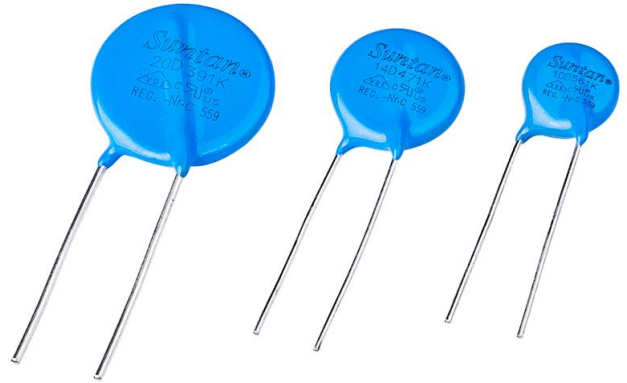
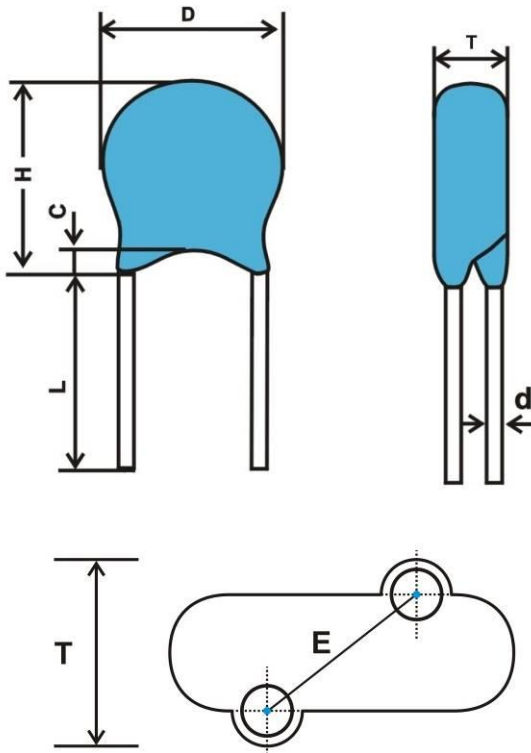


TSV



Operating Temperature Range: -40°C ~ +85°C

DIMENSION



L: 16mm min

SIZE	D MAX	H MAX	d \pm 0.05	E	c max
D05	8	11	0.5	5 \pm 0.8	2.5
D07	10	12.5	0.5	5 \pm 0.8	2.5
D10	13.5	16	0.7	7.5 \pm 0.8	2.5
D14	17.5	20	0.7	7.5 \pm 0.8	2.5
D20	24	26.5	1.0	10 \pm 1.0	2.5

T Thickness(max.)

Part Code	D05	D07	D10	D14	D20
182K	--	--	--	10.5	11.0
162K	--	--	--	9.5	10.5
152K	--	--	--	9.5	10.0
142K	--	--	--	9.0	9.5
122K	--	--	--	8.0	9.0
112K	--	--	8.0	8.0	8.5
102K	--	--	7.5	7.5	8.5
911K	--	--	7.0	7.0	8.0
821K	--	--	6.5	6.5	7.5
781K	--	--	6.5	6.5	7.5
751K	--	6.0	6.5	6.5	7.5
681K	5.5	5.5	6.0	6.0	7.0
621K	5.5	5.5	6.0	6.0	7.0
561K	5.0	5.0	5.5	5.5	6.5
511K	5.0	5.0	5.5	5.5	6.5
471K	5.0	5.0	5.5	5.5	6.0
431K	4.5	4.5	5.0	5.0	6.0
391K	4.5	4.5	5.0	5.0	6.0
361K	4.5	4.5	5.0	5.0	6.0
331K	4.5	4.5	5.0	5.0	5.5
301K	4.0	4.0	4.5	4.5	5.5
271K	4.0	4.0	4.5	4.5	5.5
241K	4.0	4.0	4.5	4.5	5.5
221K	4.0	4.0	4.5	4.5	5.0
201K	4.0	4.0	4.5	4.5	5.0
181K	4.5	4.5	5.0	5.0	5.5
151K	4.5	4.5	5.0	5.0	5.5
121K	4.5	4.5	5.0	5.0	5.5
101K	4.5	4.5	5.0	5.0	5.5
820K	4.5	4.5	5.0	5.0	5.0
680K	5.0	5.0	5.5	5.5	6.0
560K	4.5	4.5	5.0	5.0	5.5
470K	4.5	4.5	5.0	5.0	5.5
390K	4.5	4.5	5.0	5.0	5.5
330K	4.5	4.5	5.0	5.0	5.5
270K	4.5	4.5	5.0	5.0	5.5
220K	4.5	4.5	4.5	4.5	5.0
180K	4.0	4.5	4.5	4.5	5.0

