

# GRACE

## **Ceramic transient voltage suppressors**

SMD multilayer transient voltage suppressors,  
standard series

**Series/Type:**

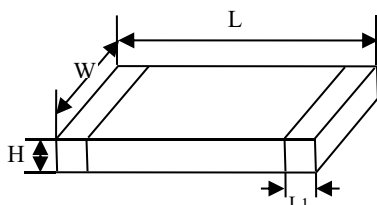
Date: Mar 2020

## 1. Standard series

KRVB   2220   G   471   N   CXXX   A801   TWS   NNN   T  
 ①   ②   ③   ④   ⑤   ⑥   ⑦   ⑧   ⑨   ⑩

- ① production series: GRACE Varistor  
 ② dimension: 2220=5650, 3220=8050  
 ③ type: E:ESD, G:general, H:high energy, S:high speed  
 ④ varistor voltage ( $V_{1mA}$ ): 470=47V, 471=470V  
 ⑤ end termination: N: Ag/Ni/Sn, S: Ag/Pd  
 ⑥ typical capacitance value measured : A:1.0-5PF, B:5.1-10PF, C:10.1-20PF, D:20.1-30PF, E:30.1-50PF, F:50.1-100PF, G:100.1-200PF, H:200.1-300PF, I:300.1-500PF, J:500.1-800PF, K:800PF-1200PF  
 201=200PF, 250=25PF, 100=10PF, 3R0=3PF, 0R15=0.15PF, 0R2=0.2PF  
 CXXX:Not required or not shown, X:Not required or not shown;  
 ⑦ rated peak single pulse transient current at \*5: A801=800A, A102=1000A,  
 AXXX= Not required or not shown, AX=Not required or not shown  
 ⑧ design NO.: TWS  
 ⑨ customer identification code: NNN  
 ⑩ package: B: bulk, T: taping

## 2. Size



Model	0201(0603)	0402(1005)	0603(1608)	0604(1610)	0805(2012)	0806(2016)	1206(3216)	1210(3225)	1812(4532)
Length(L)	0.60±0.15	1.00±0.20	1.60±0.20	1.60±0.15	2.00±0.20	2.20±0.20	3.20±0.20	3.20±0.20	4.50±0.20
Width(W)	0.30±0.15	0.50±0.20	0.80±0.20	1.00±0.15	1.20±0.20	1.70±0.20	1.60±0.20	2.50±0.20	3.20±0.20
High(H)	0.30±0.15	0.50±0.20	0.80±0.20	1.15Max	0.80±0.20	1.80Max	1.6Max	3.2Max	3.5Max
L1	0.30±0.10	0.30±0.20	0.30±0.20	0.25±0.10	0.40±0.20	0.25±0.10	0.40±0.30	0.40±0.30	0.50±0.30

Model	2220(5650)	3220(08CL)	4032(10CL)	4840(12CL)
Length(L)	5.60±0.20	8.00±0.30	10.0±0.30	12.0±0.30
Width(W)	5.00±0.20	5.00±0.30	8.00±0.30	10.0±0.30
High(H)	3.5Max	2.00±0.30	2.00±0.30	2.50±0.30
L1	0.80±0.30	0.80±0.30	0.80±0.30	2.50±0.30

### 3 . Electrical specifications and ordering codes

Type: 0201~0603

- Leadless, size 0201 (0603) ~0603 (1608)
- Multilayer ceramic construction
- Wide operating temperature : -55°C to +125°C
- High transient current capability
- Fast response ( $\leq 1\text{ns}$ )
- Low leakage current

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Peak current	Capacitance
	AC	DC	@1mA DC		8/20 $\mu\text{s}$ 1A	10/1000 $\mu\text{s}$	8/20 $\mu\text{s}$	@ 1kHz
	V <sub>RMS</sub> (V)	V <sub>DC</sub> (V)	V <sub>B</sub> (V)		V <sub>c</sub> (V)	E <sub>T</sub> (J)	I <sub>p</sub> (A)	C(pF)
KRVB0201G6R8N101A5R0RBTNNNT	3	4.0	6.8	$\pm 20\%$	10	0.01	5	100
KRVB0201G8RON101A5R0RBTNNNT	3.3	5.0	8	$\pm 20\%$	10	0.01	5	100
KRVB0201G120N101A8R0RBTNNNT	4	5.6	12	$\pm 20\%$	20	0.01	8	100
KRVB0402G5RON800A100RBTNNNT	2.5	3.3	5	$\pm 20\%$	10	0.02	10	80
KRVB0402G8RON121A500TWSNNNT	4	5.0	8	$\pm 20\%$	20	0.05	50	120
KRVB0402G8RON481A500TWSNNNT	4	5.0	8	$\pm 20\%$	20	0.05	50	480
KRVB0402G8RON651A100RBTNNNT	4	5.0	8	$\pm 20\%$	20	0.05	10	650
KRVB0402G120N121A100SZSNNNT	4	5.6	12	$\pm 20\%$	20	0.05	10	120
KRVB0402G120N231A300SZSNNNT	4	5.6	12	$\pm 20\%$	20	0.03	30	230
KRVB0402G120N361A200ZQHNNNT	4	5.6	12	$\pm 20\%$	20	0.05	20	360
KRVB0402G120N481A250WTSNNNT	4	5.6	12	$\pm 20\%$	20	0.03	25	480
KRVB0603G5RON241A300ZQHNNNT	2.5	3.3	5	$\pm 20\%$	15	0.10	30	240
KRVB0603G8RON361A300ZQHNNNT	4	5.5	8	$\pm 20\%$	18	0.10	30	360
KRVB0603G8RON761A300GZCNNNT	4	5.5	8	$\pm 20\%$	18	0.10	30	760
KRVB0603G8RON821A300TWSNNNT	4	5.5	8	$\pm 20\%$	18	0.10	30	820
KRVB0603G8RON222A300GZCNNNT	4	5.5	8	$\pm 20\%$	18	0.10	30	2200
KRVB0603G120N121A300SZSNNNT	6	9	12	$\pm 10\%$	20	0.10	30	120
KRVB0603G120N321A300GZCNNNT	6	9	12	$\pm 10\%$	20	0.10	30	320
KRVB0603G150N251A300GZCNNNT	8	11	15	$\pm 10\%$	25	0.10	30	250
KRVB0603G180N231A300GZCNNNT	11	14	18	$\pm 10\%$	30	0.10	30	230
KRVB0603G240N181A300GZCNNNT	14	18	24	$\pm 10\%$	39	0.10	30	180
KRVB0603G270N161A300GZCNNNT	17	22	27	$\pm 10\%$	44	0.10	30	160
KRVB0603G330N131A300GZCNNNT	20	26	33	$\pm 10\%$	54	0.10	30	130
KRVB0603G390N131A300GZCNNNT	25	30	39	$\pm 10\%$	65	0.10	30	130
KRVB0603G470N121A300GZCNNNT	30	38	47	$\pm 10\%$	77	0.10	30	120
KRVB0603G560N111A300GZCNNNT	35	45	56	$\pm 10\%$	90	0.10	30	110
KRVB0603G680N900A300GZCNNNT	40	56	68	$\pm 10\%$	110	0.10	30	90
KRVB0603G820N520A300GZCNNNT	50	65	82	$\pm 10\%$	135	0.10	30	52

Notes:

