CUSTOMER：_____

APPROVAL SHEET

PRODUCT NAME：Varistor

CUSTOMER P/N: _____

PART NUMBER: SR SERIES

Prepared: Qun Ou

Approved: Janus ding

Issue Date：May 3, 2013

RoHS

CUSTOMER APPROVAL:

Metal Oxide Varistor (MOV)

■ How to Order

SR	241	K	10	D	S	40	X
Type code	**Varistor Voltage**	**Tolerance**	**Disk Size Code**	**Disk Type**	**Lead Type Taping Code**	**Lead Cutting &**	**Special Request**
SR: Walsin Varistor SINCERA is brand name of Walsin	(DC volt) (From 180 to 112) Two significant digits Followed by no. of zeros 180=18volt 101=100volt 102=1000volt	J: +/-5% K:+/-10%	05: 5mm 07: 7mm 10: 10mm 14: 14mm 18: 18mm 20: 20mm 25: 25mm	D: Standard disk type E: High energy disk type	S: Straight lead L: Inline crimped O: Outward Crimped I: Inward Crimped Taping Code (Please see below)	Lead Cutting for Bulk Packing: 40 = 4.0±1.0mm 65 = 6.5±1.0mm P1=11±1.0mm No code ≧ 25mm	● Special lead cutting tolerance ● Special lead spacing (Please see below) ● Special varistor voltage range … etc

■ Varistor Special Request

F: 0.5mm lead length tolerance for short lead cutting

X: 7.5mm lead spacing for 20D and 20E (lead wire is 0.8mm diameter)

Y:10.0mm lead spacing for 18E (lead wire is 1.0mm diameter)

Z: 5mm lead spacing for 10D(E), 14D(E)

H: special request

■ Varistor Part Number Examples:

Ex.1. SR241K07DT14: 7mm, 241K, inward crimped lead and reel taped.

Ex.2. SR361K10DI45: 10mm, 361K, bulk packing, inward crimped lead, lead cutting length 4.5 ±1.0mm

Ex.3. SR621K20EOP2: 20mm, 621K, high energy, bulk, outward crimped lead, lead spacing 12mm±1.0mm.

Ex.4. SR271K20DO65X: 20mm, 271K, bulk, outward crimped lead, lead spacing 7.5 mm, lead cutting 6.5 ± 1.0mm

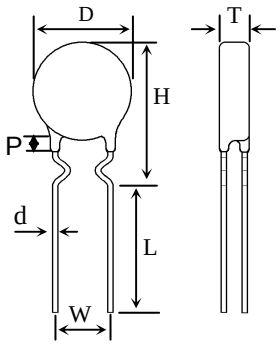
Ex.5. SR241K10DS4F: 10mm, 241K, bulk, straight lead, lead cutting 4.0 ± 0.5mm.

■ Dimensions Quick Reference: If specific item's dimensions, please contact sales

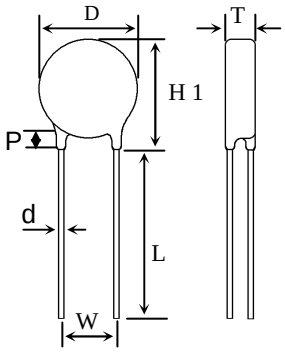
Series	5D, 5E	7D, 7E	10D, 10E	14D, 14E	18E	20D, 20E	25D
Dmax	7.0	9.5	14.0	17.5	21.0	24.0	28.5
d*	0.6	0.6	0.8	0.8	0.8	1.0	1.0
W**	5.0	5.0	7.5	7.5	7.5	10.0	12.7
Hmax	12.5	14.5	20.0	22.5	27.5	29.5	36.5
H1max	10.0	12.0	17.0	20.5	24.0	28.0	34
Tmax	4.9	4.9	8.5	8.5	9.0	9.0	9.5
Pmax	3.0	3.0	3.0	3.0	3.0	3.0	3.0

*± 0.02 **± 1.0 (Unit: mm)

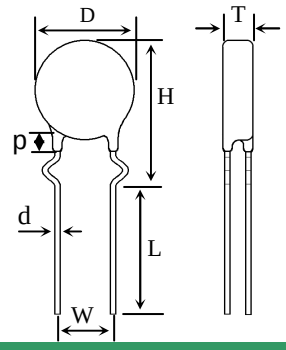
Inward Crimped



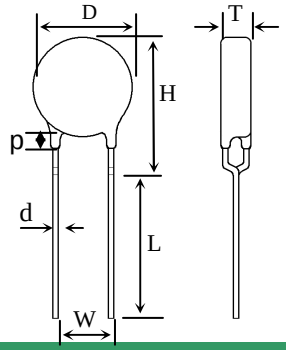
Straight Lead



Outward Crimped



Inline Crimped



Remark:
The lead length (L) is 25mm minimum unless requested by customers; please refer to lead cutting code in "How to order".

Metal Oxide Varistor (MOV)

■ Characteristics

- High performance transient voltage suppression
- Short response time to surge voltage
- Low standby power dissipation
- Excellent clamping characteristics
- High performance withstanding surge currents
- High reliability
- UL, CSA, VDE and SEV recognized

■ Applications

- Surge protection in:
  - consumer electronics
  - industrial electronics
  - communication electronics
  - measuring and controlling systems
  - electronic home appliances
- Protection against surges induced by lighting striking incoming power lines.
- Suppression of surges caused by switching inductive loads such as transformers, relays and coils.
- Protection of rectification diodes, SCRs, power transistors, semiconductor devices, etc.

■ Definition of Varistor Terms

Rated RMS Voltage, Rated DC Voltage：

The maximum designated values of power system voltage that may be applied continuously between the terminals of a device.

Varistor Voltage：

Test characteristic that is used to classify varistors by type. A test current of 1mA DC is typically used to determine varistor voltage classification type. Varistor voltage clamping characteristics can be defined at various test levels.

Rated Peak Single Pulse Transient Current：

Maximum surge current, 8/20μs waveform which a varistor is rated to withstand for a single surge.

Rated Single Pulse Transient Energy：

Maximum allowable energy for a single impulse (see specified waveforms).

Maximum Clamping Voltage：

Measured peak voltage across the device terminals when a current impulse of specified amplitude and waveform is conducted through the varistor.

Typical Capacitance：

Typical capacitance values are measured at a test frequency of 1kHz. Capacitance values are only for reference purpose only, not subject to outgoing inspection.

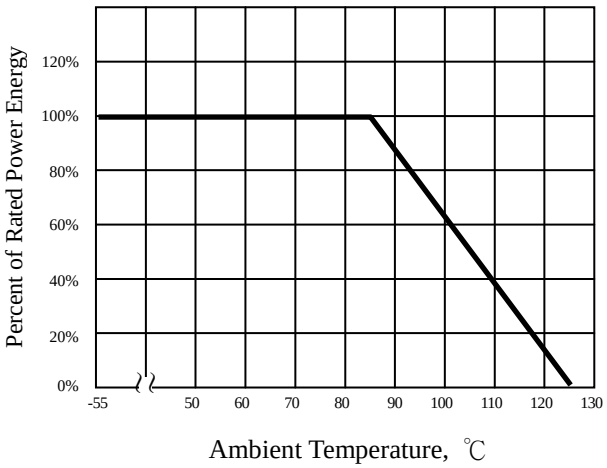
■ General Characteristics

Storage Temperature： －55℃ to ＋125℃
Operating Surface Temperature： 125℃
Operating Ambient Temperature： －55℃ to ＋85℃（without derating）
Maximum Voltage-Temperature Coefficient：＜－0.05%／℃
Insulation Resistance： 1000 Mega-ohm minimum
Hi Pot (Leads To Case, 1 Min.) ： 2500 VDC
Typical Response Time： ＜15 Nano-seconds
Epoxy Rating： 94V-0
Current/Energy Derating (＞85℃)： －2.5 %／℃
DC Leakage Current： 200μA maximum (at rated DC working voltage)
Solder ability： MIL-STD-202F
Power Dissipation Ratings(P, in-watts)：

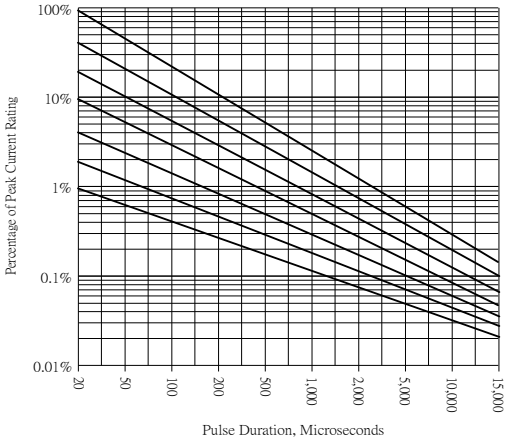
Disc Size	11Vac～40Vac	50Vac～680Vac
5mm	0.01	0.15
7mm	0.02	0.25
10mm	0.05	0.4
14mm	0.1	0.6
18mm	—	0.8
20mm	0.2	1.0
25mm	—	1.2
32mm	—	1.6
34mm(single)	—	2.1
34mm(dual)	—	2.73
40mm	—	2.1
53mm	—	2.5

All definitions are according to IEEE specifications C62.33.

