NGAW8010S5R40GS1TRF

2.4 & 4.9 GHz Multilayer Chip Antenna

9001:2015
CERTIFIED

ROHS/REACH
COMPLIANT
HALOGEN FREE

NIC Components Corp.

Features

- WIFI Protocols
- Support: 2.4 & 4.9 GHz Frequency
- Lightweight
- RoHs Complaint

Applications

- Home RF System
- Tracking
- Monitoring

Specifications

Electrical		
Frequency Range	2400 ~ 2500 MHz	4900 ~ 5900 MHz
Peak Gain	1.0 dBi	2.3 dBi
Return Loss	10 dB min.	
Impedance	50Ω	
Power Capacity	2 W max.	
Environmental		
Operating Temperature	-40°C~+85°C	
Storage Temperature	-10°C~+40°C	
Relative Humidity	70% Max.	
ROHS Compliant	Yes	

Part Number Breakdown

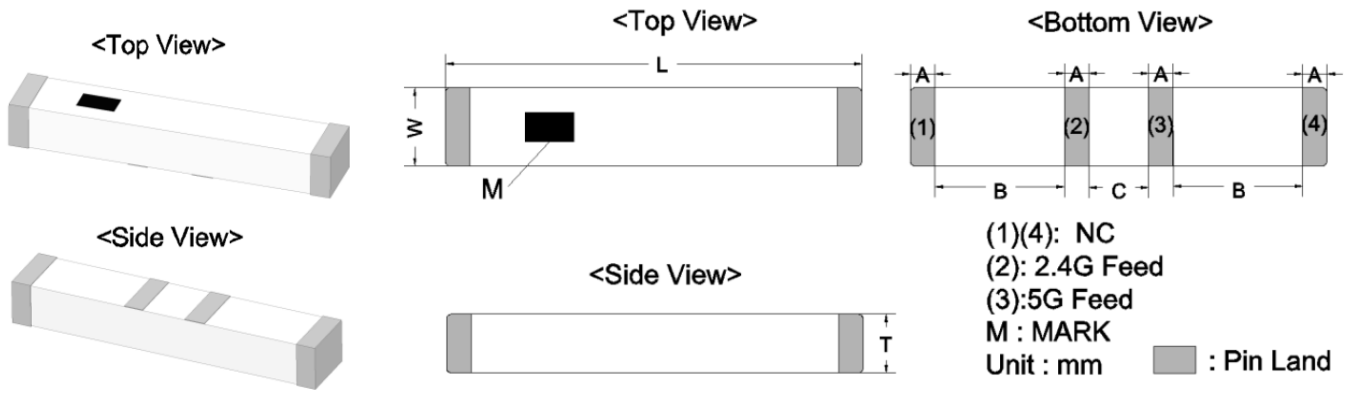
NGAW 8010S 5R40G S1 TR F

F: RoHS Compliant
TR = Tape & Reel Packaging
S1: Internal Performance Code
5R40G = Center Frequency
8010S = Case Size
NGAW: Series

Performance Passives By Design

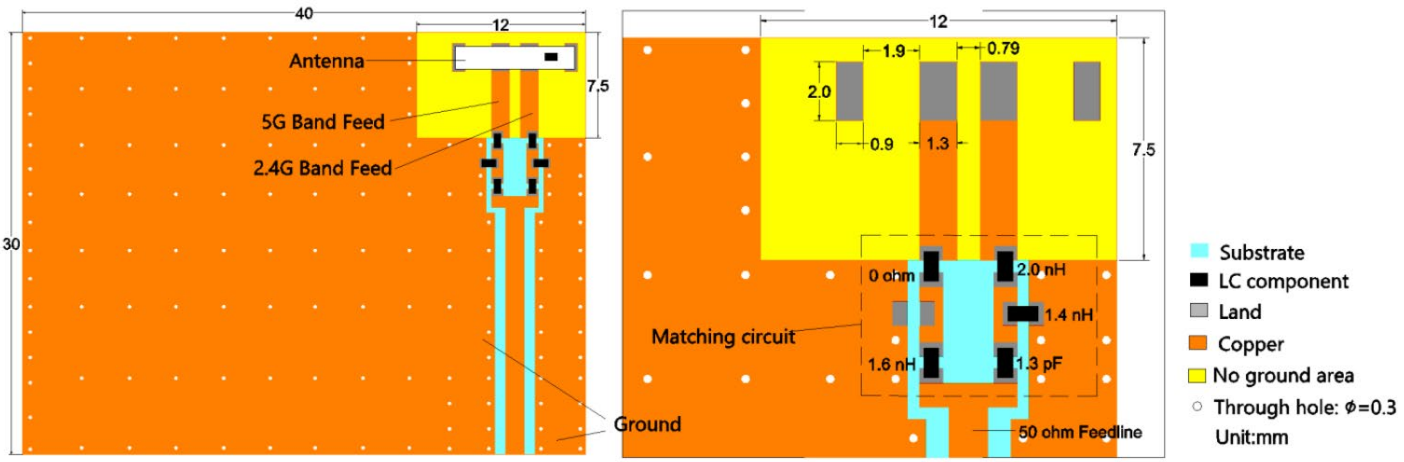
Last Updated 8/13/2024. Specification subject to change without notice. Please check web site or contact NIC for latest information

