Chip Ferrite Bead
AEC-Q200 Type

SIM02-M33 Series

MERITEK

FEATURE

- **Operating temperature: -55ºC ~ +150ºC (Including self-temperature rise)**
- **Monolithic Inorganic Material Construction**
- **Closed Magnetic Circuit Avoids Crosstalk**
- **Noise reduction solution for Signal Line**
- **Excellent Solderability and Heat Resistance**
- **AEC-Q200 Compliant**

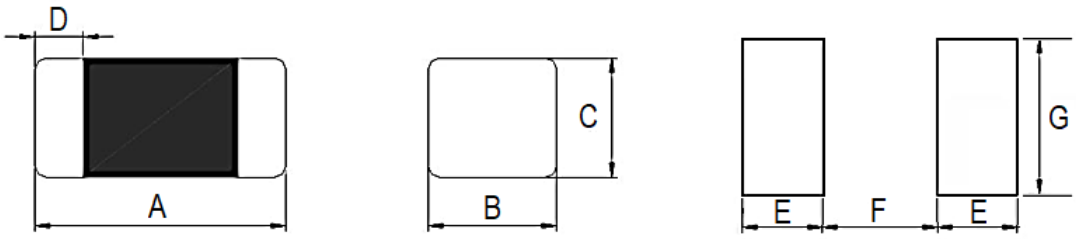
PART NUMBERING SYSTEM

SIM **02** **221** **Y** **A20** **M33**
(1) (2) (3) (4) (5) (6)

RoHS

No	Item	Code	Description	
(1)	**Product Code**	SIM	Signal Chip Inductor, Multi-Layer Chip Ferrite Bead Type	
(2)	**Dimension**	02	02: 0402, 1.0x0.5mm	See Dimensions Table
(3)	**Impedance**	221	221: 220Ω	First two digit: Significant, Third: Multiplier
(4)	**Tolerance**	Y	Y: ±25%	-25% ~ +25%
(5)	**Rated Current**	A20	A20: 0.20A	A: Decimal
(6)	**Series Code**	M33	Chip Ferrite Bead, AEC-Q200	Internal Control Code

DIMENSIONS



Size Code	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)
SIM02 (0402)	1.00±0.10	0.50±0.10	0.50±0.10	0.25±0.10	0.50	0.40	0.60
SIM03 (0603)	1.6±0.15	0.80±0.15	0.80±0.15	0.30±0.20	0.80	0.85	0.95
SIM05 (0805)	2.00±0.20	1.25±0.20	0.85±0.20	0.50±0.30	1.05	1.00	1.45
SIM06 (1206)	3.20±0.20	1.60±0.20	1.10±0.20	0.50±0.30	1.05	2.20	1.80

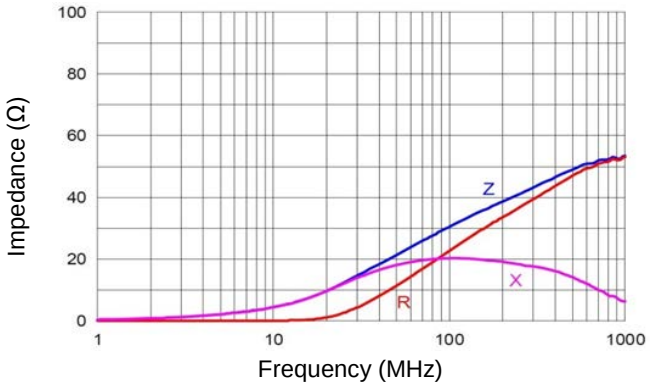
ELECTRICAL CHARACTERISTICS

Size	Part Number	Impedance (Ω)	Tolerance (%)	DCR (Ω) Max	Rated Current (mA) Max	Thickness (mm)
0402	**SIM02300YA30M33**	30	±25%	0.20	300	0.50±0.10
	SIM02600YA30M33	60	±25%	0.25	300	0.50±0.10
	SIM02121YA10M33	120	±25%	0.30	100	0.50±0.10
	SIM02221YA10M33	220	±25%	0.40	100	0.50±0.10
	SIM02301YA10M33	300	±25%	0.50	100	0.50±0.10
	SIM02601YA08M33	600	±25%	0.80	80	0.50±0.10
	SIM02102YA05M33	1000	±25%	1.20	50	0.50±0.10
	SIM02600YA10M33	60	±25%	0.30	100	0.50±0.10
	SIM02121YA08M33	120	±25%	0.45	80	0.50±0.10
	SIM02221YA05M33	220	±25%	0.60	50	0.50±0.10
	SIM02301YA05M33	300	±25%	0.75	50	0.50±0.10

