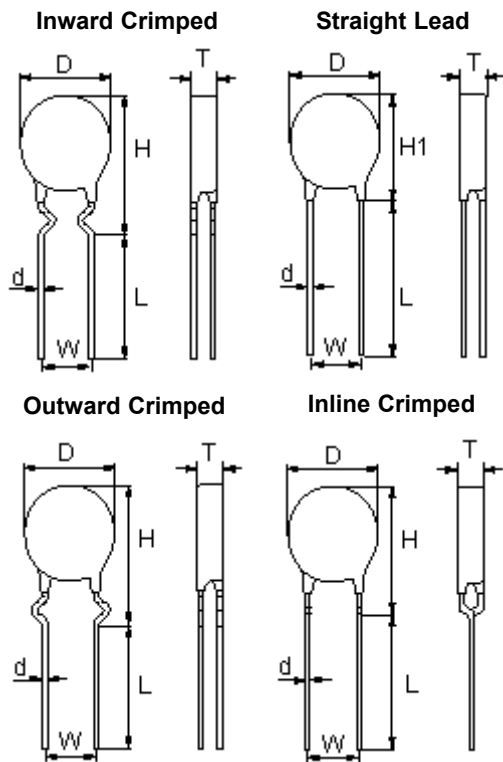


Metal Oxide Disc Thermistors



Remark : The lead length (L) is 20 mm minimum unless requested by customers; please refer to lead cutting code in "How to Order"

Dimensions Quick Reference

Series (Maximum)	5D	7D	10D	14D	20D
D	7	9.5	12	16.5	22.5
d*	0.6	0.6	0.8	0.8	1
W**	5	5	7.5	7.5	10
H	12.5	14.5	19	22.5	29
H1	10	12	17	20.5	28
T	4.9	4.9	8.5	8.5	9

* ± 0.02

** ± 1

Dimensions : Millimetres

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
Disk type : Standard
Lead type : Straight

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 1 mA 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 / 20 μ s 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 1 kHz. Capacitance values are only for reference purpose only, not object to outgoing inspection

Applications

Surge protection in

Consumer electronics
Industrial electronics
Communication electronics
Measuring and controlling systems
Electronic home appliances

Protection against surges induced by lightning 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

General Characteristics

Storage Temperature	: -55°C to +125°C
Operating Surface Temperature	: 125°C
Operating Ambient Temperature	: -55°C to +85°C (without derating)
Maximum Voltage-Temperature Coefficient	: < -0.05% / °C
Minimum Insulation Resistance	: 1,000 M
Hi Pot (Leads To Case, 1 Minimum)	: 2,500 V dc
Typical Response Time	: <15 Nero-seconds
Epoxy Rating	: 94V-0
Current / Energy Derating (>85 °C)	: -2.5% / °C
DC Leakage Current	: 200 μ A maximum (at rated DC working voltage)
Solderability	: MIL-STD-202F

