

GRACE

Ceramic transient voltage suppressors

SMD multilayer transient voltage suppressors,
standard series

Series/Type:

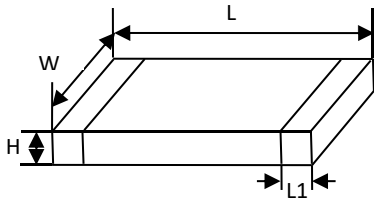
Date: November 2019

1 . Standard series

KRVD 2220 G 381 N CXXX A801 TWS NNN T
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

- ① production series: GRACE Varistor
 ② size: 2220=5650, 3220=8050
 ③ type: E:ESD, G:general, H:high energy, S:high speed
 ④ working voltage (DC): 5R6=5.6V, 380=38V, 381=380V
 ⑤ end termination: S: Ag/Pd N: Ag/Ni/Sn
 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 *s: 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: T: taping, B: bulk

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 0603~1608
- 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 μs 1A	10/100 μs	8/20 μs	@ 1kHz
	V_{RMS} (V)	V_{DC} (V)	V_{B} (V)		V_{C} (V)	E_{T} (J)	I_{P} (A)	C (pF)
KRVD0201G4RON101AXRBTNNNT	3	4.0	6.8	$\pm 20\%$	10	0.01	5	100
KRVD0201G5RON101AXRBTNNNT	3.3	5.0	8	$\pm 20\%$	10	0.01	5	100
KRVD0201G5R6N101AXRBTNNNT	4	5.6	12	$\pm 20\%$	20	0.01	8	100
KRVD0402G3R3N1AXZQHNNNT	2.5	3.3	5	$\pm 20\%$	10	0.02	10	360
KRVD0402G5R0NGAXZQHNNNT	4	5.0	8	$\pm 20\%$	20	0.05	10	160
KRVD0402G5RON481AXRBTNNNT	4	5.0	8	$\pm 20\%$	20	0.05	10	480
KRVD0402G5RON651AXRBTNNNT	4	5.0	8	$\pm 20\%$	20	0.05	10	650
KRVD0402G5R6N121AXSZSNNNT	4	5.6	12	$\pm 10\%$	20	0.05	10	120
KRVD0403G5R6N231AXSZSNNNT	4	5.6	12	$\pm 10\%$	20	0.03	10	230
KRVD0402G5R6N361AXTWSNNNT	4	5.6	12	$\pm 10\%$	20	0.05	10	360
KRVD0403G5R6N481AXTWSNNNT	4	5.6	12	$\pm 10\%$	20	0.03	10	480
KRVD0403G5R6N481A500TWSNNNT	4	5.6	12	$\pm 10\%$	20	0.03	10	480
KRVD0603G3R3N1A300ZQHNNNT	2.5	3.3	5	$\pm 20\%$	10	0.10	30	360
KRVD0603G5R5N1A300GZCNNNT	3.5	5.5	8	$\pm 20\%$	15	0.10	30	360
KRVD0603G5R5NHA300GZCNNNT	3.5	5.5	8	$\pm 20\%$	15	0.10	30	270
KRVD0603G5R5NJA300GZCNNNT	3.5	5.5	8	$\pm 20\%$	15	0.10	30	480
KRVD0603G5R5N801A300TWSNNNT	3.5	5.5	8	$\pm 20\%$	15	0.10	30	800
KRVD0603G5R5NPA300GZCNNNT	3.5	5.5	8	$\pm 20\%$	15	0.10	30	2200
KRVD0603G5R6NHA300GZCNNNT	4	5.6	9	$\pm 20\%$	15	0.10	30	270
KRVD0603G5R6N121A300GZCNNNT	4	5.6	12	$\pm 10\%$	20	0.10	30	120
KRVD0603G5R6N361A300GZCNNNT	4	5.6	12	$\pm 10\%$	20	0.10	30	360
KRVD0603G5R6N481A300GZCNNNT	4	5.6	12	$\pm 10\%$	20	0.10	30	480
KRVD0603G9RON551A300GZCNNNT	6.4	9	12	$\pm 10\%$	26	0.20	30	550
KRVD0603G9RON821A300GZCNNNT	6.4	9	12	$\pm 10\%$	26	0.20	30	820
KRVD0603G120N251A300SZSNNNT	8	12	16	$\pm 10\%$	28	0.20	30	250
KRVD0603G140N1A300GZCNNNT	11	14	18	$\pm 10\%$	30	0.20	30	350
KRVD0603G180N251A300GZCNNNT	14	18	24	$\pm 10\%$	39	0.20	30	250
KRVD0603G220N181A300GZCNNNT	17	22	27	$\pm 10\%$	45	0.20	30	180
KRVD0603G260N121A300GZCNNNT	18	26	33	$\pm 10\%$	54	0.10	30	120
KRVD0603G300NGA300GZCNNNT	25	30	39	$\pm 10\%$	65	0.20	30	160

KRVD0603G380NGA300GZCENNNT	30	38	47	±10%	77	0.20	30	130
KRVD0603G450NGA300GZCENNNT	35	45	56	±10%	90	0.20	30	110
KRVD0603G560NFA300GZCENNNT	40	56	68	±10%	110	0.20	30	80
KRVD0603G650NFA300GZCENNNT	50	65	82	±10%	135	0.20	30	60

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 Medium and low voltage , low surge protection varistor type