■ Energy Derating Versus Temperature



■ Peak Current Per Pulse Versus Pulse Duration



Number of Pulses on Order From 100% Respectively:

1 Pules
10 Puleses
10^2 Pulses
10^3 Pulses
10^4 Pulses
10^5 Pulses
10^6 Pulses

Varistors－5D Series

Part Number	Maximum Allowable Voltage		Varistor* Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy		Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	2ms	10/1000μs	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules		PF	
SR180K05D□□	11	14	16	20	100	36	1	0.4	0.6	1500	○ △ ◇
SR220K05D□□	14	18	20	24	100	43	1	0.6	0.8	1260	○ △ ◇
SR270K05D□□	17	22	24	30	100	53	1	0.7	0.9	1050	○ △ ◇
SR330K05D□□	20	26	30	36	100	65	1	0.9	1.2	850	○ △ ◇
SR390K05D□□	25	31	35	43	100	77	1	1.1	1.3	600	○ △ ◇
SR470K05D□□	30	38	42	52	100	93	1	1.4	1.6	500	○ △ ◇
SR560K05D□□	35	45	50	62	100	110	1	1.5	1.9	400	○ △ ◇
SR680K05D□□	40	56	61	75	100	135	1	1.8	2.3	360	○ △ ◇
SR820K05D□□	50	66	74	90	400	135	5	2.4	3.0	350	○ △ ◇
SR101K05D□□	60	85	90	110	400	165	5	2.4	3.5	320	○ △ ◇
SR121K05D□□	75	102	108	132	400	200	5	3.0	5.0	250	○ △ ◇
SR151K05D□□	95	127	135	165	400	250	5	3.5	5.5	180	○ △ ◇
SR181K05D□□	120	160	170	207	400	320	5	4.2	8.0	155	○ △ ☆◇
SR201K05D□□	130	175	185	225	400	340	5	5.0	8.5	140	○ △ □ ☆◇
SR221K05D□□	140	180	198	242	400	360	5	6.0	9.0	125	○ △ □ ☆◇
SR241K05D□□	150	200	216	264	400	395	5	6.5	10.0	115	○ △ □ ☆◇
SR271K05D□□	180	230	255	311	400	475	5	7.5	11.0	105	○ △ □ ☆◇
SR301K05D□□	195	250	270	330	400	525	5	8.0	11.5	95	○ △ □ ☆◇
SR331K05D□□	210	275	297	363	400	540	5	8.5	11.7	85	○ △ □ ☆◇
SR361K05D□□	230	300	324	396	400	595	5	9.0	13.0	80	○ △ □ ☆◇
SR391K05D□□	250	330	351	429	400	650	5	10	15	75	○ △ □ ☆◇
SR431K05D□□	275	370	387	473	400	710	5	11	16	65	○ △ □ ☆◇
SR471K05D□□	300	385	423	517	400	775	5	13	19	55	○ △ □ ☆◇
SR511K05D□□	320	420	459	561	400	865	5	15	21	39	○ △ □ ☆
SR561K05D□□	360	470	522	638	400	960	5	17	25	36	○ △ □ ☆
SR621K05D□□	390	505	558	682	400	1040	5	19	27	33	○ △ □ ☆
SR681K05D□□	420	560	612	748	400	1120	5	21	30	30	○ △ □ ☆

Remark:

1. □□: Suffix adding; please refer "**How to Order**" for details
2. All parts approved as follows:
   (1) ○**: UL 1449** recognized (File # E172311).
   (2) △**: UL 497B** recognized (File # E199593).
   (3) □**: UL 1414** recognized (File # E182369).
   (4) ☆**: CSA** 22.2 #1 certified (File # LR109496-1 and LR109496-4).
   (5) ◇**: VDE**/CECC 42000/42200/42201, IEC 61051-1/61051-2/61051-2-2 (Certificate # 5932, 40010090, 40003435)
3. Varistor voltage: 5ϕ series measured at @ 1mA DC pulse current

Varistors – 7D Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 µS)	Max. Clamping Voltage (8/20 µS)		Maximum Energy		Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	2ms	10/1000µs	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules		PF	
SR180K07D□□	11	14	16	20	250	36	2.5	0.8	1.0	2900	○ △ ◇
SR220K07D□□	14	18	20	24	250	43	2.5	0.9	1.3	2400	○ △ ◇
SR270K07D□□	17	22	24	30	250	53	2.5	1.0	1.4	1800	○ △ ◇
SR330K07D□□	20	26	30	36	250	65	2.5	1.2	1.7	1500	○ △ ◇
SR390K07D□□	25	31	35	43	250	77	2.5	1.5	2.1	1230	○ △ ◇
SR470K07D□□	30	38	42	52	250	93	2.5	1.8	2.5	950	○ △ ◇
SR560K07D□□	35	45	50	62	250	110	2.5	2.2	3.1	890	○ △ ◇
SR680K07D□□	40	56	61	75	250	135	2.5	2.5	3.8	850	○ △ ◇
SR820K07D□□	50	66	74	90	1200	135	10	3.5	5.5	830	○ △ ◇
SR101K07D□□	60	85	90	110	1200	165	10	4.0	6.5	730	○ △ ◇
SR121K07D□□	75	102	108	132	1200	200	10	5.0	7.8	570	○ △ ◇
SR151K07D□□	95	127	135	165	1200	250	10	6.5	9.7	400	○ △ ◇
SR181K07D□□	120	160	170	207	1200	300	10	8.8	12.0	305	○ △ ☆◇
SR201K07D□□	130	175	185	225	1200	340	10	10.0	13.0	275	○ △ □ ☆◇
SR221K07D□□	140	180	198	242	1200	360	10	11.0	14.0	250	○ △ □ ☆◇
SR241K07D□□	150	200	216	264	1200	395	10	11.0	16.0	230	○ △ □ ☆◇
SR271K07D□□	180	230	255	311	1200	455	10	12.0	18.0	205	○ △ □ ☆◇
SR301K07D□□	195	250	270	330	1200	505	10	13.0	19.0	185	○ △ □ ☆◇
SR331K07D□□	210	275	297	363	1200	540	10	14.0	20.0	170	○ △ □ ☆◇
SR361K07D□□	230	300	324	396	1200	595	10	15.0	25.0	155	○ △ □ ☆◇
SR391K07D□□	250	330	351	429	1200	650	10	17.0	26.0	145	○ △ □ ☆◇
SR431K07D□□	275	370	387	473	1200	710	10	20.0	28.0	130	○ △ □ ☆◇
SR471K07D□□	300	385	423	517	1200	775	10	21.0	30.0	115	○ △ □ ☆◇
SR511K07D□□	320	420	459	561	1200	850	10	23.0	32.0	88	○ △ □ ☆◇
SR561K07D□□	360	470	522	638	1200	960	10	27.0	39.0	85	○ △ □ ☆◇
SR621K07D□□	390	505	558	682	1200	1040	10	29.0	43.0	82	○ △ □ ☆◇
SR681K07D□□	420	560	612	748	1200	1120	10	32.0	45.0	78	○ △ □ ☆◇

Remark:

1. □□: Suffix adding; please refer "**How to Order**" for details
2. All parts approved as follows:
   (1) ○**: UL 1449** recognized (File # E172311).
   (2) △**: UL 497B** recognized (File # E199593).
   (3) □**: UL 1414** recognized (File # E182369).
   (4) ☆**: CSA** 22.2 #1 certified (File # LR109496-1 and LR109496-4).
   (5) ◇**: VDE**/CECC 42000/42200/42201, IEC 61051-1/61051-2/61051-2-2 (Certificate # 5932, 40010090, 40003435)

Varistors－10D Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy		Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	2ms	10/1000μs	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules		PF	
SR180K10D□□	11	14	16	20	500	36	5	1.5	2.1	6000	○ △ ◇
SR220K10D□□	14	18	20	24	500	43	5	2.0	2.5	5000	○ △ ◇
SR270K10D□□	17	22	24	30	500	53	5	2.5	3.0	4000	○ △ ◇
SR330K10D□□	20	26	30	36	500	65	5	3.0	4.0	3500	○ △ ◇
SR390K10D□□	25	31	35	43	500	77	5	3.5	4.6	3100	○ △ ◇
SR470K10D□□	30	38	42	52	500	93	5	4.5	5.5	2800	○ △ ◇
SR560K10D□□	35	45	50	62	500	110	5	5.5	7.0	2400	○ △ ◇
SR680K10D□□	40	56	61	75	500	135	5	6.5	8.2	2100	○ △ ◇
SR820K10D□□	50	66	74	90	2500	135	25	8.0	12.0	1600	○ △ ◇
SR101K10D□□	60	85	90	110	2500	165	25	10.0	15.0	1400	○ △ ◇
SR121K10D□□	75	102	108	132	2500	200	25	12.0	18.0	1200	○ △ ◇
SR151K10D□□	95	127	135	165	2500	250	25	16.0	22.0	1100	○ △ ◇
SR181K10D□□	120	160	170	207	2500	300	25	18.5	27.5	700	○ △ ☆◇
SR201K10D□□	130	175	185	225	2500	340	25	20.0	30.0	640	○ △ □ ☆◇
SR221K10D□□	140	180	198	242	2500	360	25	23.0	32.0	600	○ △ □ ☆◇
SR241K10D□□	150	200	216	264	2500	395	25	25.0	35.0	560	○ △ □ ☆◇
SR271K10D□□	180	230	255	311	2500	455	25	30.0	40.0	500	○ △ □ ☆◇
SR301K10D□□	195	250	270	330	2500	505	25	32.0	42.5	450	○ △ □ ☆◇
SR331K10D□□	210	275	297	363	2500	540	25	33.5	44.5	415	○ △ □ ☆◇
SR361K10D□□	230	300	324	396	2500	595	25	35.0	47.0	380	○ △ □ ☆◇
SR391K10D□□	250	330	351	429	2500	650	25	40.0	60.0	350	○ △ □ ☆◇
SR431K10D□□	275	370	387	473	2500	710	25	45.0	65.0	310	○ △ □ ☆◇
SR471K10D□□	300	385	423	517	2500	775	25	46.0	70.0	280	○ △ □ ☆◇
SR511K10D□□	320	420	459	561	2500	840	25	47.0	71.0	260	○ △ □ ☆◇
SR561K10D□□	360	470	522	638	2500	910	25	48.0	72.0	240	○ △ □ ☆◇
SR621K10D□□	390	505	558	682	2500	1025	25	49.0	73.0	150	○ △ □ ☆◇
SR681K10D□□	420	560	612	748	2500	1120	25	50.0	74.0	130	○ △ □ ☆◇
SR751K10D□□	460	615	675	825	2500	1240	25	51.0	75.0	120	○ △ □ ☆◇
SR781K10D□□	485	640	702	858	2500	1290	25	52.0	80.0	120	○ △ □ ☆◇
SR821K10D□□	510	675	738	902	2500	1350	25	55.0	85.0	110	○ △ □ ☆◇
SR911K10D□□	550	745	819	1001	2500	1400	25	60.0	93.0	90	○ □ ☆◇
SR102K10D□□	625	825	900	1100	2500	1650	25	65.0	102	80	○ □ ☆◇
SR112K10D□□	680	895	962	1175	2500	1815	25	70.0	115	70	○ □ ☆◇

