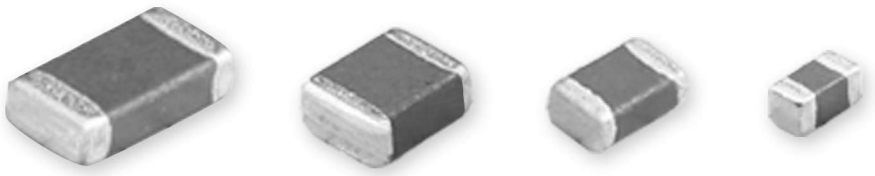
叠层片式磁珠 (大电流)

GTPxxx 系列



GT ELECTRONIC LIMITED

GT22-SP-V30.08

High current laminated sheet magnetic beads GTP series

1. Scope

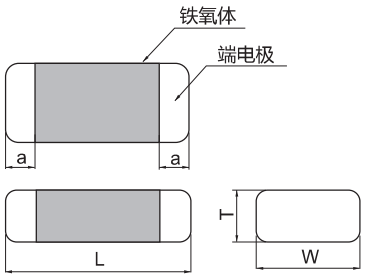
This reference specification is applicable to the large current laminated sheet magnetic beads general electronic equipment GTPxxx series.

2. Part Numbering

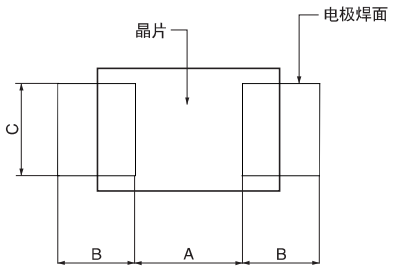
(Ex.)

GTP	3216	D	600	T	1A0
Product type ID	Dimension (L×W)	Internal code	Impedance 600=60Ω 121=120Ω 102=1000Ω	T:Tape & reel B:In bulk	Rated current 0A5=0.5A 1A0=1A

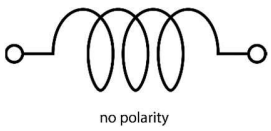
3. Appearance and Dimensions



■ Recommended Land Pattern



■ Equivalent Circuit



Unit:mm

Type	L	W	T	a	A	B	C
GTP1005	1.0± 0.15	0.5± 0.15	0.5± 0.15	0.25± 0.1	0.35	0.5	0.5
GTP1608	1.6± 0.2	0.8± 0.15	0.8± 0.15	0.3± 0.2	0.8	0.6	0.8
GTP2012	2.0± 0.2	1.25± 0.2	0.85± 0.2	0.4± 0.2	1.0	0.8	1.2
GTP3216	3.2± 0.2	1.6± 0.15	0.8± 0.2	0.5± 0.3	2.2	1.1	1.6

4. Marking

No marking

5. Testing Conditions

Unless otherwise specified	Temperature: ordinary temperature (15°C to 35°C) Humidity: ordinary humidity [25% to 85% (RH)]
In case of doubt	Temperature: 20°C±2°C Humidity: 60% to 70% (RH) Atmospheric pressure: 86 kPa to 106 kPa

6. Operating storage temperature

Operating temperature range	-55℃ to +125℃
Storage temperature range	-55℃ to +125℃

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7. Part Number and Rating

GTP1005 Series

Part Number	Impedance	Z Test Frequency	Max.DC Resistance	Max.Rated Current	Thickness
Units	Ω	MHz	Ω	mA	mm
Symbol	Z	Freq.	DCR	Ir	T
GTP1005D100T1A0	1～30	100	0.05	1000	0.5±0.15
GTP1005D100T2A0	1～30	100	0.045	2000	
GTP1005D300T1A0	30±25%	100	0.05	1000	
GTP1005D300T1A7	30±25%	100	0.045	1700	
GTP1005D600T1A5	60±25%	100	0.075	1500	
GTP1005D800T0A8	80±25%	100	0.125	800	
GTP1005D800T1A2	80±25%	100	0.09	1200	
GTP1005D121T0A7	120±25%	100	0.13	700	
GTP1005D121T1A2	120±25%	100	0.12	1200	
GTP1005D121T1A5	120±25%	100	0.11	1500	
GTP1005D221T0A6	220±25%	100	0.20	600	
GTP1005D221T0A9	220±25%	100	0.16	900	
GTP1005D471T0A5	470±25%	100	0.30	500	
GTP1005D601T0A45	600±25%	100	0.38	450	
GTP1005D601T0A5	600±25%	100	0.30	500	
GTP1005D102T0A3	1000±25%	100	0.48	300	

