

CSG Series

Surface-Mount (SMD) Thermistor for Temperature Sensing



◆ Product Introduction

SMD NTC thermistors are leadless, chip-type negative temperature coefficient thermistors specifically designed for temperature sensing, compensation, and monitoring. They are optimized for SMT automated mounting and feature small size, fast response, excellent consistency, and low cost. As such, they have become the mainstream temperature components in consumer electronics, industrial applications, and automotive electronics.

◆ Features

1. Meets RoHS and halogen-free requirements
2. EIA dimensions: 0201, 0402, 0603, 0805
3. High-reliability structure
4. Operating temperature range: -40°C to +125°C
5. Wide resistance range
6. Low cost
7. Safety certifications: UL / cUL / TUV / CQC

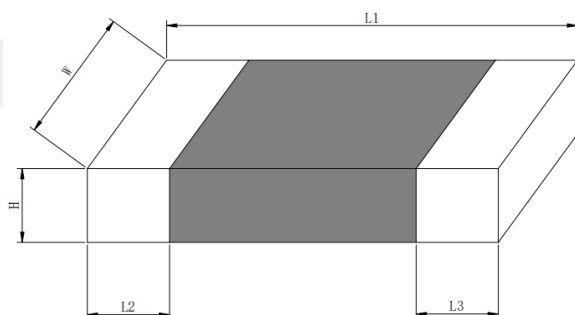
◆ Applications

1. Battery pack
2. Motherboard/Laptop/Computer
3. Liquid Crystal Display
4. Mobile phone
5. Bluetooth headphones
6. Wi-Fi module

◆ Coding Principles

1	2	3	4		5	6	7	8		9	10	11	12	13		14		15	
Product type			Body size		Resistance		Resistance Tolerance		B Value				B value calculation method		Packaging		Optional Suffix		
CSG	SMD Surface Mount Resistor	A	0201	102	1K Ω	F	±1%	3380	B (25/50)=3380				A	25°C/50°C	R	Tape& Reel	1	Stand ard	
		B	0402	103	10K Ω	G	±2%	3450	B (25/50)=3450				B	25°C/85°C	B	Bulk	A T	Autom otive Grade	
		C	0603	473	47K Ω	H	±3%	3800	B (25/50)=3800										
		D	0805			J	±5%	3950	B (25/50)=3950										
		E	1206			K	±10%	4250	B (25/50)=4250										
								3435	B (25/85)=3435										

◆ Structure and Dimension



(Unit: mm)

Series	Size (EIA)	L1	W	H max.	L2 & L3
CSGA	0201	0.60 $\pm$ 0.05	0.30 $\pm$ 0.05	0.35	0.15 $\pm$ 0.05
CSGB	0402	1.00 $\pm$ 0.15	0.50 $\pm$ 0.10	0.60	0.20 $\pm$ 0.10
CSGC	0603	1.60 $\pm$ 0.15	0.80 $\pm$ 0.15	0.95	0.40 $\pm$ 0.15
CSGD	0805	2.00 $\pm$ 0.20	1.25 $\pm$ 0.20	1.00	0.40 $\pm$ 0.20