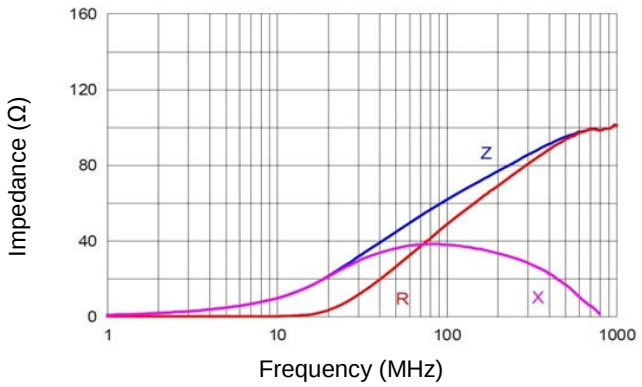
Notes: 1. Test Frequency: 100MHz; 2. Rated Current based on Temperature Rise Test

CHARICTERISTIC CURVES

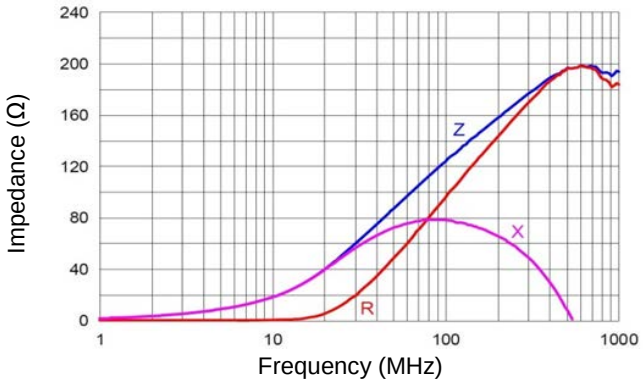
SIM02300YA30M33



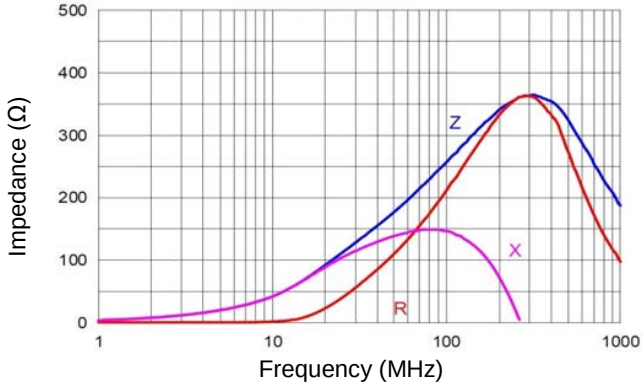
SIM02600YA30M33



SIM02121YA10M33

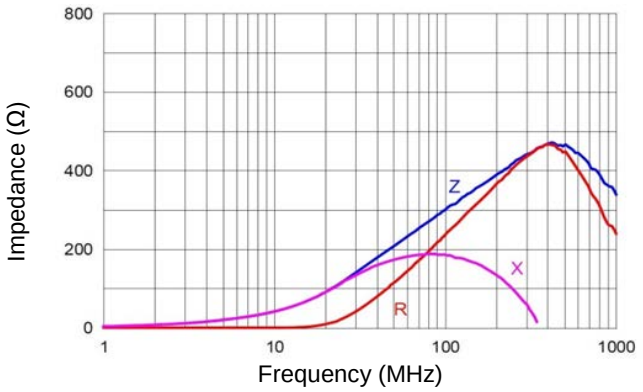


SIM02221YA10M33

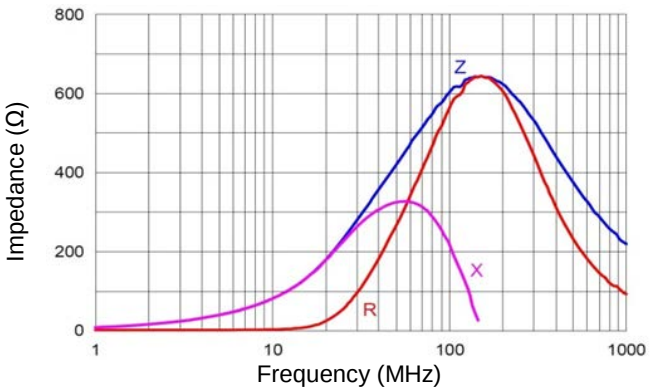