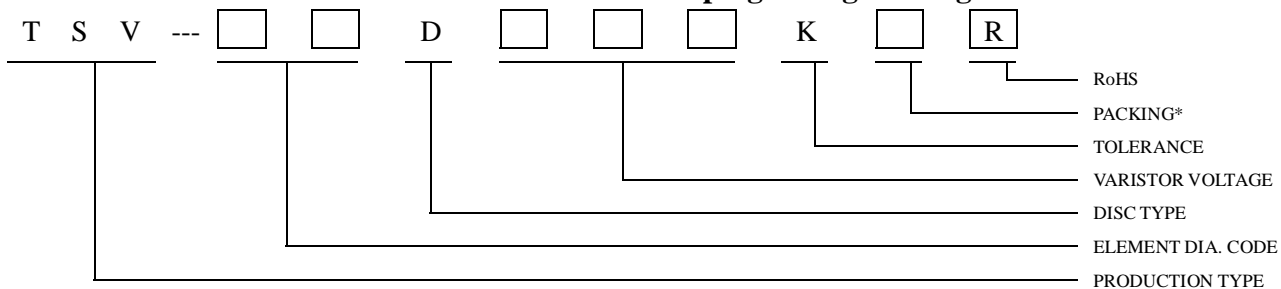
TSV

ZINC OXIDE VARISTOR 5D

SPECIFICATION

Part No	Maximum allowable Voltage		Maximum Energy (10/1000µs) (J)	Maximum Peak Current (8/20µs)	Rated Power (W)	Varistor Voltage V _{1.0mA} (V)	Clamping Voltage (Max.)		Typical Capacitance (reference) @1KHz (pF)
	AC rms (V)	DC rms (V)					VC (V)	I _p (A)	
TSV05D681K	420	560	19.4	400 / 200x2	0.1	680(612-748)	1120	5	38
TSV05D621K	385	505	17.7			620(558-682)	1025		40
TSV05D561K	350	460	16.8			560(504-616)	920		45
TSV05D511K	320	415	16.0			510(459-561)	845		50
TSV05D471K	300	385	15.0			470(423-517)	810		55
TSV05D431K	275	350	13.0			430(387-473)	745		60
TSV05D391K	250	320	12.0			390(351-429)	675		65
TSV05D361K	230	300	10.0			360(324-396)	620		70
TSV05D331K	210	275	9.5			330(297-363)	570		75
TSV05D301K	190	250	9.0			300(270-330)	520		85
TSV05D271K	175	225	8.5			270(243-297)	475		95
TSV05D241K	150	200	8.0			240(216-264)	415		100
TSV05D221K	140	180	7.0			220(198-242)	380		110
TSV05D201K	130	170	6.5			200(180-220)	355		125
TSV05D181K	115	150	5.9			180(162-198)	320		140
TSV05D151K	95	125	4.8			150(135-165)	260		165
TSV05D121K	75	100	4.0			120(108-132)	210		210
TSV05D101K	60	85	3.0			100(90-110)	175		250
TSV05D820K	50	65	2.5			82(73.8-90.2)	150		300
TSV05D680K	40	56	1.6			100 / 50x2	0.01		68(61.2-74.8)
TSV05D560K	35	45	1.3	56(50.4-61.6)	123			450	
TSV05D470K	30	38	1.1	47(42.3-51.7)	104			530	
TSV05D390K	25	31	0.9	39(35.1-42.9)	80			640	
TSV05D330K	20	26	0.8	33(29.7-36.3)	73			760	
TSV05D270K	17	22	0.6	27(24.3-29.7)	60			930	
TSV05D220K	14	18	0.5	22(19.8-24.2)	48			1150	
TSV05D180K	11	14	0.4	18(16.2-19.8)	40			1400	

#680K—180K Max. Clamping Voltage testing current 1A.