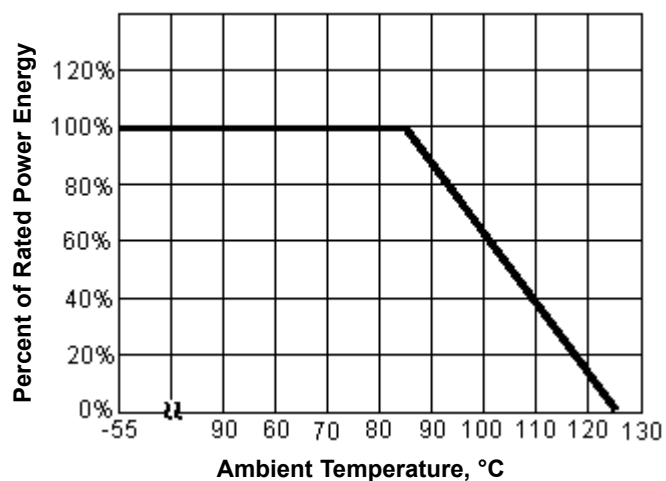
Metal Oxide Disc Thermistors



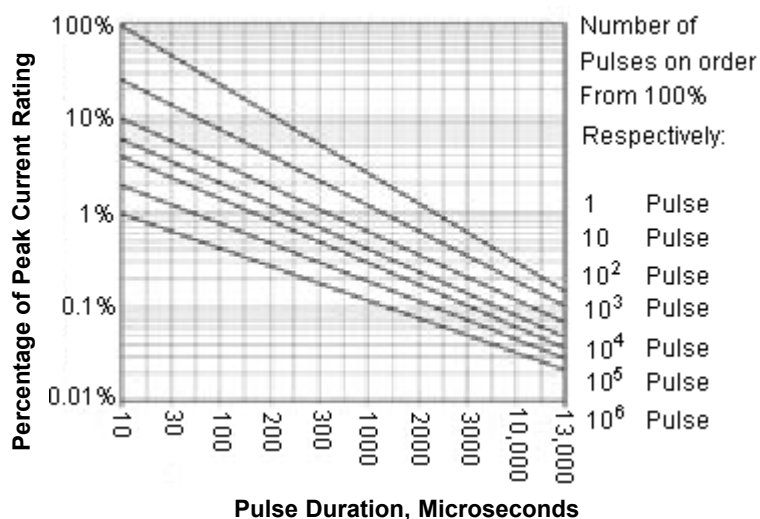
Power Dissipation Ratings (P, in-watts)

Disc Size (mm)	11 V ac to 40 V ac	50 V ac to 680 V ac
5	0.01	0.15
7	0.02	0.25
10	0.05	0.4
14	0.1	0.6
18	-	0.8
20	0.2	1
25	-	1.2
32	-	1.6
34 (Single)	-	2.1
34 (Dual)	-	2.73
40	-	2.1
53	-	2.5

Energy Derating Versus Temperature



Peak Current Per Pulse Versus Pul Seduration



Metal Oxide Disc Thermistors



Specifications Table

Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8 / 20 μ s)	Maximum Clamping Voltage (8 / 20 μ s)		Maximum Energy		Typical Capacitance	Varistor Voltage	Tolerance (%)	Disk Size (mm)	Part Number
Acrms	DC	DC Volts		1 Time	Vc	Ip	2 ms	10 / 100 μ s	at1 KHz				
Volts		Min.	Max.	Amps	Volts	Amps	Joules		PF				
11	14	16	20	100	36	1	0.4	0.6	1,500	18 V	± 10	5	MCFT000215
14	18	20	24		43		0.6	0.8	1,260	22 V			MCFT000216
17	22	24	30		53		0.7	0.9	1,050	27 V			MCFT000217
20	26	30	36		65		0.9	1.2	850	33 V			MCFT000218
25	31	35	43		77		1.1	1.3	600	39 V			MCFT000219
30	38	42	52		93		1.4	1.6	500	47 V			MCFT000220
35	45	50	62		110		1.5	1.9	400	56 V			MCFT000221
40	56	61	75		135		1.8	2.3	360	68 V			MCFT000222
50	66	74	90	400	135	5	2.4	3	350	82 V			MCFT000223
75	102	108	132		200		3	5	250	120 V			MCFT000224
95	127	135	165		250		3.5	5.5	180	150 V			MCFT000225
130	175	185	225		340		5	8.5	140	200 V			MCFT000226
150	200	216	264		395		6.5	10	115	240 V			MCFT000227
230	300	324	396		595		9	13	80	360 V			MCFT000228
250	330	351	429		650		10	15	75	390 V			MCFT000229
275	370	387	473		710		11	16	65	430 V			MCFT000230
300	385	423	517		775		13	19	55	470 V			MCFT000231
420	560	612	748		1120		21	30	30	680 V			MCFT000232
11	14	16	20	250	36	2.5	0.8	1	2,900	18 V		7	MCFT000233
14	18	20	24		43		0.9	1.3	2,400	22 V			MCFT000234
17	22	24	30		53		1	1.4	1,800	27 V		5	MCFT000235
20	26	30	36		65		1.2	1.7	1,500	33 V			MCFT000236
25	31	35	43		77		1.5	2.1	1,230	39 V			MCFT000237
30	38	42	52		93		1.8	2.5	950	47 V			MCFT000238
35	45	50	62		110		2.2	3.1	890	56 V			MCFT000239
40	56	61	75		135		2.5	3.8	850	68 V			MCFT000240
50	66	74	90	1,200	135	10	3.5	5.5	830	82 V		7	MCFT000241
75	102	108	132		200		5	7.8	570	120 V			MCFT000242
95	127	135	165		250		6.5	9.7	400	150 V			MCFT000243
130	175	185	225		340		10	13	275	200 V			MCFT000244
150	200	216	264		395		11	16	230	240 V			MCFT000245