- Leadless, size 2012~3216
- 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 μs 1A	10/100 μs	8/20 μs	@ 1kHz
	V_{RMS} (V)	V_{DC} (V)	V_{B} (V)		V_{C} (V)	E_{T} (J)	I_{P} (A)	C (pF)
KRVD0805G3R3NXA400ZQHNNNT	2.5	3.3	5	$\pm 20\%$	10	0.10	40	1600
KRVD0805G5R6NXA400ZQHNNNT	4	5.6	8	$\pm 20\%$	15	0.10	40	1200
KRVD0805G8RONXA400ZQHNNNT	6	8	12	$\pm 10\%$	20	0.10	40	900
KRVD0805G140NXA400ZQHNNNT	11	14	18	$\pm 10\%$	30	0.10	40	800
KRVD0805G180NXA400ZQHNNNT	14	18	22	$\pm 10\%$	33	0.20	40	600
KRVD0805G220NXA400ZQHNNNT	17	22	27	$\pm 10\%$	44	0.20	40	520
KRVD0805G260NXA400ZQHNNNT	20	26	33	$\pm 10\%$	54	0.20	40	450
KRVD0805G300NXA400ZQHNNNT	25	30	39	$\pm 10\%$	65	0.20	40	440
KRVD0805G380NXA400ZQHNNNT	30	38	47	$\pm 10\%$	77	0.20	40	430
KRVD0805G450NXA400ZQHNNNT	35	45	56	$\pm 10\%$	90	0.20	40	380
KRVD0805G560NXA400ZQHNNNT	40	56	68	$\pm 10\%$	110	0.20	40	360
KRVD0805G650NXA400ZQHNNNT	50	65	82	$\pm 10\%$	135	0.20	40	330
KRVD0805G850NXA400ZQHNNNT	60	85	100	$\pm 10\%$	165	0.20	40	320
KRVD0805G101NXA400ZQHNNNT	75	100	120	$\pm 10\%$	250	0.20	40	220
KRVD1206G3R3NXA151ZQHNNNT	2.5	3.3	5	$\pm 20\%$	10	0.40	150	1900
KRVD1206G5R6NXA151ZQHNNNT	4	5.6	8	$\pm 20\%$	15	0.40	150	1600
KRVD1206G8RONXA151ZQHNNNT	6	8	12	$\pm 10\%$	20	0.40	150	1300
KRVD1206G120NXA151ZQHNNNT	9	12	15	$\pm 10\%$	26	0.40	150	1200
KRVD1206G140NXA151ZQHNNNT	11	14	18	$\pm 10\%$	30	0.40	150	1200
KRVD1206G180NXA151ZQHNNNT	14	18	22	$\pm 15\%$	39	0.40	150	1000
KRVD1206G220NXA151ZQHNNNT	17	22	27	$\pm 10\%$	45	0.40	150	990
KRVD1206G260NXA151ZQHNNNT	20	26	33	$\pm 10\%$	54	0.40	150	850
KRVD1206G300NXA151ZQHNNNT	25	30	39	$\pm 10\%$	65	0.40	150	750
KRVD1206G330NXA151ZQHNNNT	28	33	45	$\pm 10\%$	72	0.40	150	720
KRVD1206G380NXA151ZQHNNNT	30	38	47	$\pm 10\%$	77	0.40	150	680
KRVD1206G450NXA151ZQHNNNT	35	45	56	$\pm 10\%$	90	0.40	150	580
KRVD1206G560NXA151ZQHNNNT	40	56	68	$\pm 10\%$	110	0.40	150	420
KRVD1206G650NXA151ZQHNNNT	50	65	82	$\pm 10\%$	135	0.40	150	400
KRVD1206G850NXA151ZQHNNNT	60	85	100	$\pm 10\%$	165	0.40	150	320
KRVD1206G101NXA151ZQHNNNT	75	100	120	$\pm 10\%$	250	0.40	150	220
KRVD1206G3R3NXA201ZQHNNNT	2.5	3.3	5	$\pm 20\%$	10	0.40	200	1900
KRVD1206G5R6NXA201ZQHNNNT	4	5.6	8	$\pm 20\%$	15	0.40	200	1600
KRVD1206G8RONXA201ZQHNNNT	6	8	12	$\pm 10\%$	20	0.40	200	1300

KRVD1206G120NXA201ZQHNNNT	9	12	15	±10%	26	0.40	200	1200
KRVD1206G140NXA201ZQHNNNT	11	14	18	±10%	30	0.40	200	1200
KRVD1206G180NXA201ZQHNNNT	14	18	22	±15%	39	0.40	200	1000
KRVD1206G220NXA201ZQHNNNT	17	22	27	±10%	45	0.40	200	990
KRVD1206G260NXA201ZQHNNNT	20	26	33	±10%	54	0.40	200	850
KRVD1206G300NXA201ZQHNNNT	25	30	39	±10%	65	0.40	200	750
KRVD1206G330NXA201ZQHNNNT	28	33	45	±10%	72	0.40	200	720
KRVD1206G380NXA201ZQHNNNT	30	38	47	±10%	77	0.40	200	680
KRVD1206G450NXA201ZQHNNNT	35	45	56	±10%	90	0.40	200	580
KRVD1206G560NXA201ZQHNNNT	40	56	68	±10%	110	0.40	200	420
KRVD1206G650NXA201ZQHNNNT	50	65	82	±10%	135	0.40	200	400

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 , low surge protection varistor type

- Leadless, size 3225~5650
- 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 μs 1A	10/100 μs	8/20 μs	@ 1kHz
	V_{RMS} (V)	V_{DC} (V)	V_{B} (V)		V_{c} (V)	E_{T} (J)	I_{p} (A)	C (pF)
KRVD1210G5R6NXA301ZQHNNNT	4	5.6	8	$\pm 20\%$	15.5	1.50	300	1600
KRVD1210G8RONXA301ZQHNNNT	6	8	12	$\pm 10\%$	25	1.50	300	1600
KRVD1210G14ONXA301ZQHNNNT	11	14	18	$\pm 10\%$	35	1.50	300	1500
KRVD1210G18ONXA301ZQHNNNT	14	18	22	$\pm 10\%$	39	1.50	300	1500
KRVD1210G22ONXA301ZQHNNNT	17	22	27	$\pm 10\%$	45	1.50	300	1500
KRVD1210G26ONXA301ZQHNNNT	20	26	33	$\pm 10\%$	54	1.50	300	1400
KRVD1210G30ONXA301ZQHNNNT	25	30	39	$\pm 10\%$	65	1.50	300	1300
KRVD1210G33ONXA301ZQHNNNT	28	33	45	$\pm 10\%$	72	1.50	300	900
KRVD1210G38ONXA301ZQHNNNT	30	38	47	$\pm 10\%$	77	1.50	300	600
KRVD1210G45ONXA301ZQHNNNT	35	45	56	$\pm 10\%$	90	1.50	300	500
KRVD1210G56ONXA301ZQHNNNT	40	56	68	$\pm 10\%$	110	1.50	300	450
KRVD1210G65ONXA301ZQHNNNT	50	65	82	$\pm 10\%$	135	1.50	300	400
KRVD1210G85ONXA301ZQHNNNT	60	85	100	$\pm 10\%$	165	1.50	300	300
KRVD1210G101NXA301ZQHNNNT	75	100	120	$\pm 10\%$	250	1.50	300	220
KRVD1210G121NXA301ZQHNNNT	95	120	150	$\pm 10\%$	290	1.50	300	220
KRVD1812G5R6NXA501ZQHNNNT	4	5.6	8	$\pm 20\%$	15	2.50	500	1500
KRVD1812G8RONXA501ZQHNNNT	6	8	12	$\pm 10\%$	20	2.50	500	1300
KRVD1812G12ONXA501ZQHNNNT	9	12	15	$\pm 10\%$	26	2.50	500	1200
KRVD1812G14ONXA501ZQHNNNT	11	14	18	$\pm 10\%$	30	2.50	500	1200
KRVD1812G18ONXA501ZQHNNNT	14	18	22	$\pm 10\%$	35	2.50	500	1600
KRVD1812G22ONXA501ZQHNNNT	17	22	27	$\pm 10\%$	45	1.50	500	1550
KRVD1812G26ONXA501ZQHNNNT	20	26	33	$\pm 10\%$	45	1.00	500	1500
KRVD1812G30ONXA501ZQHNNNT	25	30	39	$\pm 10\%$	65	1.00	500	1400
KRVD1812G38ONXA501ZQHNNNT	30	38	47	$\pm 10\%$	77	1.00	500	1300
KRVD1812G45ONXA501ZQHNNNT	35	45	56	$\pm 10\%$	90	1.00	500	1200
KRVD1812G56ONXA501ZQHNNNT	40	56	68	$\pm 10\%$	110	2.00	500	1100
KRVD1812G65ONXA501ZQHNNNT	50	65	82	$\pm 10\%$	135	2.00	500	1000
KRVD1812G85ONXA501ZQHNNNT	60	85	100	$\pm 10\%$	160	2.00	500	900
KRVD1812G101NXA501ZQHNNNT	75	100	120	$\pm 10\%$	250	2.50	500	800
KRVD2220G5R6NXA122TWSNNNT	4	5.6	8	$\pm 20\%$	15.5	2.00	1200	18000
KRVD2220G14ONXA122TWSNNNT	11	14	18	$\pm 10\%$	30	5.40	1200	4000
KRVD2220G18ONXA122TWSNNNT	14	18	24	$\pm 10\%$	39	5.80	1200	4000
KRVD2220G22ONXA122TWSNNNT	18	22	27	$\pm 10\%$	45	7.20	1200	3500