*Blank for Bulk ; A for Ammo ; T for Tape & Reel

TSV

ZINC OXIDE VARISTOR 7D

SPECIFICATION

Part No	Maximum allowable Voltage		Maximum Energy (10/1000 μ s) (J)	Maximum Peak Current (8/20 μ s)	Rated Power (W)	Varistor Voltage V _{1.0mA} (V)	Clamping Voltage (Max.)		Typical Capacitance (reference) @ 1KHz (pF)
	AC rms (V)	DC rms (V)					VC (V)	Ip (A)	
TSV07D911K	550	745	57.0	1200 / 600x2	0.25	910(819-1001)	1500	10	55
TSV07D821K	510	670	52.0			820(738-902)	1355		60
TSV07D781K	485	640	48.0			780(702-858)	1290		65
TSV07D751K	460	615	45.0			750(675-825)	1240		70
TSV07D681K	420	560	42.0			680(612-748)	1120		75
TSV07D621K	385	505	38.0			620(558-682)	1025		80
TSV07D561K	350	460	35.0			560(504-616)	925		90
TSV07D511K	320	415	31.0			510(459-561)	845		100
TSV07D471K	300	385	29.0			470(423-517)	775		105
TSV07D431K	275	350	28.0			430(387-473)	710		115
TSV07D391K	250	320	26.0			390(351-429)	650		130
TSV07D361K	230	300	24.0			360(324-396)	595		140
TSV07D331K	210	275	23.0			330(297-363)	550		150
TSV07D301K	190	250	20.0			300(270-330)	500		165
TSV07D271K	175	225	18.0			270(243-297)	455		185
TSV07D241K	150	200	15.0			240(216-264)	395		210
TSV07D221K	140	180	14.0			220(198-242)	360		230
TSV07D201K	130	170	13.0			200(180-220)	340		250
TSV07D181K	115	150	11.7			180(162-198)	300		280
TSV07D151K	95	125	9.7			150(135-165)	250		330
TSV07D121K	75	100	7.8	120(108-132)	200	420			
TSV07D101K	60	85	6.5	100(90-110)	165	500			
TSV07D820K	50	65	5.5	82(73.8-90.2)	135	600			
TSV07D680K	40	56	3.6	250 / 125x2	0.02	68(61.2-74.8)	135	2.5	740
TSV07D560K	35	45	3.1			56(50.4-61.6)	110		890
TSV07D470K	30	38	2.5			47(42.3-51.7)	93		1100
TSV07D390K	25	31	2.1			39(35.1-42.9)	77		1300
TSV07D330K	20	26	1.7			33(29.7-36.3)	65		1500
TSV07D270K	17	22	1.4			27(24.3-29.7)	53		1800
TSV07D220K	14	18	1.1			22(19.8-24.2)	43		2300
TSV07D180K	11	14	0.9			18(16.2-19.8)	36		2800

#680K—180K Max. Clamping Voltage testing current 2.5A.

TSV

ZINC OXIDE VARISTOR 10D

SPECIFICATION

Part No	Maximum allowable Voltage		Maximum Energy (10/1000 μ s) (J)	Maximum Peak Current (8/20 μ s)	Rated Power (W)	Varistor Voltage V _{1.0mA} (V)	Clamping Voltage (Max.)		Typical Capacitance (reference) @1KHz (pF)
	AC rms (V)	DC rms (V)					V _c (V)	I _p (A)	
TSV10D112K	680	895	115.0	2500 / 1250x2	0.4	1100(990-1210)	1815	25	90
TSV10D102K	625	825	102.0			1000(900-1100)	1650		100
TSV10D911K	550	745	93.0			910(819-1001)	1500		110
TSV10D821K	510	670	85.0			820(738-902)	1355		120
TSV10D781K	485	640	80.0			780(702-858)	1290		125
TSV10D751K	460	615	77.0			750(675-825)	1240		130
TSV10D681K	420	560	75.0			680(612-748)	1120		150
TSV10D621K	385	505	72.0			620(558-682)	1025		160
TSV10D561K	350	460	70.0			560(504-616)	925		180
TSV10D511K	320	415	69.0			510(459-561)	845		200
TSV10D471K	300	385	67.0			470(423-517)	775		210
TSV10D431K	275	350	65.0			430(387-473)	710		230
TSV10D391K	250	320	60.0			390(351-429)	650		260
TSV10D361K	230	300	47.0			360(324-396)	595		280
TSV10D331K	210	275	43.0			330(297-363)	550		300
TSV10D301K	190	250	40.0			300(270-330)	500		330
TSV10D271K	175	225	37.0			270(243-297)	455		370
TSV10D241K	150	200	35.0			240(216-264)	395		420
TSV10D221K	140	180	32.0			220(198-242)	360		450
TSV10D201K	130	170	30.0			200(180-220)	340		500
TSV10D181K	115	150	27.0			180(162-198)	300		560
TSV10D151K	95	125	22.0			150(135-165)	250		670
TSV10D121K	75	100	18.0			120(108-132)	200		830
TSV10D101K	60	85	15.0	100(90-110)	165	1000			
TSV10D820K	50	65	12.0	82(73.8-90.2)	135	1200			
TSV10D680K	40	56	8.2	68(61.2-74.8)	135	1500			
TSV10D560K	35	45	7.0	56(50.4-61.6)	110	1800			
TSV10D470K	30	38	5.5	47(42.3-51.7)	93	2100			
TSV10D390K	25	31	4.6	39(35.1-42.9)	77	2400			
TSV10D330K	20	26	4.0	33(29.7-36.3)	65	3000			
TSV10D270K	17	22	3.0	27(24.3-29.7)	53	3700			
TSV10D220K	14	18	2.5	22(19.8-24.2)	43	4500			
TSV10D180K	11	14	2.1	18(16.2-19.8)	36	5600			