1. Typical leakage at 25°C < 50uA, maximum leakage 100uA.
2. At normal:  $\Delta C_p \pm 30\%$ , In order to satisfy the applications of customer in various fields, the capacitance range can be designed during manufacturing according to the request, please contact our sales department if needed

## Type: 0805~1206 High speed varistor type

- Leadless, size 0805 (2012) ~1206 (3216)
- Multilayer ceramic construction
- Wide operating temperature : -55°C to +125°C
- Fast response ( $\leq 1\text{ns}$ )
- High transient current capability
- Low leakage current

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Peak current	Capacitance
	AC	DC	@1mA DC		8/20 $\mu\text{s}$ 1A	10/1000 $\mu\text{s}$	8/20 $\mu\text{s}$	@ 1kHz
	$V_{\text{RMS}}$ (V)	$V_{\text{DC}}$ (V)	$V_{\text{B}}$ (V)		$V_{\text{c}}$ (V)	$E_{\text{T}}$ (J)	$I_{\text{p}}$ (A)	C(pF)
KRVB0805S8RONXA300ZQHNNNT	4	5.5	8	$\pm 10\%$	18	0.10	30	270
KRVB0805S12ONXA300ZQHNNNT	6	9	12	$\pm 10\%$	20	0.10	30	150
KRVB0805S18ONXA300ZQHNNNT	11	14	18	$\pm 10\%$	30	0.10	30	130
KRVB0805S24ONXA300ZQHNNNT	14	18	24	$\pm 10\%$	39	0.20	30	130
KRVB0805S27ONXA300ZQHNNNT	17	22	27	$\pm 10\%$	44	0.20	30	120
KRVB0805S33ONXA300ZQHNNNT	20	26	33	$\pm 10\%$	54	0.20	30	110
KRVB0805S39ONXA300ZQHNNNT	25	30	39	$\pm 10\%$	65	0.20	30	100
KRVB0805S47ONXA300ZQHNNNT	30	38	47	$\pm 10\%$	77	0.20	30	100
KRVB0805S56ONXA300ZQHNNNT	35	45	56	$\pm 10\%$	90	0.20	30	95
KRVB0805S68ONXA300ZQHNNNT	40	56	68	$\pm 10\%$	120	0.20	30	80
KRVB1206S5RONXA400ZQHNNNT	2.5	3.3	5	$\pm 15\%$	12	0.20	40	900
KRVB1206S8RONXA400ZQHNNNT	4	5.5	8	$\pm 10\%$	18	0.20	40	820
KRVB1206S12ONXA400ZQHNNNT	6	9	12	$\pm 10\%$	20	0.30	40	620
KRVB1206S18ONXA400ZQHNNNT	11	14	18	$\pm 10\%$	30	0.40	40	550
KRVB1206S24ONXA400ZQHNNNT	14	18	24	$\pm 10\%$	39	0.40	40	490
KRVB1206S27ONXA400ZQHNNNT	17	22	27	$\pm 10\%$	44	0.40	40	480
KRVB1206S33ONXA400ZQHNNNT	20	26	33	$\pm 10\%$	54	0.50	40	470
KRVB1206S39ONXA400ZQHNNNT	25	30	39	$\pm 10\%$	65	0.50	40	330
KRVB1206S47ONXA400ZQHNNNT	30	38	47	$\pm 10\%$	77	0.50	40	260
KRVB1206S56ONXA400ZQHNNNT	35	45	56	$\pm 10\%$	90	0.50	40	180
KRVB1206S68ONXA400ZQHNNNT	40	56	68	$\pm 10\%$	120	0.50	40	150

Notes:

1. Typical leakage at 25°C < 50uA, maximum leakage 100uA.

2. At normal:  $\Delta C_{\text{p}} \pm 30\%$ , In order to satisfy the applications of customer in various fields, the capacitance range can be designed during manufacturing according to the request, please contact our sales department if needed

**Type: 0805~1206 Medium and low voltage , low surge protection varistor type**

- Leadless, size 0805 (2012) ~1206 (3216)
- Wide operating temperature : -55°C to +125°C
- High transient current capability
- Multilayer ceramic construction
- Fast response ( $\leq 1\text{ns}$ )
- Low leakage current

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Peak current	Capacitance
	AC	DC	@1mA DC		8/20 $\mu\text{s}$ 1A	10/1000 $\mu\text{s}$	8/20 $\mu\text{s}$	@ 1kHz
	V <sub>RMS</sub> (V)	V <sub>DC</sub> (V)	V <sub>B</sub> (V)		V <sub>c</sub> (V)	E <sub>T</sub> (J)	I <sub>p</sub> (A)	C(pF)
KRVB0805G5RONXA400ZQHNNNT	2.5	3.3	5	$\pm 15\%$	12	0.10	40	800
KRVB0805G8RONXA400ZQHNNNT	4	5.5	8	$\pm 10\%$	18	0.10	40	850
KRVB0805G12ONXA400ZQHNNNT	6	9	12	$\pm 10\%$	20	0.10	40	900
KRVB0805G18ONXA400ZQHNNNT	11	14	18	$\pm 10\%$	30	0.10	40	800
KRVB0805G24ONXA400ZQHNNNT	14	18	24	$\pm 10\%$	39	0.20	40	600
KRVB0805G27ONXA400ZQHNNNT	17	22	27	$\pm 10\%$	44	0.20	40	520
KRVB0805G33ONXA400ZQHNNNT	20	26	33	$\pm 10\%$	54	0.20	40	450
KRVB0805G39ONXA400ZQHNNNT	25	30	39	$\pm 10\%$	65	0.20	40	400
KRVB0805G47ONXA400ZQHNNNT	30	38	47	$\pm 10\%$	77	0.20	40	330
KRVB0805G56ONXA400ZQHNNNT	35	45	56	$\pm 10\%$	90	0.20	40	230
KRVB0805G68ONXA400ZQHNNNT	40	56	68	$\pm 10\%$	120	0.20	40	120
KRVB0805G82ONXA400ZQHNNNT	50	65	82	$\pm 10\%$	135	0.20	40	350
KRVB0805G101NXA400ZQHNNNT	60	85	100	$\pm 10\%$	165	0.20	40	300
KRVB0805G121NXA400ZQHNNNT	75	100	120	$\pm 10\%$	250	0.20	40	250
KRVB1206G5RONXA201GZCNNNT	2.5	3.3	5	$\pm 15\%$	12	0.20	200	900
KRVB1206G8RONXA201GZCNNNT	4	5.5	8	$\pm 10\%$	18	0.20	200	1500
KRVB1206G12ONXA201GZCNNNT	6	9	12	$\pm 10\%$	20	0.30	200	1300
KRVB1206G18ONXA201GZCNNNT	11	14	18	$\pm 10\%$	30	0.40	200	1200
KRVB1206G24ONXA201GZCNNNT	14	18	24	$\pm 10\%$	39	0.40	200	1000
KRVB1206G27ONXA201GZCNNNT	17	22	27	$\pm 10\%$	44	0.40	200	1000
KRVB1206G33ONXA201GZCNNNT	20	26	33	$\pm 10\%$	54	0.50	200	990
KRVB1206G39ONXA201GZCNNNT	25	30	39	$\pm 10\%$	65	0.50	200	950
KRVB1206G47ONXA201GZCNNNT	30	38	47	$\pm 10\%$	77	0.50	200	880
KRVB1206G56ONXA181GZCNNNT	35	45	56	$\pm 10\%$	90	0.50	180	500
KRVB1206G68ONXA151GZCNNNT	40	56	68	$\pm 10\%$	120	0.50	150	400
KRVB1206G82ONXA151GZCNNNT	50	65	82	$\pm 10\%$	135	0.50	150	350
KRVB1206G101NXA121GZCNNNT	60	85	100	$\pm 10\%$	165	0.50	120	300
KRVB1206G121NXA101GZCNNNT	75	100	120	$\pm 10\%$	250	0.50	100	250

