

SAW Components

SAW Duplexer

Cellular / LTE / Band 1

Series/type: QGSA1G95BASP3

Ordering code: QGSA1G95BASP3

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Version: 1.0



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1 Applications

- Multimode SAW duplexer for mobile telephone Cellular / LTE / WCDMA Band 1 systems
- Low insertion attenuation
- Low amplitude ripple

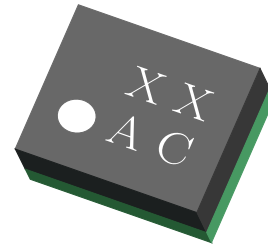
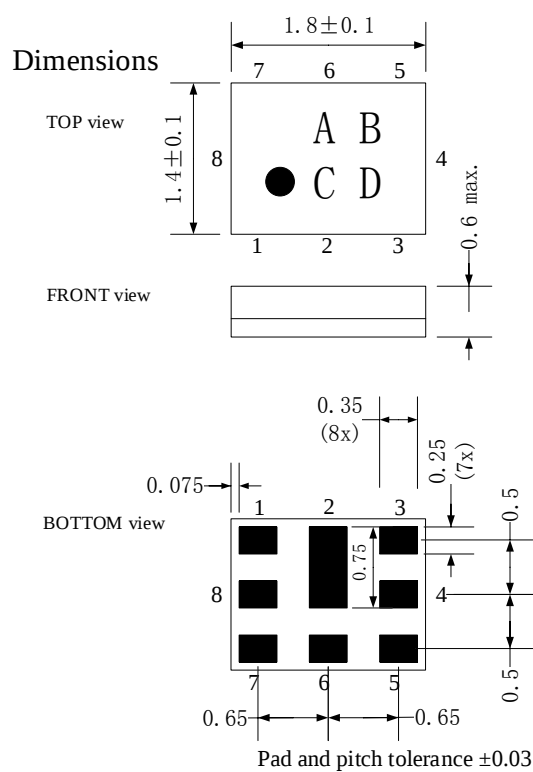


Figure 1: Picture of component with example of product marking.

2 Features

- Package size 1.8 mm x 1.4 mm
- Package height 0.6 mm (max.)
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)

3 Package



Land Pattern

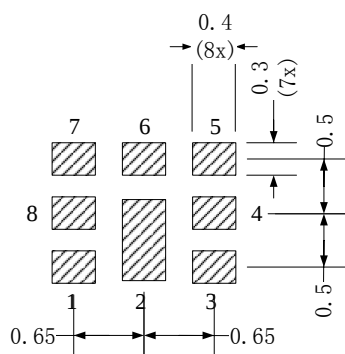


Figure 2: Drawing of package with package height A = 0.6 mm (max.)

4 Pin configuration

- 1 Rx
- 3 Tx
- 6 ANT
- 2,4,5,7,8 Ground

5 Matching circuit

- $R_1 : 50\Omega$ $R_2 : 50\Omega$ $R_3 : 50\Omega$
- $L_{p1} : 3nH$ $L_{p2} : NC$ $L_{p3} : 8nH$

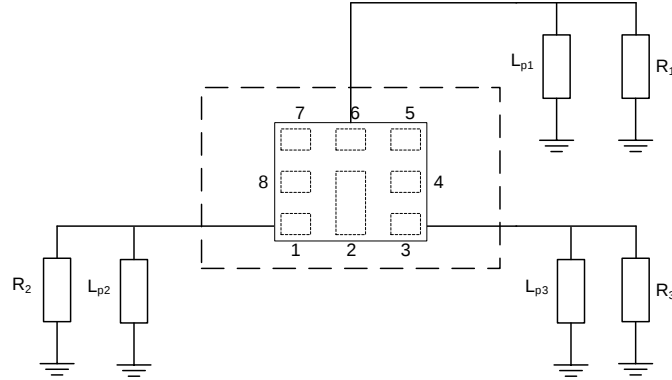


Figure 3: Schematic of matching circuit.

6 Absolute Maximum Ratings

Table 1: Absolute Maximum Ratings of Example Data Sheet

Parameter	Rating
Storage temperature	$T_{STG} = -40^{\circ}C$ to $+85^{\circ}C$
Operating temperature	$T_{opt} = -20^{\circ}C$ to $+85^{\circ}C$
DC voltage	$V_{DC} = 3.0V(max)$
Input power ¹	$P_{IN} = +30dBm$ 5000h $+55^{\circ}C$

¹Input signal shall be applied to Terminal number(1).

