring low insertion loss, small size, and cost efficiency, the ASWD-S2-0003 is ideal for industrial IoT solutions, including Bluetooth (BT), Wi-Fi, GNSS, LoRa, LTE, as well as handsets and general-purpose RF systems. It supports operation up to 3 GHz, making it well-suited for high-power applications at low control voltages. The ASWD-S2-0003 is lead-free, RoHS-compliant with Moisture Sensitivity Level (MSL) 3.



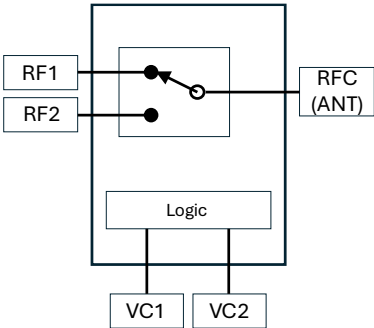
Key Features

- SOT363 /SC70-6 Package: 2.0mm x 1.2mm
- Frequency Range: 0.1 ~2.7 GHz
- Low Insertion Loss: 0.35 dB Typ. @f = 0.1 to 1 GHz
1.6 dB Typ. @f = 2.0 to 2.7 GHz
- High Isolation 30 dB Typ.
- $P_{0.1dB}$ = +32 dBm Typ.
- Wide Control Voltage V_{CTL_H} = 1.5 ~ 3.6 V
- Low Current Consumption: 1.5 μ A
- ±1.5kV HBM ESD Protection
- [RoHS Compliant | MSL Level 3](#)

Typical Applications

- Smart Phones, Tablets, PCs
- GSM/WCDMA/LTE band and Mode Switching
- Antenna Selection / Tuning Switch
- RF Combo Modules (Wi-Fi/BT, LTE/GNSS)
- AR/VR, Wi-Fi Speakers
- Access Point, Routers and Gateways

Functional Block Diagram



Ordering Information

Part No.	Description
ASWD-S2-0003	0.1~ 2.7GHz SPDT RF Switch with Enhanced ESD Protection on Cut Tape
ASWD-S2-0003-T	0.1~ 2.7GHz SPDT RF Switch with Enhanced ESD Protection on Tape & Reel
ASWD-S2-0003-EVB	0.1~ 2.7GHz SPDT RF Switch with Enhanced ESD Protection EVB

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Control Voltage	V _{CTL}	-	-	6.0	V
Max Input Power	P _{INMAX}	-	-	+33	dBm
Operating Temperature	T _{OP}	-40	-	85	°C
Storage Temperature	T _{STG}	-65	-	150	°C
Moisture Sensitivity Level	-	MSL3			-
Electrostatic Discharge, HBM ¹	V _{ESD}	-	-	±1500	V
Electrostatic Discharge, CDM ²		-	-	±2000	V

1. HBM: ESDA/JEDEC JS-001-2017

2. CDM: ESDA/JEDEC JS-002-2018

Operation of this device outside the parameter ranges given above may cause permanent damage.

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Unit
V _{CTL}	1.5	3.3	3.6	V
Pin (RFC – RFX), CW, 50 Ω			30	dBm
T _j at MTTF>105 hrs.	-	150	-	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

RF Electrical Specifications

Parameters		Condition	Values			Unit
			Minimum	Typical	Maximum	
Insertion Loss	IL	< 1.0 GHz	-	0.35	-	dB
		1.0-2.0 GHz	-	0.55	-	
		2.0-2.7 GHz	-	1.60	-	
Isolation	ISL	-	-	30	-	dB
Return Loss	RL	-	-	20	-	dB
Input P _{0.1dB}	P _{0.1dB}	-	-	32	-	dBm
2 nd Harmonics	2f ₀	f=433MHz, Pin = 25dBm	-	-65	-	dBc
3 rd Harmonics	3f ₀	f=433MHz, Pin = 25dBm	-	-52	-	dBc
Turn-on switching time	t _{SW_ON}	-	-	20	-	ns
Turn-off switching time	t _{SW_Off}	-	-	20	-	ns