Notes:

1. Typical leakage at 25°C < 50uA, maximum leakage 100uA.
2. At normal:  $\Delta C_p \pm 30\%$ , In order to satisfy the applications of customer in various fields, the capacitance range can be designed during manufacturing according to the request, please contact our sales department if needed

**Type: 1210~2220 Medium and low voltage , low surge protection varistor type**

- Leadless, size 1210 (3225) ~2220 (5650)
- Multilayer ceramic construction
- Wide operating temperature : -55°C to +125°C
- Fast response ( $\leq 1\text{ns}$ )
- High transient current capability
- Low leakage current

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Peak current	Capacitance
	AC	DC	@1mA DC		8/20 $\mu\text{s}$ 1A	10/1000 $\mu\text{s}$	8/20 $\mu\text{s}$	@ 1kHz
	V <sub>RMS</sub> (V)	V <sub>DC</sub> (V)	V <sub>B</sub> (V)		V <sub>c</sub> (V)	E <sub>T</sub> (J)	I <sub>p</sub> (A)	C(pF)
KRVB1210G8RONXA301ZQHNNNT	4	5.5	8	$\pm 10\%$	18	0.50	300	1600
KRVB1210G12ONXA301ZQHNNNT	6	9	12	$\pm 10\%$	20	0.50	300	1600
KRVB1210G18ONXA301ZQHNNNT	11	14	18	$\pm 10\%$	30	1.00	300	1500
KRVB1210G24ONXA301ZQHNNNT	14	18	24	$\pm 10\%$	39	1.00	300	1500
KRVB1210G27ONXA301ZQHNNNT	17	22	27	$\pm 10\%$	44	1.00	300	1500
KRVB1210G33ONXA301ZQHNNNT	20	26	33	$\pm 10\%$	54	1.00	300	1400
KRVB1210G39ONXA301ZQHNNNT	25	30	39	$\pm 10\%$	65	1.00	300	1300
KRVB1210G47ONXA301ZQHNNNT	30	38	47	$\pm 10\%$	77	1.00	300	600
KRVB1210G56ONXA301ZQHNNNT	35	45	56	$\pm 10\%$	90	1.00	300	500
KRVB1210G68ONXA301ZQHNNNT	40	56	68	$\pm 10\%$	120	1.00	300	400
KRVB1210G82ONXA251ZQHNNNT	50	65	82	$\pm 10\%$	135	1.00	250	350
KRVB1210G101NXA251ZQHNNNT	60	85	100	$\pm 10\%$	165	1.00	250	300
KRVB1210G121NXA251ZQHNNNT	75	100	120	$\pm 10\%$	250	1.00	250	250
KRVB1812G8RONXA501ZQHNNNT	4	5.6	8	$\pm 10\%$	18	2.50	500	1600
KRVB1812G12ONXA501ZQHNNNT	6	9	12	$\pm 10\%$	20	2.50	500	1600
KRVB1812G24ONXA501ZQHNNNT	14	18	24	$\pm 10\%$	39	2.50	500	1600
KRVB1812G33ONXA501ZQHNNNT	20	26	33	$\pm 10\%$	54	2.50	500	1500
KRVB1812G39ONXA501ZQHNNNT	25	30	39	$\pm 10\%$	65	2.50	500	1400
KRVB1812G47ONXA501ZQHNNNT	30	38	47	$\pm 10\%$	77	2.50	500	1300
KRVB1812G56ONXA501ZQHNNNT	35	45	56	$\pm 10\%$	90	2.50	500	1200
KRVB1812G68ONXA501ZQHNNNT	40	56	68	$\pm 10\%$	120	2.50	500	1100
KRVB1812G82ONXA501ZQHNNNT	50	65	82	$\pm 10\%$	135	2.50	500	1000
KRVB1812G101NXA501ZQHNNNT	60	85	100	$\pm 10\%$	160	2.50	500	900
KRVB1812G121NXA401ZQHNNNT	75	100	120	$\pm 10\%$	250	2.50	400	800
KRVB2220G8RONXA122TWSNNNT	4	5.6	8	$\pm 15\%$	18	4.40	1200	3000
KRVB2220G18ONXA122TWSNNNT	11	14	18	$\pm 10\%$	30	5.40	1200	10500
KRVB2220G24ONXA122TWSNNNT	14	18	24	$\pm 10\%$	39	5.80	1200	8500
KRVB2220G27ONXA122TWSNNNT	17	22	27	$\pm 10\%$	44	7.20	1200	8300
KRVB2220G33ONXA122TWSNNNT	20	26	33	$\pm 10\%$	54	7.80	1200	3500
KRVB2220G39ONXA122TWSNNNT	25	30	39	$\pm 10\%$	65	9.60	1200	3000
KRVB2220G47ONXA122TWSNNNT	30	38	47	$\pm 10\%$	77	12.0	1200	2500
KRVB2220G56ONXA122TWSNNNT	35	45	56	$\pm 10\%$	90	12.0	1200	2000

KRVB2220G680NXA102TWSNNNT	40	56	68	±10%	120	8.80	1000	1100
KRVB2220G820NXA122TWSNNNT	50	65	82	±10%	135	5.60	800	1000
KRVB2220G101NXA122TWSNNNT	60	85	100	±10%	165	2.00	800	900
KRVB2220G121NXA122TWSNNNT	75	100	120	±10%	250	2.50	800	850

Notes:

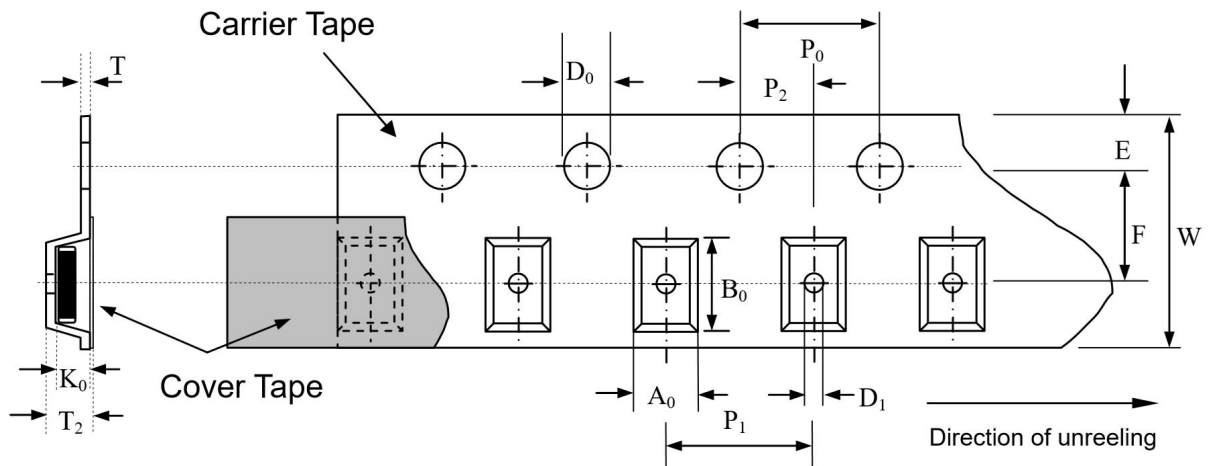
1. Typical leakage at 25°C < 50uA, maximum leakage 100uA.
2. In order to satisfy the applications of customer in various fields, the capacitance range can be designed during manufacturing according to the request, please contact our sales department if needed.