GTP1608 Series

Part Number	Impedance	Z Test Frequency	Max.DC Resistance	Max.Rated Current	Thickness
Units	Ω	MHz	Ω	mA	mm
Symbol	Z	Freq.	DCR	Ir	T
GTP1608D000T3A0	1～10	100	0.012	3000	0.8±0.15
GTP1608D000T4A0	1～10	100	0.01	4000	
GTP1608D000T6A0	1～10	100	0.006	6000	
GTP1608D110T3A0	11 ±25%	100	0.015	3000	
GTP1608D110T4A0	11 ±25%	100	0.01	4000	
GTP1608D190T3A0	19 ±25%	100	0.03	3000	
GTP1608D260T3A0	26 ±25%	100	0.03	3000	
GTP1608D310T3A0	31 ±25%	100	0.03	3000	
GTP1608D470T3A0	47 ±25%	100	0.03	3000	
GTP1608D600T1A0	60 ±25%	100	0.10	1000	
GTP1608D600T1A5	60 ±25%	100	0.08	1500	
GTP1608D600T2A0	60 ±25%	100	0.045	2000	
GTP1608D600T3A0	60 ±25%	100	0.03	3000	
GTP1608D800T2A0	80 ±25%	100	0.08	2000	
GTP1608D800T3A0	80 ±25%	100	0.06	3000	
GTP1608D101T1A0	100 ±25%	100	0.10	1000	
GTP1608D101T3A0	100 ±25%	100	0.05	3000	
GTP1608D121T1A0	120 ±25%	100	0.12	1000	
GTP1608D121T3A0	120 ±25%	100	0.055	3000	
GTP1608D151T1A0	150 ±25%	100	0.15	1000	
GTP1608D151T2A0	150 ±25%	100	0.075	2000	
GTP1608D221T1A0	220 ±25%	100	0.15	1000	
GTP1608D221T2A0	220 ±25%	100	0.10	2000	
GTP1608D301T1A0	300 ±25%	100	0.18	1000	
GTP1608D601T1A0	600 ±25%	100	0.30	1000	
GTP1608D102T1A0	1000±25%	100	0.50	1000	
GTP1608D122T1A0	1200±25%	100	6	1000	

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GTP2012 Series

Part Number	Impedance	Z Test Frequency	Max.DC Resistance	Max.Rated Current	Thickness
Units	Ω	MHz	Ω	mA	mm
Symbol	Z	Freq.	DCR	Ir	T
GTP2012D000T4A0	1～10	100	0.015	4000	0.85±0.2
GTP2012D110T4A0	11±25%	100	0.015	4000	
GTP2012D110T6A0	11±25%	100	0.006	6000	
GTP2012D190T4A0	19±25%	100	0.015	4000	
GTP2012D220T3A0	22±25%	100	0.02	3000	
GTP2012D260T2A0	26±25%	100	0.03	2000	
GTP2012D260T4A0	26±25%	100	0.015	4000	
GTP2012D310T4A0	31±25%	100	0.02	4000	
GTP2012D310T6A0	31±25%	100	0.01	6000	
GTP2012D390T4A0	39±25%	100	0.02	4000	
GTP2012D600T3A0	60±25%	100	0.04	3000	
GTP2012D600T4A0	60±25%	100	0.035	4000	
GTP2012D800T3A0	80±25%	100	0.04	3000	
GTP2012D121T2A0	120±25%	100	0.05	2000	
GTP2012D121T3A0	120±25%	100	0.05	3000	
GTP2012D151T2A0	150±25%	100	0.06	2000	
GTP2012D181T2A0	180±25%	100	0.06	2000	
GTP2012D181T3A0	180±25%	100	0.05	3000	
GTP2012D221T2A0	220±25%	100	0.06	2000	
GTP2012D221T3A0	220±25%	100	0.05	3000	
GTP2012D301T1A0	300±25%	100	0.10	1000	
GTP2012D301T2A0	300±25%	100	0.06	2000	
GTP2012D301T3A0	300±25%	100	0.05	3000	
GTP2012D421T1A5	420±25%	100	0.15	1500	
GTP2012D421T2A5	420±25%	100	0.10	2500	
GTP2012D601T1A5	600±25%	100	0.16	1500	
GTP2012D601T2A0	600±25%	100	0.12	2000	
GTP2012D601T2A5	600±25%	100	0.10	2500	
GTP2012D102T1A0	1000±25%	100	0.20	1000	
GTP2012D152T1A0	1500±25%	100	0.25	1000	

GTP3216 Series

Part Number	Impedance	Z Test Frequency	Max.DC Resistance	Max.Rated Current	Thickness
Units	Ω	MHz	Ω	mA	mm
Symbol	Z	Freq.	DCR	Ir	T
GTP3216D000T4A0	1～10	100	0.015	4000	0.8±0.2
GTP3216D000T6A0	1～10	100	0.01	6000	
GTP3216D110T6A0	11±25%	100	0.01	6000	
GTP3216D150T6A0	15±25%	100	0.01	6000	
GTP3216D190T4A0	19±25%	100	0.015	4000	
GTP3216D190T6A0	19±25%	100	0.01	6000	
GTP3216D260T4A0	26±25%	100	0.015	4000	
GTP3216D260T6A0	26±25%	100	0.01	6000	
GTP3216D310T4A0	31±25%	100	0.015	4000	
GTP3216D310T6A0	31±25%	100	0.01	6000	
GTP3216D390T3A0	39±25%	100	0.02	3000	
GTP3216D390T4A0	39±25%	100	0.015	4000	
GTP3216D390T6A0	39±25%	100	0.01	6000	

