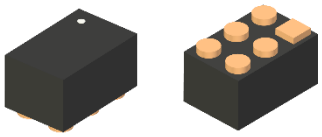
ASWD-S2-0001

0.1~ 8GHz SPDT Antenna Switch

Description

The ASWD-S2-0001 is a low loss, high isolation, SOI SPDT Radio-Frequency switch. Outstanding performance for ultra-low tuning-on resistance and ultra-high linearity are making its perfectly to use for antenna tuning application for no matter high band or low band switch in GSM/WCDMA/LTE handset application. The ASWD-S2-0001 is packaged in a RoHS-compliant, compact DFN 1.1mm x 0.7mm x 0.55mm surface-mount leadless package



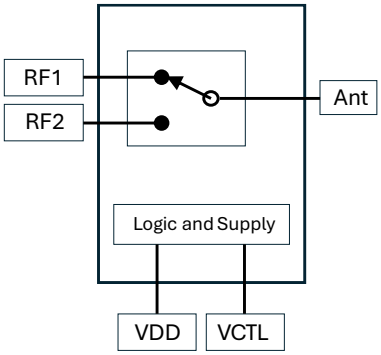
Key Features

- Frequency Range: 0.1 to 8.0GHz
- Low Insertion Loss: 0.37dB at 2.7GHz
- High Isolation: 25dB at 2.7GHz
- GPIO Control for SPDT
- DFN-6L Package: 1.1mm x 0.7mm

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-S2-0001	0.1~ 8GHz SPDT Antenna Switch on Cut Tape
ASWD-S2-0001-T	0.1~ 8GHz SPDT Antenna Switch on Tape & Reel
ASWD-S2-0001-EVB	0.1~ 8GHz SPDT Antenna Switch EVB

Revision:
Initial Release 3/19/2025

Disclaimer

Check Inventory
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Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum			Unit
Supply Voltage	V_{DD}	1.6	-	3.6	V
Control Voltage	V_{CTL}			V_{DD}	V
Max Input Power	P_{INMAX}	-	-	+35	dBm
Operating Temperature	T_{OP}	-40	-	85	℃
Storage Temperature	T_{STG}	-55	-	150	℃
Electrostatic Discharge, HBM[1]	V_{ESD}	-	-	±1000	V
Electrostatic Discharge, CDM[2]		-	-	±1000	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
VDD	1.6	2.8	3.1	V
Pin (RFC – RFX), CW, 50 Ω			34.5	dBm
T_j at MTTF>105 hrs.	-	150	-	℃

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	0.1-1.0 GHz	-	0.35	0.50	dB
		1.0-2.2 GHz	-	0.35	0.55	
		2.2-2.7 GHz	-	0.37	0.60	
		2.7-4.0 GHz		0.57	0.75	
		4.0-8.0 GHz		0.57	0.75	
Isolation	ISL	0.1-1.0 GHz	30	35	-	dB
		1.0-2.2 GHz	28	33	-	
		2.2-2.7 GHz	20	25	-	
		2.7-4.0 GHz	15	18		
		4.0-8.0 GHz	12	14		
Return Loss	RL	0.1-2.7 GHz	-	13.9	20.8	dB
Input $P_{0.1dB}$	$P_{0.1dB}$	0.8-2.7 GHz	-	34.5	-	dBm
2nd Harmonics	$2f_0$	Pin = 26dBm	-	-80	-	dBc
3rd Harmonics	$3f_0$	Pin = 26dBm	-	-75	-	dBc
Turn-on switching time (50% of final VC to 10%/90& of final RF power)	t_{SW}	-	-	1.0	-	us

DC Electrical Specifications

Parameter	Symbol	Absolute Maximum			Unit
Supply Voltage	V_{DD}	1.6	2.8	3.1	V
Supply Current	I_{DD}	-	10	50	uA
Control Voltage	V_{CTL_H}	1.2	1.8	2.85	V
	V_{CTL_L}	-	-	0.4	V
Control Current	I_{CTL}	-	2.5	5	uA

Control Logic

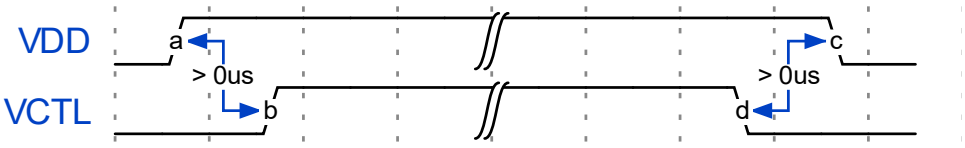
Control Pin	RF1	RF2
0	ON	OFF
1	OFF	ON

Timing Requirements

It is important that the user adheres to the correct timing sequences in order to avoid leakage power consumption.