KRVD2220G260NXA122TWSNNNT	20	26	33	±10%	54	7.80	1200	3500
KRVD2220G300NXA122TWSNNNT	25	30	39	±10%	65	9.60	1200	3000
KRVD2220G380NXA122TWSNNNT	30	38	47	±10%	77	12.0	1200	2500
KRVD2220G450NXA122TWSNNNT	35	45	56	±10%	85	12.0	1200	2000
KRVD2220G560NXA102TWSNNNT	40	56	68	±10%	110	8.80	1000	2000
KRVD2220G650NXA801TWSNNNT	50	65	82	±10%	135	5.60	800	2000
KRVD2220G850NXA801TWSNNNT	60	85	100	±10%	160	5.00	800	1000
KRVD2220G101NXA801TWSNNNT	75	100	120	±10%	200	4.50	800	1000

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

Leadless, size 1610~3216

Multilayer ceramic construction

Wide operating temperature : -55℃ to +125℃

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/ Surge voltage	Capacitance
	AC	DC	@1mA DC		8/20 μs 1A	10/100 μs	8/20 μs / (1.2/50 μs , 2 Ω)	@ 1kHz
	V_{RMS} (V)	V_{DC} (V)	V_{B} (V)		V_{C} (V)	E_{T} (J)	I_{p} (A) /Vsurge	C (pF)
KRVD0805H3R3NXA121ZQHNNNT	2.5	3.3	5	$\pm 15\%$	12	0.10	120	800
KRVD0805H5R6NXA121ZQHNNNT	4	5.5	8	$\pm 10\%$	18	0.10	120	850
KRVD0805H9RONXA101ZQHNNNT	6	9	12	$\pm 10\%$	20	0.10	100	900
KRVD0805H140NXA101ZQHNNNT	11	14	18	$\pm 10\%$	30	0.10	100	800
KRVD0805H180NXA101ZQHNNNT	14	18	24	$\pm 10\%$	39	0.20	100	600
KRVD0805H220NXA101ZQHNNNT	17	22	27	$\pm 10\%$	44	0.20	100	520
KRVD0805H260NXA101ZQHNNNT	20	26	33	$\pm 10\%$	54	0.20	100	450
KRVD0805H300NXA101ZQHNNNT	25	30	39	$\pm 10\%$	65	0.20	100	400
KRVD0805H380NXA101ZQHNNNT	30	38	47	$\pm 10\%$	77	0.20	100	330
KRVD0805H450NXA101ZQHNNNT	35	45	56	$\pm 10\%$	90	0.20	100	230
KRVD0805H560NXA101ZQHNNNT	40	56	68	$\pm 10\%$	120	0.20	100	120
KRVD0805H650NXA101ZQHNNNT	50	65	82	$\pm 10\%$	135	0.20	100	350
KRVD0805H850NXA800ZQHNNNT	60	85	100	$\pm 10\%$	165	0.20	80	300
KRVD0805H101NXA800ZQHNNNT	75	100	120	$\pm 10\%$	250	0.20	80	250
KRVD1206H3R3NXA501DGKNNNT	2.5	3.3	5	$\pm 15\%$	12	0.20	500	900
KRVD1206H5R5NXA501DGKNNNT	4	5.5	8	$\pm 10\%$	18	0.20	500	1500
KRVD1206H9RONXA501DGKNNNT	6	9	12	$\pm 10\%$	20	0.30	500	1300
KRVD1206H140NXA501DGKNNNT	11	14	18	$\pm 10\%$	30	0.40	500	1200
KRVD1206H180NXA501DGKNNNT	14	18	24	$\pm 10\%$	39	0.40	500	1000
KRVD1206H220NXA501DGKNNNT	17	22	27	$\pm 10\%$	44	0.40	500	1000
KRVD1206H260NXA501DGKNNNT	20	26	33	$\pm 10\%$	54	0.50	500	990
KRVD1206H300NXA501DGKNNNT	25	30	39	$\pm 10\%$	65	0.50	500	950
KRVD1206H380NXA501DGKNNNT	30	38	47	$\pm 10\%$	77	0.50	500	880
KRVD1206H450NXA501DGKNNNT	35	45	56	$\pm 10\%$	90	0.50	500	500
KRVD1206H560NXA501DGKNNNT	40	56	68	$\pm 10\%$	120	0.50	500	400
KRVD1206H650NXA501DGKNNNT	50	65	82	$\pm 10\%$	135	0.50	500	350
KRVD1206H850NXA501DGKNNNT	60	85	100	$\pm 10\%$	165	0.50	500	300
KRVD1206H101NXA501DGKNNNT	75	100	120	$\pm 10\%$	250	0.50	500	250

Notes:

1. Typical leakage at 25℃ < 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 3225~5650
- Multilayer ceramic construction
- Wide operating temperature : -55℃ to +125℃
- Fast response ($\leq 1\text{ns}$)
- High transient current capability
- Low leakage current