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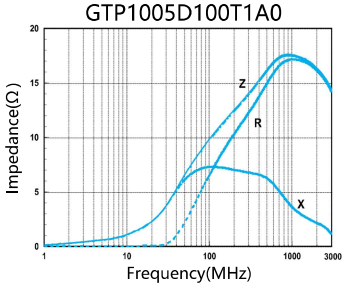
GTP3216 Series

Part Number	Impedance	Z Test Frequency	Max.DC Resistance	Max.Rated Current	Thickness
Units	Ω	MHz	Ω	mA	mm
Symbol	Z	Freq.	DCR	Ir	T
GTP3216D600T4A0	60±25%	100	0.02	4000	0.8±0.2
GTP3216D600T6A0	60±25%	100	0.015	6000	
GTP3216D800T3A0	80±25%	100	0.03	3000	
GTP3216D101T2A0	100±25%	100	0.06	2000	
GTP3216D101T3A0	100±25%	100	0.04	3000	
GTP3216D121T3A0	120±25%	100	0.04	3000	
GTP3216D151T3A0	150±25%	100	0.04	3000	
GTP3216D221T2A0	220±25%	100	0.05	2000	
GTP3216D221T3A0	220±25%	100	0.05	3000	
GTP3216D301T1A5	300±25%	100	0.10	1500	
GTP3216D301T2A0	300±25%	100	0.08	2000	
GTP3216D301T3A0	300±25%	100	0.07	3000	
GTP3216D421T1A5	420±25%	100	0.12	1500	
GTP3216D501T2A0	500±25%	100	0.12	2000	
GTP3216D501T3A0	500±25%	100	0.08	3000	
GTP3216D601T1A0	600±25%	100	0.18	1000	
GTP3216D601T2A0	600±25%	100	0.10	2000	
GTP3216D751T1A0	750±25%	100	0.15	1000	
GTP3216D102T0A5	1000±25%	100	0.20	500	
GTP3216D102T1A0	1000±25%	100	0.18	1000	
GTP3216D102T1A5	1000±25%	100	0.15	1500	
GTP3216D102T2A0	1000±25%	100	0.12	2000	

7.1 Electrical Characteristics

GTP1005 系列

GTP1005D100T1A0



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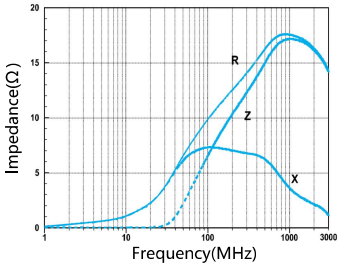

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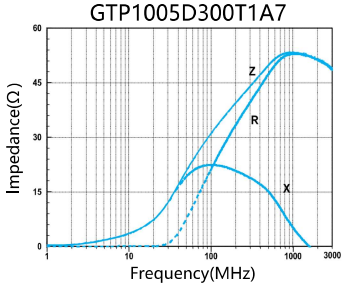

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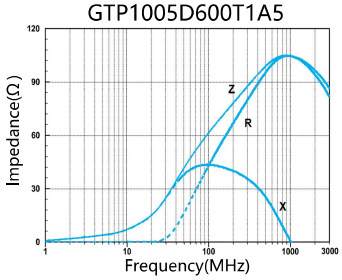

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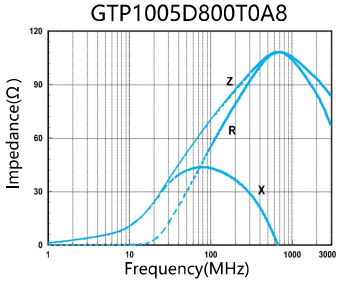

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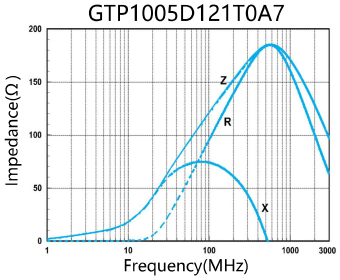

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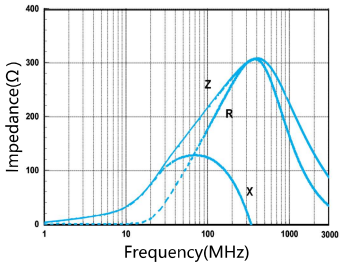

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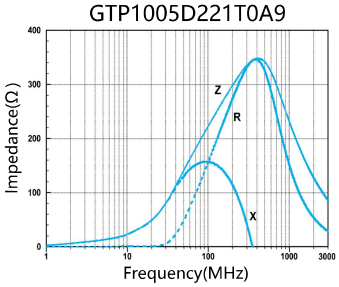

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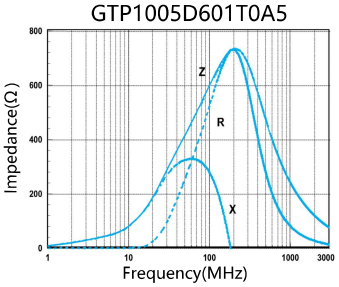

GTP1608 Series

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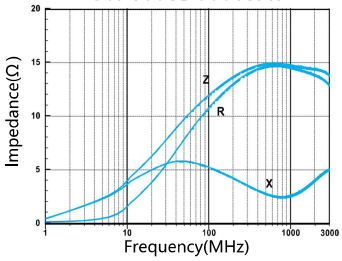