CHARICTERISTIC CURVES

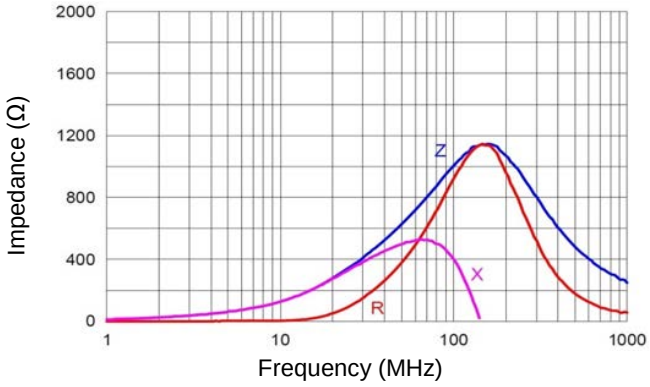
SIM02301YA10M33



SIM02601YA08M33



SIM02102YA05M33



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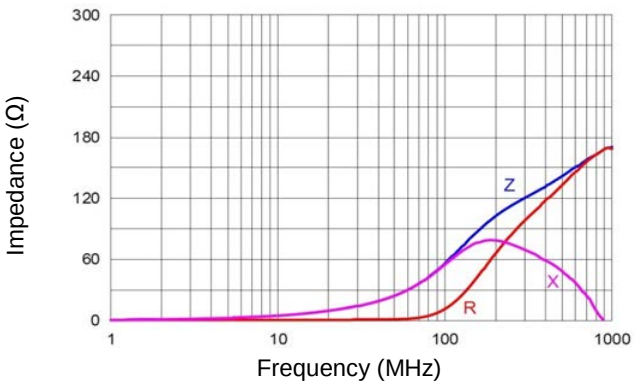
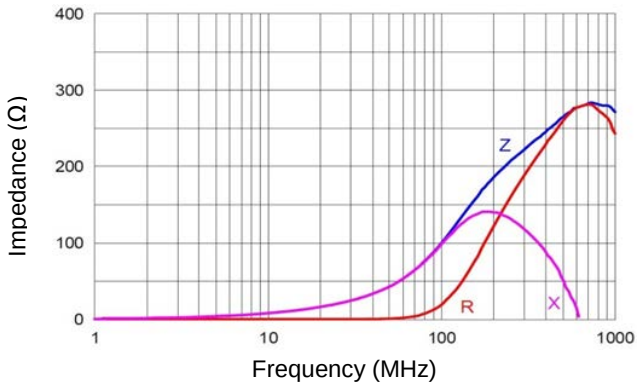


SIM02121YA08M33



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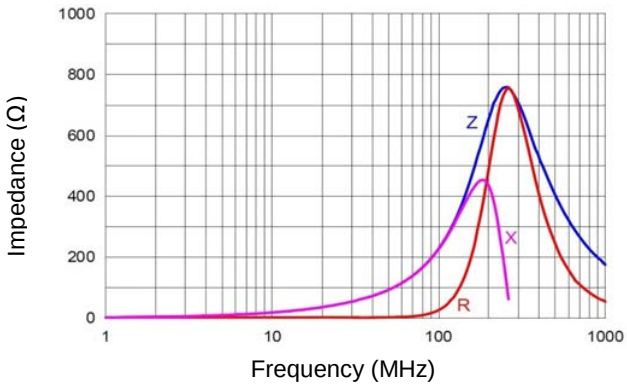