Dimension Drawing & Dimensions (mm)



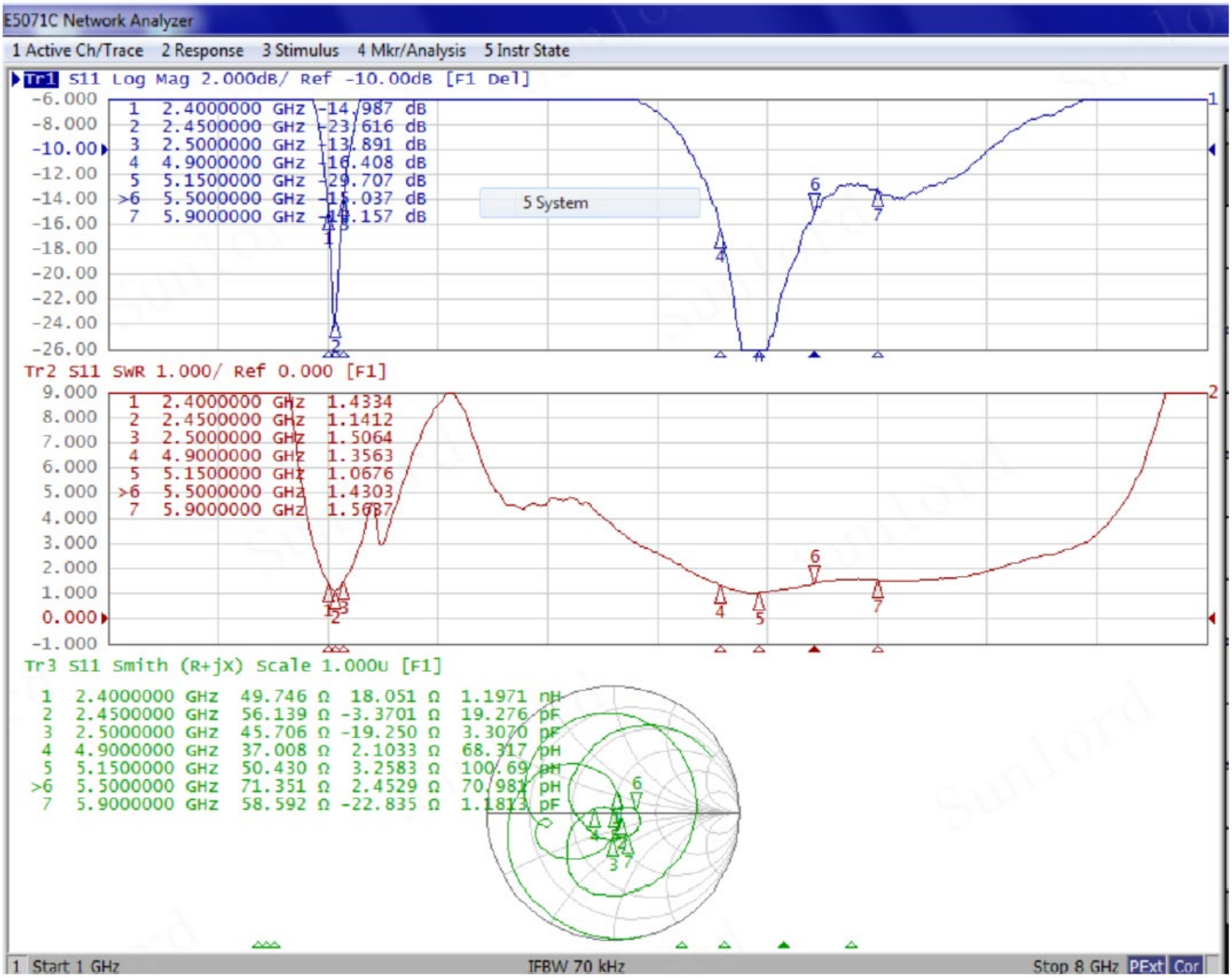
Mark	L	W	T	A	B	C
Dimensions (mm)	8.5 ± 0.2	1.6 ± 0.2	1.2 ± 0.2	0.51 ± 0.15	2.64 ± 0.15	1.18 ± 0.15