◆ electrical characteristics

Part No	size	Zero power resistance @25°C	R ₂₅ tolerance	B value		B tolerance	Max power dissipation @25°C	Dissipa tion factor	Thermal time consistence	Maximum Operating Current@ 25°C	Operation temperature range	Safety approval						
		R ₂₅ (KΩ)	(±%)	(K)		(±%)	Pmax (mW)	δ (mW/	T (Sec.)	I _{max} (mA)	TL~TU (°C)	UL cUL	TUV	CQC				
CSGA103□3380A	0201	10	1, 2, 3, 5, 10	25/ 50	3380	1, 2, 3	100	Approx. 1.4	Approx. 1.2	0.37	-40~+125	√	√	√				
CSGA473□4050A		47			4050					0.17		√	√	√				
CSGA683□4250A		68			4250					0.14		√	√	√				
CSGA104□4250A		100			4250					0.12		√	√	√				
CSGA224□4485A		220			4485					0.08		√	√	√				
CSGB103□3435B	0402	10	1, 2, 3, 5, 10	25/ 85	3435	1, 2, 3	170	Approx. 1.7	Approx. 2.0	0.41	-40 ~ +125	√	√	√				
CSGB103□3950B		10			3950					0.28		√	√	√				
CSGB223□3950B		22			3950					0.19		√	√	√				
CSGB473□3950B		47			3950					0.16		√	√	√				
CSGB683□4100B		68			4100					0.13		√	√	√				
CSGB104□4050B		100			4050					0.09		√	√	√				
CSGB104□4360B		100			4360					0.41		√	√	√				
CSGB224□4750B		220			4750					0.19		√	√	√				
CSGB103□3380A		10	0.5,1, 2, 3, 5, 10	25/ 50	3380	0.75,1, 2, 3		100	Approx. 1.7	Approx. 2.0		0.41	√	√	√			
CSGB473□4050A		47	1, 2, 3, 5, 10		4050	1, 2, 3						0.13	√	√	√			
CSGB104□4250A		100	0.5,1, 2, 3, 5, 10		4250	0.5,1, 2, 3						0.09	√	√	√			
CSGB104□4360A		100	1, 2, 3, 5, 10		4360	1, 2, 3						0.41	√	√	√			
CSGB224□4700A		220			4700							1.30	√	√	√			
CSGB103□4300B		10	3, 5, 10	25/ 85	4300	2,3		100	Approx. 2.1	Approx. 3.1		0.41	√	√	√			
CSGB102□3650A		1	5, 10	25/ 50	3650							1.02	√	√	√			
CSGB474□4700A		470	3, 5, 10	4700	0.06							√	√	√				
CSGC202□3400B	0603	2	1, 2, 3, 5, 10	25/ 85	3400	1, 2, 3	210	Approx. 2.1	Approx. 3.1	1.02	-40~-+125	√	√	√				
CSGC202□3400B		4.7			3435					0.67		√	√	√				
CSGC202□3400B		4.7			3700					0.65		√	√	√				
CSGC202□3400B		5			3435					0.56		√	√	√				
CSGC202□3400B		5			3850					0.46		√	√	√				
CSGC202□3400B		6.8			3435					0.31		√	√	√				
CSGC202□3400B		10			3435					0.25		√	√	√				
CSGC202□3400B		10			3975					1.02		√	√	√				
CSGC223□3950B		22			3950					0.67		√	√	√				
CSGC333□3950B		33			3950	2,3				0.25		√	√	√				