KRVD1210H5R6NXA152DGKNNNT	4	5.6	8	$\pm 20\%$	15.5	1.50	1500	1600
KRVD1210H8RONXA152DGKNNNT	6	8	12	$\pm 10\%$	25	1.50	1500	1600
KRVD1210H140NXA152DGKNNNT	11	14	18	$\pm 10\%$	35	1.50	1500	1500
KRVD1210H180NXA152DGKNNNT	14	18	22	$\pm 10\%$	39	1.50	1500	1500
KRVD1210H220NXA152DGKNNNT	17	22	27	$\pm 10\%$	45	1.50	1500	1500
KRVD1210H260NXA152DGKNNNT	20	26	33	$\pm 10\%$	54	1.50	1500	1400
KRVD1210H300NXA152DGKNNNT	25	30	39	$\pm 10\%$	65	1.50	1500	1300
KRVD1210H330NXA152DGKNNNT	28	33	45	$\pm 10\%$	72	1.50	1500	900
KRVD1210H380NXA152DGKNNNT	30	38	47	$\pm 10\%$	77	1.50	1500	600
KRVD1210H450NXA152DGKNNNT	35	45	56	$\pm 10\%$	90	1.50	1500	500
KRVD1210H560NXA152DGKNNNT	40	56	68	$\pm 10\%$	110	1.50	1500	450
KRVD1210H650NXA152DGKNNNT	50	65	82	$\pm 10\%$	135	1.50	1500	400
KRVD1210H850NXA102DGKNNNT	60	85	100	$\pm 10\%$	165	1.50	1000	300
KRVD1210H101NXA102DGKNNNT	75	100	120	$\pm 10\%$	250	1.50	1000	220
KRVD1210H121NXA102DGKNNNT	95	120	150	$\pm 10\%$	290	1.50	1000	220
KRVD1812H5R6NXA252DGKNNNT	4	5.6	8	$\pm 20\%$	15	2.50	2500	1500
KRVD1812H8RONXA252DGKNNNT	6	8	12	$\pm 10\%$	20	2.50	2500	1300
KRVD1812H120NXA252DGKNNNT	9	12	15	$\pm 10\%$	26	2.50	2500	1200
KRVD1812H140NXA252DGKNNNT	11	14	18	$\pm 10\%$	30	2.50	2500	1200
KRVD1812H180NXA252DGKNNNT	14	18	22	$\pm 10\%$	35	2.50	2500	1600
KRVD1812H220NXA252DGKNNNT	17	22	27	$\pm 10\%$	45	1.50	2500	1550
KRVD1812H260NXA252DGKNNNT	20	26	33	$\pm 10\%$	45	1.00	2500	1500
KRVD1812H300NXA222DGKNNNT	25	30	39	$\pm 10\%$	65	1.00	2200	1400
KRVD1812H380NXA222DGKNNNT	30	38	47	$\pm 10\%$	77	1.00	2200	1300
KRVD1812H450NXA202DGKNNNT	35	45	56	$\pm 10\%$	90	1.00	2000	1200
KRVD1812H560NXA202DGKNNNT	40	56	68	$\pm 10\%$	110	2.00	2000	1100
KRVD1812H650NXA202DGKNNNT	50	65	82	$\pm 10\%$	135	2.00	2000	1000
KRVD1812H850NXA152DGKNNNT	60	85	100	$\pm 10\%$	160	2.00	1500	900
KRVD1812H101NXA152DGKNNNT	75	100	120	$\pm 10\%$	250	2.50	1500	800
KRVD2220H5R6NXA802DGKNNNT	4	5.6	8	$\pm 20\%$	15.5	2.00	8000	18000
KRVD2220H140NXA802DGKNNNT	11	14	18	$\pm 10\%$	30	5.40	8000	4000
KRVD2220H180NXA802DGKNNNT	14	18	24	$\pm 10\%$	39	5.80	8000	4000
KRVD2220H220NXA802DGKNNNT	18	22	27	$\pm 10\%$	45	7.20	8000	3500
KRVD2220H260NXA802DGKNNNT	20	26	33	$\pm 10\%$	54	7.80	8000	3500
KRVD2220H300NXA802DGKNNNT	25	30	39	$\pm 10\%$	65	9.60	8000	3000
KRVD2220H380NXA802DGKNNNT	30	38	47	$\pm 10\%$	77	12.0	8000	2500
KRVD2220H450NXA802DGKNNNT	35	45	56	$\pm 10\%$	85	12.0	8000	2000
KRVD2220H560NXA802DGKNNNT	40	56	68	$\pm 10\%$	110	8.80	8000	2000

KRVD2220H650NXA602DGKNNNT	50	65	82	±10%	135	5.60	6000	2000
KRVD2220H850NXA602DGKNNNT	60	85	100	±10%	160	5.00	6000	1000
KRVD2220H101NXA452DGKNNNT	75	100	120	±10%	200	4.50	4500	1000

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

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Peak current/ Surge voltage	Capacitance
	AC	DC	@1mA DC		8/20 μs 1A	10/100 μs	8/20 μs / (1.2/50 μs , 2 Ω)	@ 1kHz
	V_{RMS} (V)	V_{DC} (V)	V_{B} (V)		V_{C} (V)	E_{T} (J)	I_{p} (A) /Vsurge	C (pF)
KRVD0604G221NXAXXTWSNNNT	175	225	270	$\pm 10\%$	450	0.10	40	30
KRVD0806G201NXA101GZCENNNT	150	200	240	$\pm 10\%$	390	0.30	100	100
KRVD0806H201NXA201TWSNNNT	150	200	240	$\pm 10\%$	390	0.30	200	100
KRVD0806G221NXA101GZCENNNT	175	225	270	$\pm 10\%$	450	0.30	100	60
KRVD0806H221NXA201TWSNNNT	175	225	270	$\pm 10\%$	450	0.30	200	60
KRVD0806G351NXA400GZCENNNT	275	350	430	$\pm 10\%$	705	0.30	40	40
KRVD0806H351NXA101TWSNNNT	275	350	430	$\pm 10\%$	705	0.30	100	40
KRVD0806G381NXA400GZCENNNT	300	380	470	$\pm 10\%$	775	0.30	40	40
KRVD0806H381NXA101TWSNNNT	300	380	470	$\pm 10\%$	775	0.30	100	40
KRVD1206G181NXV501GZCENNNT	140	180	220	$\pm 10\%$	380	0.60	V500	100
KRVD1206G201NXV501GZCENNNT	150	200	240	$\pm 10\%$	415	0.60	V500	100
KRVD1206H201NXA351TWSNNNT	150	200	240	$\pm 10\%$	415	0.60	350	100
KRVD1206G221NXV501GZCENNNT	175	225	270	$\pm 10\%$	450	0.60	V500	60
KRVD1206G241NXV501GZCENNNT	190	240	300	$\pm 10\%$	495	0.60	V500	50
KRVD1206G261NXV501GZCENNNT	200	260	330	$\pm 10\%$	545	0.60	V500	50
KRVD1206G281NXV501GZCENNNT	230	280	360	$\pm 10\%$	595	0.60	V500	50
KRVD1206G301NXV501GZCENNNT	250	300	390	$\pm 10\%$	650	0.60	V500	50
KRVD1206G361NXV501GZCENNNT	275	350	430	$\pm 10\%$	705	0.60	V500	50
KRVD1206H351NXA201TWSNNNT	275	350	430	$\pm 10\%$	705	0.60	200	50
KRVD1206G351NXA101SZSNNNT	275	350	430	$\pm 10\%$	705	0.60	100	50
KRVD1206G381NXV501GZCENNNT	300	380	470	$\pm 10\%$	775	0.60	V500	50
KRVD1206H381NXA201TWSNNNT	300	380	470	$\pm 10\%$	775	0.60	200	50
KRVD1206G381NXA101SZSNNNT	300	380	470	$\pm 10\%$	775	0.60	100	50
KRVD1206G421NXV501GZCENNNT	320	420	510	$\pm 10\%$	850	0.60	V500	50
KRVD1206G461NXV501GZCENNNT	350	460	560	$\pm 10\%$	925	0.60	V500	40
KRVD1210G181NXV751GZCENNNT	140	180	220	$\pm 10\%$	380	0.60	V750	100
KRVD1210G181NXA351TWSNNNT	140	180	220	$\pm 10\%$	380	0.60	350	100
KRVD1210G201NXV751GZCENNNT	150	200	240	$\pm 10\%$	415	0.60	V750	100
KRVD1210G201NXA351TWSNNNT	150	200	240	$\pm 10\%$	415	0.60	350	100
KRVD1210G221NXA251GZCENNNT	175	225	270	$\pm 10\%$	450	0.80	250	100