Recommended Land Pattern



*The matching circuits and LC component values are based on our evaluation board. The actual matching circuits need to be adjusted when the antenna is applied in the customer’s design, because the antenna impedance is easily affected by PCB layout

Electrical Performance



```
Tr1 S11 Log Mag 2.000dB/ Ref -10.00dB [F1 Del]
 1   2.4000000 GHz  -14.987 dB
 2   2.4500000 GHz  -23.616 dB
 3   2.5000000 GHz  -13.891 dB
 4   4.9000000 GHz  -16.408 dB
 5   5.1500000 GHz  -29.707 dB
>6   5.5000000 GHz  -15.037 dB
 7   5.9000000 GHz  -13.157 dB
```

```
Tr2 S11 SWR 1.000/ Ref 0.000 [F1]
 1   2.4000000 GHz   1.4334
 2   2.4500000 GHz   1.1412
 3   2.5000000 GHz   1.5064
 4   4.9000000 GHz   1.3563
 5   5.1500000 GHz   1.0676
>6   5.5000000 GHz   1.4303
 7   5.9000000 GHz   1.5637
```

```
Tr3 S11 Smith (R+jX) Scale 1.000U [F1]
 1   2.4000000 GHz  49.746 Ω  18.051 Ω  1.1971 nH
 2   2.4500000 GHz  56.139 Ω -3.3701 Ω  19.276 pF
 3   2.5000000 GHz  45.706 Ω -19.250 Ω  3.3070 pF
 4   4.9000000 GHz  37.008 Ω  2.1033 Ω  68.317 pH
 5   5.1500000 GHz  50.430 Ω  3.2583 Ω  100.69 pH
>6   5.5000000 GHz  71.351 Ω  2.4529 Ω  70.981 pH
 7   5.9000000 GHz  58.592 Ω -22.835 Ω  1.1813 pF
```

Test Conditions

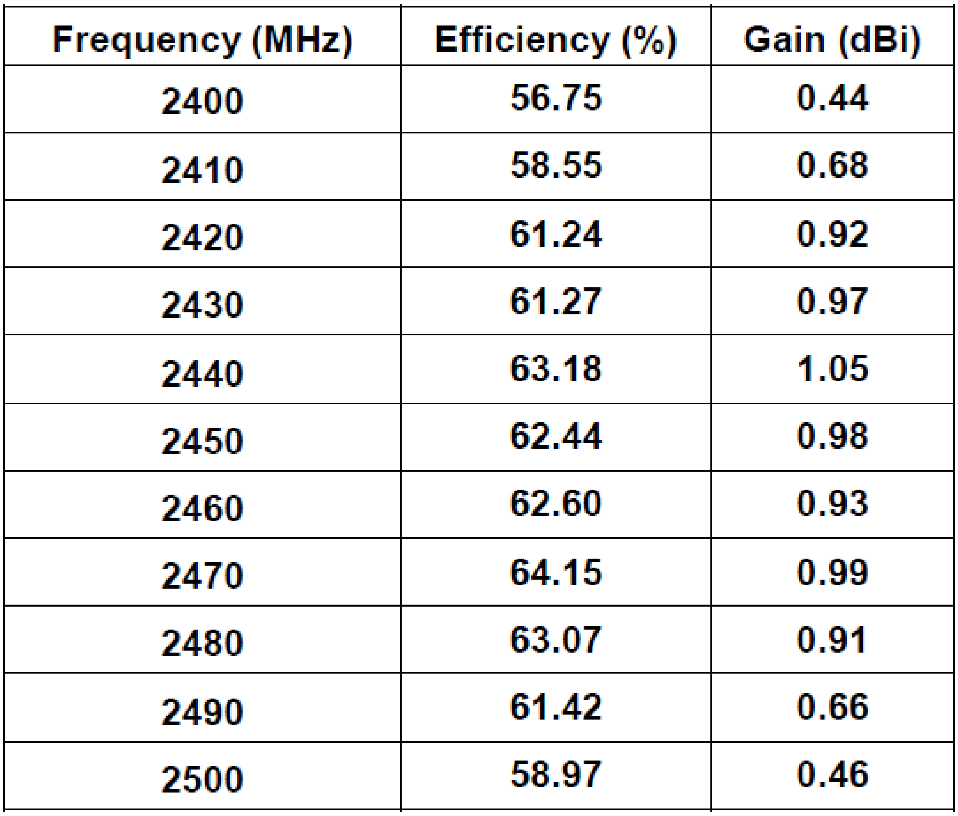
Unless otherwise specified, the standard atmospheric conditions for measurement/test as:

1. Ambient Temperature: 20±15℃
2. Relative Humidity: 65±20%
3. Air Pressure: 86 KPa to 106 KPa

If any doubt on the results, measurements/tests should be made within the following limits:

1. Ambient Temperature: 20±2℃
2. Relative Humidity: 65±5%
3. Air Pressure: 86 KPa to 106 KPa

Gain and Efficiency at 2400 – 2500 MHz

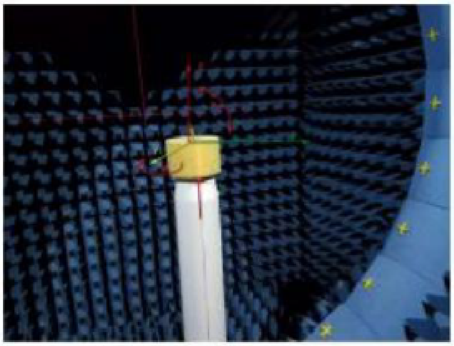
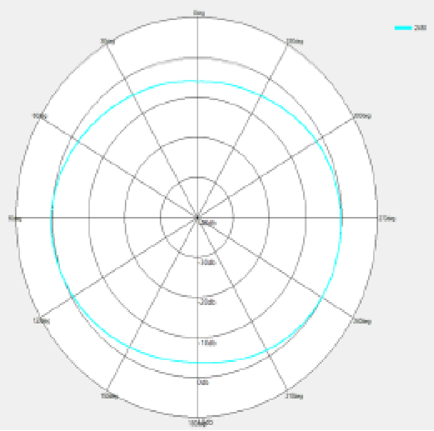
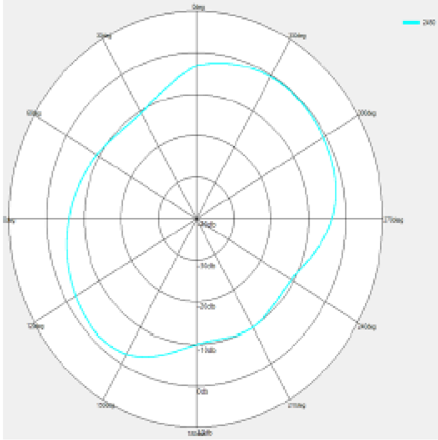
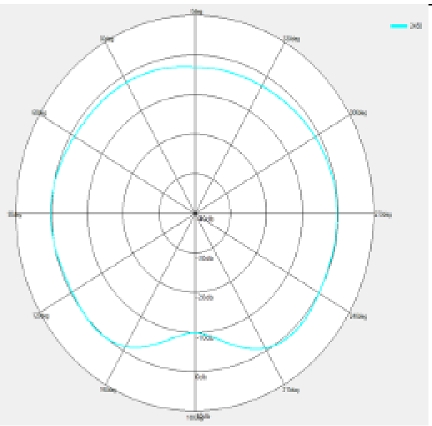


Frequency (MHz)	Efficiency (%)	Gain (dBi)
2400	56.75	0.44
2410	58.55	0.68
2420	61.24	0.92
2430	61.27	0.97
2440	63.18	1.05
2450	62.44	0.98
2460	62.60	0.93
2470	64.15	0.99
2480	63.07	0.91
2490	61.42	0.66
2500	58.97	0.46