7 Characteristics

Temperature range for specification $T_{SPEC} = -20^{\circ}C \dots +85^{\circ}C$

ANT terminating impedance $Z_{ANT} = 50\Omega$ with par. L_{p1}

RX terminating impedance $Z_{RX} = 50\Omega$

TX terminating impedance $Z_{TX} = 50\Omega$ with par. L_{p3}

7.1 TX-ANT

Item		min.	typ.	max.	Unit	Note
Center Frequency		1950			MHz	
Insertion Loss	1920 to 1980 MHz		1.6	2.2	dB	
Ripple Deviation	1920 to 1980 MHz		0.7	1.0	dB	
VSWR	1920 to 1980 MHz		1.5	2.0		TX
	1920 to 1980 MHz		1.5	2.0		ANT
Absolute Attenuation	450 to 1574 MHz	29	32		dB	
	815 to 960 MHz	29	32		dB	
	1226 to 1250 MHz	30	34		dB	
	1447.9 to 1462.9 MHz	30	38		dB	
	1475 to 1511 MHz	35	38		dB	
	1559 to 1606 MHz	37	40		dB	
	1606 to 1805 MHz	25	36		dB	
	1805 to 1865 MHz	20	26		dB	
	1865 to 1880 MHz	10	25		dB	
	2010 to 2025 MHz	15	22		dB	
	2110 to 2170 MHz	42	46		dB	
	2400 to 2500 MHz	37	41		dB	
	2620 to 2690 MHz	33	38		dB	
	3840 to 3960 MHz	23	28		dB	
	4900 to 5950 MHz	16	21		dB	

7.2 ANT-RX

Item		min.	typ.	max.	Unit	Note
Center Frequency		2140			MHz	
Insertion Loss	2110 to 2170 MHz		1.6	2.3	dB	
Ripple Deviation	2110 to 2170 MHz		0.7	1.0	dB	
VSWR	2110 to 2170 MHz		1.5	2.0		RX
	2110 to 2170 MHz		1.5	2.0		ANT
Absolute Attenuation	450 to 718 MHz	32	41		dB	
	718 to 748 MHz	40	56		dB	
	814 to 849 MHz	40	54		dB	
	880 to 915 MHz	40	53		dB	
	1427 to 1463 MHz	40	46		dB	
	1710 to 1785 MHz	37	42		dB	
	1920 to 1980 MHz	45	51		dB	
	1980 to 2015 MHz	15	46		dB	
	2015 to 2075 MHz	7	10		dB	
	2400 to 2500 MHz	30	35		dB	
	2500 to 2570 MHz	38	43		dB	
	4030 to 4150 MHz	38	43		dB	
	4220 to 4340 MHz	37	42		dB	
	4900 to 5950 MHz	33	38		dB	

7.3 TX-RX

Item	Tx to Rx	min.	typ.	max.	Unit	Note
Isolation	1920 to 1980 MHz	51	55		dB	
	2110 to 2170 MHz	55	60		dB	