Note: □ = R₂₅ tolerance

◆ electrical characteristics

Part No	size	Zero power resistance @25°C	R ₂₅ tolerance	B value		B tolerance	Max power dissipation @25°C	Dissipation factor	Thermal time consistence	Maximum Operating Current@ 25°C	Operation temperature range	Safety approval			
		R ₂₅ (KΩ)	(±%)	(K)		(±%)	Pmax (mW)	δ (mW/°C)	T (Sec.)	I _{max} (mA)	TL~TU (°C)	UL cUL	TUV	CQC	
CSGC473□3975B	0603	47	1,2,3,5,10	25/8	5	3975	210	Approx. 2.1	Approx. 3.1	0.21	-40~+125	✓	✓	✓	
CSGC503□4000B		50				4000				0.20		✓	✓	✓	
CSGC683□4000B		68				4000				0.18		✓	✓	✓	
CSGC104□3975B		100				3975				0.14		✓	✓	✓	
CSGC104□4050B		100				4050						✓	✓	✓	
CSGC104□4360B		100				4360						✓	✓	✓	
CSGC154□4060B		150				4060						0.12	✓	✓	✓
CSGC204□4100B		200				4100				0.10		✓	✓	✓	
CSGC474□4150B		470				4150				2.3		0.07	✓	✓	✓
CSGC332□3650A		3.3				3650				1,2,3		0.80	✓	✓	✓
CSGC682□3950A		6.8	3950	0.56	✓	✓	✓								
CSGC103□3380A		10	0.5,1,2,3,5, 10	3380	0.75,1,2, 3	0.46	✓	✓	✓						
CSGC103□4200A		10	1,2,3,5,10	25/5	0	4200	1,2,3	0.21	✓	✓	✓				
CSGC473□4250A		47				4250			✓	✓	✓				
CSGC104□3590A		100				3590			0.14	✓	✓	✓			
CSGC104□4250A		100	0.5,1,2,3,5, 10	4250	0.5,1,2,3	0.10	100	0.98	✓	✓	✓				
CSGC224□4500A		220	1,2,3,5,10	4500	1,2,3			0.56	✓	✓	✓				
CSGC222□3950A		2.2	3,5,10	3950	2,3			0.15	0.15	0.27	✓	✓	✓		
CSGC682□4250A		6.8	5,10	4250	3					0.23	✓	✓	✓		
CSGD102□3200B		0805	1	1,2,3,5,10	25/8	5	3200	240	Approx. 2.4	Approx. 5.4	1.55	-40~+125	✓	✓	✓
CSGD222□3450B	2.2		3450				1.04				✓		✓	✓	
CSGD502□3435B	5		3435				0.69				✓		✓	✓	
CSGD682□3435B	6.8		3435				0.59				✓		✓	✓	
CSGD103□3435B	10		3435				0.49				✓		✓	✓	
CSGD103□3730B	10		3730								✓		✓	✓	
CSGD103□3950B	10		3950								✓		✓	✓	
CSGD223□3960B	22		3960								0.33		✓	✓	✓
CSGD333□4000B	33		4000				0.27				✓		✓	✓	
CSGD473□4000B	47		4000				0.23				✓		✓	✓	
CSGD104□4000B	100		4000				0.15				✓		✓	✓	
CSGD104□4550B	100		4550								✓		✓	✓	

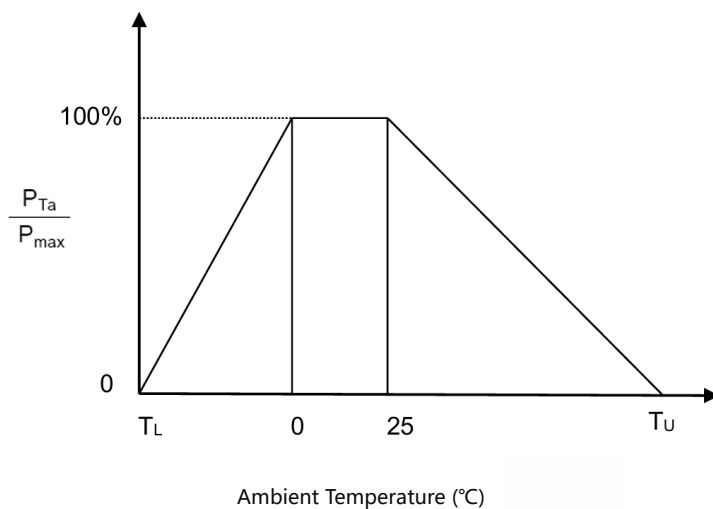
Note: □ = R₂₅ tolerance

◆ electrical characteristics

Part No	size	Zero power resistance @25°C	R ₂₅ tolerance	B value		B tolerance	Max power dissipation @25°C	Dissipation factor	Thermal time consistency	Maximum Operating Current @25°C	Operation temperature range	Safety approval		
		R ₂₅ (KΩ)	(± %)	(K)		(± %)	Pmax(mW)	δ (mW/°C)	T (Sec.)	I _{max} (mA)	TL~TU (°C)	UL cUL	TU V	CQC
CSGD334□4150B	0805	330	1,2,3,5,10	25/85	4150	1,2,3	240	Approx. 2.4	Approx. 5.4	0.09	-40~+125	√	√	√
CSGC103□3950A		10			3950					0.49		√	√	√
CSGC104□4250A		100		25/50	4250					0.15		√	√	√

