Uchi ® Uchi Electronics Co.,Ltd

Transient Voltage Suppression Multilayer Chip Varistor

Notice

1.2. In order to improve this catalog, specifications may be changed without prior notice, please consult our sales representative or product engineer before ordering;

3. Due to the limitation of length, this catalog provides only the main product information.
We can produce any special specifications products according to customers' requests.

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Contents

1. Identification (Part Number)

QV	0402	E	180	C150	T
①	②	③	④	⑤	⑥

① Type	
QV	Chip Varistor

② External Dimension L×W×T (mm)	
0402	1.00×0.50×0.50
0603	1.60×0.80×0.80
0805	2.00×1.25×0.85

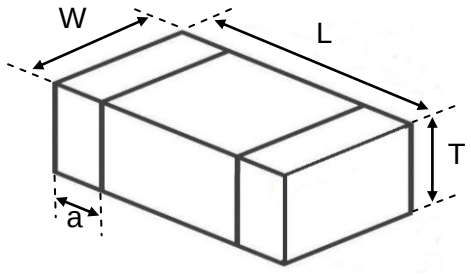
③ Application Code	
E	ESD Protection and transient voltage suppression

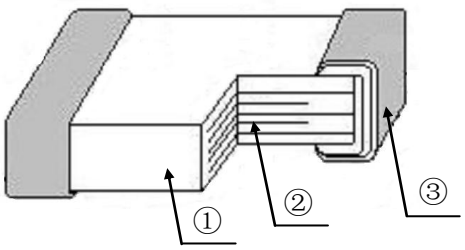
④ Maximum Continuous Working Voltage	
5R5	5.5V
180	18V

⑤ Capacitance @1MHz	
C121	120pF
C150	15pF

⑥ Packaging	
T	Tape
B	Bulk

2. Structure and Dimensions





Type	L（mm）	W（mm）	T（mm）	a（mm）
0402	1.00±0.10	0.50±0.10	0.50±0.10	0.25±0.15
0603	1.60±0.15	0.80±0.15	0.80±0.15	0.30±0.20
0805	2.00±0.20	1.25±0.20	0.85±0.20	0.50±0.30

Part	①	②	③
Component	ZnO Semiconductor Ceramics for Chip Varistor	Internal Electrode (Ag or Ag-Pd)	Terminal Electrode (Ag/Ni/Sn three layers)

3.Features

- SMD type suitable for high density mounting
- Excellent clamping ratio and quick response time (<0.5ns)
- Excellent solderability (Ni, Sn plating)

4. Applications

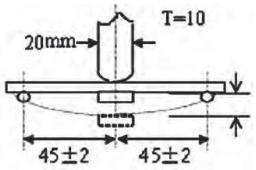
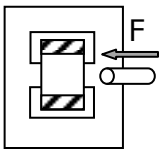
- ESD protection for high-speed data lines such as USB 2.0, firewire, IEEE 1394 interfaces, RF antennas, RF modules. ESD protection for I/O ports of video and audio lines.
- Transient voltage protection for IC and transistor.
- Used in mobile communications, computer/EDP, LCD Module, hand held/portable devices, PDA etc.

5. Electrical Characteristics

Part No.	Max. Working Voltage	Varistor Voltage @1mA DC	Peak Current 8/20μs	Capacitance @1MHz, 0.5V	Insulation Resistance @3.6V	Operating ambient temperature
	V_{DC}(V)	V_{1mA}(V)	Ip(A)	C_p(pF)	I_R(MΩ)	℃
QV0402E180C0R5T	18	100～160	/	0.25～1.0	Min. 30	-55～+125
QV0402E180C010T	18	100～160	/	0.5～1.5	Min. 30	
QV0402E180C030T	18	30～38	1	1.5～5.0	Min. 30	
QV0402E180C050T	18	30～38	1	2.5～9.0	Min. 30	
QV0402E180C100T	18	24～32	2	10±30%	Min. 30	
QV0402E180C180T	18	24～32	2	18±30%	Min. 30	
QV0402E5R5C300T	5.5	10～15	5	30±30%	Min. 30	
QV0402E5R5C500T	5.5	10～15	10	50±30%	Min. 30	
QV0402E5R5C101T	5.5	10～15	20	100±30%	Min. 10	
QV0402E5R5C181T	5.5	10～15	20	180±30%	Min. 10	
QV0402E5R5C231T	5.5	10～15	20	230±30%	Min. 10	
QV0402E120C121T	12	15～22	15	120±30%	Min. 10	
QV0603E180C0R5T	18	100～160	/	0.25～1.0	Min. 30	