8 Transmission coefficients

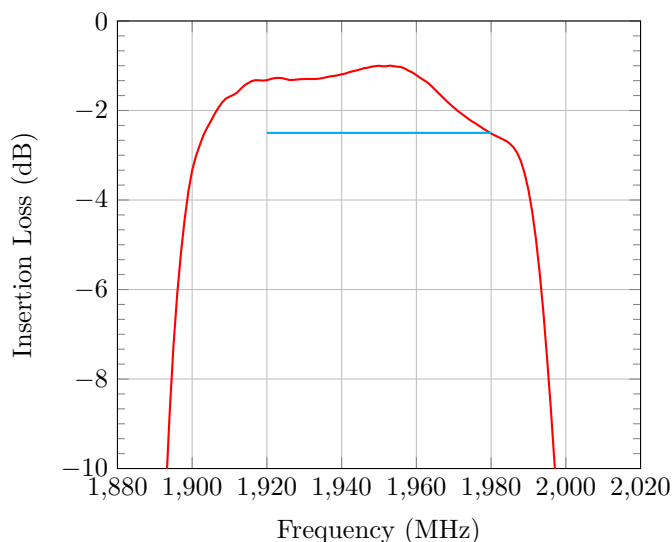


Figure 4: Tx-Ant Insertion Loss

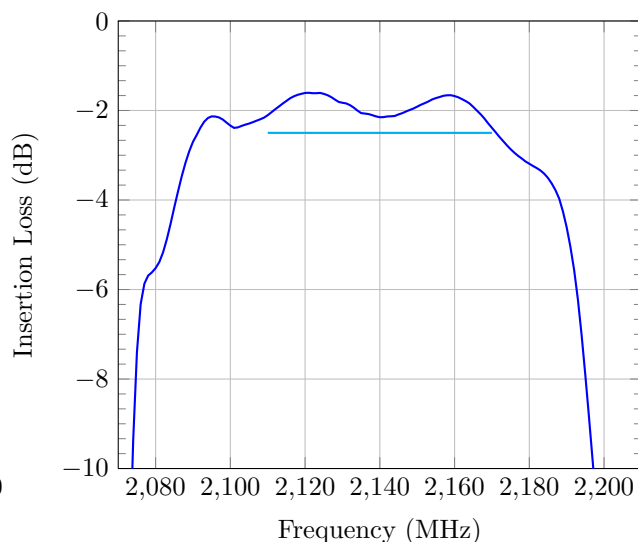


Figure 5: Ant-Rx Insertion Loss

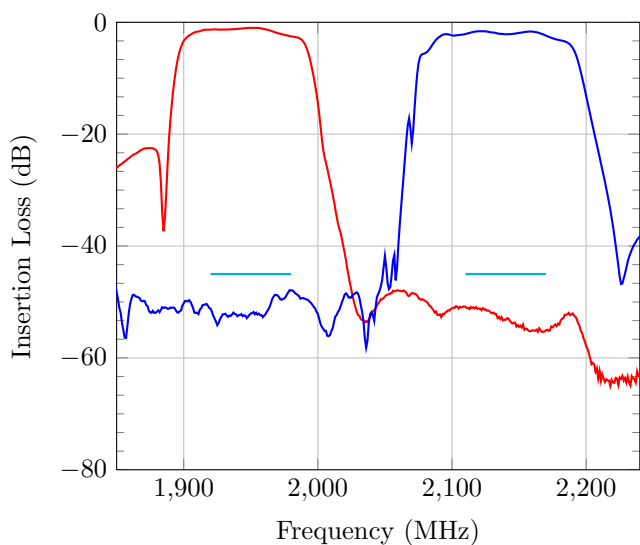


Figure 6: Tx Rejection in Rx Band and Rx Rejection in Tx Band