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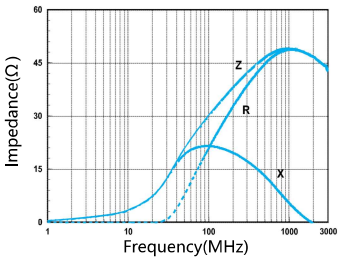

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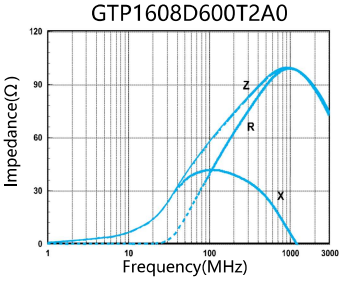

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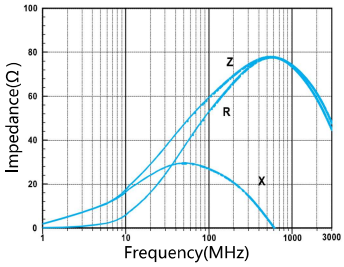

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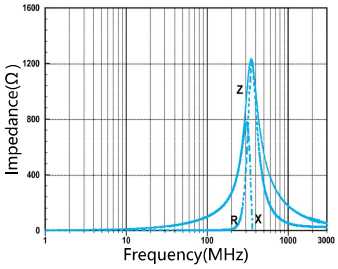

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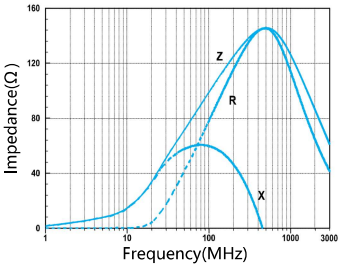

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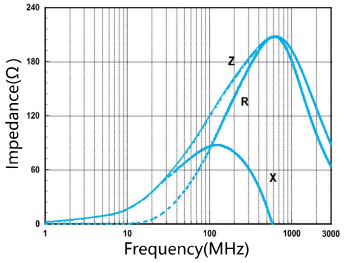

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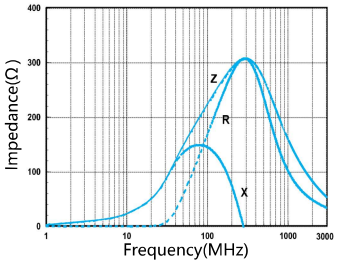

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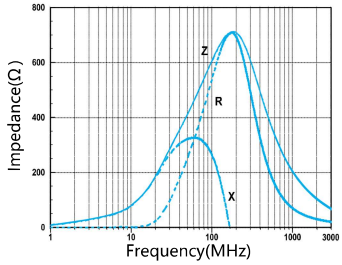

GTP2012 Series

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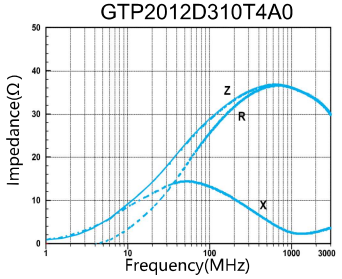

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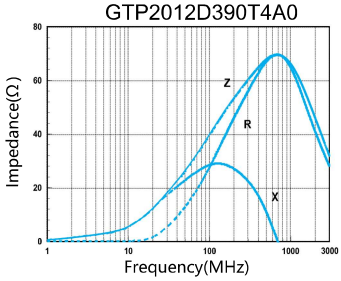

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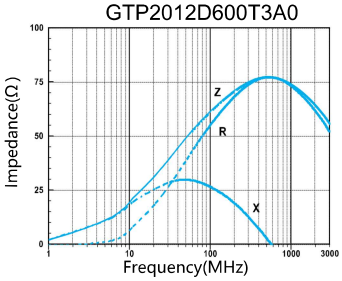

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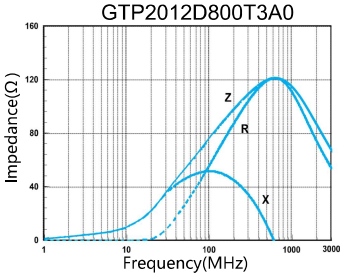

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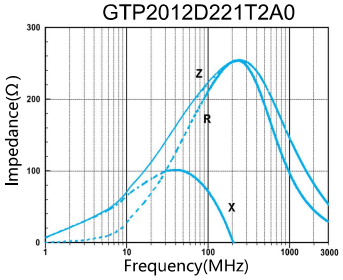

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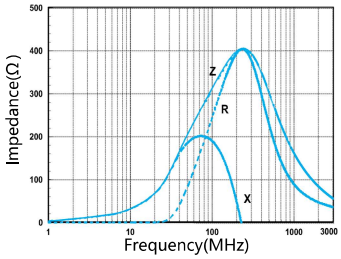

GTP3216 Series

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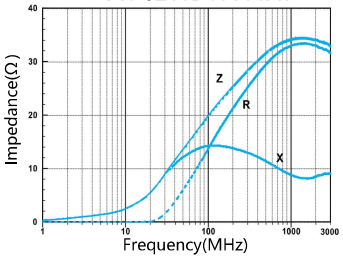