### Packaging Specification

Carrier tape transparent cover tape should be heat-sealed to carry the products, and the reel should be used to reel the carrier tape. The adhesion of the heat-sealed cover tape shall be 40 + 20/ - 15 grams.

Both the head and the end portion of taping shall be empty for reel package and SMT auto-pickup machine.

And a normal paper tape shall be connected in the head of taping for the operator handle.



type	A <sub>0</sub> ±0.10	B <sub>0</sub> ±0.10	K <sub>0</sub> ±0.10	T ±0.05	T <sub>2</sub> ±0.05	D <sub>0</sub> +0.10 -0.00	D <sub>1</sub> ±0.05	P <sub>1</sub> ±0.10	P <sub>2</sub> ±0.05	P <sub>0</sub> ±0.05	W ±0.20	E ±0.10	F ±0.05
1005	1.08	1.88	1.04	0.22	0.65	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1608	1.08	1.88	1.04	0.22	0.95	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
2012	1.42	2.30	1.04	0.22	1.26	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
3216	1.88	3.50	1.27	0.20	1.27	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
3225	2.18	3.46	1.45	0.22	1.77	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
4532	3.66	4.95	1.74	0.25	1.99	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50
5650	5.10	5.97	2.80	0.25	3.05	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50

**Type: 0805~1206 Medium and low voltage , high surge protection varistor type**

- Leadless, size 0805 (2012) ~1206 (3216)
- Multilayer ceramic construction
- Wide operating temperature : -55°C to +125°C
- Fast response ( $\leq 1\text{ns}$ )
- High transient current capability
- Low leakage current

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Peak current	Capacitance
	AC	DC	@1mA DC		8/20 $\mu\text{s}$ 1A	10/1000 $\mu\text{s}$	8/20 $\mu\text{s}$	@ 1kHz
	V <sub>RMS</sub> (V)	V <sub>DC</sub> (V)	V <sub>B</sub> (V)		V <sub>c</sub> (V)	E <sub>T</sub> (J)	I <sub>p</sub> (A)	C(pF)
KRVB0805H5RONXA121ZQHNNNT	2.5	3.3	5	$\pm 15\%$	12	0.10	120	800
KRVB0805H8RONXA121ZQHNNNT	4	5.5	8	$\pm 10\%$	18	0.10	120	850
KRVB0805H12ONXA101ZQHNNNT	6	9	12	$\pm 10\%$	20	0.10	100	900
KRVB0805H18ONXA101ZQHNNNT	11	14	18	$\pm 10\%$	30	0.10	100	800
KRVB0805H24ONXA101ZQHNNNT	14	18	24	$\pm 10\%$	39	0.20	100	600
KRVB0805H27ONXA101ZQHNNNT	17	22	27	$\pm 10\%$	44	0.20	100	520
KRVB0805H33ONXA101ZQHNNNT	20	26	33	$\pm 10\%$	54	0.20	100	450
KRVB0805H39ONXA101ZQHNNNT	25	30	39	$\pm 10\%$	65	0.20	100	400
KRVB0805H47ONXA101ZQHNNNT	30	38	47	$\pm 10\%$	77	0.20	100	330
KRVB0805H56ONXA101ZQHNNNT	35	45	56	$\pm 10\%$	90	0.20	100	230
KRVB0805H68ONXA101ZQHNNNT	40	56	68	$\pm 10\%$	120	0.20	100	120
KRVB0805H82ONXA101ZQHNNNT	50	65	82	$\pm 10\%$	135	0.20	100	350
KRVB0805H101NXA800ZQHNNNT	60	85	100	$\pm 10\%$	165	0.20	80	300
KRVB0805H121NXA800ZQHNNNT	75	100	120	$\pm 10\%$	250	0.20	80	250
KRVB1206H5RONXA501DGKNNNT	2.5	3.3	5	$\pm 15\%$	12	0.20	500	900
KRVB1206H8RONXA501DGKNNNT	4	5.5	8	$\pm 10\%$	18	0.20	500	1500
KRVB1206H12ONXA501DGKNNNT	6	9	12	$\pm 10\%$	20	0.30	500	1300
KRVB1206H18ONXA501DGKNNNT	11	14	18	$\pm 10\%$	30	0.40	500	1200
KRVB1206H24ONXA501DGKNNNT	14	18	24	$\pm 10\%$	39	0.40	500	1000
KRVB1206H27ONXA501DGKNNNT	17	22	27	$\pm 10\%$	44	0.40	500	1000
KRVB1206H33ONXA501DGKNNNT	20	26	33	$\pm 10\%$	54	0.50	500	990
KRVB1206H39ONXA501DGKNNNT	25	30	39	$\pm 10\%$	65	0.50	500	950
KRVB1206H47ONXA501DGKNNNT	30	38	47	$\pm 10\%$	77	0.50	500	880
KRVB1206H56ONXA501DGKNNNT	35	45	56	$\pm 10\%$	90	0.50	500	500
KRVB1206H68ONXA501DGKNNNT	40	56	68	$\pm 10\%$	120	0.50	500	400
KRVB1206H82ONXA501DGKNNNT	50	65	82	$\pm 10\%$	135	0.50	500	350
KRVB1206H101NXA501DGKNNNT	60	85	100	$\pm 10\%$	165	0.50	500	300
KRVB1206H121NXA501DGKNNNT	75	100	120	$\pm 10\%$	250	0.50	500	250

Notes:

1. Typical leakage at 25°C < 50uA, maximum leakage 100uA.

2. In order to satisfy the applications of customer in various fields, the capacitance range can be designed during manufacturing according to the request, please contact our sales department if needed.



**Type: 1210~2220 Medium and low voltage , high surge protection varistor type**

- Leadless, size 1210 (3225) ~2220 (5650)
- Multilayer ceramic construction
- Wide operating temperature : - 55°C to +125°C
- High transient current capability
- Fast response ( $\leq 1\text{ns}$ )
- Low leakage current