Remark:

1. □□: Suffix adding; please refer "**How to Order**" for details
2. All parts approved as follows:
   (1) ○**: UL 1449** recognized (File # E172311).
   (2) △**: UL 497B** recognized (File # E199593).
   (3) □**: UL 1414** recognized (File # E182369).
   (4) ☆**: CSA** 22.2 #1 certified (File # LR109496-1 and LR109496-4).
   (5) ◇**: VDE**/CECC 42000/42200/42201, IEC 61051-1/61051-2/61051-2-2 (Certificate # 5932, 40010090, 40003435)

Varistors－14D Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy		Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	2ms	10/1000μs	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules		PF	
SR180K14D□□	11	14	16	20	1000	36	10	3.5	4.0	15000	○ △ ◇
SR220K14D□□	14	18	20	24	1000	43	10	4.0	5.0	12000	○ △ ◇
SR270K14D□□	17	22	24	30	1000	53	10	5.0	6.0	8500	○ △ ◇
SR330K14D□□	20	26	30	36	1000	65	10	6.0	7.5	7200	○ △ ◇
SR390K14D□□	25	31	35	43	1000	77	10	7.0	8.6	6300	○ △ ◇
SR470K14D□□	30	38	42	52	1000	93	10	8.5	10.0	5500	○ △ ◇
SR560K14D□□	35	45	50	62	1000	110	10	10.0	11.0	4800	○ △ ◇
SR680K14D□□	40	56	61	75	1000	135	10	12.0	14.0	4000	○ △ ◇
SR820K14D□□	50	66	74	90	4500	135	50	15.0	22.0	3300	○ △ ◇
SR101K14D□□	60	85	90	110	4500	165	50	20.0	30.0	2900	○ △ ◇
SR121K14D□□	75	102	108	132	4500	200	50	22.0	34.0	2600	○ △ ◇
SR151K14D□□	95	127	135	165	4500	250	50	30.0	45.0	2000	○ △ ◇
SR181K14D□□	120	160	170	207	4500	300	50	33	53.0	1400	○ △ ☆◇
SR201K14D□□	130	175	185	225	4500	340	50	38	60.0	1370	○ △ □ ☆◇
SR221K14D□□	140	180	198	242	4500	360	50	40	60.0	1150	○ △ □ ☆◇
SR241K14D□□	150	200	216	264	4500	395	50	45	66.0	1060	○ △ □ ☆◇
SR271K14D□□	180	230	255	311	4500	455	50	52	72.0	950	○ △ □ ☆◇
SR301K14D□□	195	250	270	330	4500	505	50	56	78.0	890	○ △ □ ☆◇
SR331K14D□□	210	275	297	363	4500	545	50	63	87.0	800	○ △ □ ☆◇
SR361K14D□□	230	300	324	396	4500	595	50	70	98.0	725	○ △ □ ☆◇
SR391K14D□□	250	330	351	429	4500	650	50	72	102	665	○ △ □ ☆◇
SR431K14D□□	275	370	387	473	4500	710	50	75	115	600	○ △ □ ☆◇
SR471K14D□□	300	385	423	517	4500	775	50	80	125	570	○ △ □ ☆◇
SR511K14D□□	320	420	459	561	4500	840	50	82	128	530	○ △ □ ☆◇
SR561K14D□□	360	470	522	638	4500	910	50	85	139	480	○ △ □ ☆◇
SR621K14D□□	390	505	558	682	4500	1025	50	88	142	270	○ △ □ ☆◇
SR681K14D□□	420	560	612	748	4500	1120	50	90	142	240	○ △ □ ☆◇
SR751K14D□□	460	615	675	825	4500	1240	50	100	143	210	○ △ □ ☆◇
SR781K14D□□	485	640	702	858	4500	1290	50	105	148	205	○ △ □ ☆◇
SR821K14D□□	510	675	738	902	4500	1350	50	110	157	200	○ △ □ ☆◇
SR911K14D□□	550	745	819	1001	4500	1400	50	120	175	175	○ □ ☆◇
SR102K14D□□	625	825	900	1100	4500	1620	50	130	190	145	○ □ ☆◇
SR112K14D□□	680	895	962	1175	4500	1800	50	140	215	140	○ □ ☆◇

Remark:

1. □□: Suffix adding; please refer "**How to Order**" for details
2. All parts approved as follows:
   (1) ○**: UL 1449** recognized (File # E172311).
   (2) △**: UL 497B** recognized (File # E199593).
   (3) □**: UL 1414** recognized (File # E182369).
   (4) ☆**: CSA** 22.2 #1 certified (File # LR109496-1 and LR109496-4).
   (5) ◇**: VDE**/CECC 42000/42200/42201, IEC 61051-1/61051-2/61051-2-2 (Certificate # 5932, 40010090, 40003435)

Varistors－20D Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy		Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	2ms	10/1000μs	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules		PF	
SR390K20D□□	25	31	35	43	2000	77	20	24	26	10000	○ △ ◇
SR470K20D□□	30	38	42	52	2000	93	20	30	33	9350	○ △ ◇
SR560K20D□□	35	45	50	62	2000	110	20	35	38	8000	○ △ ◇
SR680K20D□□	40	56	61	75	2000	135	20	40	43	6800	○ △ ◇
SR820K20D□□	50	66	74	90	6500	135	100	37	48	5600	○ △ ◇
SR101K20D□□	60	85	90	110	6500	165	100	38	50	4700	○ △ ◇
SR121K20D□□	75	102	108	132	6500	200	100	40	55	4100	○ △ ◇
SR151K20D□□	95	127	135	165	6500	250	100	50	70	3200	○ △ ◇
SR181K20D□□	120	160	170	207	6500	300	100	60	85	2500	○ △ ☆◇
SR201K20D□□	130	175	185	225	6500	340	100	70	95	2200	○ △ □ ☆◇
SR221K20D□□	140	180	198	242	6500	360	100	75	100	2000	○ △ □ ☆◇
SR241K20D□□	150	200	216	264	6500	395	100	82	110	1900	○ △ □ ☆◇
SR271K20D□□	180	230	255	311	6500	455	100	90	127	1700	○ △ □ ☆◇
SR301K20D□□	195	250	270	330	6500	505	100	100	135	1540	○ △ □ ☆◇
SR331K20D□□	210	275	297	363	6500	545	100	110	148	1400	○ △ □ ☆◇
SR361K20D□□	230	300	324	396	6500	595	100	120	163	1320	○ △ □ ☆◇
SR391K20D□□	250	330	351	429	6500	650	100	130	180	1210	○ △ □ ☆◇
SR431K20D□□	275	370	387	473	6500	710	100	140	190	1120	○ △ □ ☆◇
SR471K20D□□	300	385	423	517	6500	775	100	150	220	1000	○ △ □ ☆◇
SR511K20D□□	320	420	459	561	6500	840	100	152	222	950	○ △ □ ☆◇
SR561K20D□□	360	470	522	638	6500	910	100	154	226	900	○ △ □ ☆◇
SR621K20D□□	390	505	558	682	6500	1025	100	158	228	770	○ △ □ ☆◇
SR681K20D□□	420	560	612	748	6500	1120	100	160	230	700	○ △ □ ☆◇
SR751K20D□□	460	615	675	825	6500	1240	100	175	255	640	○ △ □ ☆◇
SR781K20D□□	485	640	702	858	6500	1290	100	180	265	590	○ △ □ ☆◇
SR821K20D□□	510	675	738	902	6500	1350	100	190	282	510	○ △ □ ☆◇
SR911K20D□□	550	745	819	1001	6500	1400	100	215	310	430	○ □ ☆◇
SR102K20D□□	625	825	900	1100	6500	1620	100	230	342	380	○ □ ☆◇
SR112K20D□□	680	895	962	1175	6500	1800	100	250	383	340	○ □ ☆◇

Remark:

1. □□: Suffix adding; please refer "**How to Order**" for details
2. All parts approved as follows:
   (1) ○**: UL 1449** recognized (File # E172311).
   (2) △**: UL 497B** recognized (File # E199593).
   (3) □**: UL 1414** recognized (File # E182369).
   (4) ☆**: CSA** 22.2 #1 certified (File # LR109496-1 and LR109496-4).
   (5) ◇**: VDE**/CECC 42000/42200/42201, IEC 61051-1/61051-2/61051-2-2 (Certificate # 5932, 40010090, 40003435)