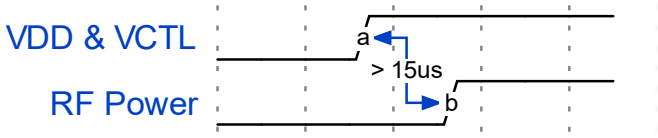
1. VDD and VCTL cannot be powered on and off independently from one another. During power-on sequence, the user must power up VDD first, then power up VCTL. During power-off sequence, the user must power off VCTL first, then power off VDD.

In the state of VDD=OFF (0 V) and VCTL=ON (1.8V), it may cause leakage power consumption as ESD protection circuit inside the switch.



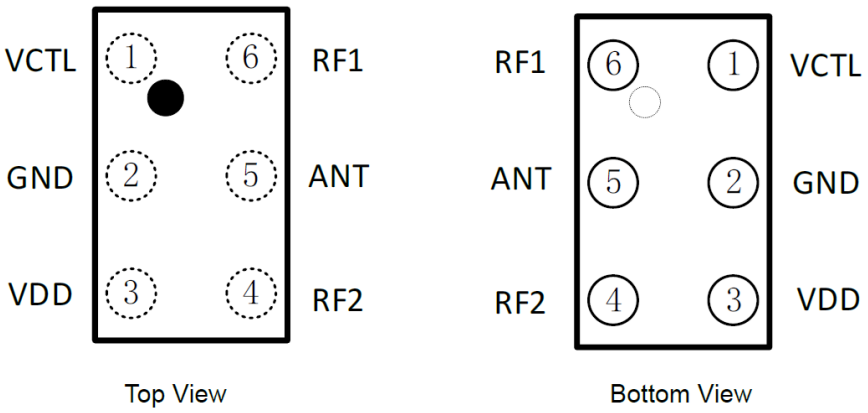
a: VDD ON **b**: VCTL ON **c**: VDD OFF **d**: VCTL OFF

2. VDD and VCTL must be on for a minimum of 15 us before applying RF power



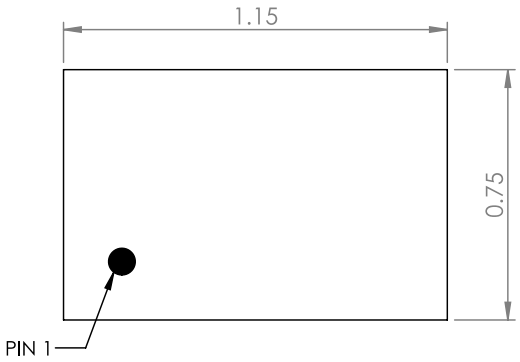
a: VDD and VCTL ON **b**: RF Power Up

Pin Configuration

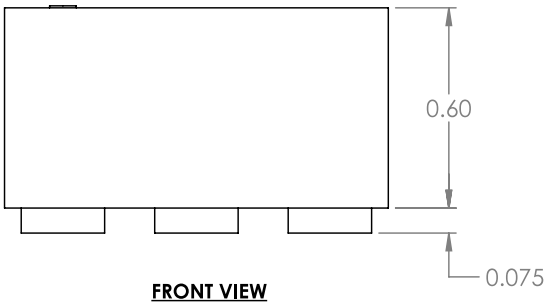


Pin	Name	Description
1	VCTL	Switch Control
2	GND	Ground
3	VDD	DC Control Voltage
4	RF2	RF2 Port
5	ANT	Antenna Port
6	RF1	RF1 Port