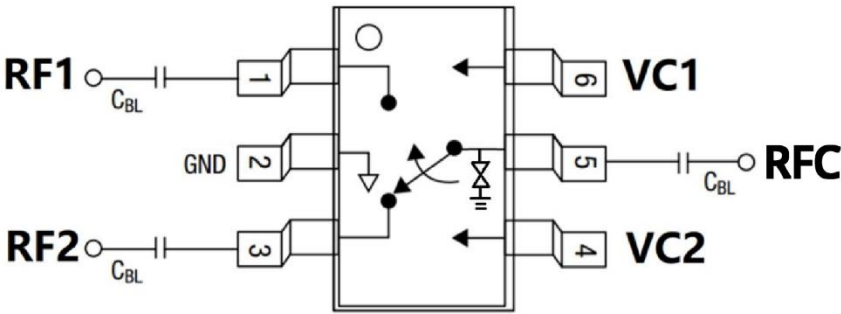
DC Electrical Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Control Voltage	V_{CTL_H}	1.5	3.3	3.6	V
	V_{CTL_L}	0	-	0.45	V
Control Current	I_{CTL}	-	1.5	-	uA

Control Logic

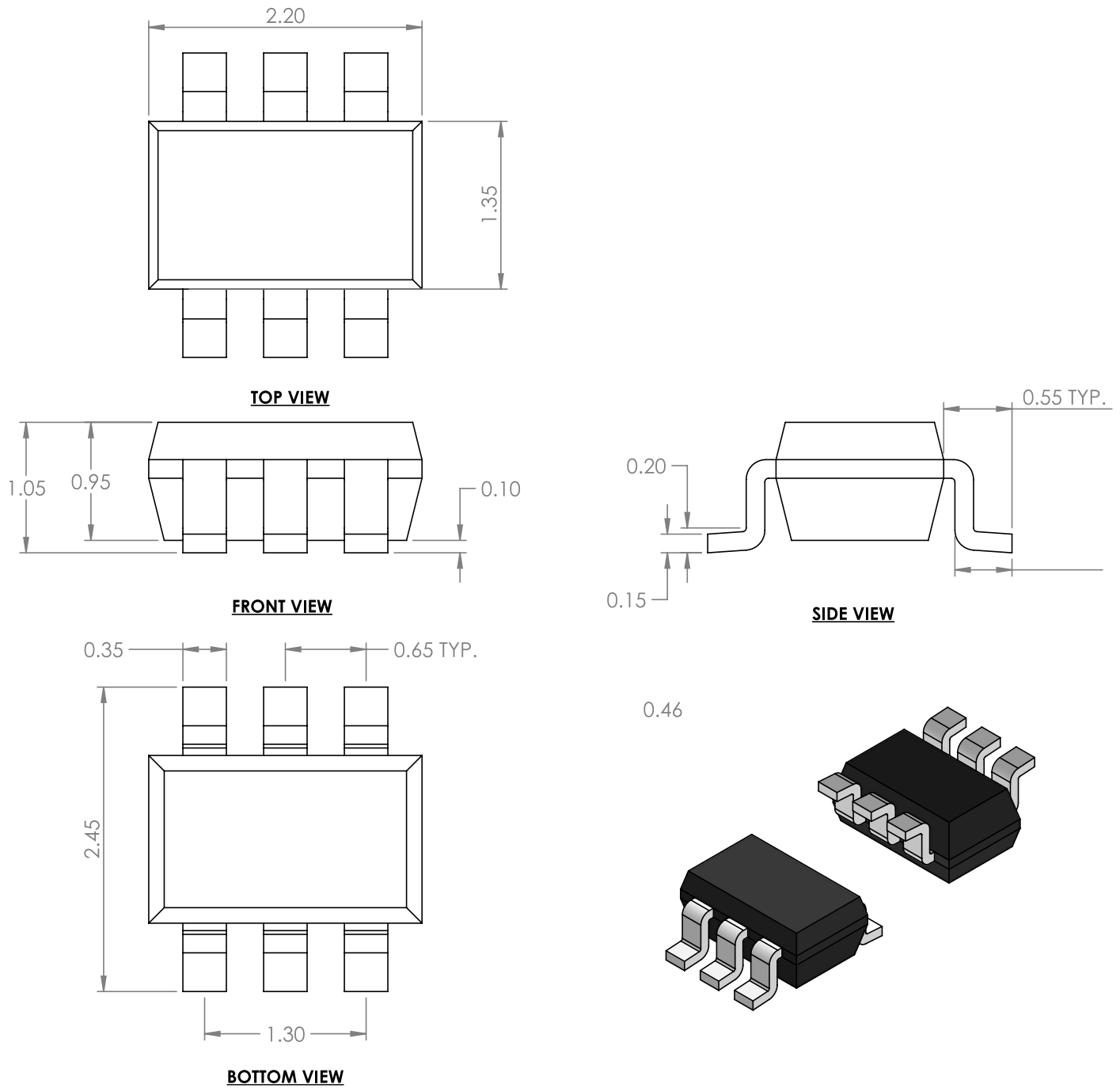
Control Pin	VC1	VC2	RF1	RF2
1	0	1	ON	OFF
2	1	0	OFF	ON