#680K—180K Max. Clamping Voltage testing current 5A.

TSV

ZINC OXIDE VARISTOR 14D

SPECIFICATION

Part No	Maximum allowable Voltage		Maximum Energy (10/1000 μ s) (J)	Maximum Peak Current (8/20 μ s)	Rated Power (W)	Varistor Voltage $V_{1.0mA}$ (V)	Clamping Voltage (Max.)		Typical Capacitance (reference) @1KHz (pF)
	AC rms (V)	DC rms (V)					Vc (V)	Ip (A)	
TSV14D182K	1100	1465	250	4500 / 2500x2	0.6	1800(1620-1980)	2970	50	130
TSV14D162K	1000	1280	243			1600(1440-1760)	2640		140
TSV14D152K	930	1200	240			1500(1350-1650)	2475		145
TSV14D142K	880	1140	238			1400(1260-1540)	2310		150
TSV14D122K	750	990	232			1200(1080-1320)	1980		160
TSV14D112K	680	895	213			1100(990-1210)	1815		180
TSV14D102K	625	825	190			1000(900-1100)	1650		200
TSV14D911K	550	745	175			910(819-1001)	1500		220
TSV14D821K	510	670	157			820(738-902)	1355		240
TSV14D781K	485	640	148			780(702-858)	1290		260
TSV14D751K	460	615	143			750(675-825)	1240		270
TSV14D681K	420	560	130			680(612-748)	1120		290
TSV14D621K	385	505	128			620(558-682)	1025		320
TSV14D561K	350	460	125			560(504-616)	925		360
TSV14D511K	320	415	121			510(459-561)	845		390
TSV14D471K	300	385	118			470(423-517)	775		430
TSV14D431K	275	350	115			430(387-473)	710		460
TSV14D391K	250	320	100			390(351-429)	650		510
TSV14D361K	230	300	93.0			360(324-396)	595		560
TSV14D331K	210	275	85.0			330(297-363)	550		610
TSV14D301K	190	250	77.0			300(270-330)	500		670
TSV14D271K	175	225	70.0			270(243-297)	455		740
TSV14D241K	150	200	63.0			240(216-264)	395		830
TSV14D221K	140	180	60.0			220(198-242)	360		900
TSV14D201K	130	170	57.0			200(180-220)	340		1000
TSV14D181K	115	150	50.0			180(162-198)	300		1100
TSV14D151K	95	125	40.0			150(135-165)	250		1300
TSV14D121K	75	100	32.0			120(108-132)	200		1700
TSV14D101K	60	85	28.0			100(90-110)	165		2000
TSV14D820K	50	65	22.0			82(73.8-90.2)	135		2400
TSV14D680K	40	56	14.0			68(61.2-74.8)	135		2900
TSV14D560K	35	45	11.0			56(50.4-61.6)	110		3600
TSV14D470K	30	38	10.0	47(42.3-51.7)	93	4300			
TSV14D390K	25	31	8.6	39(35.1-42.9)	77	5100			
TSV14D330K	20	26	7.5	33(29.7-36.3)	65	6100			
TSV14D270K	17	22	6.0	27(24.3-29.7)	53	7400			
TSV14D220K	14	18	5.0	22(19.8-24.2)	43	9100			
TSV14D180K	11	14	4.0	18(16.2-19.8)	36	11100			

#680K—180K Max. Clamping Voltage testing current 10A.