KRVD1210G221NXA401GZCENNNT	175	225	270	±10%	450	0.80	400	100
KRVD1210H221NXA801TWSNNNT	175	225	270	±10%	450	0.80	800	100
KRVD1210G261NXV751GZCENNNT	200	260	330	±10%	705	0.60	V750	50
KRVD1210G261NXA200GZCENNNT	200	260	330	±10%	705	0.60	200	50
KRVD1210G281NXV751GZCENNNT	230	280	360	±10%	595	0.60	V750	50
KRVD1210G301NXV751GZCENNNT	250	300	390	±10%	650	0.60	V750	50
KRVD1210G301NXA201TWSNNNT	250	310	390	±10%	650	0.80	200	90
KRVD1210G361NXV751GZCENNNT	275	350	430	±10%	705	0.80	V750	80
KRVD1210G351NXA201SZSNNNT	275	350	430	±10%	705	0.80	200	80
KRVD1210G351NXA501TWSNNNT	275	350	430	±10%	705	0.80	500	80
KRVD1210G381NXV751GZCENNNT	300	380	470	±10%	775	0.80	V750	80
KRVD1210G381NXA201SZSNNNT	300	380	470	±10%	775	0.80	200	80
KRVD1210G381NXA501TWSNNNT	300	380	470	±10%	775	0.80	500	80
KRVD1210G421NXV751GZCENNNT	320	420	510	±10%	850	0.80	V750	70
KRVD1210G421NXA351TWSNNNT	320	420	510	±10%	850	0.80	350	70
KRVD1210G461NXV751GZCENNNT	350	460	560	±10%	925	0.80	V750	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 4532~12CL
- 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/ Surge voltage	Capacitance
	AC	DC	@1mA DC		8/20 μs 1A	10/100 μs	8/20 μs / (1.2/50 μs , 2 Ω)	@ 1kHz
	V_{RMS} (V)	V_{DC} (V)	V_{B} (V)		V_{C} (V)	E_{T} (J)	I_{p} (A) /Vsurge	C (pF)
KRVD1812G221NXA401GZCENNNT	175	225	270	$\pm 10\%$	450	0.90	400	100
KRVD1812G221NXA102TWSNNNT	175	225	270	$\pm 10\%$	450	0.90	1000	100
KRVD1812G221NXA202TWSNNNT	175	225	270	$\pm 10\%$	450	0.90	2000	100
KRVD1812G351NXA401GZCENNNT	275	350	430	$\pm 10\%$	705	0.90	400	80
KRVD1812G351NXA801TWSNNNT	275	350	430	$\pm 10\%$	705	0.90	800	80
KRVD1812G351NXA102TWSNNNT	275	350	430	$\pm 10\%$	705	0.90	1000	80
KRVD1812G381NXA401GZCENNNT	300	380	470	$\pm 10\%$	775	0.90	400	60
KRVD1812G381NXA801TWSNNNT	300	380	470	$\pm 10\%$	775	0.90	800	60
KRVD1812G381NXA102TWSNNNT	300	380	470	$\pm 10\%$	775	0.90	1000	60
KRVD1812G421NXA401GZCENNNT	320	420	510	$\pm 10\%$	850	0.90	400	50
KRVD1812G421NXA801TWSNNNT	320	420	510	$\pm 10\%$	850	0.90	800	50
KRVD1812G461NXA401GZCENNNT	350	460	560	$\pm 10\%$	925	0.90	400	50
KRVD1812G461NXA801TWSNNNT	350	460	560	$\pm 10\%$	925	0.90	800	50
KRVD2220G351NXA701GZCENNNT	275	350	430	$\pm 10\%$	710	2.00	700	380
KRVD2220G351NXA801TWSNNNT	275	350	430	$\pm 10\%$	710	2.00	800	380
KRVD2220G351NXA102TWSNNNT	275	350	430	$\pm 10\%$	710	2.00	1000	380
KRVD2220G381NXA701GZCENNNT	300	380	470	$\pm 10\%$	775	2.00	700	250
KRVD2220G381NXA801TWSNNNT	300	380	470	$\pm 10\%$	775	2.00	800	250
KRVD2220G381NXA102TWSNNNT	300	380	470	$\pm 10\%$	775	2.00	1000	250
KRVD2220G381NXA182TWSNNNT	300	380	470	$\pm 10\%$	775	2.00	1800	250
KRVD2220G421NXA801GZCENNNT	320	420	510	$\pm 10\%$	850	1.00	800	180
KRVD2220G461NXA801GZCENNNT	350	460	560	$\pm 10\%$	925	1.00	800	120
KRVD3220G101NXA501TWSNNNT	75	100	120	$\pm 10\%$	200	3.00	500	450
KRVD3220G201NXA501TWSNNNT	150	200	240	$\pm 10\%$	360	3.00	500	300
KRVD3220G221NXA501TWSNNNT	175	225	270	$\pm 10\%$	380	3.00	500	250
KRVD3220G301NXA501TWSNNNT	250	300	390	$\pm 10\%$	650	3.00	500	120
KRVD3220G351NXA502TWSNNNT	275	350	430	$\pm 10\%$	710	4.50	500	100
KRVD3220G381NXA501TWSNNNT	300	380	470	$\pm 10\%$	775	5.00	500	80
KRVD3225G351NXA502ZQHNNNT	275	350	430	$\pm 10\%$	710	4.50	500	100
KRVD3225G381NXA501ZQHNNNT	300	380	470	$\pm 10\%$	775	5.00	500	80

KRVD4032G101NXA501ZQHNNNT	75	100	120	±10%	200	5.00	500	500
KRVD4032G301NXA501ZQHNNNT	250	300	390	±10%	650	5.00	500	200
KRVD4032G351NXA501ZQHNNNT	275	350	430	±10%	710	5.00	500	160
KRVD4032G381NXA501ZQHNNNT	300	380	470	±10%	775	5.00	500	135
KRVD4840G101NXA501ZQHNNNT	75	100	120	±10%	200	5.00	500	350
KRVD4840G301NXA501ZQHNNNT	250	300	390	±10%	650	5.00	500	320
KRVD4840G351NXA451ZQHNNNT	275	350	430	±10%	710	5.00	450	180
KRVD4840G381NXA451ZQHNNNT	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