Pin Configuration



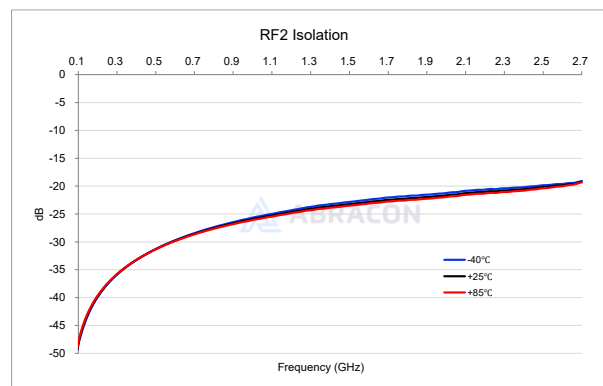
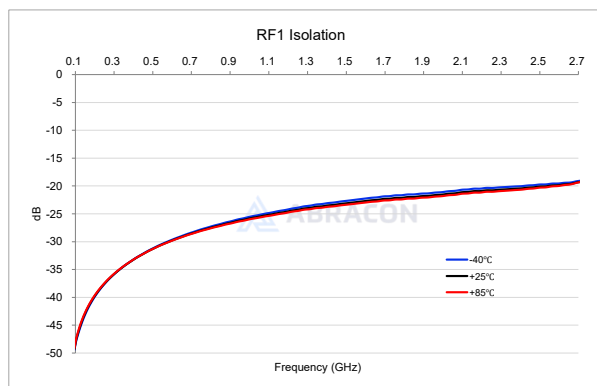
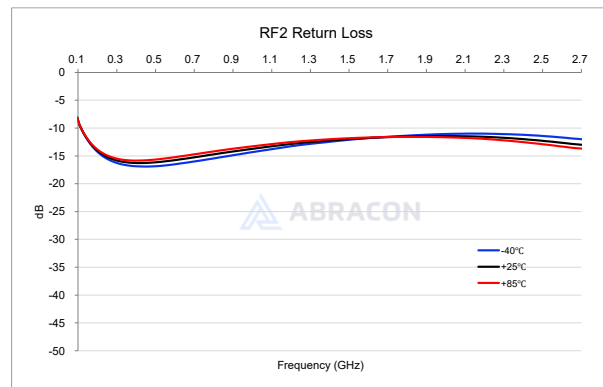
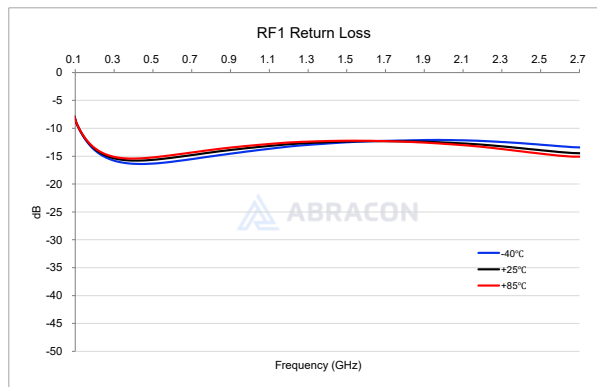
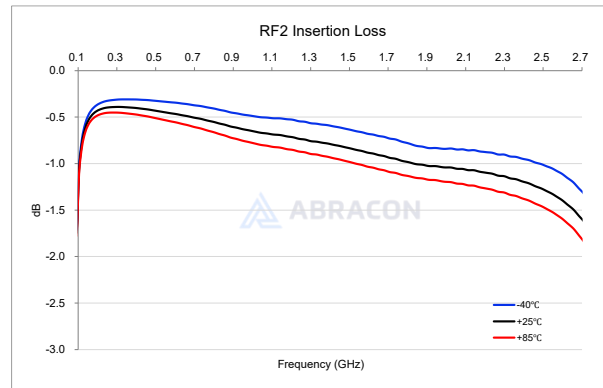
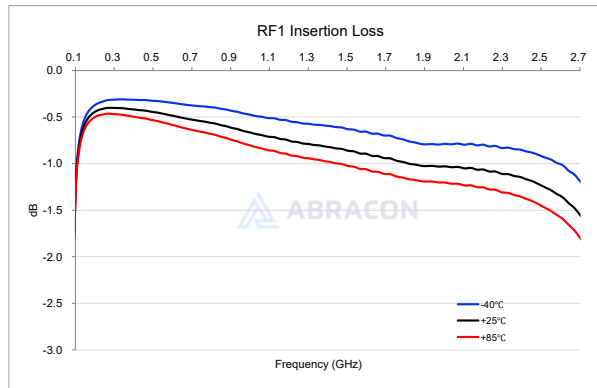
Pin	Name	Description
1	RF1	RF I/O
2	GND	Ground
3	RF2	RF I/O
4	VC2	Logic Control
5	RFC	RF Common Port (Antenna Port)
6	VC1	Logic Control