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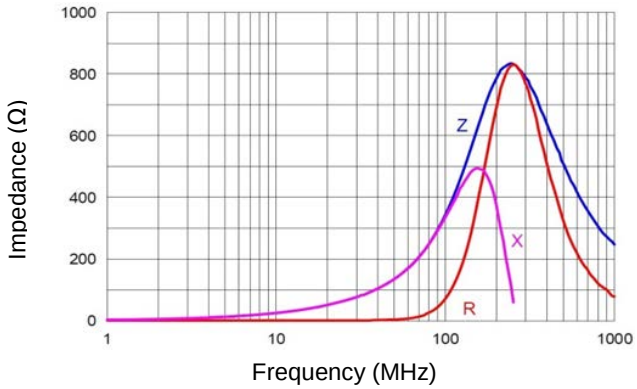


RELIABILITY TEST CONDITON AND REQUIREMENT

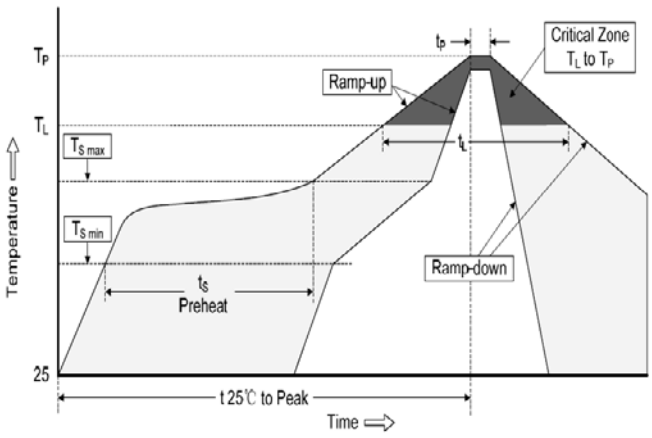
<table>
<tr><th>Item</th><th>Test Conditions</th><th>Requirement</th></tr>
<tr><td>Temperature Rise Test</td><td>Applied the allowed DC current.
Temperature measured by digital surface thermometer.</td><td>Rated Current < 1A ΔT 20℃Max.
Rated Current ≧ 1A ΔT 40℃Max.</td></tr>
<tr><td>High Temperature Exposure (Storage)</td><td>Preconditioning: Run through IR reflow for 3 times.
Temperature: 150±2°C
Duration: 1000hrs Min.
Measured at room temperature after 24±2 Hrs.</td><td>Appearance: no damage.
Impedance: within±15%of initial value.
Inductance: within±10%of initial value.
Q: shall not exceed the specification value.
RDC: within ±15% of initial value and shall not exceed the specification value.</td></tr>
<tr><td>Temperature Cycling</td><td>Preconditioning: Run through IR reflow for 3 times.
Number of cycles: 1000. Condition for 1 cycle:
<table>
<tr><th>No.</th><th>Temp. (°C)</th><th>Time (min.)</th></tr>
<tr><td>1</td><td>-55±2°C</td><td>30 Min.</td></tr>
<tr><td>2</td><td>+150±2°C Transition time</td><td>1 Max.</td></tr>
<tr><td>3</td><td>+150±2°C</td><td>30 Min.</td></tr>
<tr><td>4</td><td>Low Temperature Transition time</td><td>1 Max.</td></tr>
</table>
Measured at room temperature after placing for 24±2 hrs.</td><td>Appearance: no damage.
Impedance: within±15%of initial value.
Inductance: within±10%of initial value.
Q: shall not exceed the specification value.
RDC: within ±15% of initial value and shall not exceed the specification value.</td></tr>
<tr><td>Biased Humidity (AEC-Q200)</td><td>Preconditioning: Run through IR reflow for 3 times.
Humidity: 85±3%R.H. Temperature: 85±2°C.
Duration: 1000hrs Min. with 100% rated current.
Measured at room temperature after 24±2 hrs.</td><td>Appearance: no damage.
Impedance: within±15%of initial value.
Inductance: within±10%of initial value.
Q: shall not exceed the specification value.
RDC: within ±15% of initial value and shall not exceed the specification value.</td></tr>
<tr><td>High Temperature Operational Life</td><td>Preconditioning: Run through IR reflow for 3 times.
Temperature: 150±2°C
Duration: 1000hrs Min. with 100% rated current.
Measured at room temperature after 24±2 Hrs.</td><td>Appearance: no damage.
Impedance: within±15%of initial value.
Inductance: within±10%of initial value.
Q: shall not exceed the specification value.
RDC: within ±15% of initial value and shall not exceed the specification value.</td></tr>
<tr><td>External Visual</td><td>Inspect device construction, marking and workmanship.
Electrical test not required</td><td>Appearance: no damage.</td></tr>
<tr><td>Physical Dimension</td><td>According to the product specification size measurement</td><td>According to the product specification size measurement</td></tr>
<tr><td>Resistance to Solvents</td><td>Add aqueous wash chemical – OKEM clean or equivalent</td><td>Appearance: no damage.</td></tr>
<tr><td>Mechanical Shock</td><td>Preconditioning: Run through IR reflow for 2 times.
Test condition:
<table>
<tr><th>Type</th><th>Peak Value (g's)</th><th>Normal duration (ms)</th><th>Wave From</th><th>Velocity change (ft/sec)</th></tr>
<tr><td>SMD</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr>
<tr><td>Lead</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr>
</table>
3 shocks in each direction along 3 perpendicular axes.</td><td>Appearance: no damage.
Impedance: within±15%of initial value.
Inductance: within±10%of initial value.
Q: shall not exceed the specification value.
RDC: within ±15% of initial value and shall not exceed the specification value.</td></tr>
</table>