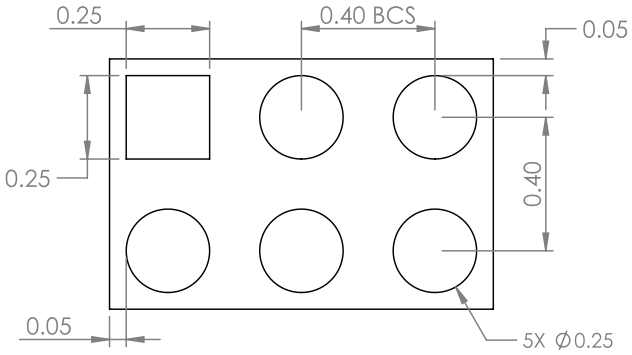
Product Dimensions



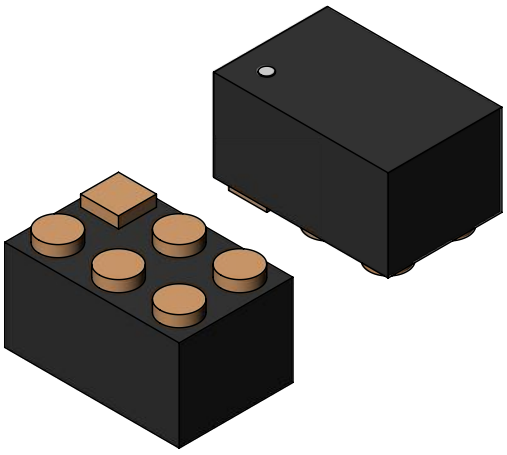
TOP VIEW



FRONT VIEW

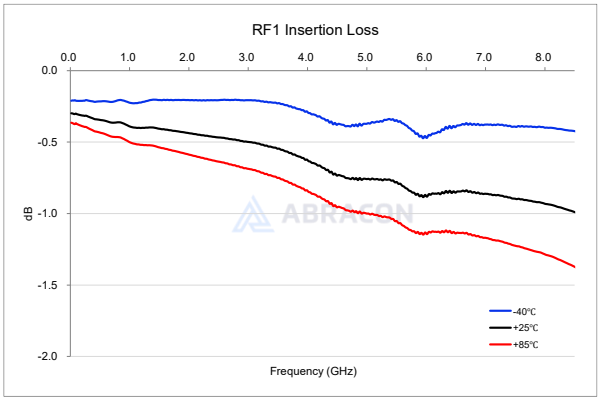


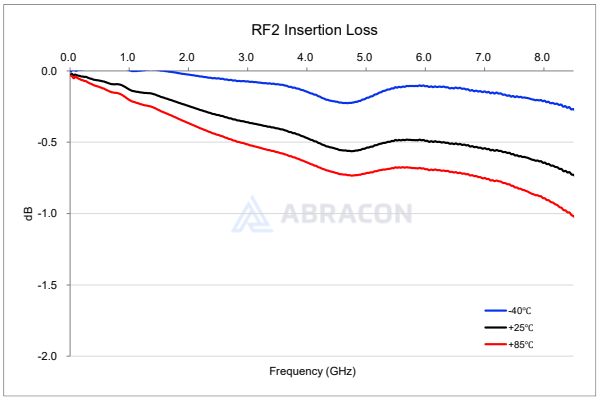
BOTTOM VIEW

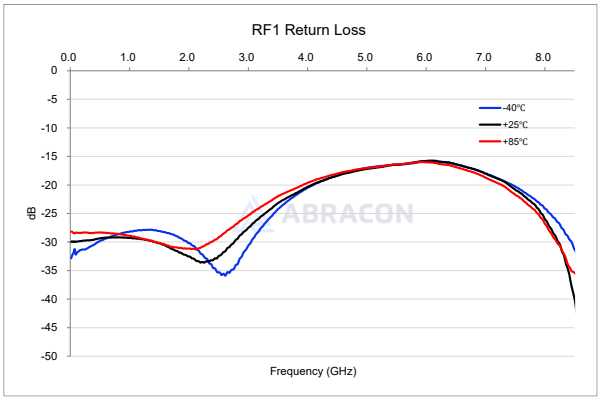


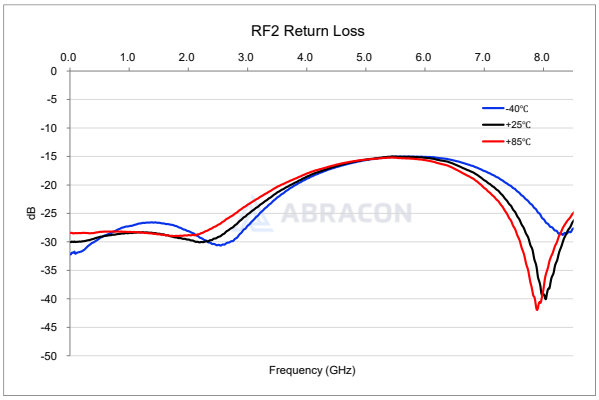
Unit: mm

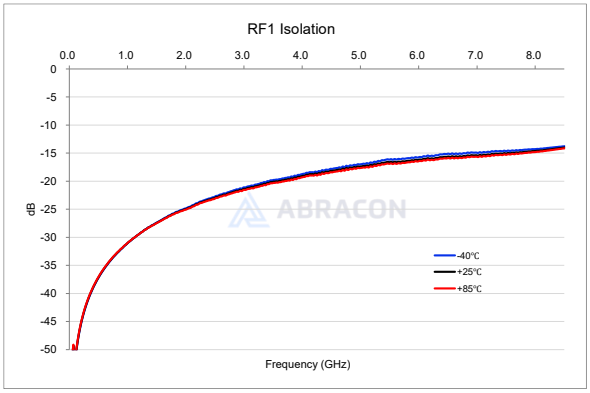
Performance Plots