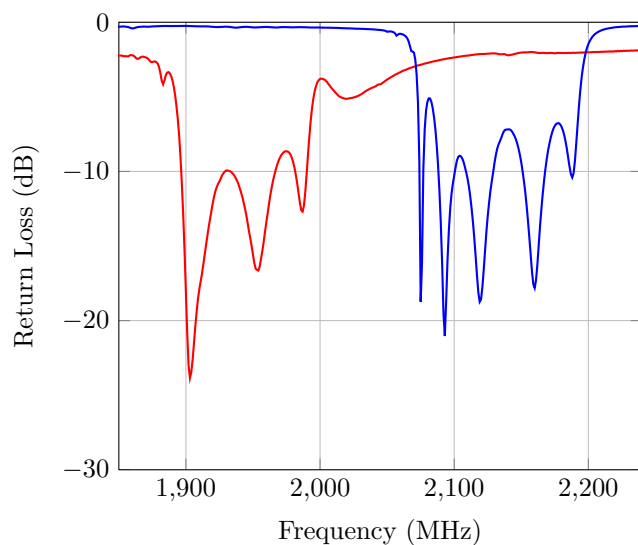


Figure 7: Tx and Rx Port Return Loss

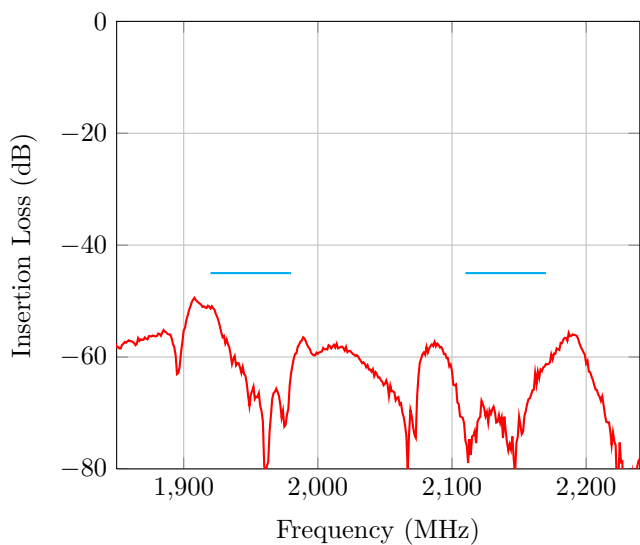


Figure 8: Tx-Rx Isolation

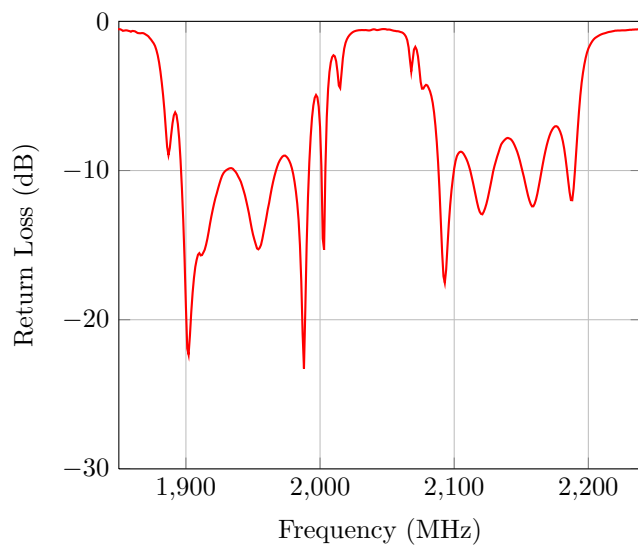


Figure 9: Antenna Port Return Loss

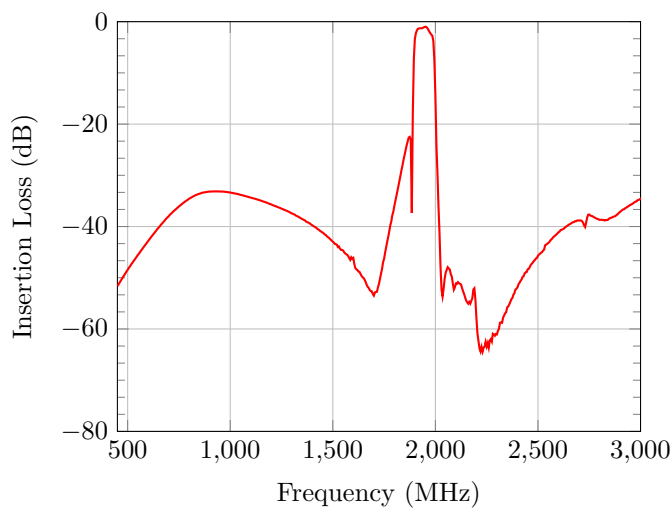