Varistors－25D Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy		Typical Capacitance	Safety Approval	
	ACrms	DC	DC Volts		1 time	Vc	Ip	2ms	10/1000μs	@1kHz		
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules		PF		
SR181K25D□□	120	160	170	207	18000	300	100	90	180	3900	○	☆
SR201K25D□□	130	175	185	225	18000	340	100	100	200	3600	○	☆
SR221K25D□□	140	180	198	242	18000	360	100	105	225	3300	○	☆
SR241K25D□□	150	200	216	264	18000	395	100	110	235	3050	○	☆
SR271K25D□□	180	230	255	311	18000	455	100	120	245	2600	○	☆
SR301K25D□□	195	250	270	330	18000	505	100	125	255	2400	○	☆
SR331K25D□□	210	275	297	363	18000	545	100	130	270	2200	○	☆
SR361K25D□□	230	300	324	396	18000	595	100	160	315	2050	○	☆
SR391K25D□□	250	330	351	429	18000	650	100	175	342	1900	○	☆
SR431K25D□□	275	370	387	473	18000	710	100	190	370	1700	○	☆
SR471K25D□□	300	385	423	517	18000	775	100	200	390	1600	○	☆
SR511K25D□□	320	420	459	561	18000	840	100	210	422	1400	○	☆
SR561K25D□□	360	470	522	638	18000	910	100	215	460	1200	○	☆
SR621K25D□□	390	505	558	682	18000	1025	100	225	495	1800	○	☆
SR681K25D□□	420	560	612	748	18000	1120	100	230	515	1100	○	☆
SR751K25D□□	460	615	675	825	18000	1240	100	250	530	1000	○	☆
SR781K25D□□	485	640	702	858	18000	1290	100	260	540	980	○	☆
SR821K25D□□	510	675	738	902	18000	1350	100	270	550	920	○	☆
SR911K25D□□	550	745	819	1001	18000	1400	100	300	600	880	○	☆
SR102K25D□□	625	825	900	1100	18000	1620	100	340	630	760	○	☆
SR112K25D□□	680	895	962	1175	18000	1800	100	390	700	650	○	☆

Remark:

1. □□: Suffix adding; please refer "**How to Order**" for details
2. All parts approved as follows:
   (1) ○**: UL 1449** recognized (File # E172311).
   (2) △**: UL 497B** recognized (File # E199593).
   (3) □**: UL 1414** recognized (File # E182369).
   (4) ☆**: CSA** 22.2 #1 certified (File # LR109496-1 and LR109496-4).
   (5) ◇**: VDE**/CECC 42000/42200/42201, IEC 61051-1/61051-2/61051-2-2 (Certificate # 5932, 40010090, 40003435)

Varistors—5E Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy	Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	10/1000 s	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules	PF	
SR820K05E□□	50	66	74	90	800	135	5	3.5	355	○ △
SR181K05E□□	120	160	170	207	800	320	5	8.0	130	○
SR201K05E□□	130	175	185	225	800	340	5	8.5	120	○ △ □ ☆
SR221K05E□□	140	180	198	242	800	360	5	9.0	110	○ △ □ ☆
SR241K05E□□	150	200	216	264	800	395	5	10.5	100	○ △ □ ☆
SR271K05E□□	180	230	255	311	800	475	5	11.0	90	○ △ □ ☆
SR301K05E□□	195	250	270	330	800	525	5	12.0	84	□
SR331K05E□□	210	275	297	363	800	540	5	13.0	75	○ △ □ ☆
SR361K05E□□	230	300	324	396	800	595	5	16.0	69	○ □ ☆
SR391K05E□□	250	330	351	429	800	650	5	17.0	63	○ □ ☆
SR431K05E□□	275	370	387	473	800	710	5	20.0	57	○ □ ☆
SR471K05E□□	300	385	423	517	800	775	5	21.0	50	○ △ □ ☆
SR511K05E□□	320	420	459	561	800	865	5	22.0	35	□
SR561K05E□□	360	470	522	638	800	960	5	23.0	32	□
SR621K05E□□	390	505	558	682	800	1040	5	25.0	30	□
SR681K05E□□	420	560	612	748	800	1120	5	26.0	27	□

Varistors—7E Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy	Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	10/1000 s	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules	PF	
SR820K07E□□	50	66	74	90	1750	135	10	7.0	790	○ △ ◇
SR181K07E□□	120	160	170	207	1750	320	10	16.0	210	○ ◇
SR201K07E□□	130	175	185	225	1750	340	10	17.5	200	○ △ □ ☆ ◇
SR221K07E□□	140	180	198	242	1750	360	10	19.0	190	○ △ □ ☆ ◇
SR241K07E□□	150	200	216	264	1750	395	10	21.0	170	○ △ □ ☆ ◇
SR271K07E□□	180	230	255	311	1750	475	10	24.0	150	○ △ □ ☆ ◇
SR301K07E□□	195	250	270	330	1750	525	10	26.0	140	□ ◇
SR331K07E□□	210	275	297	363	1750	540	10	28.0	130	○ △ □ ☆ ◇
SR361K07E□□	230	300	324	396	1750	595	10	32.0	123	○ □ ☆ ◇
SR391K07E□□	250	330	351	429	1750	650	10	35.0	116	○ □ ☆ ◇
SR431K07E□□	275	370	387	473	1750	710	10	40.0	108	○ □ ☆ ◇
SR471K07E□□	300	385	423	517	1750	775	10	42.0	100	○ △ □ ☆ ◇
SR511K07E□□	320	420	459	561	1750	865	10	46.0	78	□ ◇
SR561K07E□□	360	470	522	638	1750	960	10	47.0	75	□ ◇
SR611K07E□□	390	505	558	682	1750	1040	10	51.0	72	□ ◇
SR681K07E□□	420	560	612	748	1750	1120	10	57.0	69	□ ◇

Remark

1. □□: Suffix adding; please refer "**How to Order**" for details
2. All parts approved for 5E ~ 20E as follows:
   (1) ○**: UL 1449** recognized (File # E172311).
   (2) △**: UL 497B** recognized (File # E199593).
   (3) □**: UL 1414** recognized (File # E182369).
   (4) ☆**: CSA** 22.2 #1 certified (Certificate # 1129226).
   (5) ◇**: VDE**/CECC 42000/42200/42201 (Certificate # 40003435). VDE approval of 05E and 20E series is pending.
3. Varistor voltage: All series are measured at @ 1mA DC pulse current

Varistors—10E Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy	Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	10/1000 s	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules	PF	
SR820K10E□□	50	66	74	90	3500	135	25	14.0	1780	○ △ ◇
SR181K10E□□	120	160	170	207	3500	320	25	33.0	460	○ ◇
SR201K10E□□	130	175	185	225	3500	340	25	35.0	430	○ △ □ ☆ ◇
SR221K10E□□	140	180	198	242	3500	360	25	39.0	410	○ △ □ ☆ ◇
SR241K10E□□	150	200	216	264	3500	395	25	42.0	380	○ △ □ ☆ ◇
SR271K10E□□	180	230	255	311	3500	475	25	49.0	350	○ △ □ ☆ ◇
SR301K10E□□	195	250	270	330	3500	525	25	53.0	320	□ ◇
SR331K10E□□	210	275	297	363	3500	540	25	58.0	300	○ △ □ ☆ ◇
SR361K10E□□	230	300	324	396	3500	595	25	65.0	285	○ □ ☆ ◇
SR391K10E□□	250	330	351	429	3500	650	25	70.0	270	○ □ ☆ ◇
SR431K10E□□	275	370	387	473	3500	710	25	80.0	255	○ □ ☆ ◇
SR471K10E□□	300	385	423	517	3500	775	25	85.0	230	○ △ □ ☆ ◇
SR511K10E□□	320	420	459	561	3500	865	25	92.0	210	○ △ □ ☆ ◇
SR561K10E□□	360	470	522	638	3500	960	25	97.0	170	○ □ ☆ ◇
SR621K10E□□	390	505	558	682	3500	1040	25	107.0	146	□ ☆ ◇
SR681K10E□□	420	560	612	748	3500	1120	25	110.0	136	□ ☆ ◇
SR751K10E□□	460	615	675	825	3500	1240	25	115.0	124	□ ☆ ◇
SR781K10E□□	485	640	702	858	3500	1290	25	120.0	120	□ ☆ ◇
SR821K10E□□	510	675	738	902	3500	1350	25	125.0	110	○ △ □ ☆ ◇
SR911K10E□□	550	745	819	1001	3500	1400	25	130.0	90	○ □ ◇
SR102K10E□□	625	725	900	1100	3500	1620	25	145.0	80	□ ◇
SR112K10E□□	680	895	962	1175	3500	1815	25	155.0	70	○ □ ◇