RELIABILITY TEST CONDITON AND REQUIREMENT

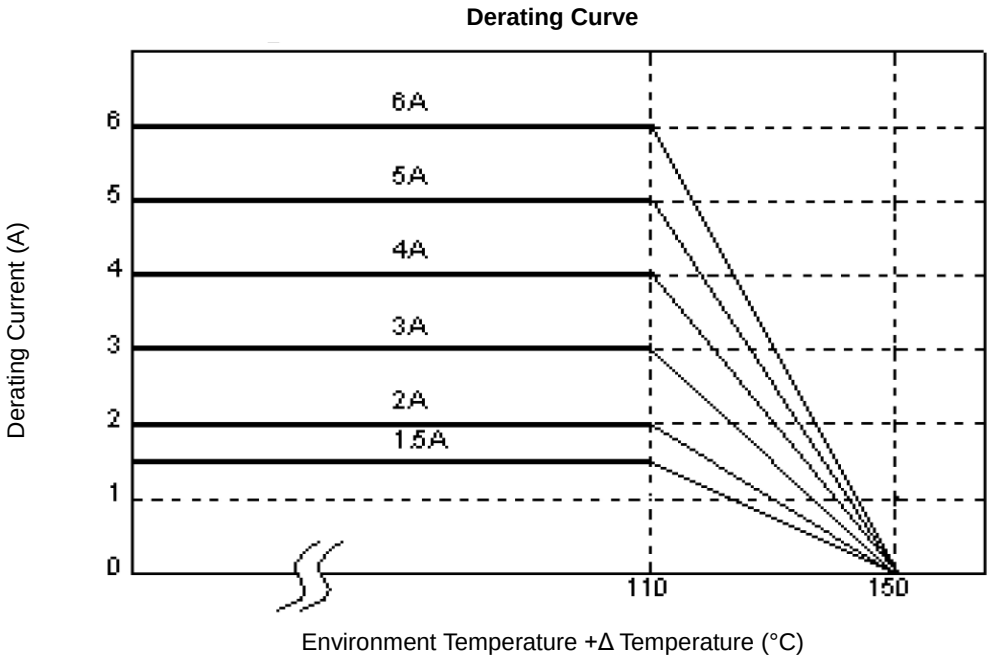
<table>
<tr><th>Item</th><th>Test Conditions</th><th>Requirement</th></tr>
<tr><td>Vibration</td><td>Preconditioning: Run through IR reflow for 3 times.
Oscillation Frequency: 10~2K~10 Hz for 20 minutes
Equipment: Vibration checker
Total Amplitude:10g
Testing Time: 12 hours (20 minutes, 12 cycles each of 3 orientations)</td><td>Appearance: no damage.
Impedance: within±15%of initial value.
Inductance: within±10%of initial value.
Q: Shall not exceed the specification value
RDC: within ±15% of initial value and shall not exceed the specification value.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>Test Condition: MIL-STD-202 Condition B
Number of heat cycles: 1, Depth: Completely cover the termination
Temperature: 260±5°C for 10 sec. Temperature ramp/immersion and emersion rate 25mm/s ±6 mm/s.</td><td>Appearance: no damage.
Impedance: within±15%of initial value.
Inductance: within±10%of initial value.
Q: Shall not exceed the specification value
RDC: within ±15% of initial value and shall not exceed the specification value.</td></tr>
<tr><td>Thermal Shock</td><td>Preconditioning: Run through IR reflow for 3 times.
Number of cycles: 300. Condition for 1 cycle:
<table>
<tr><th>No.</th><th>Temp. (°C)</th><th>Time (min.)</th></tr>
<tr><td>1</td><td>-55±2°C</td><td>15±1</td></tr>
<tr><td>2</td><td>+150±2°C</td><td>within 20 sec.</td></tr>
<tr><td>3</td><td>+150±2°C</td><td>15±1</td></tr>
</table>
Measured at room temperature after placing for 24±2 hrs.</td><td>Appearance: no damage.
Impedance: within±15%of initial value.
Inductance: within±10%of initial value.