Note: □ = R₂₅ tolerance

◆ Maximum Power Derating Curve

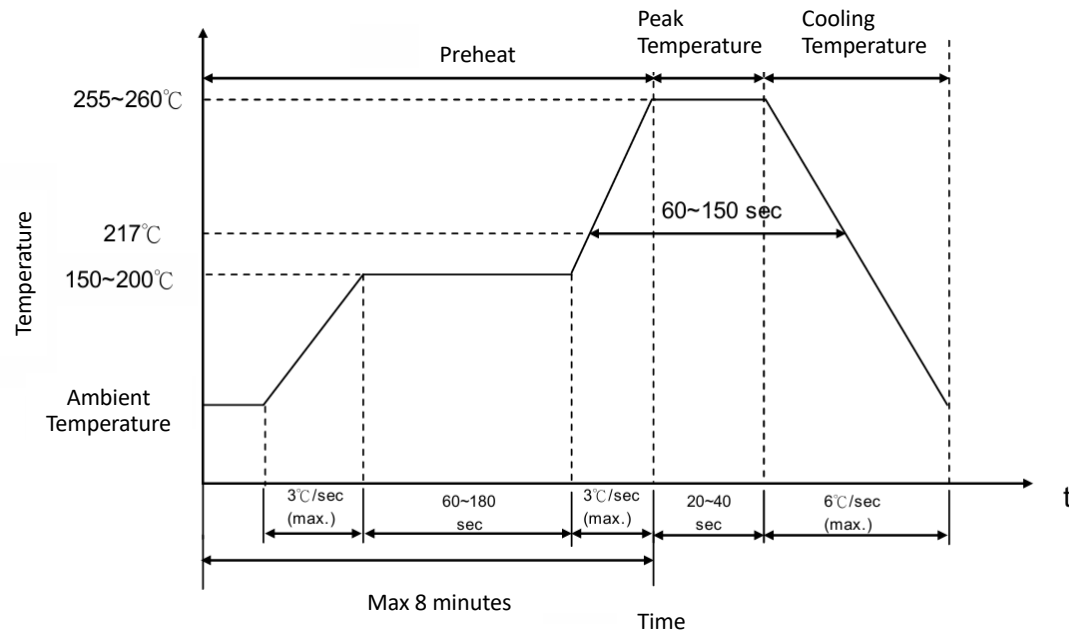
T_U: Upper Operating Temperature Limit (°C)T_L: Lower Operating Temperature Limit (°C)

For example:

Ambient Temperature (T_a) = 55°CUpper Operating Temperature Limit (T_U) = 125°C $P_{Ta} = (T_U - T_a) / (T_U - 25) \times P_{max} = 70\% P_{max}$

◆ Recommended Soldering Conditions

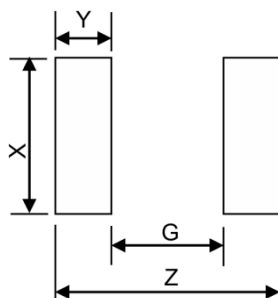
● Reflow Soldering Profile



● Soldering Iron Rework Soldering Conditions

Item	Condition
Soldering Iron Tip Temperature	360°C (max.)
Soldering Time	3 sec. (max.)
Distance Between Soldering Position and Coating Layer	Φ3mm (max.)
Note: Do not let the soldering iron tip directly contact the component surface to avoid component damage.	