Varistors—14E Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy	Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	10/1000 s	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules	PF	
SR820K14E□□	50	66	74	90	6000	135	50	28.0	3310	○ △ ◇
SR181K14E□□	120	160	170	207	6000	320	50	56.0	800	○ ◇
SR201K14E□□	130	175	185	225	6000	340	50	70.0	770	○ △ □ ☆ ◇
SR221K14E□□	140	180	198	242	6000	360	50	78.0	740	○ △ □ ☆ ◇
SR241K14E□□	150	200	216	264	6000	395	50	84.0	700	○ △ □ ☆ ◇
SR271K14E□□	180	230	255	311	6000	475	50	99.0	640	○ △ □ ☆ ◇
SR301K14E□□	195	250	270	330	6000	525	50	107.0	620	□ ◇
SR331K14E□□	210	275	297	363	6000	540	50	115.0	580	○ △ □ ☆ ◇
SR361K14E□□	230	300	324	396	6000	595	50	140.0	540	○ □ ☆ ◇
SR391K14E□□	250	330	351	429	6000	650	50	150.0	500	○ □ ☆ ◇
SR431K14E□□	275	370	387	473	6000	710	50	165.0	460	○ □ ☆ ◇
SR471K14E□□	300	385	423	517	6000	775	50	175.0	400	○ △ □ ☆ ◇
SR511K14E□□	320	420	459	561	6000	865	50	190.0	350	○ △ □ ☆ ◇
SR561K14E□□	360	470	522	638	6000	960	50	210.0	320	○ □ ☆ ◇
SR621K14E□□	390	505	558	682	6000	1040	50	215.0	270	□ ☆ ◇
SR681K14E□□	420	560	612	748	6000	1120	50	225.0	250	□ ☆ ◇
SR751K14E□□	460	615	675	825	6000	1240	50	230.0	230	□ ☆ ◇
SR781K14E□□	485	640	702	858	6000	1290	50	235.0	210	□ ☆ ◇
SR821K14E□□	510	675	738	902	6000	1350	50	240.0	190	○ △ □ ☆ ◇
SR911K14E□□	550	745	819	1001	6000	1400	50	255.0	170	○ □ ◇
SR102K14E□□	625	725	900	1100	6000	1620	50	290.0	165	□ ◇
SR112K14E□□	680	895	962	1175	6000	1815	50	310.0	140	○ □ ◇

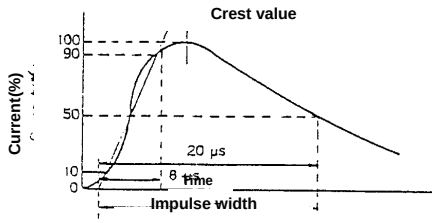
Varistors—18E Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy	Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	10/1000 s	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules	PF	
SR820K18E□□	50	66	74	90	9000	135	75	46	3500	○ ◇
SR181K18E□□	120	160	170	207	9000	320	75	70	1600	○ ◇
SR201K18E□□	130	175	185	225	9000	340	75	130	1270	○ △ □ ☆ ◇
SR221K18E□□	140	180	198	242	9000	360	75	135	1220	○ △ □ ☆ ◇
SR241K18E□□	150	200	216	264	9000	395	75	140	1200	○ △ □ ☆ ◇
SR271K18E□□	180	230	255	311	9000	475	75	150	1050	○ △ □ ☆ ◇
SR301K18E□□	195	250	270	330	9000	525	75	170	1010	□ ☆ ◇
SR331K18E□□	210	275	297	363	9000	540	75	190	950	○ △ □ ☆ ◇
SR361K18E□□	230	300	324	396	9000	595	75	215	870	○ △ □ ☆ ◇
SR391K18E□□	250	330	351	429	9000	650	75	240	800	○ △ □ ☆ ◇
SR431K18E□□	275	370	387	473	9000	710	75	260	730	○ △ □ ☆ ◇
SR471K18E□□	300	385	423	517	9000	775	75	290	660	○ △ □ ☆ ◇
SR511K18E□□	320	420	459	561	9000	865	75	314	570	○ △ □ ☆ ◇
SR561K18E□□	360	470	522	638	9000	960	75	320	520	○ △ □ ☆ ◇
SR621K18E□□	390	505	558	682	9000	1040	75	330	470	○ △ □ ☆ ◇
SR681K18E□□	420	560	612	748	9000	1120	75	340	430	○ △ □ ☆ ◇
SR751K18E□□	460	615	675	825	9000	1240	75	360	390	○ △ □ ☆ ◇
SR781K18E□□	485	640	702	858	9000	1290	75	365	370	○ △ □ ☆ ◇
SR821K18E□□	510	675	738	902	9000	1350	75	388	310	○ △ □ ☆ ◇
SR911K18E□□	550	745	819	1001	9000	1400	75	405	280	○ □ ☆ ◇
SR102K18E□□	625	725	900	1100	9000	1620	75	450	250	○ □ ☆ ◇
SR112K18E□□	680	895	962	1175	9000	1815	75	500	230	○ □ ☆ ◇

Varistors—20E Series

Part Number	Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8/20 μS)	Max. Clamping Voltage (8/20 μS)		Maximum Energy	Typical Capacitance	Safety Approval
	ACrms	DC	DC Volts		1 time	Vc	Ip	10/1000 s	@1kHz	
	Volts	Volts	Min	Max	Amps	Volts	Amps	Joules	PF	
SR820K20E□□	50	66	74	90	12000	135	100	56	5300	○ △ ◇
SR181K20E□□	120	160	170	207	12000	320	100	135	1800	○ ◇
SR201K20E□□	130	175	185	225	12000	340	100	140	1700	○ △ □ ◇
SR221K20E□□	140	180	198	242	12000	360	100	155	1600	○ △ □ ☆ ◇
SR241K20E□□	150	200	216	264	12000	395	100	170	1500	○ △ □ ☆ ◇
SR271K20E□□	180	230	255	311	12000	455	100	190	1300	○ △ □ ☆ ◇
SR301K20E□□	195	250	270	330	12000	505	100	210	1200	○ □ ☆ ◇
SR331K20E□□	210	275	297	363	12000	545	100	228	1100	○ △ □ ☆ ◇
SR361K20E□□	230	300	324	396	12000	595	100	275	1050	○ □ ☆ ◇
SR391K20E□□	250	330	351	429	12000	650	100	305	1000	○ □ ☆ ◇
SR431K20E□□	275	370	387	473	12000	710	100	330	950	○ □ ☆ ◇
SR471K20E□□	300	385	423	517	12000	775	100	350	900	○ △ □ ☆ ◇
SR511K20E□□	320	420	459	561	12000	840	100	382	800	○ △ □ ☆ ◇
SR561K20E□□	360	470	522	638	12000	910	100	395	760	○ □ ☆ ◇
SR621K20E□□	390	505	558	682	12000	1025	100	410	710	○ □ ☆ ◇
SR681K20E□□	420	560	612	748	12000	1120	100	423	670	○ □ ☆ ◇
SR751K20E□□	460	615	675	825	12000	1240	100	435	620	○ □ ☆ ◇
SR781K20E□□	485	640	702	858	12000	1240	100	450	580	○ □ ☆ ◇
SR821K20E□□	510	675	738	902	12000	1350	100	460	530	○ △ □ ☆ ◇
SR911K20E□□	550	745	819	1001	12000	1400	100	510	470	○ □ ☆ ◇
SR102K20E□□	625	725	900	1100	12000	1620	100	560	425	○ □ ☆ ◇
SR112K20E□□	680	895	962	1175	12000	1800	100	620	380	○ □ ☆ ◇

Performance Characteristics

Characteristics	Test Method and Specifications
Standard Test Condition	Temperature range : 5 to 35°C Relative humidity : 45 to 85% R.H.
Varistor Voltage	Voltage across the varistor measured at 1 mA DC rectangular pulse current
Maximum Allowable Voltage	Maximum continuous sinusoidal rms voltage or DC voltage which may be applied within the specified environmental temperature range
Maximum Clamping Voltage	Peak voltage across the varistor under condition of a specified standard impulse current (8/20μs) 
Withstanding Surge Current	Maximum current across the varistor measured at a given standard waveform (8/20μs) applied one time or two times with the varistor voltage less than ±10%
Rated Transient Average Power Dissipation	Maximum average power which may be dissipated due to a group of pulses occurring within a specified isolated time period, without causing device failure
Maximum Energy	The maximum energy within the varistor voltage change of ±10% when one impulse of 2ms or 10/1000μs is applied
Capacitance (Reference)	Capacitance between the terminals of the varistor measured at 1 kHz, 1 Vrms, zero bias and room temperature (Exception 100pF below measured at 1MHz)
Temperature Coefficient of Varistor Voltage	(V at 85°C －V at 25°C) /(V at 25°C×60) ×100(%/°C) should be less than -0.05%/°C
Withstanding Voltage (Body insulation)	The specified voltage shall be applied both terminals of the varistor connected together and metal foil closely wrapped round its body for 1 min without breakdown

Performance Characteristics

Impulse Life

The variation of varistor voltage should less than ±10% after the impulse listed below is applied 10000 times continuously with the interval of 10 sec at room temperature

5D series	SR180K05D TO SR680K05D	0.5A(2ms)
	SR820K05D TO SR471K05D	20A(8/20μS)
7D series	SR180K07D TO SR680K07D	18A(8/20μS)
	SR820K07D TO SR471K07D	50A(8/20μS)
10D series	SR180K10D TO SR680K10D	50A(8/20μS)
	SR820K10D TO SR112K10D	100A(8/20μS)
14D series	SR180K14D TO SR680K14D	75A(8/20μS)
	SR820K14D TO SR112K14D	150A(8/20μS)
20D series	SR180K20D TO SR680K20D	100A(8/20μS)
	SR820K20D TO SR112K20D	200A(8/20μS)