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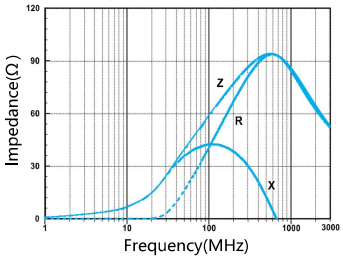

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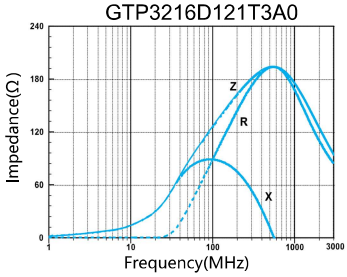

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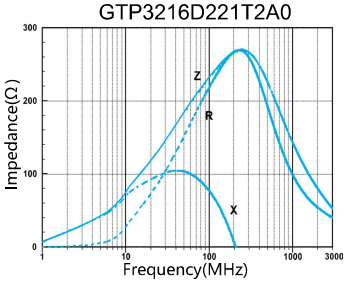

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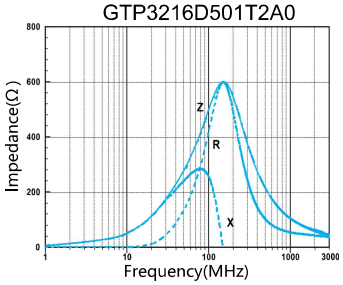

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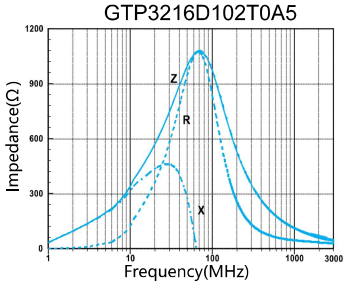

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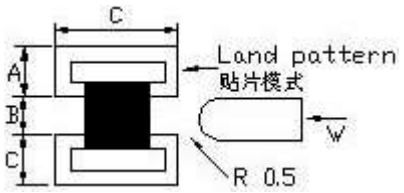
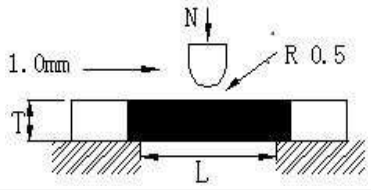
8. Electrical Performance

8.1TestConditions
Unlessotherwisespecified,thestandardatmosphericconditionsformeasurement/test as:

a. Ambient Temperature: 20±15℃
b. Relative Humidity: 65±20%
c. Air Pressure: 86kPa to 106kPa

No.	Item	Specification	Test Method
8-1	Impedance	Meet item 7.	HP4287APACKEDRFLCRMETER B2911APRECISIONSOURCE
8-1	DC Resistance	Meet item 7.	HP4338BMILLIOHMMETER E4991ARFIMPEDANCEANALYZER

9. Mechanical Performance

<table>
<tr><th>ITEM</th><th>REOUIREMIENTS</th><th>TEST CONDITIOS</th></tr>
<tr><td>1. Resistance to solder heat</td><td>1. No visible mechanical damage.
2.More than 75% of the terminal shall be covered with new solder.
3.Impedance change:within±30%;Inductance change: within ±10%; Quality factor change :within ±30%.</td><td>①Solder temperature: 260±3℃
②Dip time:10±1s
③Solder:Sn93.5/Ag3.0/Cu0.5
④Flux: 25% Rosin and 75% ethanol in weight.
⑤The chip shall be stabilized at normal condition for 1~2 hours before measuring.</td></tr>
<tr><td>2. Solderability</td><td>1. No visible mechanical damage
2.More than 95% of the terminal shall be covered with new solder.</td><td>①Solder temperature:245±2℃
②Dip time :4±1s
③Solder:Sn93.5/Ag3.0/Cu0.5
④Flux: 25% Rosin and 75%ethanol in weight.</td></tr>
<tr><td>3. Terminal Strength</td><td>No visible mechanical damage.
<table>
<tr><td></td><td>1005</td><td>1608</td><td>2012</td><td>3216</td></tr>
<tr><td>w(kgf)</td><td>1.5</td><td>2.0</td><td>4.0</td><td>5.0</td></tr>
<tr><td>A(mm)</td><td>0.8</td><td>1.0</td><td>1.0</td><td>1.3</td></tr>
<tr><td>B(mm)</td><td>0.8</td><td>1.0</td><td>1.0</td><td>1.5</td></tr>
<tr><td>C(mm)</td><td>1.0</td><td>1.3</td><td>1.3</td><td>3.0</td></tr>
</table></td><td> 
</td></tr>
<tr><td>4. Bending strength</td><td>The body shall not be damaged by forces applied on the right
<table>
<tr><td></td><td>1005</td><td>1608</td><td>2012</td><td>3216</td></tr>
<tr><td>w(kgf)</td><td>1.5</td><td>2.0</td><td>3.0</td><td>4.0</td></tr>
<tr><td>C(mm)</td><td>1.0</td><td>1.3</td><td>1.3</td><td>3.0</td></tr>
</table></td><td> 
</td></tr>
<tr><td>5. Drop</td><td>1. No visible mechanical damage.
2. Impedance change: within ±20% of initial value;Inductance change: within ±10% of initial value; Q： within ±30% of initial value.</td><td>Drop 10 times on a concrets floor from a height of 100cm.</td></tr>
<tr><td>6. Vibration</td><td>1. No visible mechanical damage.
2. Impedance change: within ±20% of initial value; Inductance change: within ±10% of initial value; Q： within ±30% of initial value.</td><td>①Frequency:10Hz-55Hz.
②Amplitude:1.5mm
③ Direction and time: X,Y and Z directions for 2 hours.</td></tr>
</table>