Product Dimensions



Unit: mm

Performance Plots

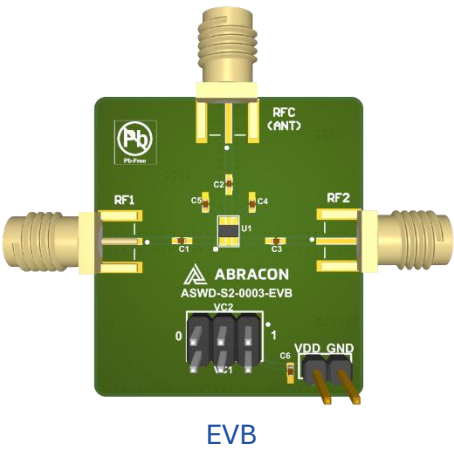


ASWD-S2-0003

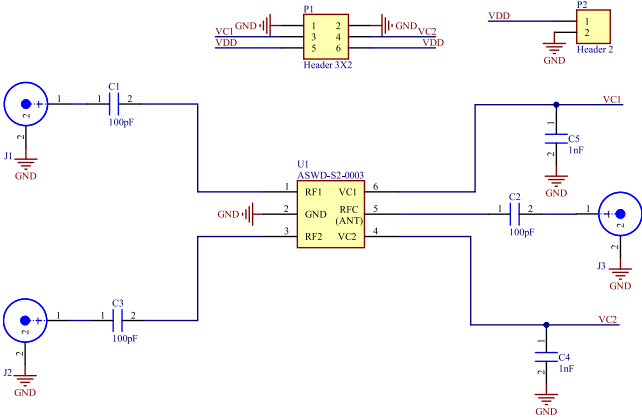
0.1~ 2.7GHz SPDT RF Switch with Enhanced ESD Protection