Metal Oxide Disc Thermistors



Specifications Table

Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8 / 20 μ s)	Maximum Clamping Voltage (8 / 20 μ s)		Maximum Energy		Typical Capacitance	Varistor Voltage	Tolerance (%)	Disk Size (mm)	Part Number
Acrms	DC	DC	Volts	1 Time	Vc	Ip	2ms	10 / 100 μ s	at1 KHz				
Volts		Min.	Max.	Amps	Volts	Amps	Joules		PF				
230	300	324	396	1,200	595	10	15	25	155	360 V	± 10	7	MCFT000246
250	330	351	429		650		17	26	145	390 V			MCFT000247
275	370	387	473		710		20	28	130	430 V			MCFT000248
300	385	423	517		775		21	30	115	470 V			MCFT000249
420	560	612	748		1120		32	45	78	680 V			MCFT000250
11	14	16	20	500	36	5	1.5	2.1	6,000	18 V		10	MCFT000251
14	18	20	24		43		2	2.5	5,000	22 V			MCFT000252
17	22	24	30		53		2.5	3	4,000	27 V			MCFT000253
20	26	30	36		65		3	4	3,500	33 V			MCFT000254
25	31	35	43		77		3.5	4.6	3,100	39 V			MCFT000255
30	38	42	52		93		4.5	5.5	2,800	47 V			MCFT000256
35	45	50	62		110		5.5	7	2,400	56 V			MCFT000257
40	56	61	75		135		6.5	8.2	2,100	68 V			MCFT000258
50	66	74	90	2,500	135	25	8	12	1,600	82 V			MCFT000259
75	102	108	132		200		12	18	1,200	120 V			MCFT000260
95	127	135	165		250		16	22	1,100	150 V			MCFT000261
130	175	185	225		340		20	30	640	200 V			MCFT000262
150	200	216	264		395		25	35	560	240 V			MCFT000263
230	300	324	396		595		35	47	380	360 V			MCFT000264
250	330	351	429		650		40	60	350	390 V			MCFT000265
275	370	387	473		710		45	65	310	430 V			MCFT000266
300	385	423	517		775		46	70	280	470 V			MCFT000267
11	14	16	20	1,000	36	10	3.5	4	15,000	18 V		14	MCFT000268
14	18	20	24		43		4	5	12,000	22 V			MCFT000269
17	22	24	30		53		5	6	8,500	27 V			MCFT000270
20	26	30	36		65		6	7.5	7,200	33 V			MCFT000271
25	31	35	43		77		7	8.6	6,300	39 V			MCFT000272
30	38	42	52		93		8.5	10	5,500	47 V			MCFT000273
35	45	50	62		110		10	11	4,800	56 V			MCFT000274
40	56	61	75		135		12	14	4,000	68 V			MCFT000275
50	66	74	90	4,500	135	50	5	22	3,300	82 V			MCFT000276