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8. Electrical Performance

ITEM	REQUIREMIENTS	TEST CONDITIOS
7. Thermal shock	1. No visible mechanical damage. 2.Impedance change: within ±20% of initial value; Inductance change: within ±10% of initial value; Q： within ±30% of initial value.	Step 1:-55±3 ℃ 30±3min Step 2:125±3 ℃ 30±3min Number of cycle:100 times
8. Resistance to Low Temperature	1. No visible mechanical damage. 2. Impedance change: within ±20% of initial value; Inductance change: within ±10% of initial value; Q： within ±30% of initial value.	Temperature:-55℃±2℃; Duration: 1000+24 hours. Measured at room temperature after placing for (24±2) hours.
9. Resistance to High Temperature	1. No visible mechanical damage. 2. Impedance change: within ±20% of initial value; Inductance change: within ±10% of initial value; Q： within ±30% of initial value.	①Temperature:125℃±2℃; ②Duration: 1000+24 hours. ③Measured at room temperature after placing for (24±2) hours.
10. Loading at High Temperature	1. No visible mechanical damage. 2. Impedance change: within ±20% of initial value; Inductance change: within ±10% of initial value; Q： within ±30% of initial value.	①Temperature:85℃±2℃; ②Applied current :Rated current; ③Duration: 1000+24 hours. ④Measured at room temperature after placing for (24±2) hours.
11. Humidity load resistance	1. No visible mechanical damage. 2. Impedance change: within ±20% of initial value; Inductance change: within ±10% of initial value; Q： within ±30% of initial value.	Temperature:40℃±2℃,Time:90~90%RH; Applied current; Rated current time:500 hours. Measured at room temperature after placing for (24±2) hours.
12. Solevnt resistance	1. No visible mechanical damage. 2. Impedance change: within ±20% of initial value; Inductance change: within ±10% of initial value; Q: within ±30% of initial value.	Solvent:Trichlorethylene Washer:Ultrasonic washer(100w) Washing time:3 mintues

10. Taping specifications

Packing quantity (Standard quantity)	Refer to table 11.3
Packing method	The products are placed in cavities of a carrier tape and sealed by a cover tape (top tape and bottom tape when the cavities of the carrier tape are punched type).
Feed hole position	The feed holes on the carrier tape are on the right side when the cover tape (top tape when the cavities of the carrier tape are punched type) is pulled toward the user.
Joint	The carrier tape and cover tape (top tape when the cavities of the carrier tape are punched type) are seamless.
Number of missing products	Number of missing products within 0.025% of the number per reel or 1 pc., whichever is greater, and are not continuous. The specified quantity per reel is kept.

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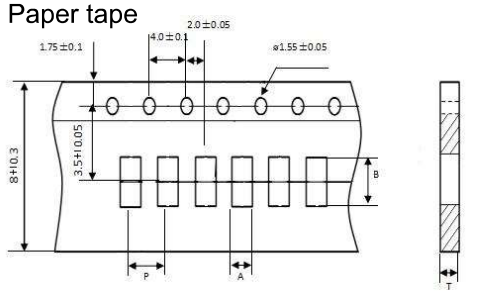
11. Specification of Packaging

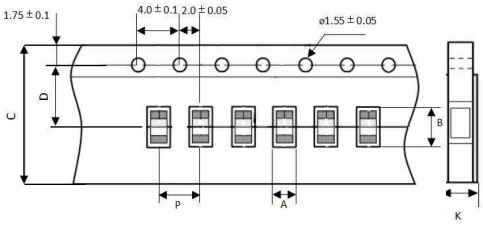
11.1 Appearance and dimensions of tape

Paper tape



Paper Tape				
Type	A	B	P	T
1005	0.65±0.02	1.15±0.03	2.0±0.05	0.61±0.02
1608	1.00±0.03	1.8±0.03	4.0±0.1	0.95±0.10
2012	1.5±0.1	2.3±0.1	4.0±0.1	0.95±0.10
3216	1.9±0.1	3.6±0.1	4.0±0.1	0.95±0.10