TSV

ZINC OXIDE VARISTOR 20D

SPECIFICATION

Part No	Maximum allowable Voltage		Maximum Energy (10/1000µs) (J)	Maximum Peak Current (8/20µs)	Rated Power (W)	Varistor Voltage V _{1.0mA} (V)	Clamping Voltage (Max.)		Typical Capacitance (reference) @1KHz (pF)
	AC rms (V)	DC rms (V)					V _c (V)	I _p (A)	
TSV20D182K	1100	1465	625	6500 / 4500x2	1.0	1800(1620-1980)	2970	100	320
TSV20D162K	1000	1280	606			1600(1440-1760)	2640		330
TSV20D152K	930	1200	569			1500(1350-1650)	2475		335
TSV20D142K	880	1140	532			1400(1260-1540)	2310		340
TSV20D122K	750	990	408			1200(1080-1320)	1980		350
TSV20D112K	680	895	383			1100(990-1210)	1815		360
TSV20D102K	625	825	342			1000(900-1100)	1650		400
TSV20D911K	550	745	310			910(819-1001)	1500		440
TSV20D821K	510	670	282			820(738-902)	1355		500
TSV20D781K	485	640	265			780(702-858)	1290		510
TSV20D751K	460	615	255			750(675-825)	1240		530
TSV20D681K	420	560	230			680(612-748)	1120		600
TSV20D621K	385	505	224			620(558-682)	1025		650
TSV20D561K	350	460	215			560(504-616)	925		710
TSV20D511K	320	415	210			510(459-561)	845		780
TSV20D471K	300	385	204			470(423-517)	775		850
TSV20D431K	275	350	190			430(387-473)	710		930
TSV20D391K	250	320	180			390(351-429)	650		1000
TSV20D361K	230	300	163			360(324-396)	595		1100
TSV20D331K	210	275	150			330(297-363)	550		1200
TSV20D301K	190	250	136			300(270-330)	500		1300
TSV20D271K	175	225	127			270(243-297)	455		1500
TSV20D241K	150	200	108			240(216-264)	395		1650
TSV20D221K	140	180	100			220(198-242)	360		1800
TSV20D201K	130	170	95			200(180-220)	340		2000
TSV20D181K	115	150	85			180(162-198)	300		2200
TSV20D151K	95	125	70	150(135-165)	250	2700			
TSV20D121K	75	100	55	120(108-132)	200	3300			
TSV20D101K	60	85	50	100(90-110)	165	4000			
TSV20D820K	50	65	45	82(73.8-90.2)	135	4900			
TSV20D680K	40	56	41	2000 / 1000x2	0.2	68(61.2-74.8)	135	20	5800
TSV20D560K	35	45	38			56(50.4-61.6)	110		6500
TSV20D470K	30	38	30			47(42.3-51.7)	93		7400
TSV20D390K	25	31	26			39(35.1-42.9)	77		8500
TSV20D330K	20	26	23			33(29.7-36.3)	65		11500
TSV20D270K	17	22	16			27(24.3-29.7)	53		13000
TSV20D220K	14	18	14			22(19.8-24.2)	43		18500
TSV20D180K	11	14	11			18(16.2-19.8)	36		28500

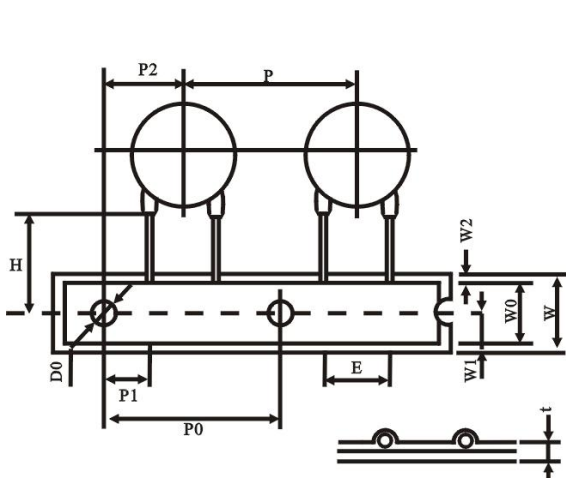
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TSV