Metal Oxide Disc Thermistors



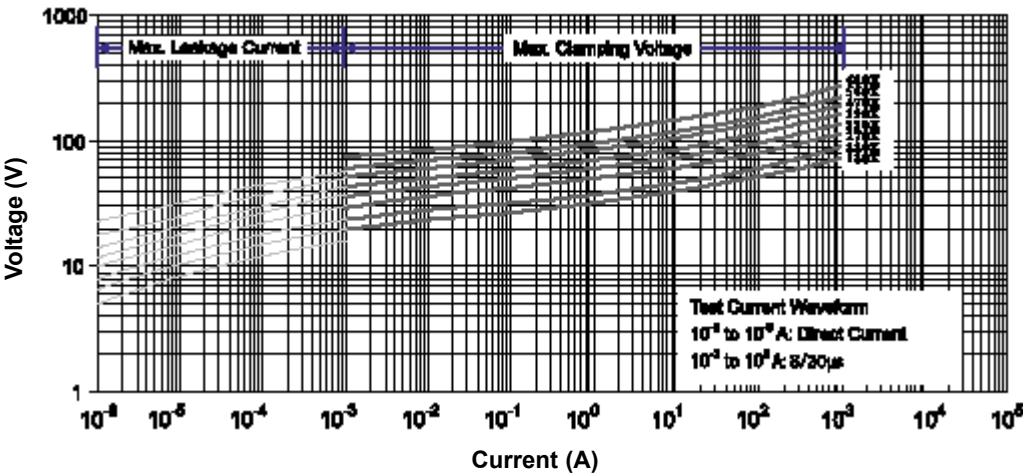
Specifications Table

Maximum Allowable Voltage		Varistor Voltage		Withstanding Surge Current (8 / 20 μs)	Maximum Claming Voltage (8 / 20 μs)		Maximum Energy		Typical Capacitance	Varistor Voltage	Tolerance (%)	Disk Size (mm)	Part Number	
Acrms	DC	DC	Volts	1 Time	Vc	Ip	2ms	10 / 100 μs	at1 KHz					
Volts		Min.	Max.	Amps	Volts	Amps	Joules		PF					
75	102	108	132	4,500	200	50	22	34	2,600	120 V	±10	14	MCFT000277	
95	127	135	165		250		30	45	2,000	150 V			MCFT000278	
130	175	185	225		340		38	60	1,370	200 V			MCFT000279	
150	200	216	264		395		45	66	1,060	240 V			MCFT000280	
230	300	324	396		595		70	98	725	360 V			MCFT000281	
250	330	351	429		650		72	102	665	390 V			MCFT000282	
275	370	387	473		710		75	115	600	430 V			MCFT000283	
300	385	423	517		775		80	125	570	470 V			MCFT000284	
11	14	16	20	2,000	36	20	10	12	27,000	18 V		±10	20	MCFT000285
14	18	20	24		43		13	15	20,000	22 V				MCFT000286
17	22	24	30		53		15	17	15,000	27 V				MCFT000287
20	26	30	36		65		22	22	12,200	33 V				MCFT000288
25	31	35	43		77		24	26	10,000	39 V				MCFT000289
30	38	42	52		93		30	33	9,350	47 V				MCFT000290
35	45	50	62		110		35	38	8,000	56 V				MCFT000291
40	56	61	75		135		40	43	6,800	68 V				MCFT000292
50	66	74	90	6,500	135	100	37	48	5,600	82 V			20	MCFT000293
75	102	108	132		200		40	55	4,100	120 V				MCFT000294
95	127	135	165		250		50	70	3,200	150 V				MCFT000295
130	175	185	225		340		70	95	2,200	200 V				MCFT000296
150	200	216	264		395		82	110	1,900	240 V				MCFT000297
230	300	324	396		595		120	163	1,320	360 V				MCFT000298
250	330	351	429		650		130	180	1,210	390 V				MCFT000299
275	370	387	473		710		140	190	1,120	430 V				MCFT000300
300	385	423	517	775	50	220	1,000	470 V	MCFT000301					