Q: shall not exceed the specification value.
RDC: within ±15% of initial value and shall not exceed the specification value.</td></tr>
<tr><td>ESD</td><td>Direct contact discharge 4KV (Level 2)</td><td>Appearance: no damage.</td></tr>
<tr><td>Solderability</td><td>Method B, 4hrs at 155°C, dry heat at 235°C±5°C,
Test time: 5 +0/-0.5 sec.
Method D category 3. (Steam aging 8 hrs ±15min) at 260°C±5°C,
Test time: 30 +0/-0.5 sec.</td><td>More than 95% of the terminal electrode should be covered with solder.</td></tr>
<tr><td>Flammability</td><td>V-0 or V-1 are acceptable</td><td>Electrical test not required.</td></tr>
<tr><td>Bending</td><td>Shall be mounted on a FR4 substrate of the following dimensions:
<table>
<tr><th>Dimensions</th><th>Bending depth</th></tr>
<tr><td>40x100x1.6mm</td><td>2.0mm (min).</td></tr>
</table>
Duration of applied force 60+5 sec.
The force is to be applied only once to the board</td><td>Appearance: no damage.</td></tr>
<tr><td>Terminal strength</td><td>Preconditioning: Run through IR reflow for 2 times.
With component mounted on a PCB apply a force of 17.7(N) (1.8Kg) force to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also, the force shall be applied gradually as not to shock the component being tested.</td><td>Appearance: no damage.</td></tr>
</table>

RECOMMENDED SOLDERING PROFILES

Reflow Condition		
Pre Heat	Temp. Min $T_{s(min)}$	150°C
	Temp. Max $T_{s(max)}$	200°C
	Time (min. to max.) (t_s)	60 ~120 seconds
Reflow	Temp. (T_L)	217°C
	Time (min. to max.) (t_L)	60 ~150 seconds
Peak Temperature (T_P)		260°C
Time within 5°C of actual peak Temperature (t_p)		< 30 seconds
Reflow times:		3 times Max.