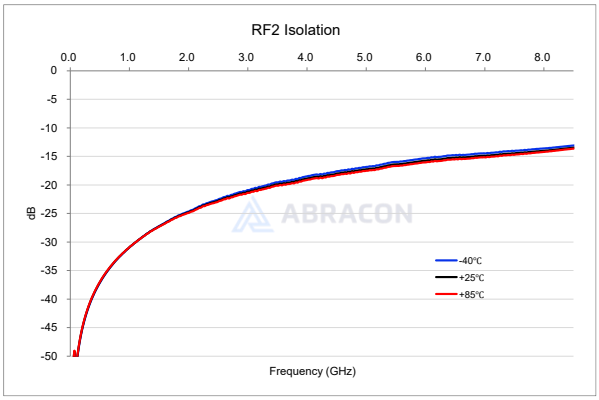




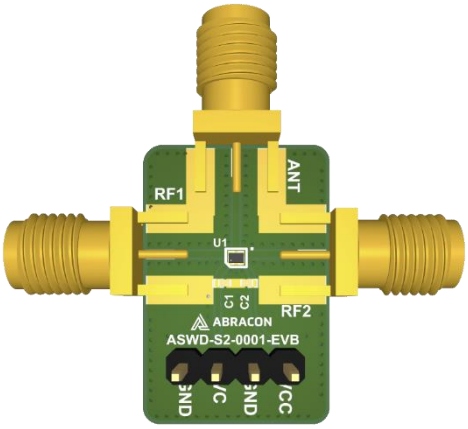




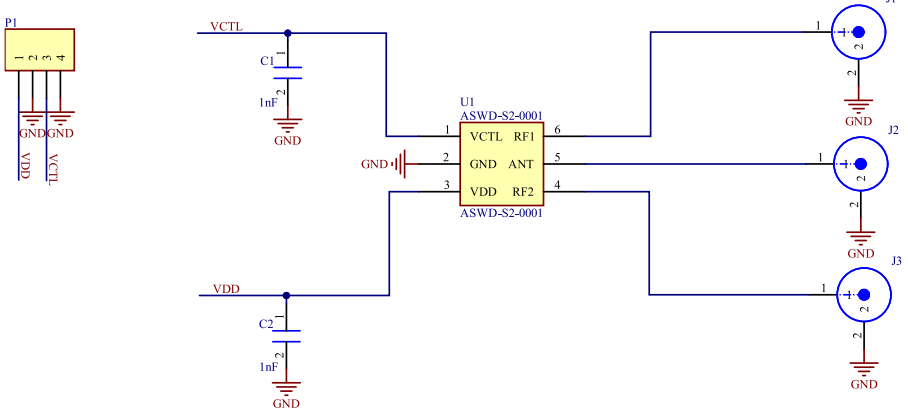




Evaluation Board ASWD-S2-0001-EVB



EVB



Schematic

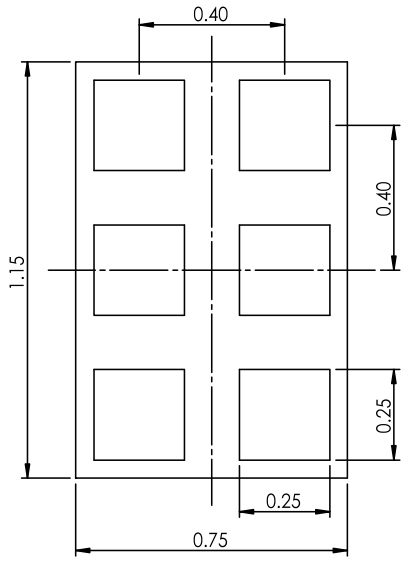
Bill of Material

Component	Description	Manufacturer	Manufacturer Part	QTY
U1	SPDT Antenna Switch	Abracon	ASWD-S2-0001	1
C1, C2	Capacitor (0402)	Murata	GRM022R60J102KE19	2