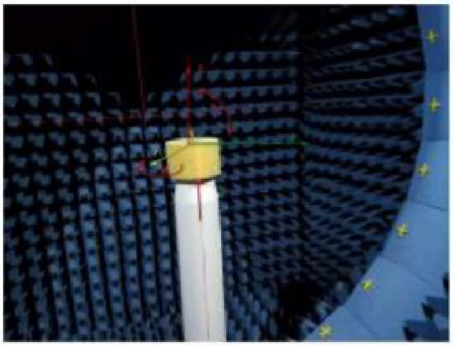
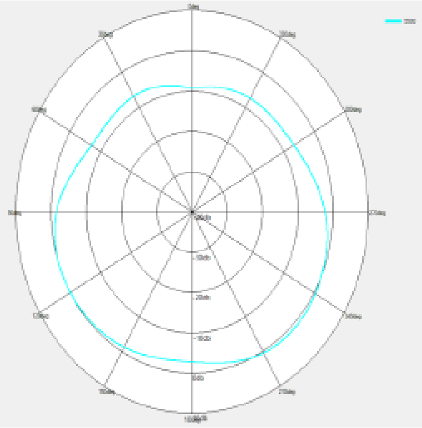
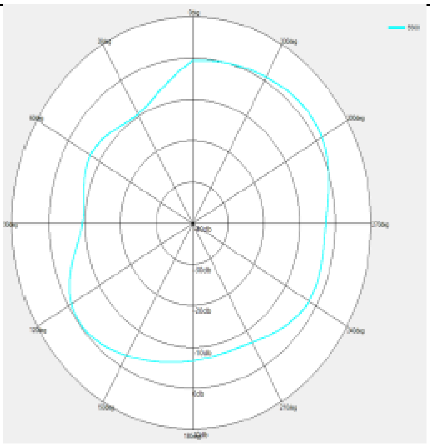
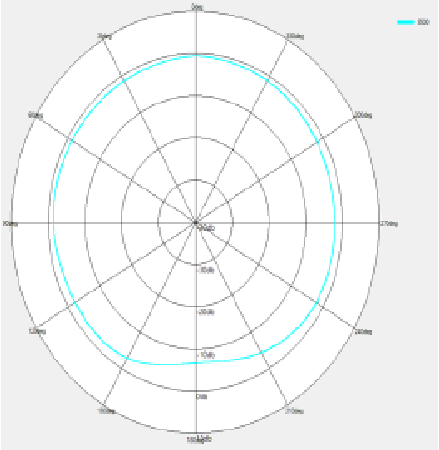
Gain and Efficiency at 4900 ~ 5900 MHz

Frequency (MHz)	Efficiency (%)	Gain (dBi)	Frequency (MHz)	Efficiency (%)	Gain (dBi)
4900	49.87	1.64	5400	54.78	2.08
4950	50.78	1.94	5450	54.01	1.95
5000	51.83	2.08	5500	52.58	1.98
5050	52.71	2.31	5550	52.68	2.09
5100	53.96	2.39	5600	53.17	1.80
5150	55.06	2.43	5650	53.53	1.62
5200	55.97	2.35	5700	53.03	1.30
5250	56.23	1.99	5750	52.23	1.35
5300	54.13	1.96	5800	51.52	1.27
5350	54.07	2.00	5850	51.53	1.18

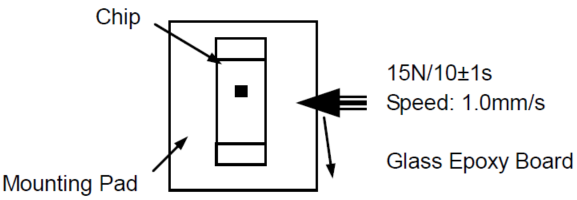
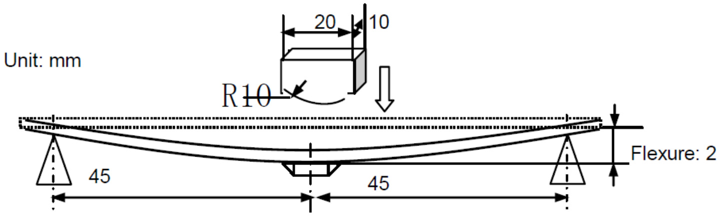
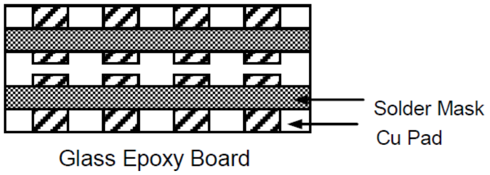
2D Radiation Patterns @ 2450 MHz