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Peak current	Capacitance
	AC	DC	@1mA DC		8/20 $\mu\text{s}$ 1A	10/1000 $\mu\text{s}$	8/20 $\mu\text{s}$	@ 1kHz
	V <sub>RMS</sub> (V)	V <sub>DC</sub> (V)	V <sub>B</sub> (V)		V <sub>c</sub> (V)	E <sub>T</sub> (J)	I <sub>p</sub> (A)	C(pF)
KRVB1210H240NXA102TWSNNNT	14	18	24	$\pm 10\%$	39	/	1000	2700
KRVB1210H470NXA102TWSNNNT	30	38	47	$\pm 10\%$	77	/	1000	1600
KRVB1210H750NXA122TWSNNNT	48	62	75	$\pm 10\%$	125	/	1200	930
KRVB1812H470NXA202TWSNNNT	30	38	47	$\pm 10\%$	77	/	2000	2200
KRVB1812H750NXA202TWSNNNT	48	62	75	$\pm 10\%$	125	/	2000	1650
KRVB2220H240NXA103TWSNNNT	14	18	24	$\pm 10\%$	39	/	10000	18000
KRVB2220H470NXA502TWSNNNT	30	38	47	$\pm 10\%$	77	/	5000	9900
KRVB2220H470NXA802TWSNNNT	30	38	47	$\pm 10\%$	77	/	8000	7500
KRVB2220H820NXA452TWSNNNT	50	65	82	$\pm 10\%$	135	/	4500	4800
KRVB2220H820NXA602TWSNNNT	50	65	82	$\pm 10\%$	135	/	6000	3500
KRVB2220H101NXA502TWSNNNT	60	85	100	$\pm 10\%$	165	/	5000	2600

Notes:

1. Typical leakage at 25°C < 50uA, maximum leakage 100uA.
2. In order to satisfy the applications of customer in various fields, the capacitance range can be designed during manufacturing according to the request, please contact our sales department if needed.

## Type: 0604~1210 High voltage high surge protection varistor type

- Leadless, size 0604 (1610) ~1210 (3225)
- Multilayer ceramic construction
- Wide operating temperature : -55°C to +125°C
- Fast response ( $\leq 1\text{ns}$ )
- High transient current capability
- Low leakage current

### Part A:

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Peak current	Capacitance
	AC	DC	@1mA DC		8/20 $\mu\text{s}$ 1A	10/1000 $\mu\text{s}$	8/20 $\mu\text{s}$	@ 1kHz
	$V_{\text{RMS}}$ (V)	$V_{\text{DC}}$ (V)	$V_{\text{B}}$ (V)		$V_{\text{c}}$ (V)	$E_{\text{T}}$ (J)	$I_{\text{p}}$ (A)	C(pF)
KRVB0604G271NXAXXTWSNNNT	175	225	270	$\pm 10\%$	450	0.10	40	30
KRVB0806G151NXA101GZCNNNT	95	120	150	$\pm 10\%$	260	0.30	100	100
KRVB0806G181NXA101GZCNNNT	120	150	180	$\pm 10\%$	300	0.30	100	100
KRVB0806G201NXA101GZCNNNT	130	170	200	$\pm 10\%$	340	0.30	100	100
KRVB0806G221NXA101GZCNNNT	140	180	220	$\pm 10\%$	360	0.30	100	100
KRVB0806G241NXA101GZCNNNT	150	200	240	$\pm 10\%$	390	0.30	100	100
KRVB0806H241NXA201TWSNNNT	150	200	240	$\pm 10\%$	390	0.30	200	100
KRVB0806G271NXA101GZCNNNT	175	225	270	$\pm 10\%$	450	0.30	100	60
KRVB0806H271NXA201TWSNNNT	175	225	270	$\pm 10\%$	450	0.30	200	60
KRVB0806G301NXA800GZCNNNT	190	240	300	$\pm 10\%$	495	0.60	80	50
KRVB0806G331NXA800GZCNNNT	200	260	330	$\pm 10\%$	545	0.60	80	50
KRVB0806G361NXA600GZCNNNT	230	280	360	$\pm 10\%$	595	0.60	60	50
KRVB0806G391NXA600GZCNNNT	250	300	390	$\pm 10\%$	650	0.60	60	50
KRVB0806G431NXA400GZCNNNT	275	369	430	$\pm 10\%$	705	0.30	40	40
KRVB0806H431NXA101TWSNNNT	275	369	430	$\pm 10\%$	705	0.30	100	40
KRVB0806G471NXA400GZCNNNT	300	380	470	$\pm 10\%$	775	0.30	40	40
KRVB0806H471NXA101TWSNNNT	300	380	470	$\pm 10\%$	775	0.30	100	40
KRVB0806G511NXA400GZCNNNT	320	420	510	$\pm 10\%$	850	0.80	350	40
KRVB1206H241NXA351TWSNNNT	150	200	240	$\pm 10\%$	415	0.60	350	100
KRVB1206H431NXA201TWSNNNT	275	369	430	$\pm 10\%$	705	0.60	200	50
KRVB1206G431NXA101SZSNNNT	275	369	430	$\pm 10\%$	705	0.60	100	50
KRVB1206H471NXA201TWSNNNT	300	380	470	$\pm 10\%$	775	0.60	200	50
KRVB1206G471NXA101SZSNNNT	300	380	470	$\pm 10\%$	775	0.60	100	50
KRVB1210G221NXA351TWSNNNT	140	180	220	$\pm 10\%$	380	0.60	350	100
KRVB1210G241NXA351TWSNNNT	150	200	240	$\pm 10\%$	415	0.60	350	100
KRVB1210G271NXA251GZCNNNT	175	225	270	$\pm 10\%$	450	0.80	250	100
KRVB1210G271NXA401GZCNNNT	175	225	270	$\pm 10\%$	450	0.80	400	100
KRVB1210H271NXA801TWSNNNT	175	225	270	$\pm 10\%$	450	0.80	800	100
KRVB1210G331NXA251GZCNNNT	200	260	330	$\pm 10\%$	545	0.80	250	50
KRVB1210G361NXA251GZCNNNT	230	280	360	$\pm 10\%$	595	0.80	250	50
KRVB1210G391NXA251TWSNNNT	250	310	390	$\pm 10\%$	650	0.80	250	90
KRVB1210G431NXA251SZSNNNT	275	369	430	$\pm 10\%$	705	0.80	250	80

KRVB1210G431NXA501TWSNNNT	275	369	430	±10%	705	0.80	500	80
KRVB1210G471NXA201SZSNNNT	300	380	470	±10%	775	0.80	200	80
KRVB1210G471NXA501TWSNNNT	300	380	470	±10%	775	0.80	500	80
KRVB1210G511NXA351TWSNNNT	320	415	510	±10%	850	0.80	350	70

Part B:

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Surge voltage	Capacitance
	AC	DC	@1mA DC		8/20 $\mu$ s 1A	10/1000 $\mu$ s	1.2/50 $\mu$ s,2 $\Omega$ ; ( $\pm$ 5 times)	@ 1kHz
	V <sub>RMS</sub> (V)	V <sub>DC</sub> (V)	V <sub>B</sub> (V)		V <sub>c</sub> (V)	E <sub>T</sub> (J)	Surge(V)	C(pF)
KRVB1206G151NXV501GZCNNNT	95	120	150	±10%	260	0.60	500	70
KRVB1206G181NXV501GZCNNNT	120	150	180	±10%	300	0.60	500	65
KRVB1206G201NXV501GZCNNNT	130	170	200	±10%	340	0.60	500	65
KRVB1206G221NXV501GZCNNNT	140	180	220	±10%	360	0.60	500	60
KRVB1206G241NXV501GZCNNNT	150	200	240	±10%	415	0.60	500	60
KRVB1206G271NXV501GZCNNNT	175	225	270	±10%	450	0.60	500	55
KRVB1206G301NXV501GZCNNNT	190	240	300	±10%	495	0.60	500	55
KRVB1206G331NXV501GZCNNNT	200	260	330	±10%	545	0.60	500	50
KRVB1206G361NXV501GZCNNNT	230	280	360	±10%	595	0.60	500	50
KRVB1206G391NXV501GZCNNNT	250	300	390	±10%	650	0.60	500	45
KRVB1206G431NXV501GZCNNNT	275	369	430	±10%	705	0.60	500	45
KRVB1206G471NXV501GZCNNNT	300	380	470	±10%	775	0.60	500	40
KRVB1206G511NXV501GZCNNNT	320	415	510	±10%	850	0.60	500	30
KRVB1206G561NXV501GZCNNNT	350	455	560	±10%	925	0.60	500	30
KRVB1210G151NXV751GZCNNNT	95	120	150	±10%	260	0.80	750	300
KRVB1210G181NXV751GZCNNNT	120	150	180	±10%	300	0.80	750	220
KRVB1210G201NXV751GZCNNNT	130	170	200	±10%	340	0.80	750	170
KRVB1210G221NXV751GZCNNNT	140	180	220	±10%	360	0.80	750	160
KRVB1210G241NXV751GZCNNNT	150	200	240	±10%	415	0.80	750	140
KRVB1210G271NXV751GZCNNNT	175	225	270	±10%	450	0.80	750	120
KRVB1210G301NXV751GZCNNNT	190	240	300	±10%	495	0.80	750	120
KRVB1210G331NXV751GZCNNNT	200	260	330	±10%	545	0.80	750	80
KRVB1210G361NXV751GZCNNNT	230	280	360	±10%	595	0.80	750	80
KRVB1210G391NXV751GZCNNNT	250	300	390	±10%	650	0.80	750	60
KRVB1210G431NXV751GZCNNNT	275	369	430	±10%	705	0.80	750	60
KRVB1210G471NXV751GZCNNNT	300	380	470	±10%	775	0.80	750	60
KRVB1210G511NXV751GZCNNNT	320	415	510	±10%	850	0.80	750	60
KRVB1210G561NXV751GZCNNNT	350	455	560	±10%	925	0.80	750	60

Notes:

1. Typical leakage at 25°C < 50uA, maximum leakage 100uA.
2. In order to satisfy the applications of customer in various fields, the capacitance range can be designed during manufacturing according to the request, please contact our sales department if needed.
3. The peak current can be adjust according to the request of customer

## Type: 1812~4840 High voltage high surge protection varistor type

- Leadless, size 1812(4532)~4810(1080=12CL)
- Multilayer ceramic construction
- Wide operating temperature : -55°C to +125°C
- Fast response ( $\leq 1\text{ns}$ )
- High transient current capability
- Low leakage current

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Peak current	Capacitance
	AC	DC	@1mA DC		8/20 $\mu\text{s}$ 1A	10/1000 $\mu\text{s}$	8/20 $\mu\text{s}$	@ 1kHz
	$V_{\text{RMS}}$ (V)	$V_{\text{DC}}$ (V)	$V_{\text{B}}$ (V)		$V_{\text{c}}$ (V)	$E_{\text{T}}$ (J)	$I_{\text{p}}$ (A)	$C$ (pF)
KRVB1812G151NXA401GZCENNNT	95	120	150	$\pm 10\%$	260	0.90	400	400
KRVB1812G181NXA401GZCENNNT	120	150	180	$\pm 10\%$	300	0.90	400	300
KRVB1812G201NXA401GZCENNNT	130	170	200	$\pm 10\%$	340	0.90	400	260
KRVB1812G221NXA401GZCENNNT	140	180	220	$\pm 10\%$	360	0.90	400	200
KRVB1812G241NXA401GZCENNNT	150	200	240	$\pm 10\%$	390	0.90	400	190
KRVB1812G271NXA401GZCENNNT	175	225	270	$\pm 10\%$	450	0.90	400	190
KRVB1812G271NXA102TWSNNNT	175	225	270	$\pm 10\%$	450	0.90	1000	500
KRVB1812G271NXA202TWSNNNT	175	225	270	$\pm 10\%$	450	0.90	2000	900
KRVB1812G301NXA401GZCENNNT	190	240	300	$\pm 10\%$	495	0.90	400	180
KRVB1812G331NXA401GZCENNNT	200	260	330	$\pm 10\%$	545	0.90	400	180
KRVB1812G361NXA401GZCENNNT	230	280	360	$\pm 10\%$	595	0.90	400	180
KRVB1812G391NXA401GZCENNNT	250	300	390	$\pm 10\%$	650	0.90	400	180
KRVB1812G431NXA401GZCENNNT	275	369	430	$\pm 10\%$	705	0.90	400	150
KRVB1812G431NXA801TWSNNNT	275	369	430	$\pm 10\%$	705	0.90	800	380
KRVB1812G431NXA102TWSNNNT	275	369	430	$\pm 10\%$	705	0.90	1000	380
KRVB1812G471NXA401GZCENNNT	300	380	470	$\pm 10\%$	775	0.90	400	140
KRVB1812G471NXA801TWSNNNT	300	380	470	$\pm 10\%$	775	0.90	800	260
KRVB1812G471NXA102TWSNNNT	300	380	470	$\pm 10\%$	775	0.90	1000	290
KRVB1812G511NXA401GZCENNNT	320	415	510	$\pm 10\%$	850	0.90	400	140
KRVB1812G511NXA801TWSNNNT	320	415	510	$\pm 10\%$	850	0.90	800	250
KRVB1812G561NXA401GZCENNNT	350	455	560	$\pm 10\%$	925	0.90	400	140
KRVB1812G561NXA801TWSNNNT	350	455	560	$\pm 10\%$	925	0.90	800	250
KRVB2220G151NXA801GZCENNNT	95	120	150	$\pm 10\%$	260	0.90	800	450
KRVB2220G181NXA801GZCENNNT	120	150	180	$\pm 10\%$	300	0.90	800	420
KRVB2220G201NXA801GZCENNNT	130	170	200	$\pm 10\%$	340	0.90	800	400
KRVB2220G221NXA801GZCENNNT	140	180	220	$\pm 10\%$	360	0.90	800	380
KRVB2220G241NXA801GZCENNNT	150	200	240	$\pm 10\%$	390	0.90	800	380
KRVB2220G271NXA801GZCENNNT	175	225	270	$\pm 10\%$	450	0.90	800	300
KRVB2220G301NXA801GZCENNNT	190	240	300	$\pm 10\%$	495	0.90	800	380
KRVB2220G331NXA801GZCENNNT	200	260	330	$\pm 10\%$	545	0.90	800	330
KRVB2220G361NXA801GZCENNNT	230	280	360	$\pm 10\%$	595	0.90	800	280
KRVB2220G391NXA801GZCENNNT	250	300	390	$\pm 10\%$	650	0.90	800	280
KRVB2220G431NXA801GZCENNNT	275	350	430	$\pm 10\%$	710	2.00	800	260