Figure 10: Tx-Ant Wideband Insertion Loss

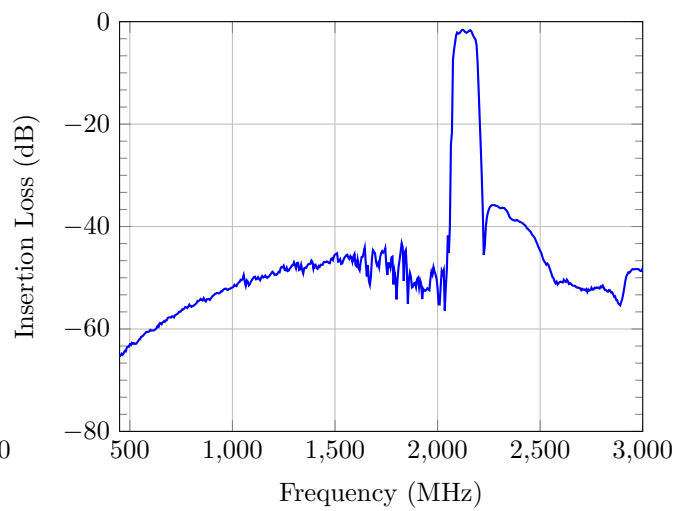
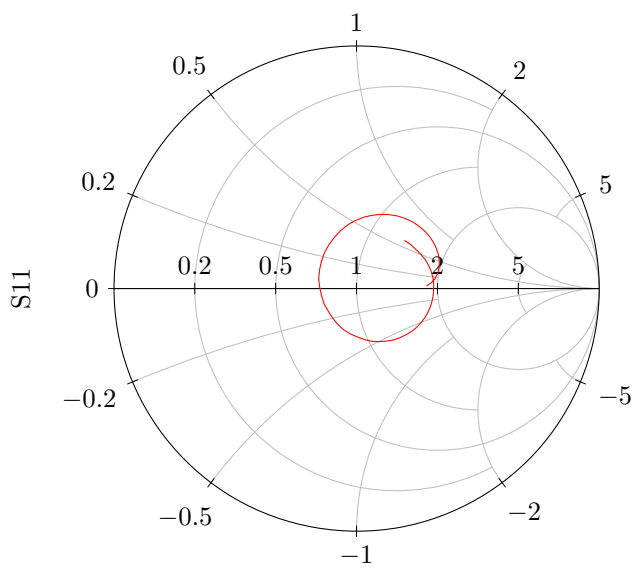
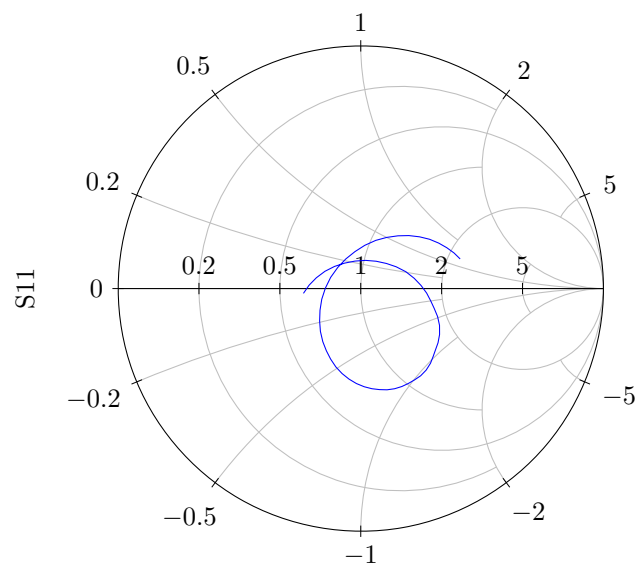
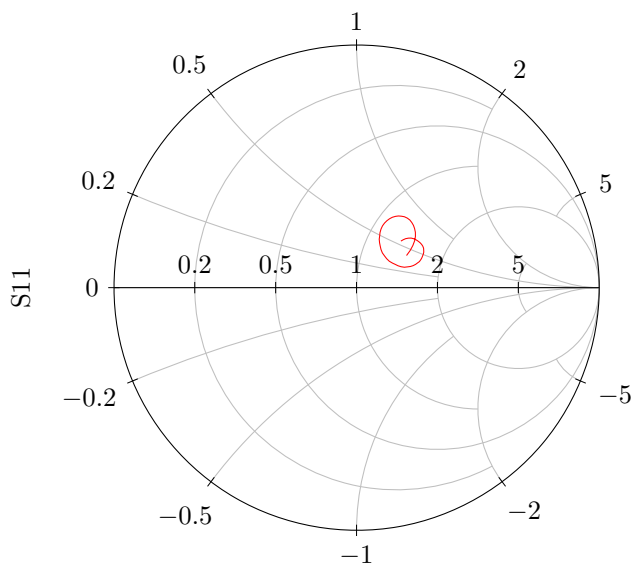
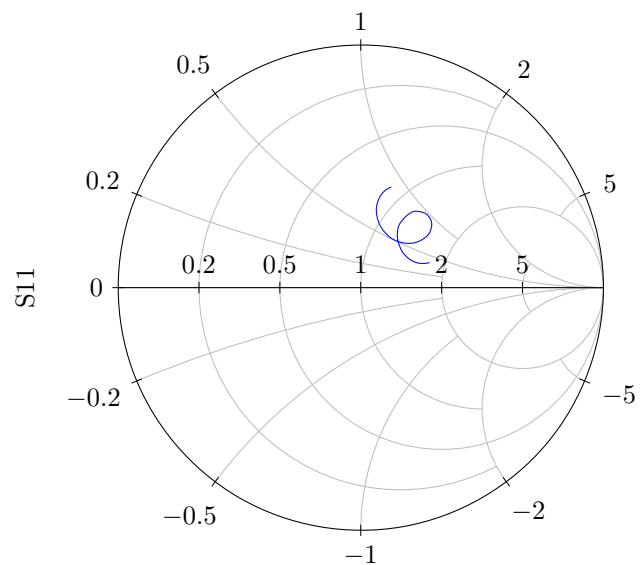