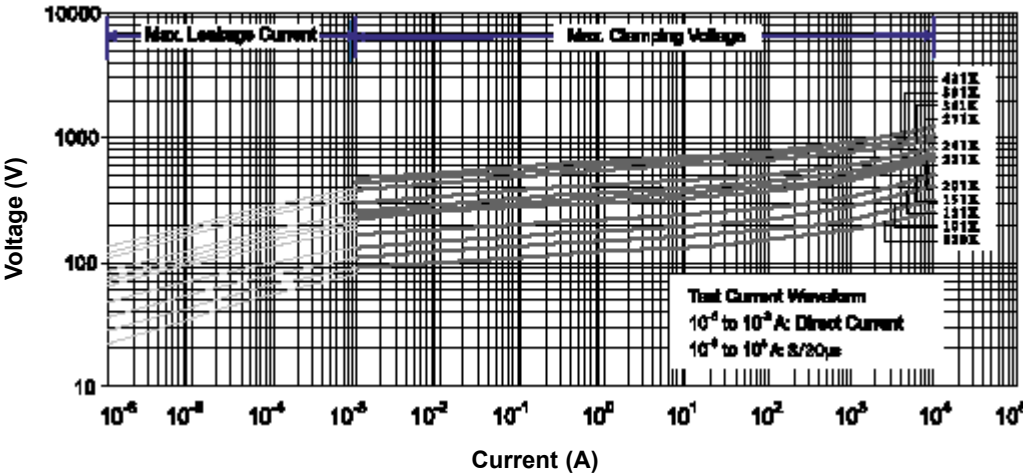
Metal Oxide Disc Thermistors



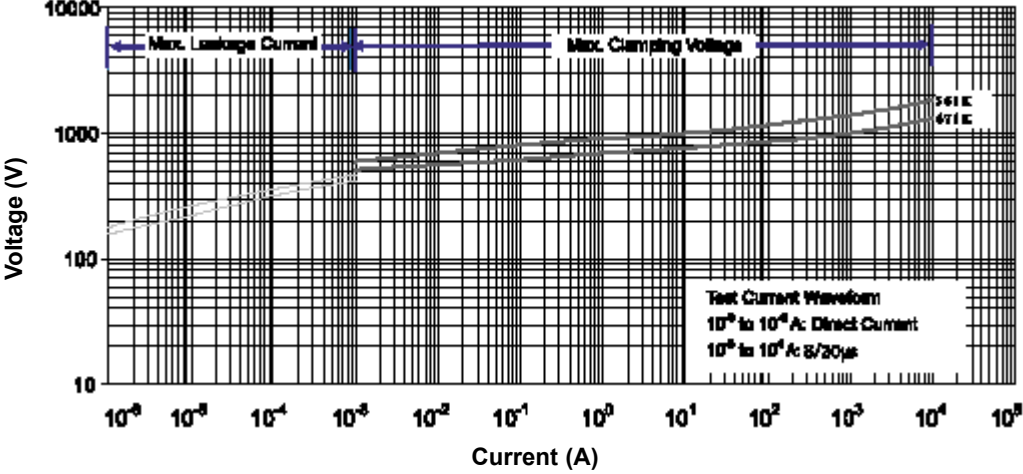
V-I Curve for SR180K to 680K05D(E) Series



V-I Curve for SR820K to 431K05D(E) Series



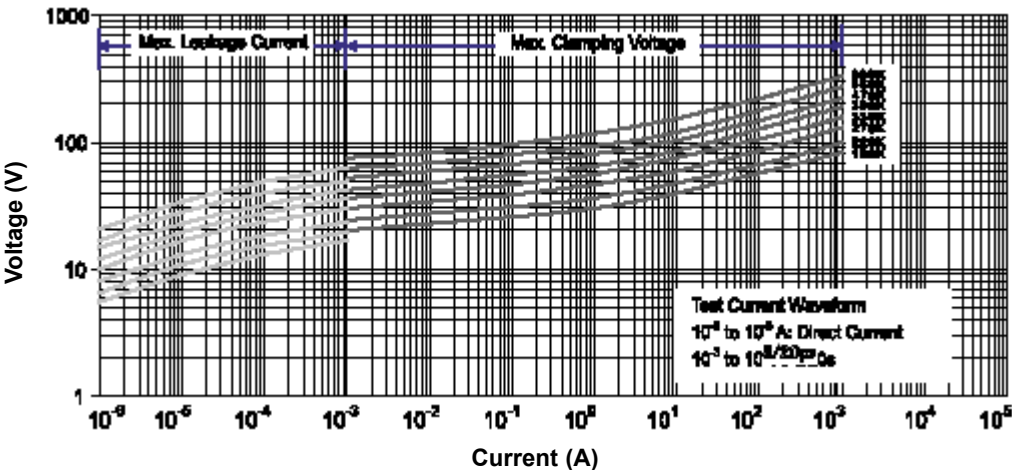
V-I Curve for SR471K to 6811K05D(E) Series