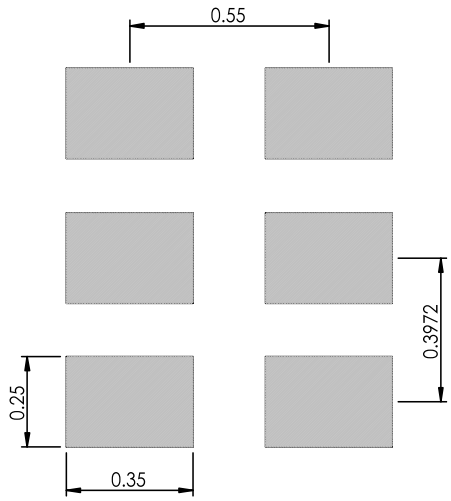
NOTES:

1. Input and output are 50-ohm lines.

IC Footprint & PCB Land Pattern



Footprint



Land Pattern

Reflow Profile [JEDEC J-STD-020]

Solder paste: Sn/3.0Ag/0.5Cu

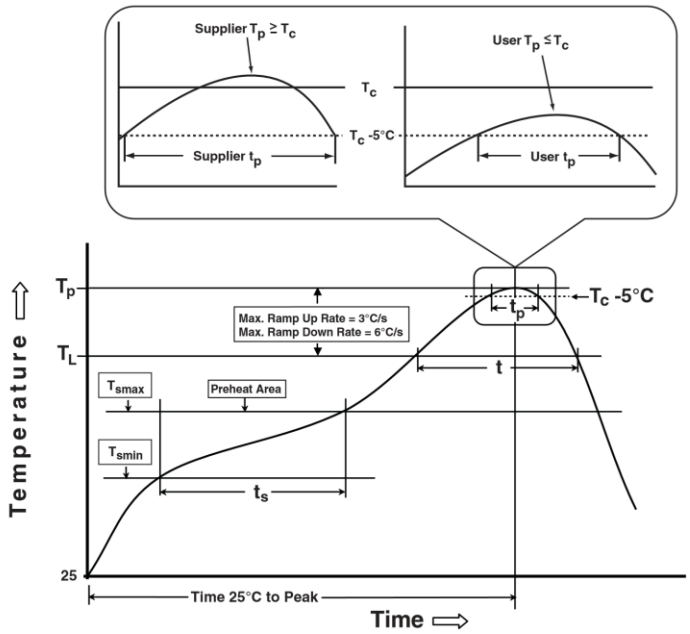


Table 1

SnPb Eutectic Process Classification Temperatures (T_c)		
Package Thickness	**Volume mm³ <350**	**Volume mm³ ≧350**
<2.5mm	235℃	220℃
≧2.5mm	220℃	220℃