Figure 11: Ant-Rx Wideband Insertion Loss

Figure 12: Tx Port Impedance in Tx Band ($Z_0 = 50\Omega$)Figure 13: Rx Port Impedance in Rx Band ($Z_0 = 50\Omega$)Figure 14: Ant Port Impedance in Tx Band ($Z_0 = 50\Omega$)Figure 15: Ant Port Impedance in Rx Band ($Z_0 = 50\Omega$)

9 Soldering profile

The recommended soldering process is in accordance with IEC 60068-2-58-3rd edit and IPC/JEDECJ-STD-020B.

Table 2: Characteristics of recommended soldering profile for lead-free solder (Sn95.5Ag3.8Cu0.7).

Parameter	Rating
Ramp rate	≥ 3 K/s
Preheat	125 °C to 220 °C, 150 s to 210 s, 0.4 K/s to 1.0 K/s
T >220 °C	30 s to 70 s
T >230 °C	Min. 10 s
T >245 °C	Max. 20 s
T $\leq$ 255 °C	-
Peak temperature T_{peak}	220 °C $\pm$ 5°C
Wetting temperature T_{min}	230 °C $\pm$ 5°C for 10s $\pm$ 1s
Cooling rate	≥ 3 K/s
Soldering temperature T	Measured at solder pads

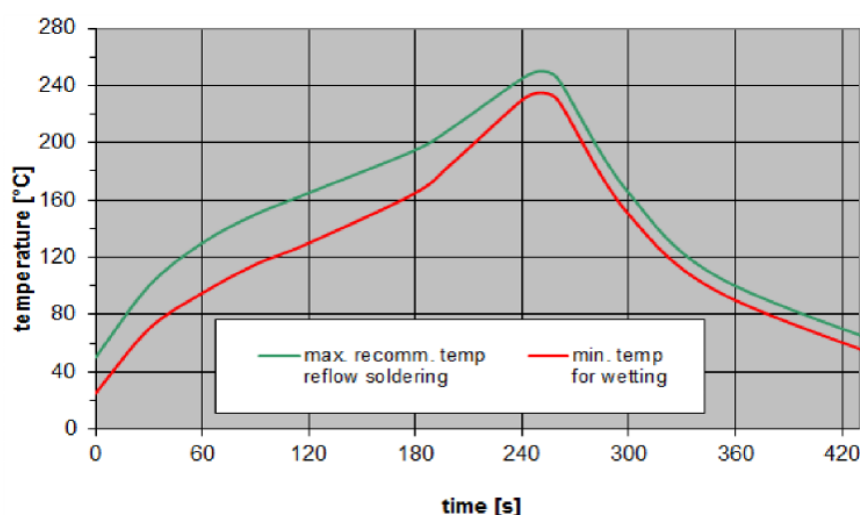


Figure 16: Drawing of reel (Recommended reflow profile for convection and infrared soldering – lead-free solder)