◆ Recommended Solder Pad Dimensions

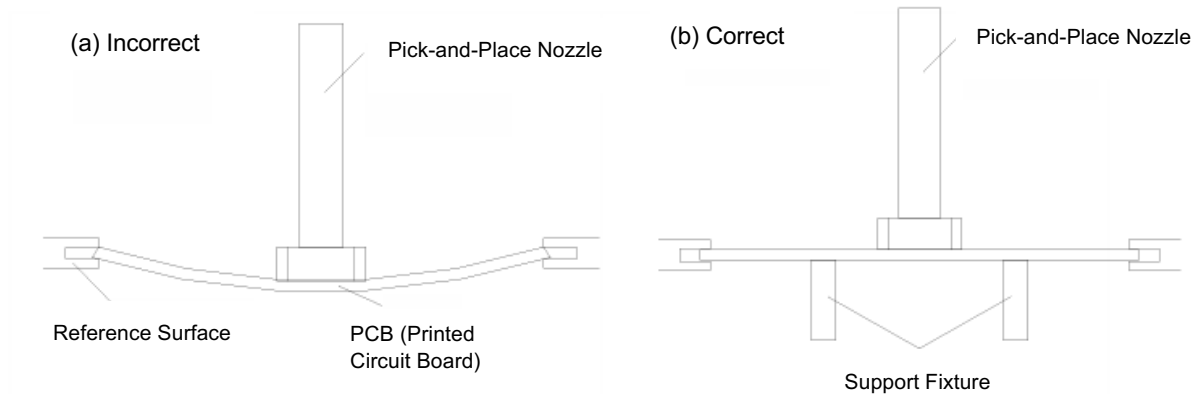


Size(EIA)	Z (mm)	G (mm)	X (mm)	Y (mm)
0201	0.8	3.4	0.3	0.25
0402	1.7	0.5	0.6	0.6
0603	3.0	1.0	1.0	1.0
0805	3.4	1.0	1.4	1.2

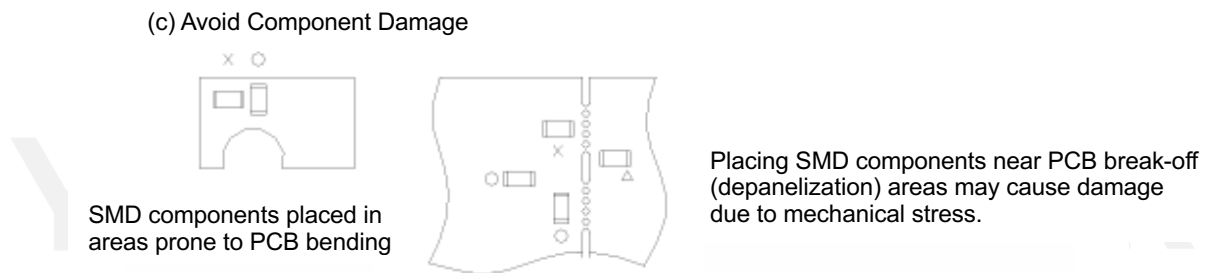
Precautions for Mounting on Flexible Printed Circuit Boards (FPC):

1. Before mounting the SMD, a support plate should be attached to the back of the SMD mounting position on the FPC to avoid applying excessive stress to the SMD body during the mounting process.
2. After the SMD mounting is completed, a protective frame should be attached around the outer periphery of the SMD mounting position to avoid directly applying inappropriate stress to the SMD body during subsequent assembly processes.

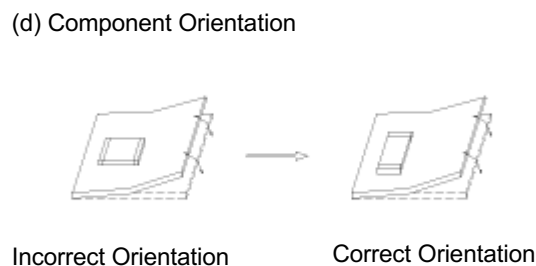
◆ Recommended Placement of Products on the PCB



When mounting SMD components on a PCB, it is recommended to provide adequate support beneath the board, as shown in Figure (b). This helps prevent external stress from causing damage to the components, as illustrated in Figure (a).