5E series	SR180K05E TO SR680K05E	2.5A(2ms)
	SR820K05E TO SR471K05E	40A(8/20μS)
7E series	SR180K07E TO SR680K07E	36A(8/20μS)
	SR820K07E TO SR471k07E	73A(8/20μS)
10E series	SR180K10E TO SR680K10E	100A(8/20μS)
	SR820K10E TO SR112K10E	150A(8/20μS)
14E series	SR180K14E TO SR680K14E	150A(8/20μS)
	SR820K14E TO SR112K14E	200A(8/20μS)
20E series	SR180K20E TO SR680K20E	150A(8/20μS)
	SR820K20E TO SR112K20E	275A(8/20μS)

Mechanical Ratings

<table>
<tr><th>Characteristics</th><th>Test Method and Specification</th></tr>
<tr><td>Terminal Pull Strength</td><td>JIS-C-0051
The two terminals shall be no outstanding damage visually after gradually applying the force listed below
<table>
<tr><th>Terminal Diameter</th><th>Force</th></tr>
<tr><td>0.6mm</td><td>9.8 N (1.0kgf)</td></tr>
<tr><td>0.8mm</td><td>9.8 N (1.0kgf)</td></tr>
<tr><td>1.0mm</td><td>19.6 N (2.0kgf)</td></tr>
</table></td></tr>
<tr><td>Terminal Bendin Strength</td><td>JIS-C-0051
Hold the specimen and keep its lead-out axis vertical Suspend 1 Kg weight on the terminal. Bend the specimen through 90° then return to the original position. Repeat the procedure in the opposite direction. Test and examine every terminal.</td></tr>
<tr><td>Vibration</td><td>JIS-C-0040
Varistors subjected to simple harmonic motion of 0.75mm amplitude between limits of 10-55 HZ. Frequency scan shall be traversed in 1 min. This motion shall then be applied for period of 2 Hrs in each of three mutually perpendicular directions. Thereafter, varistors shall be no outstanding damage visually.</td></tr>
<tr><td>Solderability</td><td>JIS-C-5102
The two terminals shall be covered uniformly with solder approximately 95% after dipping the terminals to a depth of approximately 3 mm from the body in a soldering bath of 260±5°C for 2±0.5 sec.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>JIS-C-5102
Varistors shall be no outstanding damage and the variation varistor voltage should be less than ±5%(ΔVB/VB=±5%) after each lead shall be dipped into a solder bath having a temperature 300±5°C to a point 2.0 to 2.5 mm from the body of the unit, using the shielding board (thickness 1.5 mm), be held there for a specified time(5D series 5±1sec.the other series 10±1sec), and then be stored at room ambient for 1 to 2 Hrs.</td></tr>
</table>

Environment and Endurance Rating

<table>
<tr><th>Characteristics</th><th>Test Method and Specifications</th></tr>
<tr><td>Dry Heat
(High Temperature)</td><td>JIS-C-5023
Varistors shall be subjected to 125±2°C, for 1000 Hrs in a thermostatic bath without load and then stored at room ambient condition for 1 to 2 Hrs. The variation of varistor voltage should be less than±5%(ΔVB/VB=±5%) .</td></tr>
<tr><td>Damp Heat
(Humidity)</td><td>JIS-C-5023
Varistors shall be subjected to 40±2°C, 90 to 95%R.H. for 1000 Hrs in a thermostatic bath without load and then stored at room ambient condition for 1 to 2 Hrs. The variation of varistor voltage should be less then ±5%(ΔVB/VB=±5%) .</td></tr>
<tr><td>Cold
(Low Temperature Storage)</td><td>JIS-C-5021
Varistors shall be subjected to -40±2°C for 1000 Hrs in a thermostatic bath without load and then stored at room ambient condition for 1 to 2 Hrs. The variation of varistor voltage should be less than ±5%(ΔVB/VB=±5%).</td></tr>
<tr><td>Temperature Cycle
(Thermal shock)</td><td>JIS-C-5030
The temperature cycling listed below shall be repeated 5 times and the variation of varistor voltage should be less than ±5% and no outstanding damage visually.
<table>
<tr><th>Step</th><th>Temperature(°C)</th><th>Time(minutes)</th></tr>
<tr><td>1</td><td>-40±2</td><td>30±2</td></tr>
<tr><td>2</td><td>Room Temp.</td><td>3 max.</td></tr>
<tr><td>3</td><td>125±2</td><td>30±2</td></tr>
<tr><td>4</td><td>Room Temp.</td><td>3 max.</td></tr>
</table></td></tr>
<tr><td>Dry Heat Load
(High Temperature)</td><td>JIS-C-5036
Varistors shall be subjected to 85±2°C for 1000 Hrs in a thermostatic bath with maximum allowable voltage continuously applied and then stored at room ambient condition for 1 to 2 Hrs. The variation of varistor voltage should be less than ±10%((ΔVB/VB=±10%)</td></tr>
</table>

THE PROCESS CONTROL OF VARISTOR

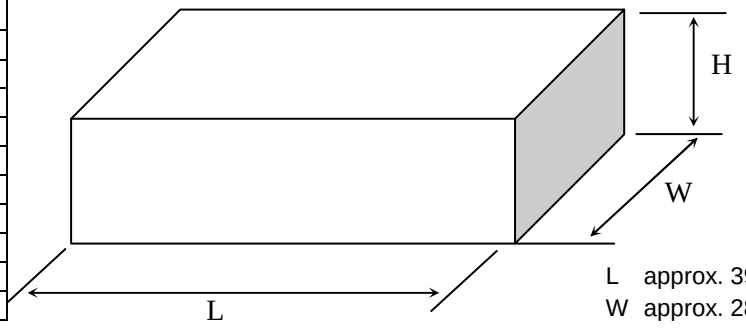
Process	Inspection Items	Control Method
Raw materials	Product line test	IQC report
Weighing	Weight Weighing accuracy control	Record check Periodical calibration
Wet mixing	Solid content Mixing time	Record and check
Spray drying	Rheology and viscosity of slurry Slurry density Spray drying conditions	Record and check
Granulated powder	Moisture content,flowability, Tap density	Sampling test
Forming	Dimension of green body Weight of green body	Record and check
Binder Burn-out	Burn-out temperature and time	Record and check
Sintering	Sintering profile	Automatic record and monitor Record and check
Electrical test	Vb. Leakage current, clamping Voltage, capacitance	Every batch by sampling
Electrode applying	Heat treating temperature, time, Visual inspection	Record and check
Soldering & Coating	Temperature and visual inspection	Every batch
Cutting Leads	Visual inspection, Lead length	Every batch 100%
Final test	Electrical: Vb, leakage current, alpha	Every batch 100%
Marking	Visual inspection	Every batch
Quality control	Vb, leakage current, alpha, Clamping voltage, surge test, Dimension, solderability	Every batch sampling
Packing & Shipment	PO #, Customer name, Quantity, P/N, address	Every shipment

Packing Method (5 - 25 Series)

A. Bulk Packing:

Disk size mm	Voltage BDV	Q'ty pcs/bag	Q'ty pcs/Carton
Diameter 05	All	1000	10000
Diameter 07	All	500	5000
Diameter 10	180K-471K	500	5000
	Above 511K	300	3000
Diameter 14	180K-751K	300	3000
	Above 821K	200	2000
Diameter 18	All	200	2000
Diameter 20	180K-621K	100	1000
	Above 681K	50	500
Diameter 25	All	50	500

Carton size of bulk packing



L approx. 395mm
W approx. 285mm
H approx. 180mm

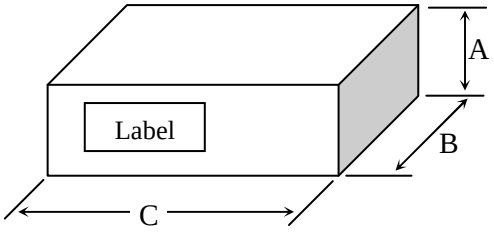
B. Tape and Reel:

Disk Size	Varistor Voltage	AMMO BOX		REEL		
		PCS / BOX	BOX / CARTON	PCS / REEL	REELS / BOX	BOX / CARTON
5	All	2000	10	2000	2	5
7	≦431K	1500	10	1500	2	5
7	≧471K	1000	10	1000	2	5
10	≦431K	500	10	500	2	5
10	≧471K	300	10	300	2	5
14	≦431K	500	8	500	2	4
14	≧471K	300	8	300	2	4
18	≦431K	500	8	500	2	4
18	≧471K	300	8	300	2	4
20	≦431K	500	8	500	2	4
20	≧471K	300	8	300	2	4

Note: Ammo box and reel quantities may vary. Please contact sales for details.