Part No.	Max. Working Voltage	Varistor Voltage @1mA DC	Peak Current 8/20μs	Capacitance @1MHz, 0.5V	Insulation Resistance @3.6V	Operating ambient temperature
	V_{DC}(V)	V_{1mA}(V)	Ip(A)	C_p(pF)	I_R(MΩ)	℃
QV0603E180C010T	18	100～160	/	0.5～1.5	Min. 30	
QV0603E180C030T	18	30～38	1	1.5～5.0	Min. 30	
QV0603E180C050T	18	30～38	1	2.5～9.0	Min. 30	
QV0603E180C100T	18	24～32	2	10±30%	Min. 30	
QV0603E5R5C231T	5.5	10～15	30	230±30%	Min. 10	
QV0603E5R5C361T	5.5	10～15	30	360±30%	Min. 10	
QV0603E5R5C551T	5.5	10～15	30	550±30%	Min. 10	
QV0603E5R5C821T	5.5	10～15	30	820±30%	Min. 10	
QV0805E180C301T	18	24～30	60	300±30%	Min. 10	
QV0805E180C501T	18	24～30	120	500±30%	Min. 10	
QV0805E180C701T	18	24～30	150	700±30%	Min. 10	

6. Reliability Test

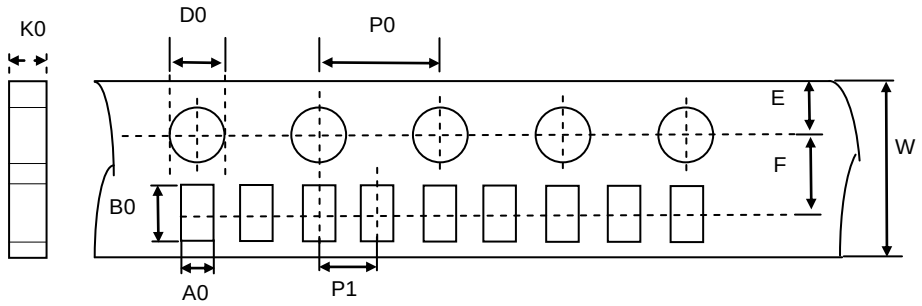
No	Items	Test conditions / Methods	Requirements
1	Bending Resistance	Warp: 2mm Speed <0.5mm/s Duration: 10s 	① No visible mechanical damage. ② |ΔV1mA /V1mA| ≦5%.
2	Terminal Strength	Speed＜0.5mm/s Apply force: 5N Duration: 10±1s 	No removal or split of the termination
3	Solderability	Solder temperature：240±5℃； Dipping Duration：3±0.3s；	① No visible mechanical damage. ② Wetting coverage≧90%.
4	Resistance to Soldering Heat	Solder temperature：260±5℃； Dipping Duration：5±1s；	① No visible mechanical damage. ② |ΔV1mA /V1mA| ≦10%.

No	Items	Test conditions / Methods	Requirements
5	Thermal Shock	High and low temperatures Transform for 100 Cycles.  	① No visible mechanical damage. ② |ΔV1mA /V1mA| ≦10%.
6	Damp Heat	Temperature: 60±2℃ Humidity: 90% ～ 95% RH. Duration: 1000+24 h.	
7	High Temp. Storage	Temperature: 125±2℃ Duration: 1000±24 h.	
8	High Temp. Load	Temperature: 125±2℃ Loading Voltage: V_{DC}. Duration: 1000±24 h.	
9	Damp Heat Load	Temperature: 60±2℃ Humidity: 90% ～ 95% RH. Loading Voltage: V_{DC}. Duration: 1000±24 h.	
10	Maximum Surge Current	Pulse waveform: 8/20 us Number of hit: each 1 time of +/- polarity Applied current: maximum surge current (Ip)	

7. Packaging

7.1 Carrier tape dimensions

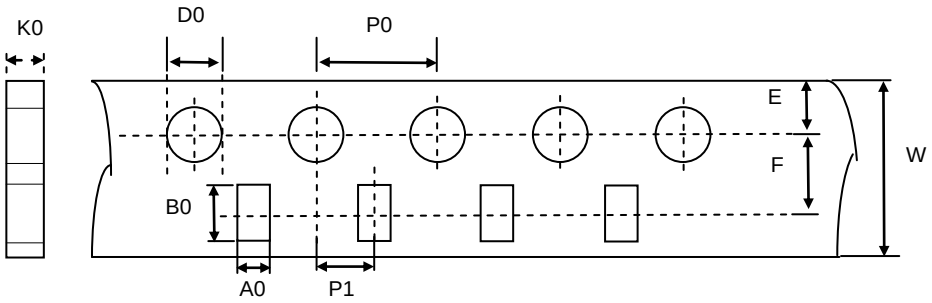
A. For 0402 Size



Unit: mm

Type	A0	B0	W	E	F	P1	P0	D0	K0
0402	0.65±0.2	1.15±0.2	8.0±0.3	1.75±0.1	3.5±0.1	2.0±0.1	4.0±0.1	1.55±0.1	0.8 Max.