KRVB2220G431NXA801TWSNNNT	275	350	430	±10%	710	2.00	800	380
KRVB2220G431NXA102TWSNNNT	275	350	430	±10%	710	2.00	1000	380
KRVB2220G471NXA801GZCENNNT	300	380	470	±10%	775	2.00	800	260
KRVB2220G471NXA801TWSNNNT	300	380	470	±10%	775	2.00	800	320
KRVB2220G471NXA102TWSNNNT	300	380	470	±10%	775	2.00	1000	350
KRVB2220G471NXA182TWSNNNT	300	380	470	±10%	775	2.00	1800	650
KRVB2220G511NXA801GZCENNNT	320	415	510	±10%	850	1.00	800	250
KRVB2220G561NXA801GZCENNNT	350	455	560	±10%	925	1.00	800	240
KRVB3220G121NXA501TWSNNNT	75	100	120	±10%	200	3.00	500	450
KRVB3220G241NXA501TWSNNNT	150	200	240	±10%	360	3.00	500	300
KRVB3220G271NXA501TWSNNNT	175	225	270	±10%	380	3.00	500	250
KRVB3220G391NXA501TWSNNNT	250	310	390	±10%	650	3.00	500	120
KRVB3220G431NXA502TWSNNNT	275	350	430	±10%	710	4.50	500	100
KRVB3220G471NXA501TWSNNNT	300	380	470	±10%	775	5.00	500	80
KRVB3225G431NXA502ZQHNNNT	275	350	430	±10%	710	4.50	500	100
KRVB3225G471NXA501ZQHNNNT	300	380	470	±10%	775	5.00	500	80
KRVB4032G121NXA501ZQHNNNT	75	100	120	±10%	200	5.00	500	500
KRVB4032G391NXA501ZQHNNNT	250	300	390	±10%	650	5.00	500	200
KRVB4032G431NXA501ZQHNNNT	275	350	430	±10%	710	5.00	500	160
KRVB4032G471NXA501ZQHNNNT	300	380	470	±10%	775	5.00	500	135
KRVB4840G121NXA501ZQHNNNT	75	100	120	±10%	200	5.00	500	350
KRVB4840G391NXA501ZQHNNNT	250	300	390	±10%	650	5.00	500	320
KRVB4840G431NXA451ZQHNNNT	275	350	430	±10%	710	5.00	450	180
KRVB4840G471NXA451ZQHNNNT	300	380	470	±10%	775	5.00	450	150

Notes:

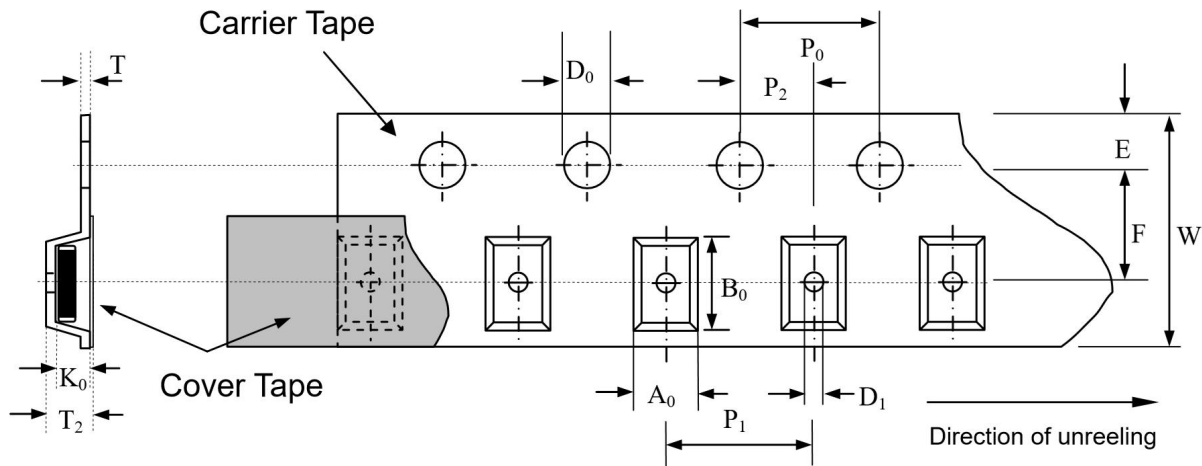
1. Typical leakage at 25°C < 50uA, maximum leakage 100uA.
2. In order to satisfy the applications of customer in various fields, the capacitance range can be designed during manufacturing according to the request, please contact our sales department if needed.
3. The peak current can be adjust according to the request of customer

## Packaging Specification

Carrier tape transparent cover tape should be heat-sealed to carry the products, and the reel should be used to reel the carrier tape.

The adhesion of the heat-sealed cover tape shall be  $40 + 20 / - 15$  grams.

Both the head and the end portion of taping shall be empty for reel package and SMT auto-pickup machine. And a normal paper tape shall be connected in the head of taping for the operator handle.



type	$A_0$ $\pm 0.10$	$B_0$ $\pm 0.10$	$K_0$ $\pm 0.10$	$T$ $\pm 0.05$	$T_2$ $\pm 0.05$	$D_0$ $+0.10$ $-0.00$	$D_1$ $\pm 0.05$	$P_1$ $\pm 0.10$	$P_2$ $\pm 0.05$	$P_0$ $\pm 0.05$	$W$ $\pm 0.20$	$E$ $\pm 0.10$	$F$ $\pm 0.05$
1005	1.08	1.88	1.04	0.22	0.65	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1608	1.08	1.88	1.04	0.22	0.95	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
2012	1.42	2.30	1.04	0.22	1.26	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
2016	2.00	2.50	1.90	0.22	2.12	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
3216	1.88	3.50	2.00	0.20	2.22	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
3225	2.18	3.46	2.70	0.22	2.87	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
4532	3.66	4.95	3.40	0.25	3.60	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50
5650	5.10	5.97	3.85	0.25	3.95	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50

# ESD Solutions suppressor series

## Electro Static discharge (ESD)

is the transients as short duration excursion.

Our ESD products are based on Multilayer fabrication technology design to suppress ESD events.

Our products meets IEC61000-4-2 standard for Electromagnetic Compliance testing.

We supply extra low capacitance and protect integrated circuits protection

- Fast Response < 0.5nS
- Low Working Voltage 3.3V
- Low Capacitance 2.5pF
- Low Leakage Current < 0.1 uA
- Low Clamping Voltage

**Type: 0201 (0603) ~ 0603 (1608)**

### ■ Specifications

GRACE Varistor Part number	Workin g voltage	Breakdown voltage		Clamping voltage	Transient energy	Peak current	Capacitance
	DC	@1mA DC		8/20 μs 1A	10/1000μs	8/20μs	@ 1kHz
	V <sub>DC</sub> (V)	V <sub>B</sub> (V)		V <sub>c</sub> (V)	E <sub>T</sub> (J)	I <sub>p</sub> (A)	C(pF)
KRVO201E6R8N101AXRBTNNNT	3.5	6.8	±10%	10	0.01	5	100
KRVO201E120N150AXHGANNNT	5.5	12	±10%	20	0.01	5	15
KRVO201E120N330AXHGANNNT	5.5	12	±10%	20	0.01	5	33
KRVO201E120N500AXHGANNNT	5.5	12	±10%	20	0.01	5	50
KRVO201E120N101AXHGANNNT	5.5	12	±10%	20	0.01	5	100
KRVO201E270N150AXHGANNNT	18	27	±10%	50	0.01	5	15
KRVO201E270N5R0AXHGANNNT	18	27	±20%	55	0.01	5	5
KRVO201E101N2R5AXTWSNNNT	24	100	±20%	204	0.01	5	2.5
KRVO402E8RON330AXRNTNNNT	5.5	8	±10%	30	0.02	1	33
KRVO402E120N500AXSZSNNNT	5.6	12	±10%	20	0.02	2	50
KRVO402E120N101AXSZSNNNT	5.6	12	±10%	20	0.02	2	100
KRVO402E140N330AXSZSNNNT	12	14	±10%	22	0.05	2	33
KRVO402E180N500AXSZSNNNT	14	18	±10%	28	0.05	3	50
KRVO402E270N150AXSZSNNNT	18	27	±10%	55	0.05	2	15
KRVO402E350N2R5AXSZSNNNT	22	35	±20%	65	0.05	1	2.5
KRVO402E101N2R5AXSZSNNNT	24	100	±20%	204	0.05	1	2.5
KRVO402E271N2R5AXNYVNNNT	42	270	±20%	500	0.05	1	2.5
KRVO603E120N500AXGZCNNNT	5	12	±10%	20	0.20	10	50
KRVO603E270N150AXSZSNNNT	18	27	±10%	50	0.20	10	15
KRVO603E350N2R5AXSZSNNNT	22	35	±20%	65	0.05	1	2.5
KRVO603E101N2R5AXSZSNNNT	24	100	±20%	198	0.20	10	2.5
KRVO603E121N2R5AXTWSNNNT	30	120	±20%	240	0.20	10	2.5