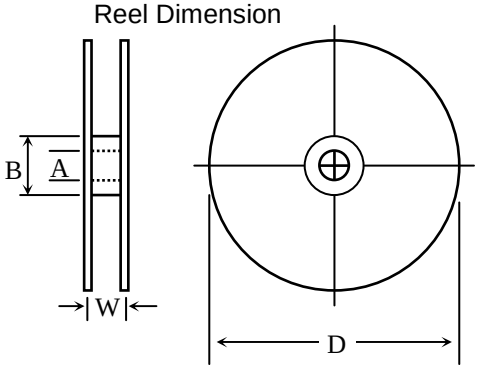
■ Dimensions of Ammo Box and Reel:

Ammo Dimension



Disk size	A (max.)	B (max.)	C (max.)
5	50mm	270mm	350mm
7	50mm	270mm	350mm
10	70mm	270mm	370mm
14	70mm	270mm	370mm
18、20	70mm	270mm	370mm

Reel Dimension



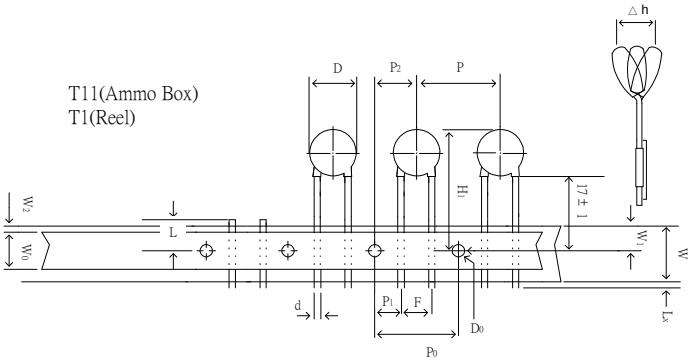
W approx. 50mm
D 350ϕ max
A approx. 30ϕ
B approx. 95ϕ

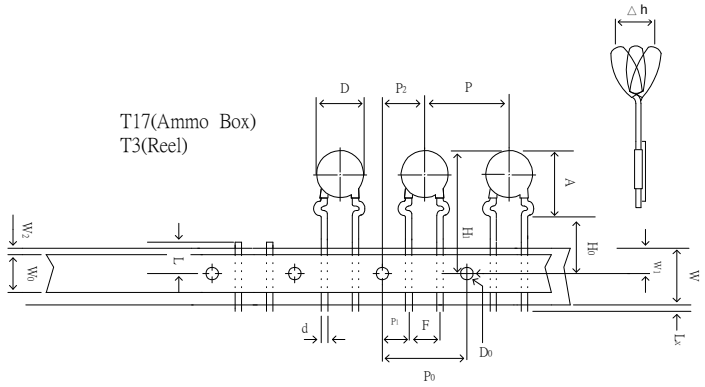
■ Taping Code:

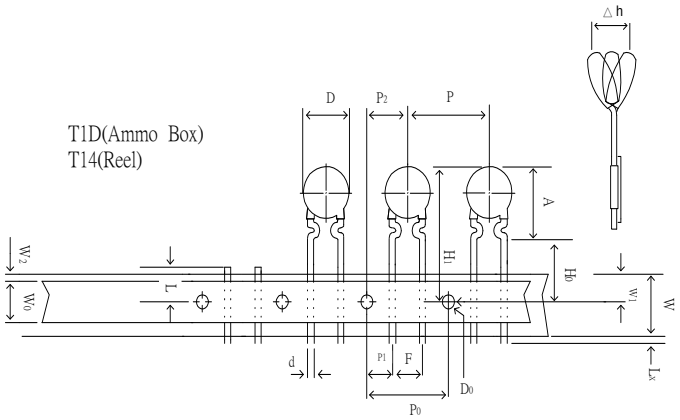
Varistor series	Lead spacing	Packing type	Lead type			
			Straight	Outward crimped	Inward crimped	Inline crimped
5D, 5E	5 mm	Ammo Reel	T11 T1	T17 T3	T1D T14	T1W T32
7D, 7E	5 mm	Ammo Reel	T11 T1	T17 T3	T1D T14	T1W T32
10D, 10E	7.5 mm	Ammo Reel	T36 T19	T1U T1N	T8 T16	T43 T4
14D, 14E	7.5 mm	Ammo Reel	T36 T19	T1U T1N	T8 T16	T43 T4
20D, 20E (18E)	7.5 mm	Ammo Reel	T44 T1H	T45 T1X	T40 T4X	T2 T25
	10 mm	Ammo Reel	T5 T30	T50 T2X	T35 T2D	T60 T3X

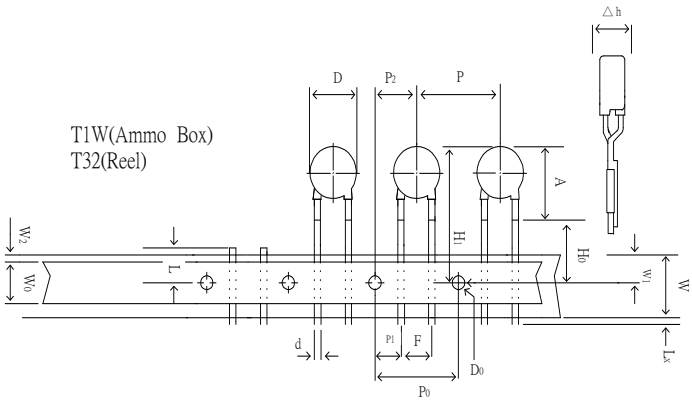
For 18E Series, we provide 7.5mm lead spacing only.

Taping Specifications - 5 ¸ and 7









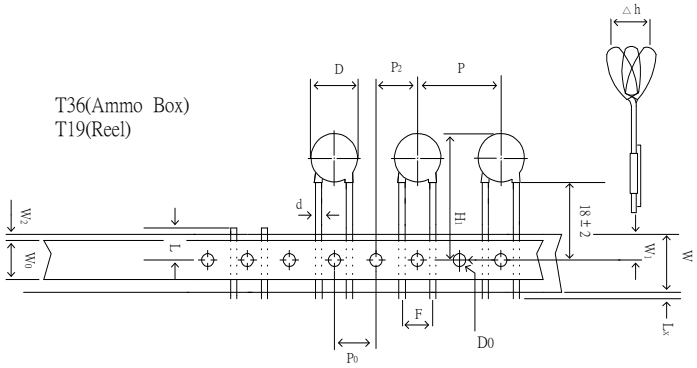
Item		Disk Size					
		5Φ (5D, 5E)			7Φ (7D, 7E)		
Taping Code		T11, T1	T17, T3, T14, T1D	T32, T1W	T11, T1	T17, T3, T14, T1D	T32, T1W
Body Diameter	D	7Max	7Max	7Max	9Max	9Max	9Max
Lead Wire Diameter	d	0.6	0.6	0.6	0.6	0.6	0.6
Pitch of Component	P	12.7±1	12.7±1	12.7±1	12.7±1	12.7±1	12.7±1
Feed Hole Pitch	P0	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3
Feed Hole Center to Lead	P1	3.85±0.7	3.85±0.7	3.85±0.7	3.85±0.7	3.85±0.7	3.85±0.7
Lead to Lead Distance (Center to Center)	F	5.0±0.8	5.0±0.8	5.0±0.8	5.0±0.8	5.0±0.8	5.0±0.8
Component Alignment	Δh	2.0Max	2.0Max	2.0Max	2.0Max	2.0Max	2.0Max
Base paper Tape Width	W	18*	18*	18*	18*	18*	18*
Adhesive Tape Width	W0	10Min	10Min	10Min	10Min	10Min	10Min
Hole Position	W1	9±0.5	9±0.5	9±0.5	9±0.5	9±0.5	9±0.5
Adhesive Tape Border	W2	1.5Max	1.5Max	1.5Max	1.5Max	1.5Max	1.5Max
Component Height	H1	30Max	30Max	30Max	32Max	32Max	30Max
Lead-Wire Clinch Height	H0	—	16±0.5	16±0.5	—	16±0.5	16±0.5
Lead-Wire Protrusion	LX	1.0Max	1.0Max	1.0Max	1.0Max	1.0Max	1.0Max
Feed Hole Diameter	D0	4±0.2	4±0.2	4±0.2	4±0.2	4±0.2	4±0.2
Total Tape Thickness	t	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Length of Clipped Lead	L	11Max	11Max	11Max	11Max	11Max	11Max
Component Height from Seating Plane	A	—	13Max	13Max	—	15Max	15Max
Hole Center to Component Center	P2	6.35±0.7	6.35±0.7	6.35±0.7	6.35±0.7	6.35±0.7	6.35±0.7

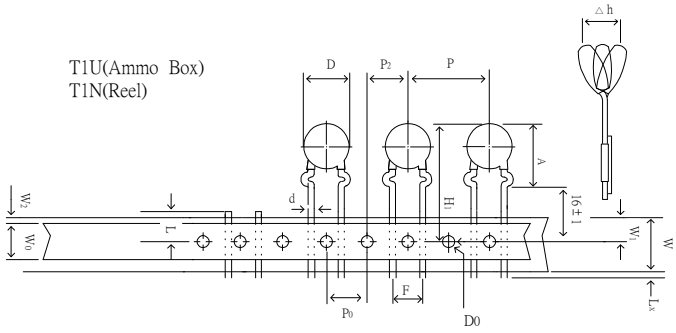
Based on EIA-468-B Specification

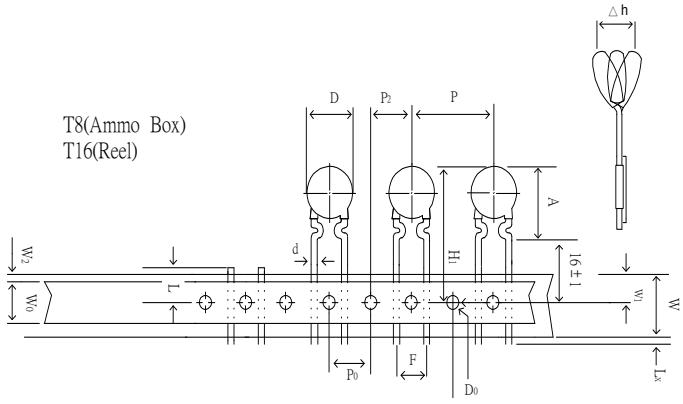
* Tolerances are +1.0 and -0.5

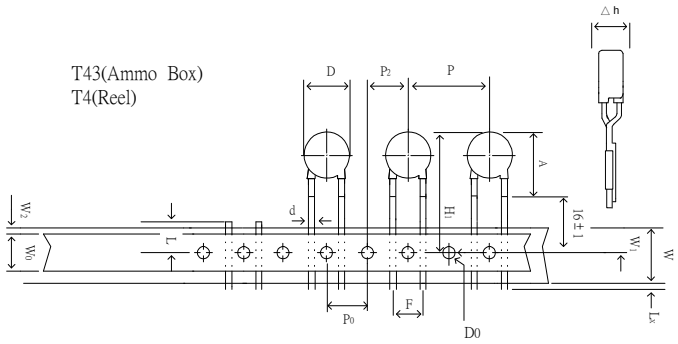
All dimensions are in millimeters.