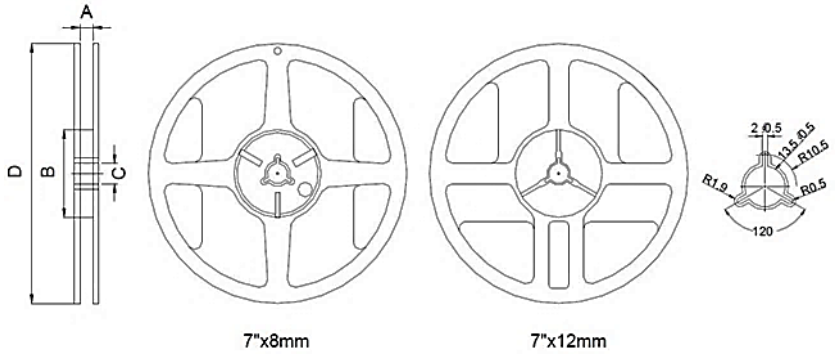


DERATING CURVE



PACKAGING SPECIFICATIONS

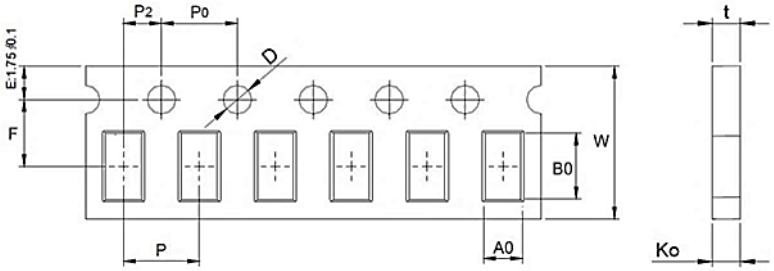
Reel Specification & Packaging Quantity



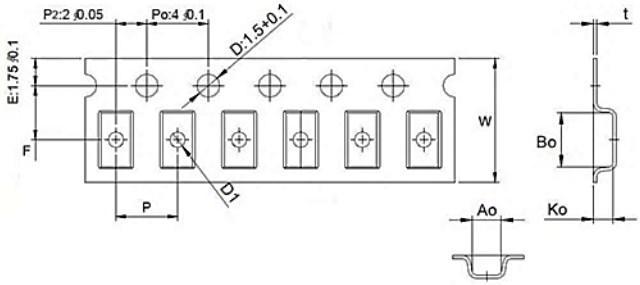
Size	Reel Dimension (mm)						
	Quantity	Tape Width	Reel Diameter	A	B	C	D
0402	Paper 10K	8mm	7"	9.0±0.5	60.0+2.0	13.5±0.5	178.0±2.0
0603	Paper 4K	8mm	7"	9.0±0.5	60.0+2.0	13.5±0.5	178.0±2.0
0805	Paper 4K	8mm	7"	9.0±0.5	60.0+2.0	13.5±0.5	178.0±2.0
1206	Plastic 3K	8mm	7"	9.0±0.5	60.0+2.0	13.5±0.5	178.0±2.0

PACKAGING SPECIFICATIONS

Paper Tape Specification



Plastic Tape Specification



Size	Paper Tape Dimension (mm)									
	A0	B0	W	F	P_0	P	P_2	D	t	Ko
0402	0.62±0.03	1.12±0.03	8±0.3	3.5±0.05	4±0.1	2±0.05	-	1.5+0.1	0.6±0.03	0.6±0.03
0603	0.96+0.05/-0.03	1.80±0.05	8±0.1	3.5±0.1	4±0.1	4±0.1	2±0.1	1.56+0.1/-0.05	0.95±0.05	0.95±0.05
0805	1.3±0.05	2.1±0.05	8±0.1	3.5±0.1	4±0.1	4±0.1	2±0.1	1.56+0.1/-0.05	0.95±0.05	0.95±0.05
Size	**Plastic Tape Dimension (mm)**									
	A0	**B0**	**W**	**F**	**P**	P_0	P_2	**D1**	**t**	**Ko**
1206	1.75±0.1	3.35±0.1	8±0.1	3.5±0.05	4±0.1	4±0.1	2±0.05	1±0.1	0.23±0.05	1.25±0.1

*Specifications subject to change without notice.