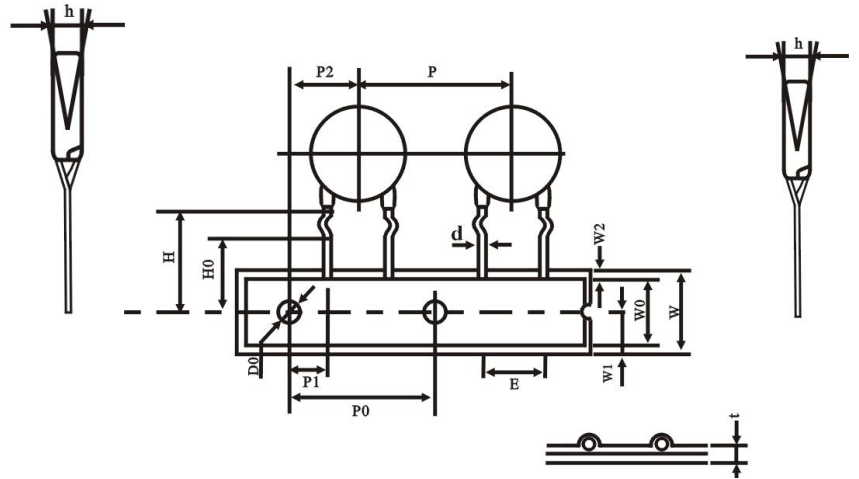
ZINC OXIDE VARISTOR

TAPING SPECIFICATION

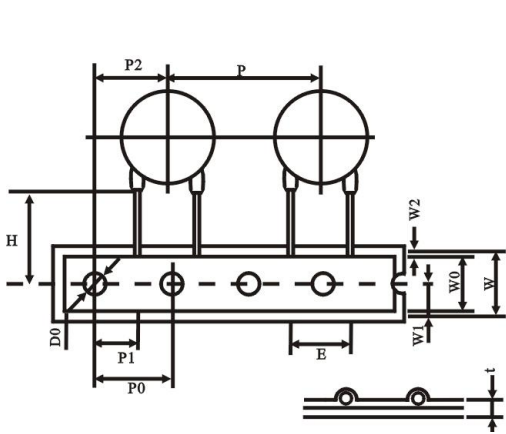
Straight Leads (D05, D07)



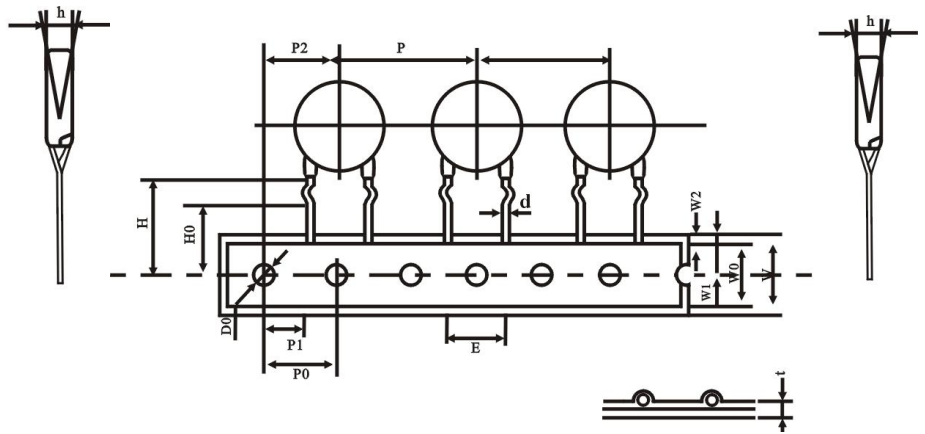
Crimped Leads (D05, D07)



Straight Leads (D10, D14)



Crimped Leads (D10, D14)