Taping Specifications - 10 ¸ and 14









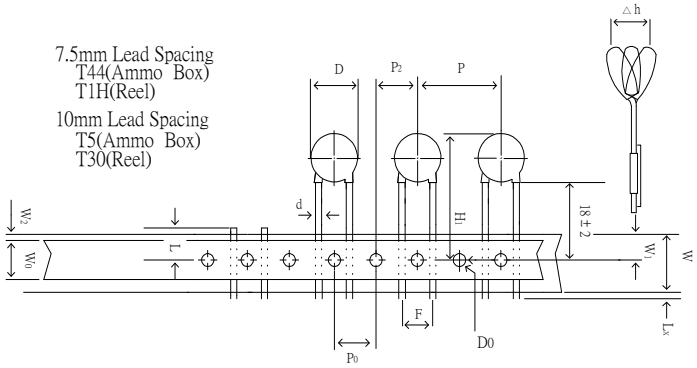
Item		Disk Size					
		10 Φ (10D, 10E)			14 Φ (14D, 14E)		
Taping Code		T19, T36	T1N, T1U, T8, T16	T43, T4	T19, T36	T1N, T1U, T8, T16	T43, T4
Body Diameter	D	14Max	14Max	14Max	17.5Max	17.5Max	17.5Max
Lead Wire Diameter	d	0.8±0.05	0.8±0.05	0.8±0.05	0.8±0.05	0.8±0.05	0.8±0.05
Pitch of Component	P	25.4±1	25.4±1	25.4±1	25.4±1	25.4±1	25.4±1
Hole Center to Component Center	P_2	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3
Feed Hole Pitch	P0	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3
Lead to Lead Distance (Center to Center)	F	7.5±0.8	7.5±0.8	7.5±0.8	7.5±0.8	7.5±0.8	7.5±0.8
Component Alignment	Δh	2.0Max	2.0Max	2.0Max	2.0Max	2.0Max	2.0Max
Base paper Tape Width	W	18*	18*	18*	18*	18*	18*
Adhesive Tape Width	W0	10Min	10Min	10Min	10Min	10Min	10Min
Hole Position	W1	9±0.5	9±0.5	9±0.5	9±0.5	9±0.5	9±0.5
Adhesive Tape Border	W2	1.5Max	1.5Max	1.5Max	1.5Max	1.5Max	1.5Max
Component Height	H1	33Max	38.5Max	35.5Max	37Max	40Max	40Max
Lead-Wire Protrusion	LX	1.0Max	1.0Max	1.0Max	1.0Max	1.0Max	1.0Max
Feed Hole Diameter	D0	4±0.2	4±0.2	4±0.2	4±0.2	4±0.2	4±0.2
Total Tape Thickness	t	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Length of Clipped Lead	L	11Max	11Max	11Max	11Max	11Max	11Max
Component Height from Seating Plane	A	—	19.5Max	19.5Max	—	22.5Max	22.5Max

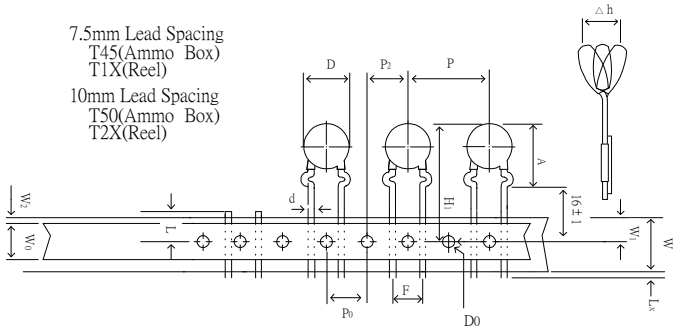
Based on EIA-468-B Specification

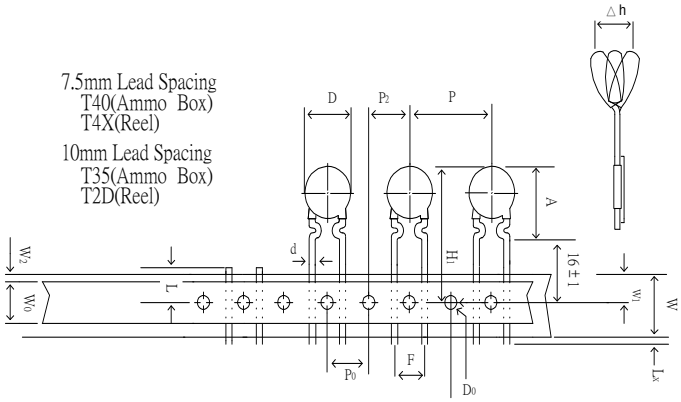
* Tolerances are +1 and -0.5

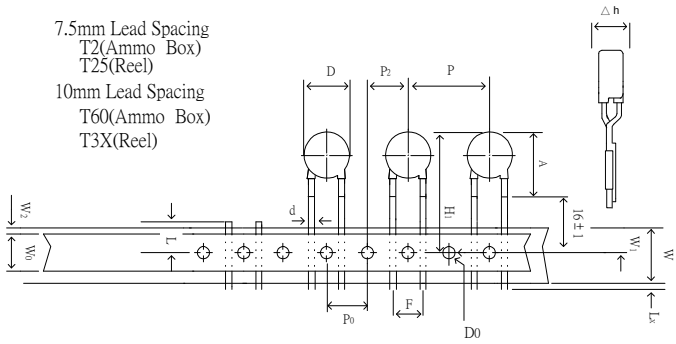
All dimensions are in millimeters.

Taping Specifications - 18 . and 20









Item		Disk Size					
		20Φ (20D, 20E), 18Φ (18E)			20Φ (20D, 20E)		
		Lead Spacing 7.5 mm			Lead Spacing 10.0 mm		
Taping Code		T44, T1H	T45, T1X, T40, T4X	T2, T25	T5, T30	T50, T2X, T35, T2D	T60, T3X
Body Diameter	D	24Max**	24Max**	24Max**	24Max	24Max	24Max
Lead Wire Diameter	d	0.8±0.1	0.8±0.1	0.8±0.1	1.0±0.1	1.0±0.1	1.0±0.1
Pitch of Component	P	25.4±1	25.4±1	25.4±1	25.4±1	25.4±1	25.4±1
Feed Hole Pitch	P0	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3
Hole Center to Component Center	P_2	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3
Lead to Lead Distance	F	7.5±0.8	7.5±0.8	7.5±0.8	10.0±1.0	10.0±1.0	10.0±1.0
Component Alignment	Δh	2.0Max	2.0Max	2.0Max	2.0Max	2.0Max	2.0Max
Base paper Tape Width	W	18*	18*	18*	18*	18*	18*
Adhesive Tape Width	W0	10Min	10Min	10Min	10Min	10Min	10Min
Hole Position	W1	9±0.5	9±0.5	9±0.5	9±0.5	9±0.5	9±0.5
Adhesive Tape Border	W2	1.5Max	1.5Max	1.5Max	1.5Max	1.5Max	1.5Max
Component Height	H1	48Max**	48Max**	48Max**	48Max	48Max	48Max
Lead-Wire Protrusion	LX	1.0Max	1.0Max	1.0Max	1.0Max	1.0Max	1.0Max
Feed Hole Diameter	D0	4±0.2	4±0.2	4±0.2	4±0.2	4±0.2	4±0.2
Total Tape Thickness	t	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Length of Clipped Lead	L	11Max	11Max	11Max	11Max	11Max	11Max
Component Height from Seating Plane	A	—	29Max**	28Max**	—	29Max	28Max

Based on EIA-468-B Specification
All dimensions are in millimeters.

* Tolerances are +1 and -0.5
** For 18Φ, D=22max, H_1=46max and A=26max.

1. Vendor Name: Walsin Technology Corporation

2. Component type/Wistron P/N: Varistor

Main Purposes	%	Chemical Substances	CAS No.	Chemical formula	%	Typical ppm
Ceramic	26	Zinc Oxide	1314-13-2	ZnO	89.7	
		Bismuth trioxide	1304-76-3	Bi_2O_3	2.8	69 PPm pb
		Boron trioxide	1303-86-2	B_2O_3	0.005	
		Titanium dioxide	13463-67-7	TiO_2	0	
		Nickel Oxide	1313-99-1	NiO	0.75	
		Aluminium trioxide	1344-28-1	Al_2O_3	0.018	
silver paste	2	slive	7440-22-4	Ag	80	10PPm pb
		Glass			4	
Coating	40	Epoxy resin			30~40	5 PPm pb
		Filler			45~55	
wire	30	cooper	7440-50-8	Cu	96	
Plating (Lead-free)	2	Nickel	7440-02-0	Ni	0	66 PPm pb
		Tin	7440-31-5	Sn	96	
Plating (Lead-contained)	0.04	Nickel	7440-02-0	Ni	100	2200
		Lead	7439-92-1	Pb	10	200
		Tin	7440-31-5	Sn	90	1300

Manufacturing location

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