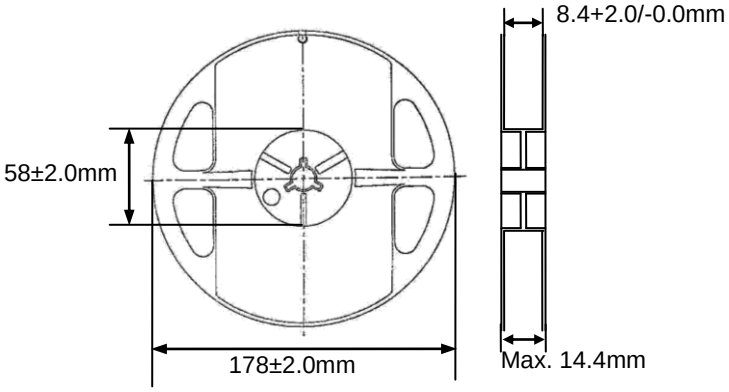
B. For 0603 and 0805 Size



Unit: mm

Type	A0	B0	W	E	F	P1	P0	D0	K0
0603	1.0±0.2	1.8±0.2	8.0±0.3	1.75±0.1	3.5±0.1	2.0±0.1	4.0±0.1	1.55±0.1	1.1 Max.
0805	1.5±0.2	2.3±0.2	8.0±0.3	1.75±0.1	3.5±0.1	2.0±0.1	4.0±0.1	1.55±0.1	1.1 Max.

7.2 Taping reel dimensions

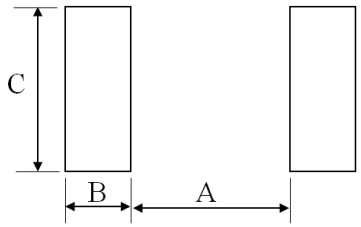


7.3 Packaging quantity

Type	Tape	Quantity (pcs/reel)
0402	Paper Tape	10K
0603		4K
0805		4K

8. Soldering Recommendation

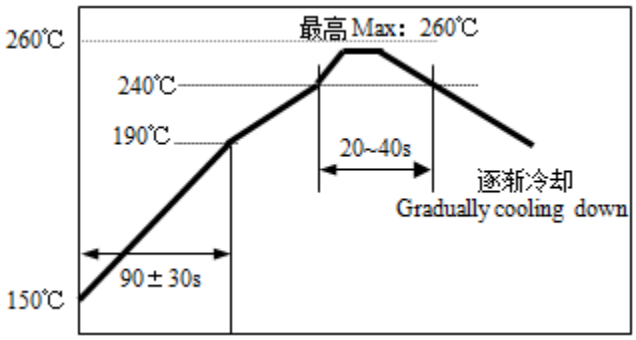
8.1 Recommended Land pattern



Type	A（mm）	B（mm）	C（mm）
0402	0.45~0.55	0.40~0.50	0.45~0.55
0603	0.60~0.80	0.60~0.80	0.60~0.80
0805	0.80~1.20	0.80~1.20	0.90~1.60

8.2 Recommended Soldering Profile

- Pb Free Solder Paste: Sn/Ag/Cu (96.5/3.0/0.5).
- Max time at max temp: 10sec.
- Allowed Reflow time: 2x Max



9. Notes & Warnings

9.1 Storage

1.Storage temperature in original packaging: -10~+40℃.

2. Relative Humidity: ≤70%RH.

3. Keep away from corrosive atmosphere and sunlight.

4. Period of Storage: 12 Months.

5. Shall not be operated and stored under the following environmental condition:

(1) Corrosive or deoxidized atmospheres(such as chlorine, sulfureted hydrogen, ammonia, sulfuric acid, nitric oxide and so on)

(2) Volatile or inflammable atmospheres

(3) Dusty condition

(4) Excessive high or low pressure condition

(5) Humid site

(6) Places with brine, oil, chemical liquid or organic solvent

(7) Intense vibration

(8) Places with analogously deleterious

9.2 Usage

1. The ceramic body of the QV series varistors is fragile, no excessive pressure or impact shall be exerted on it.

2. The QV series varistors shall not be operated beyond the specified “Operating ambient temperature” range.