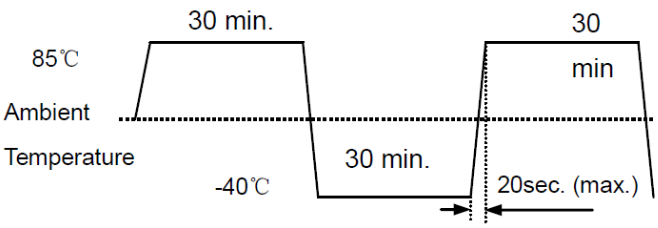
	Direction	
	XOY Plane	
	XOZ Plane	
	YOZ Plane	

2D Radiation Patterns @ 5500 MHz

	Direction	
	XOY Plane	
	XOZ Plane	
	YOZ Plane	

Reliability Test

Items	Requirements	Test Methods and Remarks
Terminal Strength	No visible mechanical damage	1. Solder the inductor to the testing jig (glass epoxy board shown as the following figure) using leadfree solder. Then apply a force in the direction of the arrow 2. 15N force for 8010 series 3. Keep time: 10± 1 sec 
Resistance to Fixture	No visible mechanical damage	1. Solder the chip to the test jig (glass epoxy board) using a leadfree solder. Then apply a force in the direction shown as the following figure. 2. Flexure: 2 mm 3. Pressurizing Speed: 0.5mm/sec 4. Keep time: ≥ 30 sec
	 	
Vibration	No visible mechanical damage	1. Solder the chip to the testing jig (glass epoxy board shown as the following figure) using leadfree solder. 2. The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz 3. The frequency range from 10 to 55 Hz and return to 10 Hz shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hrs. in each 3 mutually perpendicular directions (total of 6 hrs.) 

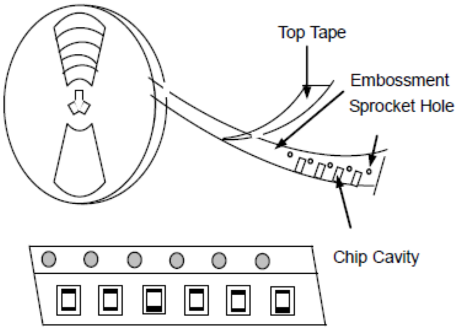
Dropping	No visible mechanical damage	Drop the chip 10 times on a concrete floor from the height of 100 cm.
Solderability	1) No visible mechanical damage 2) Wetting shall be exceeded 75% coverage	1. Solder temperature: 240 ± 2°C 2. Duration: 3 sec 3. Solder: Sn/3.0Ag/0.5Cu 4. Flux: 25% Resin and 75% ethanol in weight
Resistance to Soldering Heat	No visible mechanical damage	1. Solder temperature: 260 ± 5°C 2. Duration: 5 sec 3. Solder: Sn/3.0Ag/0.5Cu 4. Flux: 25% Resin and 75% ethanol in weight 5. The chip shall be stabilized at normal condition for 1 ~ 2 hrs before measuring
Thermal Shock	1) No visible mechanical damage 2) Satisfy electrical characteristic	1. Temperature and time: -40°C for 30 ± 3 min → 85°C for 30 ± 3 min 2. Transforming interval: Max. 20 sec 3. Tested cycle: 100 cycles 4. The chip shall be stabilized at normal condition for 1 ~ 2 hours before measuring 
Damp Heat (Steady States)	1) No visible mechanical damage 2) Satisfy electrical characteristic	1. Temperature: 60 ± 2°C 2. Humidity 90% to 95% RH 3. Duration: 500^{+24} hours 4. The chip shall be stabilized at normal condition for 1~2 hours before measuring
Resistance to High Temperature	1) No visible mechanical damage 2) Satisfy electrical characteristic	1. Temperature: 85 ± 2°C 2. Duration: 500^{+24} hours 3. The chip shall be stabilized at normal condition for 1~2 hours before measuring