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

■ Specifications

GRACE Varistor Part number	Working voltage		Breakdown voltage		Clamping voltage	Transient energy	Peak current	Capacitance
	AC	DC	@1mA DC		8/20 μs 1A	10/100μs	8/20μs	@ 1kHz
	V _{RMS} (V)	V _{DC} (V)	V _B (V)		V _C (V)	E _T (J)	I _p (A)	C (pF)
KRVD0201E5R0N150AXHGANNNT	3.3	5.0	8	±20%	15	0.01	5	15
KRVD0201E5R0N330AXHGANNNT	3.3	5.0	8	±20%	15	0.01	5	33
KRVD0201E5R5N150AXHGANNNT	4	5.5	12	±20%	20	0.01	5	15
KRVD0201E5R5N330AXHGANNNT	4	5.5	12	±20%	20	0.01	5	33
KRVD0201E5R5N500AXHGANNNT	4	5.5	12	±20%	20	0.01	5	50
KRVD0201E5R5N101AXHGANNNT	4	5.5	12	±20%	20	0.01	5	100
KRVD0201E180N150AXHGANNNT	14	18	27	±10%	50	0.01	5	15
KRVD0201E180N5R0AXHGANNNT		18	30	±10%	50	0.01	5	5
KRVD0201E240N2R5AXTWSNNNT		24	120	±20%	200	0.01	3	2.5
KRVD0402E5R5N330AXRBTNNNT	4	5.5	12	±10%	20	0.02	10	33
KRVD0402E5R5N500AXSZSNNNT	4	5.5	12	±10%	20	0.02	10	50
KRVD0402E5R5N800AXSZSNNNT	4	5.5	12	±10%	20	0.02	10	80
KRVD0402E5R5N101AXSZSNNNT	4	5.5	12	±10%	20	0.02	10	100
KRVD0402E120N100AXTWTNNNT	9	12	14	±10%	55	0.05	10	10
KRVD0402E140N500AXSZSNNNT	11	14	18	±10%	55	0.05	10	40
KRVD0402E180N150AXSZSNNNT	14	18	27	±10%	55	0.05	10	15
KRVD0402E240N2R5AXSZSNNNT		24	100	±20%	198	0.05	10	2.5
KRVD0603E5R0N500AXSZSNNNT	4	5	12	±10%	18	0.20	10	50
KRVD0603E180N100AXSZSNNNT	14	18	27	±10%	50	0.20	10	10
KRVD0603E240N2R5AXSZSNNNT		24	100	±20%	198	0.20	10	2.5

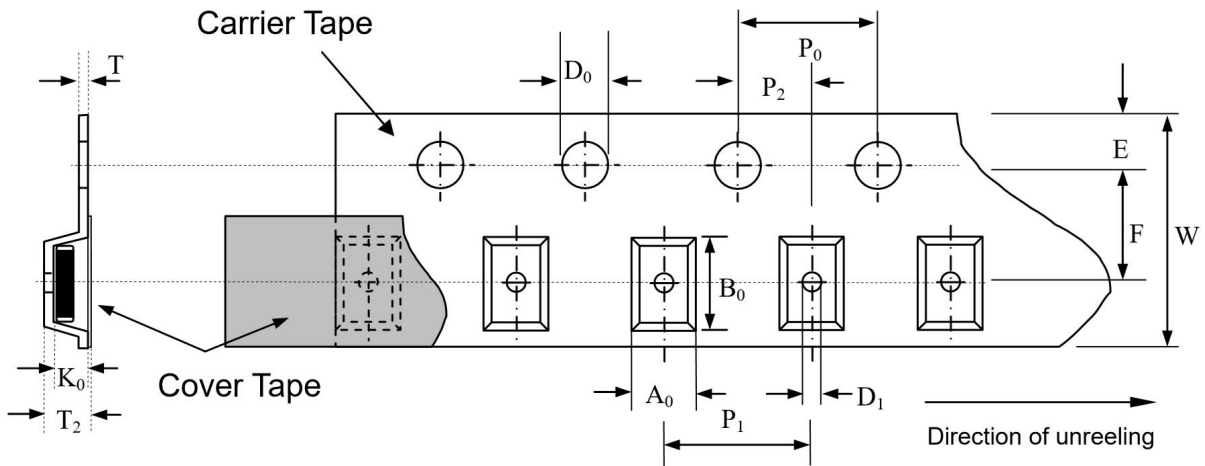
Notes:

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

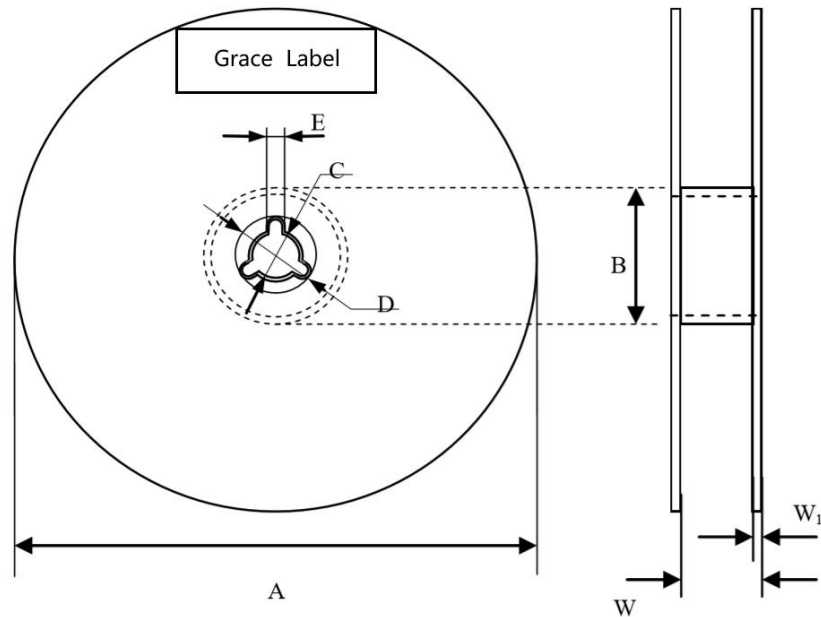
Packaging Specification

- 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 ± 0.10	B_0 ± 0.10	K_0 ± 0.10	T ± 0.05	T_2 ± 0.05	D_0 $+0.10$ -0.00	D_1 ± 0.05	P_1 ± 0.10	P_2 ± 0.05	P_0 ± 0.05	W ± 0.20	E ± 0.10	F ± 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 ₁
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	500/ 1000/ 3000	500/ 1000
Minimum ordering			-	4000	4000	3000	2000/ 3000	1500/ 3000	500/ 1000/ 3000	500/ 1000