Table 2

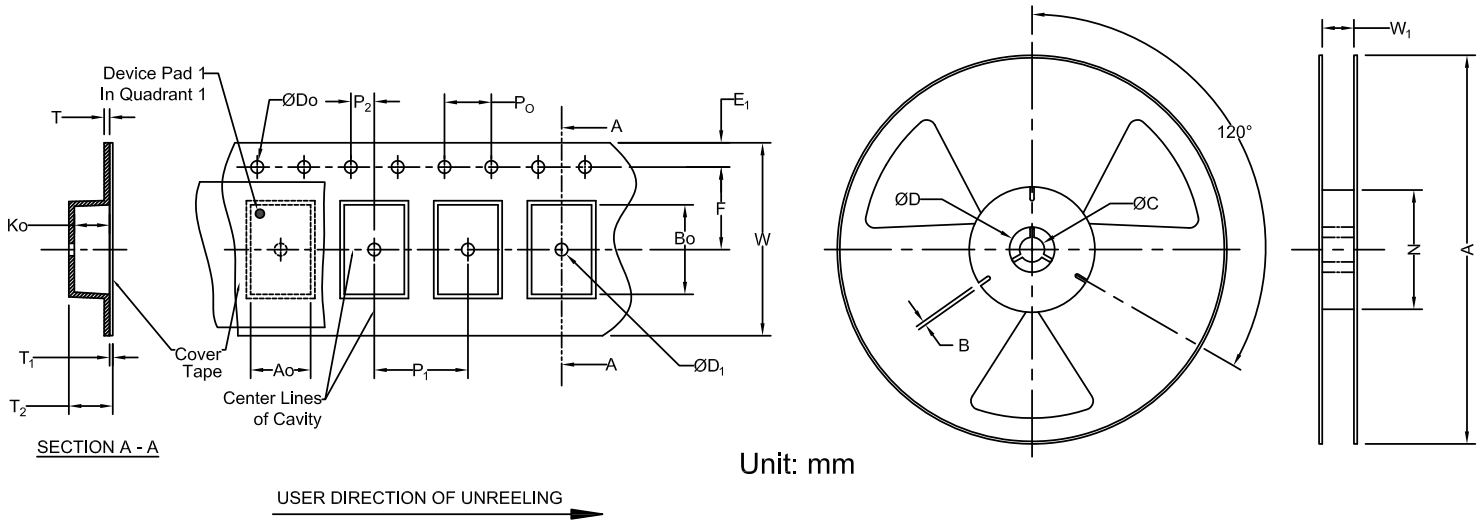
Pb-Free Process Classification Temperatures (T_c)			
Package Thickness	**Volume mm³ <350**	**Volume mm³ 350-2000**	**Volume mm³ >2000**
<1.6mm	260℃	260℃	260℃
1.6mm - 2.5mm	260℃	250℃	245℃
>2.5mm	250℃	245℃	245℃

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100℃	150℃
Temperature maximum (T_{smax})	150℃	200℃
Time (T_{smin} to T_{smax}) (t_s)	60 – 120 sec.	60 – 120 sec.
Average ramp-up rate (T_{smax} to T_p)	3℃/sec. max	3℃/sec. max
Liquidous temperature (T_L)	183℃	217℃
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℃ of the specified classification temperature (T_c)	20 sec.	10 sec.
Ramp-down rate (T_p to T_{smax})	3℃/sec. max	3℃/sec. max
Time 25℃ 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



Unit: mm

Carrier Tape Specifications (mm)										
E1	D0	P0	P2	F	P1	W	A0	B0	K_0	Reel Qty
1.75 ± 0.1	1.55 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	3.5 ± 0.05	2.0 ± 0.05	8.0 + 0.2/-0.1	0.83 ± 0.05	1.25 ± 0.05	0.55 ± 0.05	5,000

Reel Specifications (mm)					
A	W_1	N	B	C	D
177.8	8.4 ± 1.5	53.6 ± 2.0	1.5	13.2 ± 0.3	20.2