Evaluation Board ASWD-S2-0003-EVB



EVB



Schematic

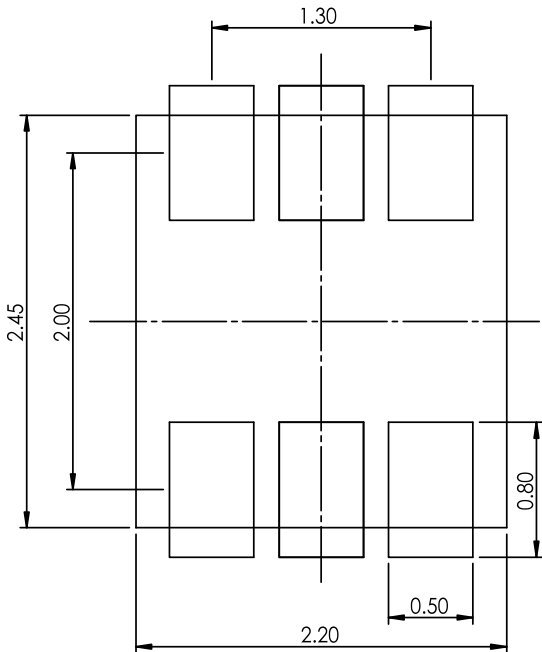
Bill of Material

Component	Description	Manufacturer	Manufacturer Part	QTY
U1	0.1~ 2.7GHz SPDT RF Switch with Enhanced ESD Protection	Abrakon	ASWD-S2-0003	1
C1, C2, C3	Capacitor (100pF)	Murata	GRM0222C0J101GA02	3
C4, C5	Capacitor (1nF)	Murata	GRM022R60J102KE19	2

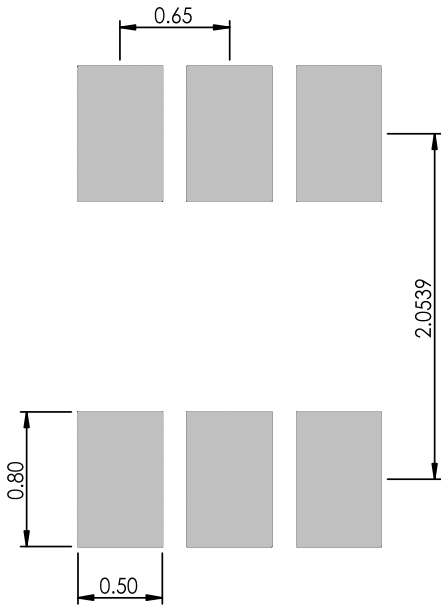
NOTES:

1. Input and output are 50-ohm lines.

IC Footprint & PCB Land Pattern



Footprint



Land Pattern

Unit: mm

Reflow Profile [JEDEC J-STD-020]