If PCB depanelization is required during the PCB design process, the solder joint placement of SMD components should follow the recommendations shown in Figure (c):



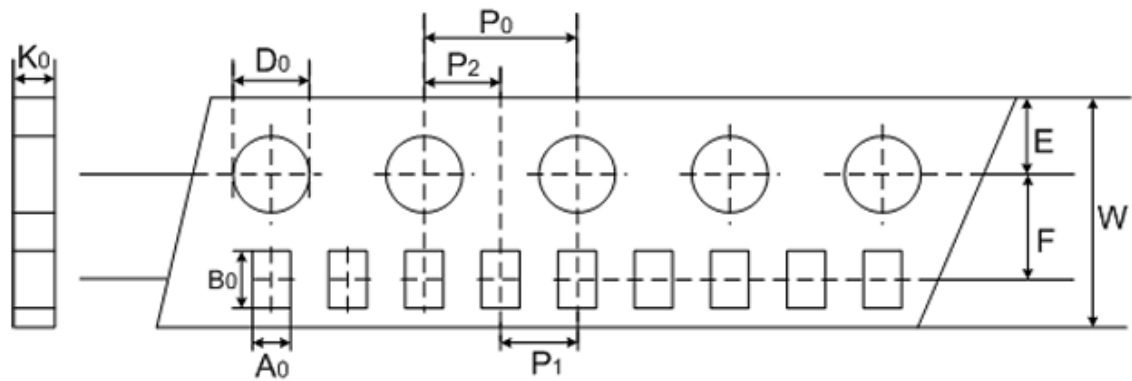
If PCB bending is unavoidable, as shown in Figure (d), it is recommended that the orientation of SMD components be parallel to the direction of the applied stress to minimize the risk of component damage.

◆ Reliability

Test Item	Test Standard	Test Conditions/Method	Performance Requirements															
Bending Strength	IEC 60068-2-21	Deflection: 2 mm for 0402, 0603, and 0805; 1 mm for 0201. Bending rate: < 0.5 mm/s.  Hold for 10 seconds with the specimen mounted on the PCB.	No visual damage $ \Delta R_{25}/R_{25} \leq 5\%$															
Solderability	IEC 60068-2-58	245 ± 5°C, 3 ± 0.3 sec	Solder coverage area ≥ 95%															
Resistance to Soldering Heat	IEC 60068-2-58	260 ± 5°C, 10 ± 1 sec	No visual damage $ \Delta R_{25}/R_{25} \leq 3\%$															
High Temperature Storage	IEC 60068-2-2	125 ± 5°C, 1000 ± 24 hour	No visual damage $ \Delta R_{25}/R_{25} \leq 5\%$															
Damp Heat, Steady State	IEC 60068-2-78	40 ± 2°C, 90~95% RH, 1000 ± 24 hour	No visual damage $ \Delta R_{25}/R_{25} \leq 3\%$															
Temperature Cycling	IEC 60068-2-14	Subject the device to five cycles on a PCB under the conditions specified in the table below. <table><tr><th>Step</th><th>Temperature (°C)</th><th>Cycle (min)</th></tr><tr><td>1</td><td>-40 ± 3</td><td>30 ± 3</td></tr><tr><td>2</td><td>room temperature</td><td>≤3</td></tr><tr><td>3</td><td>125 ± 2</td><td>30 ± 3</td></tr><tr><td>4</td><td>room temperature</td><td>≤3</td></tr></table>	Step	Temperature (°C)	Cycle (min)	1	-40 ± 3	30 ± 3	2	room temperature	≤3	3	125 ± 2	30 ± 3	4	room temperature	≤3	No visual damage $ \Delta R_{25}/R_{25} \leq 3\%$
Step	Temperature (°C)	Cycle (min)																
1	-40 ± 3	30 ± 3																
2	room temperature	≤3																
3	125 ± 2	30 ± 3																
4	room temperature	≤3																
Maximum Power Dissipation	IEC 60539-14.26.3	25 ± 5°C, Pmax., 1000 ± 24 hour	No visual damage $ \Delta R_{25}/R_{25} \leq 5\%$															