Notes:

1. Typical leakage at 25°C < 50uA, maximum leakage 100uA.

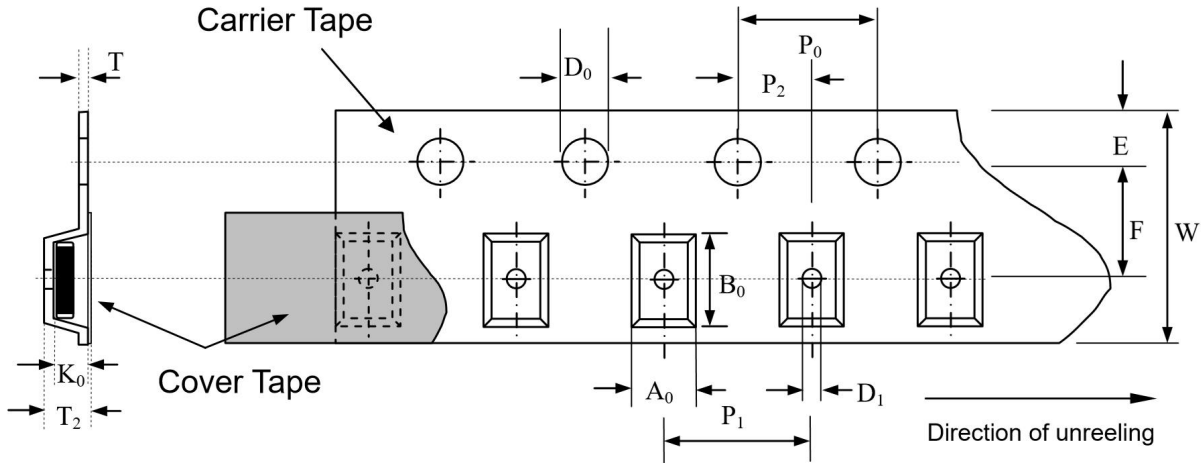
2. At normal: ΔCp ± 30%, In order to satisfy the applications of customer in various fields, the capacitance range can be designed during manufacturing according to the request, please contact our sales department if needed

## Packaging Specification

□ Carrier tape transparent cover tape should be heat-sealed to carry the products, and the reel should be used to reel the carrier tape.

□ The adhesion of the heat-sealed cover tape shall be  $40 + 20 / - 15$  grams.

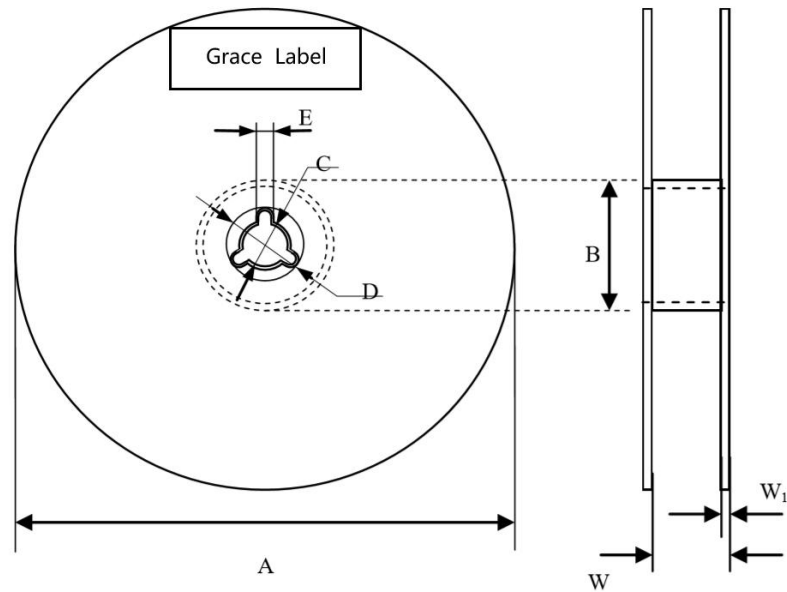
□ Both the head and the end portion of taping shall be empty for reel package and SMT auto-pickup machine. And a normal paper tape shall be connected in the head of taping for the operator handle.



type	$A_0$ $\pm 0.10$	$B_0$ $\pm 0.10$	$K_0$ $\pm 0.10$	$T$ $\pm 0.05$	$T_2$ $\pm 0.05$	$D_0$ $+0.10$ $-0.00$	$D_1$ $\pm 0.05$	$P_1$ $\pm 0.10$	$P_2$ $\pm 0.05$	$P_0$ $\pm 0.05$	$W$ $\pm 0.20$	$E$ $\pm 0.10$	$F$ $\pm 0.05$
0201=0603	0.37	0.67	0.50	0.10	0.65	1.50	1.00	2.00	2.00	4.00	8.00	1.75	3.50
0402=1005	0.62	1.12	0.60	0.22	0.10	1.50	1.00	2.00	2.00	4.00	8.00	1.75	3.50
0603=1608	1.08	1.88	1.04	0.22	0.10	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
0805=2012	1.42	2.30	1.04	0.22	0.10	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1206=3216	1.88	3.50	1.27	0.20	0.10	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1210=3225	2.18	3.46	1.45	0.22	0.10	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1812=4532	3.66	4.95	1.74	0.25	0.10	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50
2220=5650	5.10	5.97	2.80	0.25	0.10	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50



## Reel Dimension



type	A	B	C	D	E	W	W <sub>1</sub>
0201=0603	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
0402=1005	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
0603=1608	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
0805=2012	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
1206=3216	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
1210=3225	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
1812=4532	178.0±1.0	60.0±0.5	13.5±0.1	21.0±0.2	2.0±0.5	13.6±0.2	1.5±0.15
2220=5650	178.0±1.0	60.0±0.5	13.5±0.1	21.0±0.2	2.0±0.5	13.6±0.2	1.5±0.15

## Standard packaging

type		0603	1005	1608	2012		3216	3225	4532	5650
quantity	paper	1000 /1500	10000	4000	4000	-	-	-	-	-
	plastic		-	-	-	3000	2000/ 3000	1500/ 2000/ 3000	500/ 1000/ 3000	500/ 1000
Minimum ordering			-	4000	4000	3000	2000/ 3000	1500/ 2000/ 3000	500/ 1000/ 3000	500/ 1000