Solder paste: Sn/3.0Ag/0.5Cu

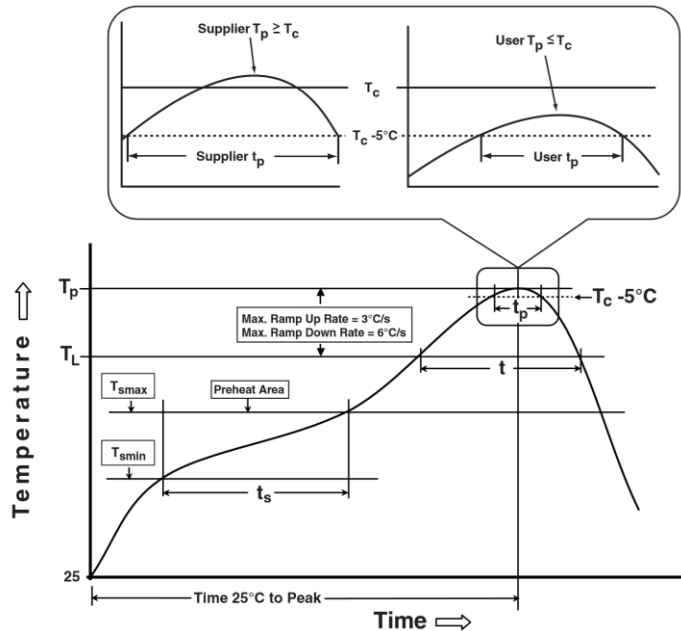


Table 1

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

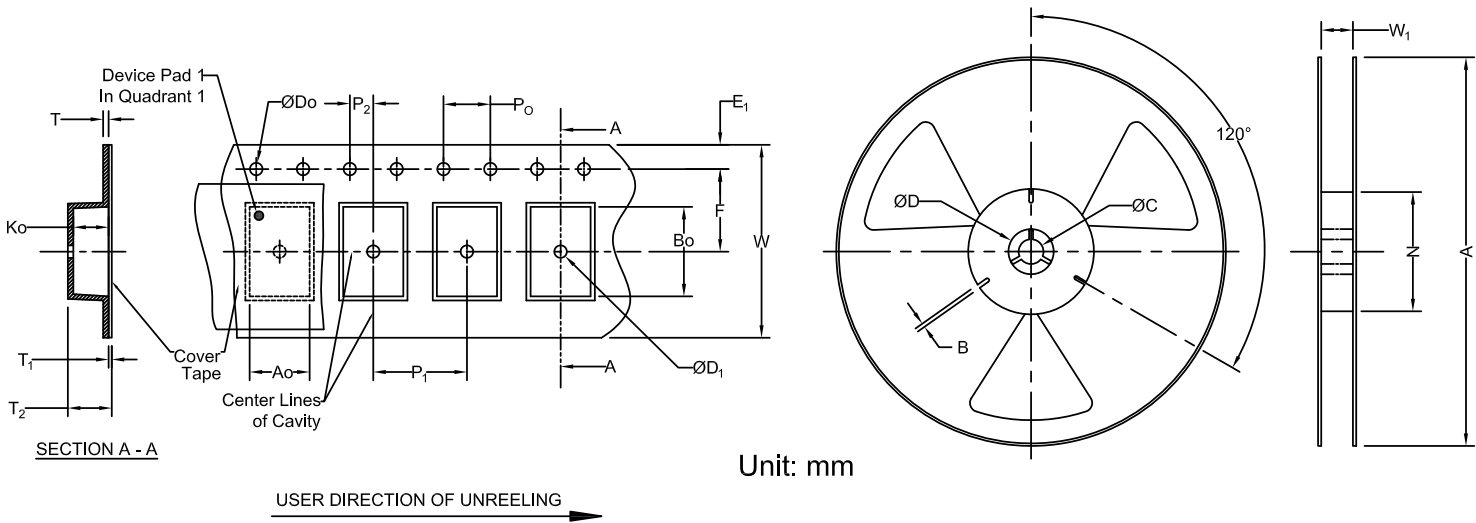
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T _{smin})	100°C	150°C
Temperature maximum (T _{smax})	150°C	200°C
Time (T _{smin} to T _{smax}) (t _s)	60 – 120 sec.	60 – 120 sec.
Average ramp-up rate (T _{smin} to T _p)	3°C/sec. max	3°C/sec. max
Liquidous temperature (T _L)	183°C	217°C
Time at Liquidous (T _L)	60 – 90 sec.	60 – 90 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.	10 sec.
Ramp-down rate (T _p to T _{smax})	3°C/sec. max	3°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.

Packaging

Tape & Reel Dimension



Carrier Tape Specifications (mm)										
E1	D0	P0	P2	F	P1	W	A0	B0	K0	Reel Qty
1.75 ± 0.1	1.50 ± 0.1	4.0 ± 0.1	2.0 ± 0.1	3.5 ± 0.1	4.0 ± 0.1	8.0 ± 0.2	2.28 ± 0.1	2.35 ± 0.1	1.2 ± 0.1	3,000

Reel Specifications (mm)				
A	W1	N	B	C
178	12.4 ± 0.5	54.5 ± 2.0	2.4 ± 0.3	13.3 ± 0.3