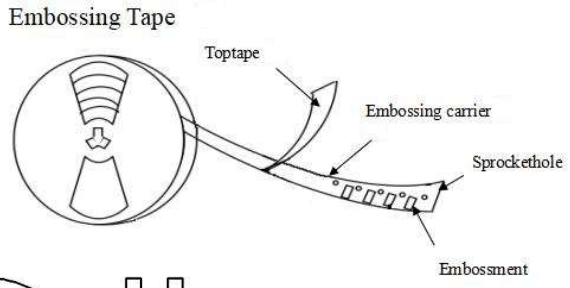
Embossed tape

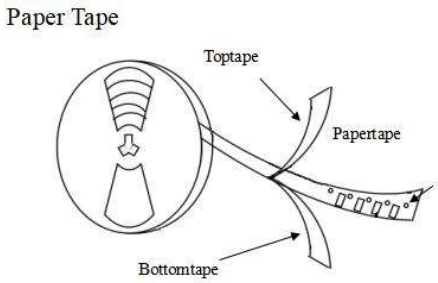


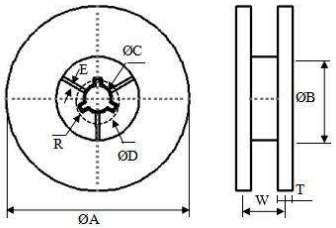
Embossed Tape						
Type	A	B	C	D	P	K
1608	1.08±0.1	1.88±0.1	8±0.3	3.5±0.05	4.0±0.1	1.05±0.1
2012	1.50±0.1	2.32±0.1	8±0.3	3.5±0.05	4.0±0.1	1.4±0.1
3216	1.88±0.1	3.5±0.1	8±0.3	3.5±0.05	4.0±0.1	1.27±0.1

11.2 Dimensions of leader section, trailer section and reel

A vacant section is provided in the leader (start) section and trailer (end) section of the tape for the product. The leader section is further provided with an area consisting only of the cover tape (or top tape). (See the diagram below.)







Tape Width	A	B	C	D	E	W	T	R
8mm	178±2	60±1	13±0.5	21±0.8	2±0.5	10±1	1.5±0.5	1
12mm	178±2	60±1	13±0.5	21±0.8	2±0.5	14±1	1.5±0.5	1

11.3 Denominator volume

Type	PCS/REEL	PCS/INNERBOX	PCS/OUTNERBOX
1005	10000	50000	250000
1608	4000	20000	100000
2012	4000	20000	100000
3216	4000	20000	100000

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12. Precautions for Use

This product is for use only with reflow soldering. It is designed to be mounted by soldering. If you want to use other mounting method, for example, using a conductive adhesive, please consult us beforehand.
Also, if repeatedly subjected to temperature cycles or other thermal stress, due to the difference in the coefficient of thermal expansion with the mounting substrate, the solder (solder fillet part) in the mounting part may crack.
The occurrence of cracks due to thermal stress is affected by the size of the land where mounted, the solder volume, and the heat dissipation of the mounting substrate. Carefully design it when a large change in ambient temperature is assumed.

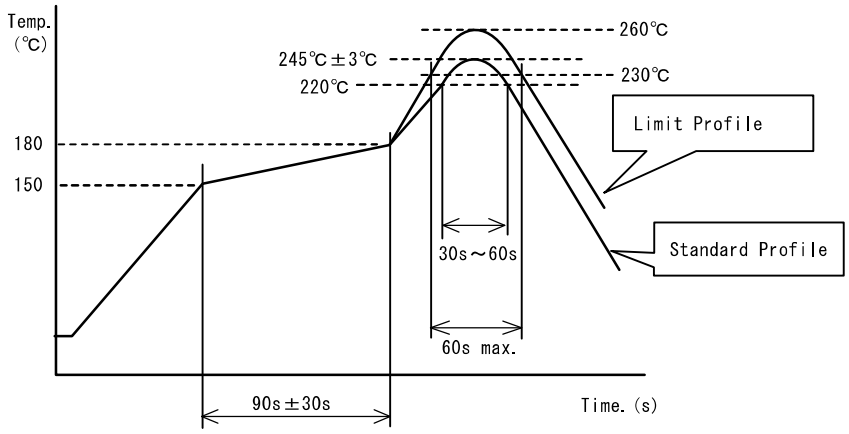
12.1 Flux and solder used

Flux	• Use a rosin-based flux. • Do not use a highly acidic flux with a halide content exceeding 0.2(wt)% (chlorine conversion value). • Do not use a water-soluble flux.
Solder	• Use Sn-3.0Ag-0.5Cu solder. • Standard thickness of solder paste: 100 μm to 150 μm

If you want to use a flux other than the above, please consult our technical department.

12.2 Soldering conditions (reflow)

- Pre-heating should be in such a way that the temperature difference between solder and product surface is limited to 100°C max.
  Cooling into solvent after soldering also should be in such a way that the temperature difference is limited to 100°C max.
  Insufficient pre-heating may cause cracks on the product, resulting in the deterioration of product quality.
- Standard soldering profile and the limit soldering profile is as follows.
  The excessive limit soldering conditions may cause leaching of the electrode and/or resulting in the deterioration of product quality.



	Standard profile	Limit profile
Pre-heating	150°C to 180°C/90 s±30 s	150°C to 180°C/90 s±30 s
Heating	Above 220°C/30 s to 60 s	Above 230°C/60 s max.
Peak temperature	245°C±3°C	260°C/10 s
Number of reflow cycles	2 times	2 times

12.3 Reworking with soldering iron

The following requirements must be met to rework a soldered product using a soldering iron.