New Product I

■ Specifications

- Low Capacitance 1pF
- Low Leakage Current < 0.1 uA

Type: 0402~0603

GRACE Varistor Part number	Max.Operating Volitage	Breakdown voltage	Clamping voltage	Transient energy	Peak current	Capacitance
	DC	@1mA DC	8/20 μs 1A	10/100μs	8/20μs	@ 1kHz
	V _{DC} (V)	V _B (V)	V _c (V)	E _T (J)	I _p (A)	C(pF)
KRVD0603E180N1R0AXSZSNNNT	18	64~96	240	0.01	~	1±0.3pf
KRVD0603E240N0R5AXSZSNNNT	24	100~160	300	0.01	~	0.5±0.3pf
KRVD0402E180N1R0AXSZSNNNT	18	64~96	240	0.01	~	1±0.3pf
KRVD0402E240N0R5AXSZSNNNT	24	100~160	300	0.01	~	0.5±0.3pf

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

Standard series

KRVD **0603** **E** **180** **N** **1R0** **AX** **SZS** **NNN** **T**
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

- ① production series: GRACE ESD/ Varistor
- ② size: 0402=1005, 0603=1608
- ③ type: E: ESD ;G:general ; H: high energy; S:high speed
- ④ working voltage (DC): 5R6=5.6V, 120=12V, 180=18V, 240=24V, 300=30V
- ⑤ end termination: S: Ag/Pd N: Ag/Ni/Sn
- 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, 1R0=1PF, 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.: SZS
- ⑨ customer identification code:NNN
- ⑩ package: T: taping B: bulk

New Product II

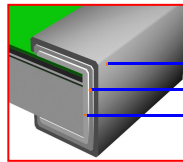
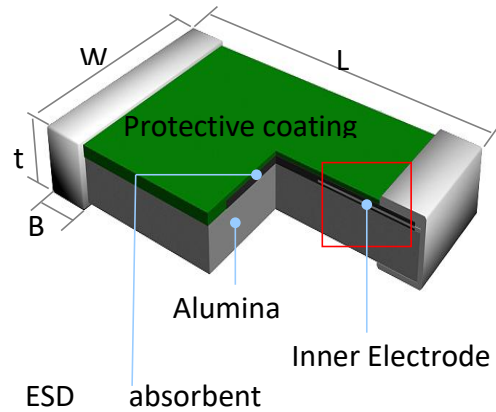
Specifications

- Excellent ESD clamping & Small Insertion Loss
- High transient current capability, Fastest response time
- Capacitance is designed to ultra-low value, which can be efficiently suitable to high speed data line.
- EU-RoHS Compliance

Applications

- CMOS and MOSFET protection from ESD
- Computer ESD and I/O protection
- Telecommunication transient protection
 - USB2.0 port, IEEE-1394, RF module, Antenna circuit, high speed Protocol Etc.

Shape & Dimension



Solder layer, Sn
Barrier, Ni
External Electrode,

unit : mm

SIZE	L	W	t	B
1608	1608 ± 0.2	0.8 ± 0.2	0.55 ± 0.1	0.4 ± 0.2

SIZE	L	W	t	B
1005	1.0 ± 0.1	0.5 ± 0.1	0.40 ± 0.1	0.2 ± 0.1

Standard series

KRVD **0603** **E** **300** **C** **0R15** **AX** **HGJ** **NNN** **T**
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① production series: GRACE ESD/ Varistor

② size: 0402=1005, 0603=1608

③ type: E:ESD, G:general, H:high energy, S:high speed

④ working voltage (DC): 5R0=5V, 120=12V, 300=30V

⑤ capacitance: C: ≤ 0.5 pf

⑥ typical capacitance value measured : 100=10PF, 1R0=1PF, 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.: HGJ

⑨ customer identification code: NNN

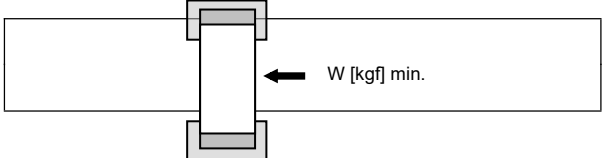
⑩ package: T: taping B: bulk

Type: 0402~0603

GRACE ESD Part number	Capacitance	Trigger Voltage	Clamping Voltage	Continuous Operating Voltage	Attenuation	ESD Capability*
KRVD0402E5R0C0R15AXHGJNNNT	0.15pf	200V	86V	5V	-0.3dB at 10GHz	8kV, contact
KRVD0402E120C0R15AXHGJNNNT	0.15pf	300V	100V	12V	-0.3dB at 10GHz	8kV, contact
KRVD0603E5R0C0R15AXHGJNNNT	0.15pf	200V	86V	5V	-0.3dB at 10GHz	8kV, contact
KRVD0603E300C0R15AXHGJNNNT	0.15pf	300V	100V	30V	-0.3dB at 10GHz	8kV, contact

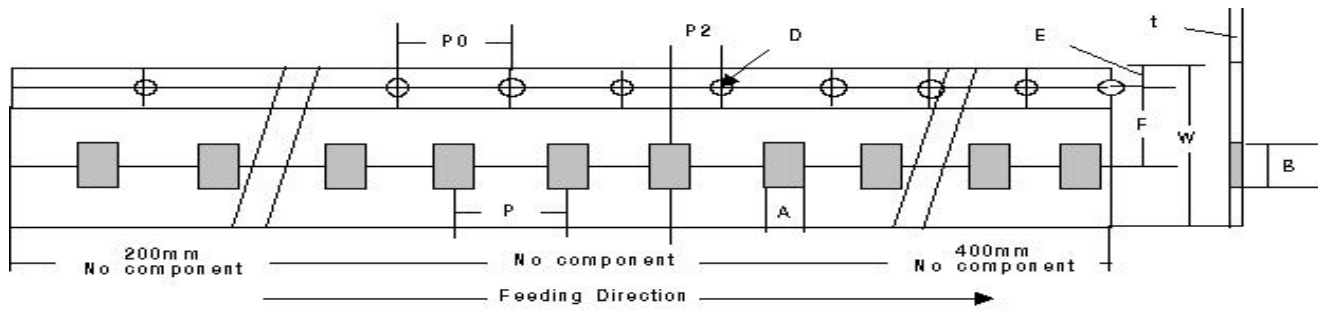
* Per IEC 61000-4-2, 30A@8kV, level 4, clamp measurement made 30ns after initiation of pulse, . all test in contact discharge mode