Packaging

Type	8516
Tape	Embossed Tape
Quantity	4K

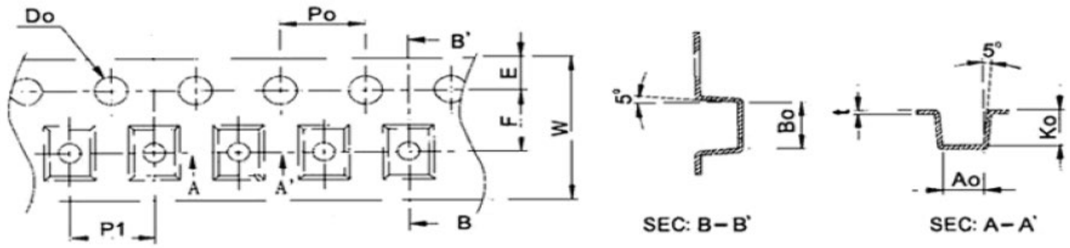
Taping Drawings (Unit: mm)

Embossed Tape



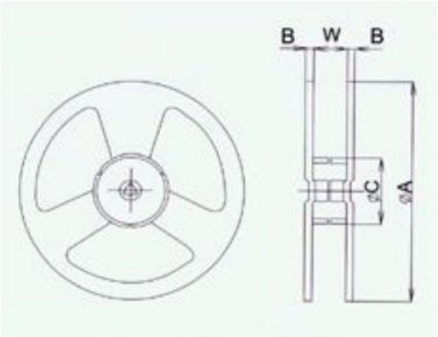
Remark: The sprocket holes are to the right as the tape is pulled toward the user.

Taping Dimensions (Unit: mm)



Type	W	P1	E	F	D0	P0	K0	A0	B0	t
Dimensions (mm)	16 ± 0.1	8 ± 0.1	1.75 ± 0.1	7.5 ± 0.15	1.5 +0.1/-0.0	4 ± 0.1	1.4 ± 0.1	1.8 ± 0.1	8.90 ± 0.1	0.3 ± 0.05

Reel Dimensions (Unit: mm)



Type	Reel	A	W	C	B
Dimensions (mm)	13" x 16mm	330 ± 1	16.5 ± 0.2	100 ± 0.5	2.3 ± 0.2

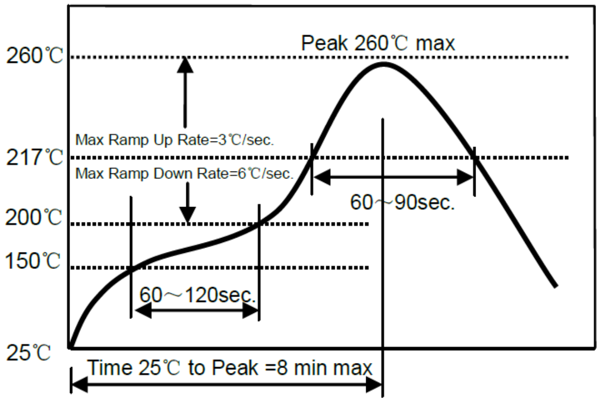
a. The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to high humidity. Package must be stored at 40°C or less and 70 % RH or less
b. The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to dust of harmful gas (e.g. HCI, sulfurous gas of H_2S
c. Packaging material may be deformed if package stored where they are exposed to heat of direct sunlight
d. Solderability shall be guaranteed for 6 months from the date of delivery on condition that they are stored at the environment specified in the testing conditions. For those parts, which passed more than 6 months shall be checked solder-ability before use.

Recommended Soldering Technologies

Re-flowing Profile

- Preheat condition: 150 ~ 200°C / 60 ~120 sec.
- Allowed time above 217 °C: 60 ~ 90 sec.
- Max temp: 260 °C
- Max time at max temp: 10 sec.
- Solder paste: Sn/3.0Ag/0.5Cu
- Allowed Reflow time: 2x max

[Note: the reflow profile in the above table is only for qualification and is not meant to specify board assembly profiles. Actual board assembly profiles must be based on the customer's specific board design. Solder paste and process, and should not exceed the parameters as the Reflow profile shows]



Iron Soldering Profile

- Iron soldering power: Max 30W
- Pre-heating: 150 °C / 60 sec.
- Soldering Tip temperature: 350 °C max.
- Soldering time: 3 sec max
- Solder paste: Sn/3.0Ag/0.5Cu
- Max.1 time for iron soldering

[Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.]