TSV

ZINC OXIDE VARISTOR

TAPING SPECIFICATION

Symbol	Parameter	05D	07D	10D	14D
P	Pitch Component	12.7±1.0	12.7±1.0	25.4±1.0	25.4±1.0
P0	Feed Hold	12.7±0.3	12.7±0.3	12.7±1.0	12.7±1.0
P1	Feed Hold Center to Lead	3.85±0.7	3.85±0.7	8.95±1.5	8.95±1.5
P2	Hold Center to Component Center	6.35±1.3	6.35±1.3	12.7±1.5	12.7±1.5
E	Lead to Lead Distance	5.0±0.8	5.0±0.8	7.5±0.8	7.5±0.8
W	Tape Width	18.0+1.5/-1.0	18.0+1.5/-1.0	18.0+1.0/-0.5	18.0+1.0/-0.5
W0	Hold Down Tape Width	10±0.5	10±0.5	10±0.5	10±0.5
W1	Hold Position	9.0+0.75/-0.5	9.0+0.75/-0.5	9.0±0.75	9.0±0.75
W2	Hold Down Tape Position	3.0max	3.0max	3.0max	3.0max
H	Height from Tape Center to Component	20.0±2.0	20.0±2.0	20.0±2.0	20.0±2.0
H0	Height from Tape Center to Component	16.0±1.0	16.0±1.0	16.0±1.0	16.0±1.0
t	Total Tape Thickness	0.6±0.3	0.6±0.3	0.6±0.3	0.6±0.3
Δh	Component Alignment	0±2.0	0±2.0	0±2.0	0±4.0
D0	Feed Hold Diameter	4.0±0.2	4.0±0.2	4.0±0.2	4.0±0.2
Unit : mm					

TSV

ZINC OXIDE VARISTOR

Approval No.	cUL (Canada) E360986	UL (USA) E360986	VDE (Germany) 40036445
5D	180K,220K,270K,330K,	180K,220K,270K,330K,	N/A
	390K,820K,101K,121K,	390K,820K,101K,121K,	
	561K,391K,431K,471K	561K,151K,181K,201K,	
		221K,241K,271K,301K,	
		331K,361K,391K,431K,471K	
7D	180K,220K,270K,330K,	180K,220K,270K,330K,	820K,101K,121K,151K,
	390K,470K,560K,680K,	390K,470K,560K,680K,	181K,201K,221K,241K,
	820K,101K,121K,151K,	820K,101K,121K,151K,	271K,301K,331K,361K,
	181K,201K,221K,241K,	181K,201K,221K,241K,	391K,431K,471K,511K,
	271K,301K,331K,361K,	271K,301K,331K,361K,	561K,621K,681K,
	391K,431K,471K,511K,	391K,431K,471K,511K,	
	561K,621K,681K	561K,621K,681K	
10D	180K,220K,270K,330K,	180K,220K,270K,330K,	820K,101K,121K,151K,
	390K,470K,560K,680K,	390K,470K,560K,680K,	181K,201K,221K,241K,
	820K,101K,121K,151K,	820K,101K,121K,151K,	271K,301K,331K,361K,
	181K,201K,221K,241K,	181K,201K,221K,241K,	391K,431K,471K,511K,
	271K,301K,331K,361K,	271K,301K,331K,361K,	561K,621K,681K,751K,
	391K,431K,471K,511K,	391K,431K,471K,511K,	821K,911K,102K
	561K,621K,681K,751K,	561K,621K,681K,751K,	
	781K,821K,911K,102K,112K	781K,821K,911K,102K,112K	
14D	180K,220K,270K,330K,	180K,220K,270K,330K,	
	390K,470K,560K,680K,	390K,470K,560K,680K,	820K,101K,121K,151K,
	820K,101K,121K,151K,	820K,101K,121K,151K,	181K,201K,221K,241K,
	181K,201K,221K,241K,	181K,201K,221K,241K,	271K,301K,331K,361K,
	271K,301K,331K,361K,	271K,301K,331K,361K,	391K,431K,471K,511K,
	391K,431K,471K,511K,	391K,431K,471K,511K,	561K,621K,681K,751K,
	561K,621K,681K,751K,	561K,621K,681K,751K,	821K,911K,102K
	781K,821K,911K,102K,	781K,821K,911K,102K,	
	112K,182K	112K,182K	
20D	180K,220K,270K,330K,	180K,220K,270K,330K,	820K,101K,121K,151K,
	390K,470K,560K,680K,	390K,470K,560K,680K,	181K,201K,221K,241K,
	820K,101K,121K,151K,	820K,101K,121K,151K,	271K,301K,331K,361K,
	181K,201K,221K,241K,	181K,201K,221K,241K,	391K,431K,471K,511K,
	271K,301K,331K,361K,	271K,301K,331K,361K,	561K,621K,681K,751K,
	391K,431K,471K,511K,	391K,431K,471K,511K,	821K,911K,102K
	561K,621K,681K,751K,	561K,621K,681K,751K,	
	781K,821K,911K,102K,	781K,821K,911K,102K,	
	112K,182K	112K,182K	

Note: Specification are subject to change without notice. For more detail and update, please visit our website.