■ Performance specifications

No	Item	Requirements	Test method
1	Operation Range	1. -40°C ~ 85°C	
2	Leakage current	1. Satisfaction to the specification, under 1uA	1. Applied voltage : specified working voltage
3	Capacitance	1. Satisfaction to the specification, under 1pF	1. Frquency & OSC level : 1MHz, 1.0Vrms
4	Solderability	1. More than 90% of the terminal electrode shall be covered with new solder.	1. Type of solder : H63A 2. Soldering Temp & Time : 230+/-5°C, 5+/-1 sec
5	Reflow soldering	1. No Serious mechanical damage 2. More than 50% of the terminal electrode shall be covered with new solder 3. Leakage Current : ≤ 10uA	1. Type of solder : H63A 2. Temp & Time : max 260+/-5°C, min 10sec * Refer to the soldering profile of page 6
6	Humidity Load Test		1. Test Temp. & Relative Humidity & Time : 85+/- 5°C, 85 +/- 5% RH, Vw Applied, 500 +/- 12hrs
7	Thermal Shock	1. No Serious mechanical damage 2. Leakage Current : ≤ 10uA	1. Step 1 : -40 +/- 5°C, Step 2 : 85 +/- 5°C 2. Cycle : 30min ± 3min, each 5 cycles
8	High Temp. Test		1. Temp. & time : 85+/-5°C , 1000 +/- 24hrs
9	Adhesive strength	1. No Serious mechanical damage under condition of 1005 : min 0.5kgf, 1608 : min 1.0kgf	
10	ESD	1. No mechanical damage after test 2. Leakage Current : ≤ 10uA * ESD gun (IEC61000-4-2 standard) * C=150pF R=330Ω	1. Contact discharge * Voltage : +/-8kV(Level 4) * Number : 10 times in 10sec 2. Air discharge * Voltage : +/-15kV(Level 4) * Number : 10 times in 10sec

Packing specifications

1. Carrier tape



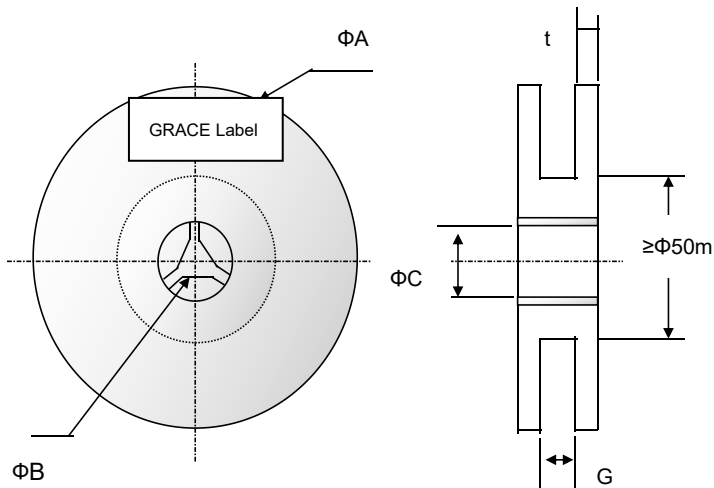
Size	A	B	W	D	E	F	P	P0	P2	t
0402=1005	0.65+/-0.10	1.15+/-0.10	8.00+/-0.20	1.50+/-0.25	1.75+/-0.10	3.50+/-0.50	2.0+/-0.1	4.0+/-0.10	2.0+/-0.10	1.1max
0603=1608	1.10+/-0.10	1.90+/-0.10					4.0+/-0.1			

* paper type

unit :mm

type		1005	1608
quantity	paper	10000	5000
	plastic	-	-
Minimum ordering		-	5000

2. Reel & Label [Plastic Reel]

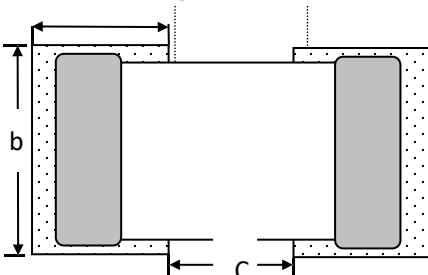


unit :
mm

code	dimension
ΦA	178+/-2.0
ΦB	13.0+/-0.5
ΦC	22.0+/-2.0
G	10.0+/-1.5
t	2.5+/-0.5

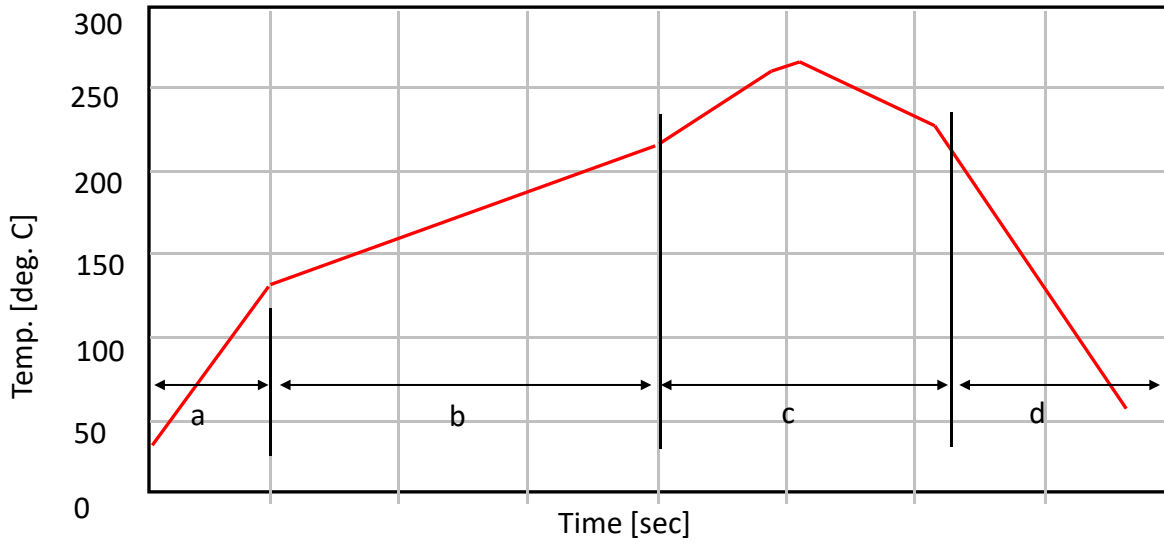
Recommended Soldering condition

1) Land Pattern Design



Code	Land Dimension with Chip Size [mm]			
	0201=0603	0402=1005	0603=1608	0805=2012
a	0.20~0.35	0.30~0.50	0.60~0.70	0.60~0.70
b	0.25~0.40	0.40~0.60	0.60~0.80	0.80~1.10
c	0.25~0.40	0.30~0.50	0.60~0.80	1.00~1.20

2) Reflow Soldering



Zone	temp. range [deg. C]	time [sec]	Remark
a	Curing RT ~ 130	60	* Solder : Sn-Ag-Cu * 260deg. C, over 10sec
b	Preheat max 220	90 ~ 150	
c	Soldering 220 ~ 260 [max 270]	90 ~ 150	
d	Cooling 220 ~ RT	min 60	

3) Soldering Iron