10 Tape and Reel

10.1 Tape

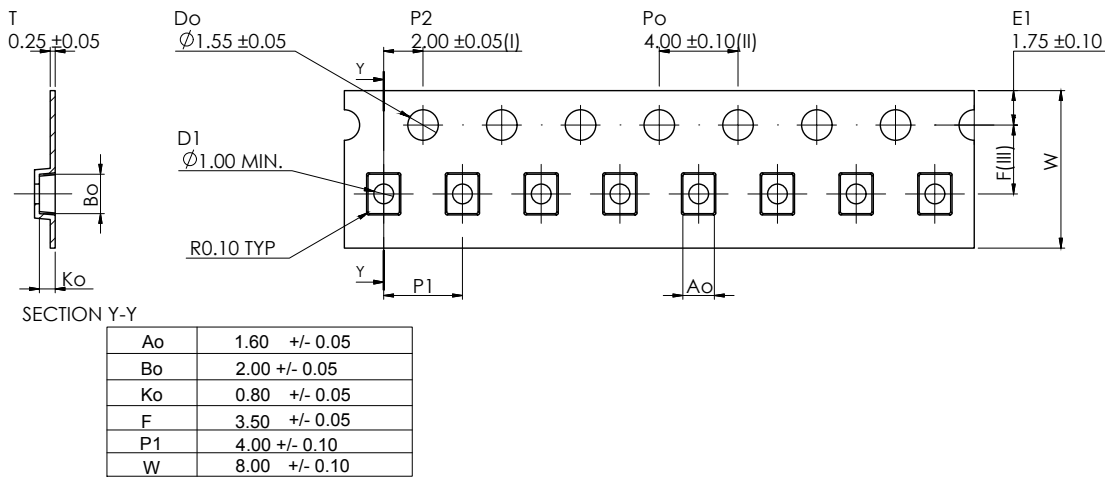


Figure 17: Drawing of tape (first-angle projection) with tape dimensions

10.2 Reel with diameter of 178 mm

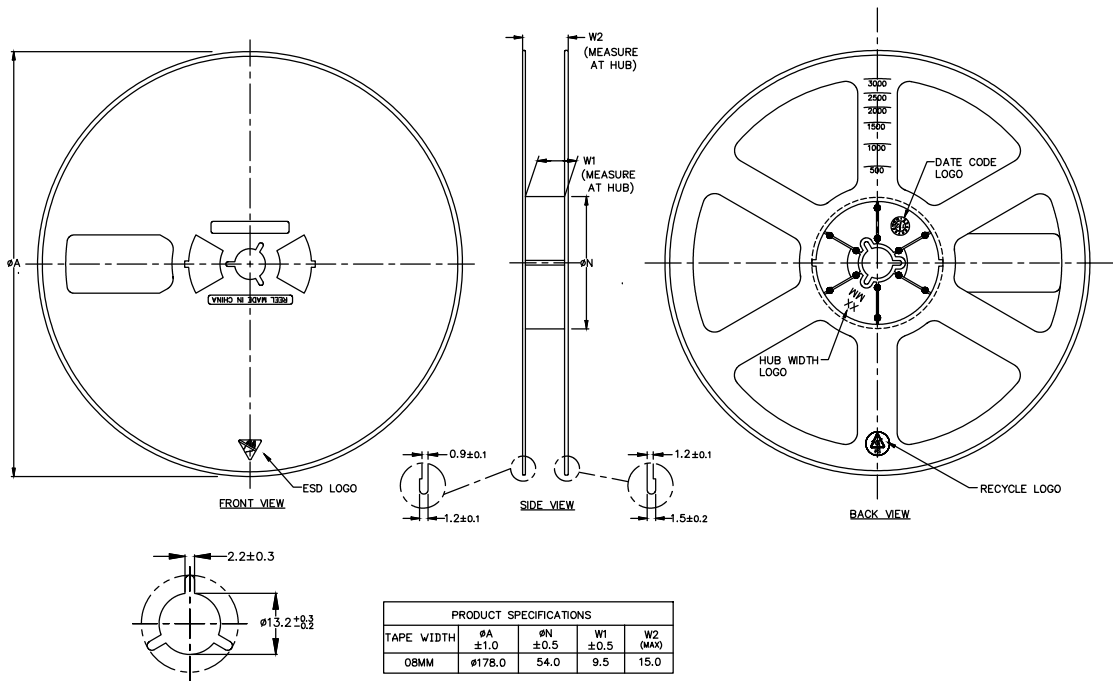


Figure 18: Drawing of reel (first-angle projection) with diameter of 180 mm