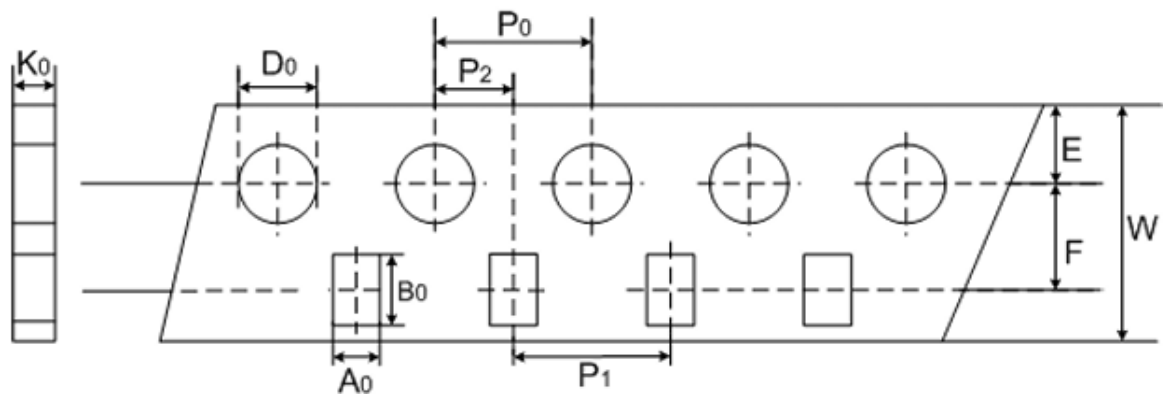
◆ Packaging Method

- Tape Packaging Method



(Unit: mm)

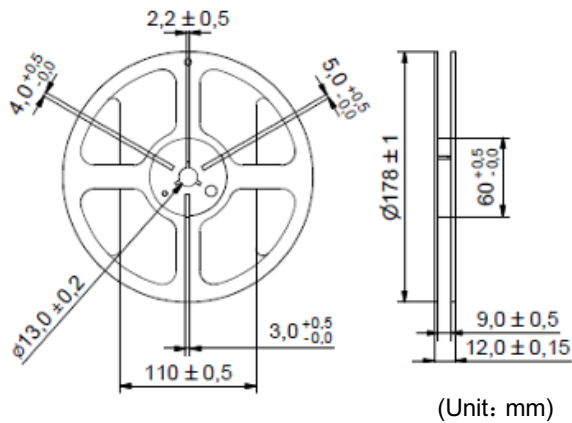
item	A_0	B_0	W	E	F	P_1	P_2	P_0	D_0	K_0
Dimensions	± 0.05	± 0.12	± 0.2	± 0.1	± 0.05	± 0.1	± 0.05	± 0.1	± 0.1	± 0.1
0201	0.38	0.68	8	1.75	3.5	2	2	4	1.55	0.38
0402	0.62	1.12	8	1.75	3.5	2	2	4	1.55	0.60



(Unit: mm)

item	A_0	B_0	W	E	F	P_1	P_2	P_2	P_0	K_0
Dimensions	± 0.2	± 0.2	± 0.2	± 0.1	± 0.05	± 0.1	± 0.05	± 0.05	± 0.1	± 0.1
0603	1.1	1.9	8	1.75	3.5	4	2	4	1.55	0.95
0805	1.5	2.3	8	1.75	3.5	4	2	4	1.55	1.0

◆ Packaging Method



Size (EIA)	Quantity (pcs/Reel)
0201	15,000
0402	10,000
0603	4,000
0805	3,500

◆ Storage Conditions

- Storage Conditions:
 1. Storage Temperature: $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
 2. Relative Humidity: $\leq 75\% \text{ RH}$
 3. Do not store this product in environments with corrosive gases or direct sunlight.
- Storage Period: 1 Year