Item	Requirement
Pre-heating	150°C/approx. 1 min
Tip temperature of soldering iron	380°C max.
Power consumption of soldering iron	80 W max.
Tip diameter of soldering iron	ø3 mm max.
Soldering time	3 s (+1 s, -0 s)
Number of reworking operations	2 times max.
* Avoid a direct contact of the tip of the soldering iron with the product. Such a direction contact may cause cracks in the ceramic body due to thermal shock.	

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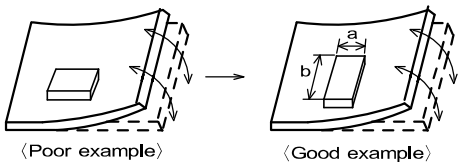
12.4 Solder volume

Solder shall be used not to increase the volume too much.
An increased solder volume increases mechanical stress on the product. Exceeding solder volume may cause the failure of mechanical or electrical performance.

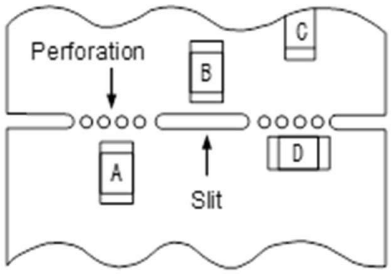
12.5 Product's location

The following shall be considered when designing and laying out PCBs.
(1) PCB shall be designed so that products are not subject to mechanical stress due to warping the board.
[Products direction]
Products shall be located in the sideways direction (length: a < b) to the mechanical stress.

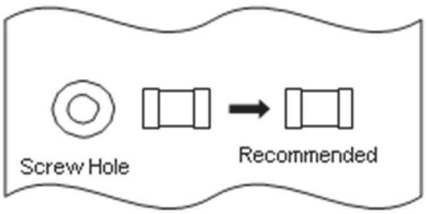


(2) Components location on PCB separation
It is effective to implement the following measures, to reduce stress in separating the board.
It is best to implement all of the following three measures; however, implement as many measures as possible to reduce stress.

Contents of measures	Stress level
(1) Turn the mounting direction of the component parallel to the board separation surface.	A > D*1
(2) Add slits in the board separation part.	A > B
(3) Keep the mounting position of the component away from the board separation surface.	A > C
*1 A > D is valid when stress is added vertically to the perforation as with hand separation. If a cutting disc is used, stress will be diagonal to the PCB, therefore A > D is invalid.	



(3) Mounting components near screw holes
When a component is mounted near a screw hole, it may be affected by the board deflection that occurs during the tightening of the screw.
Mount the component in a position as far away from the screw holes as possible.



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12.6 Handling of substrate

After mounting products on a substrate, do not apply any stress to the product caused by bending or twisting to the substrate when cropping the substrate, inserting and removing a connector from the substrate or tightening screw to the substrate. Excessive mechanical stress may cause cracking in the product.

Bending　　Twisting

12.7 Cleaning

Excessive ultrasonic oscillation during cleaning can cause the PCBs to resonate, resulting in cracked chips or broken solder joints. Before starting your production process, test your cleaning equipment / process to insure it does not degrade this product.

12.8 Storage and transportation

Storage period	Use the product within 12 months after delivery. If you do not use the product for more than 12 months, check solderability before using it.
Storage conditions	• The products shall be stored in a room not subject to rapid changes in temperature and humidity. The recommended temperature range is -10°C to +40°C. The recommended relative humidity range is 15% to 85%. Keeping the product in corrosive gases, such as sulfur, chlorine gas or acid may cause the poor solderability. • Do not place the products directly on the floor; they should be placed on a palette so that they are not affected by humidity or dust. • Avoid keeping the products in a place exposed to direct sunlight, heat or vibration. • Do not keep products in bulk packaging. Bulk storage could result in collisions between the products or between the products and other parts, resulting in chipping or wire breakage. • Avoid storing the product by itself bare (i.e. exposed directly to air).
Transportation	Excessive vibration and impact reduces the reliability of the products. Exercise caution when handling the products.

⚠ Caution

Restricted applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property.

(1) Aircraft equipment
(2) Aerospace equipment
(3) Undersea equipment
(4) Power plant control equipment
(5) Medical equipment
(6) Transportation equipment (vehicles, trains, ships, etc.)
(7) Traffic signal equipment
(8) Disaster/crime prevention equipment
(9) Data-processing equipment
(10) Applications of similar complexity and/or reliability requirements to the applications listed in the above

Precautions on rating

Avoid using in exceeded the rated temperature range, rated voltage, or rated current.
Usage when the ratings are exceeded could lead to wire breakage, burning, or other serious fault.

Inrush current

If an inrush current (or pulse current or rush current) that significantly exceeds the rated current is applied to the product, overheating could occur, resulting in wire breakage, burning, or other serious fault.

Corrosive gas

Please refrain from use since contact with environments with corrosive gases (sulfur gas [hydrogen sulfide, sulfur dioxide, etc.], chlorine, ammonia, etc.) or oils (cutting oil, silicone oil, etc.) that have come into contact with the previously stated corrosive gas environment will result in deterioration of product quality or an open from deterioration due to corrosion of product electrode, etc. We will not bear any responsibility for use under these environments.

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