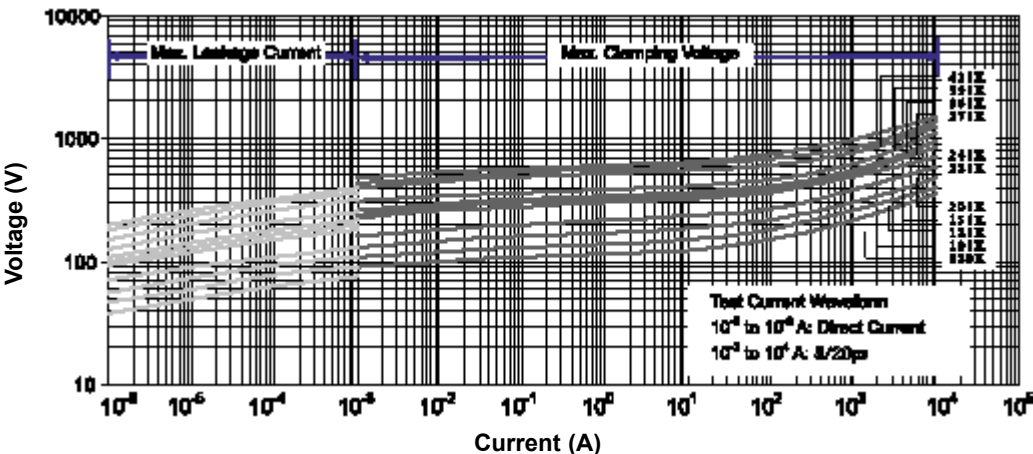
Metal Oxide Disc Thermistors



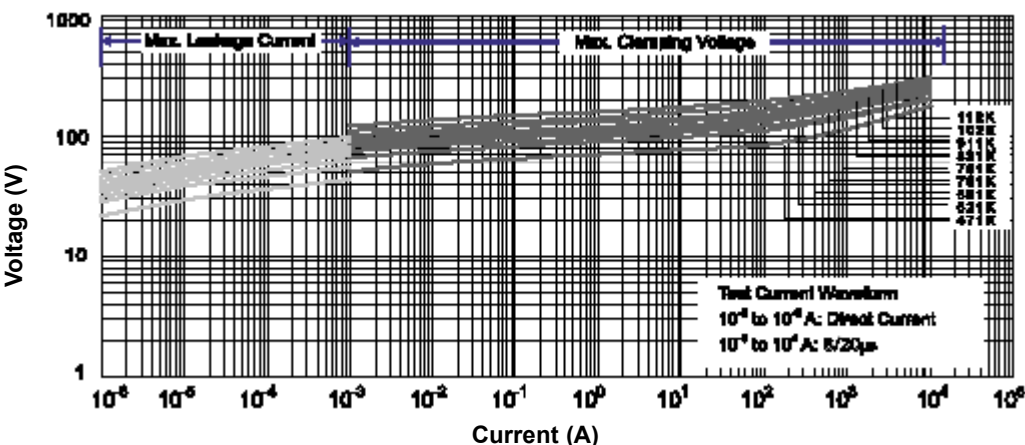
V-I Curve for SR180K to 680K10D(E) Series



V-I Curve for SR820K to 431K10D(E) Series

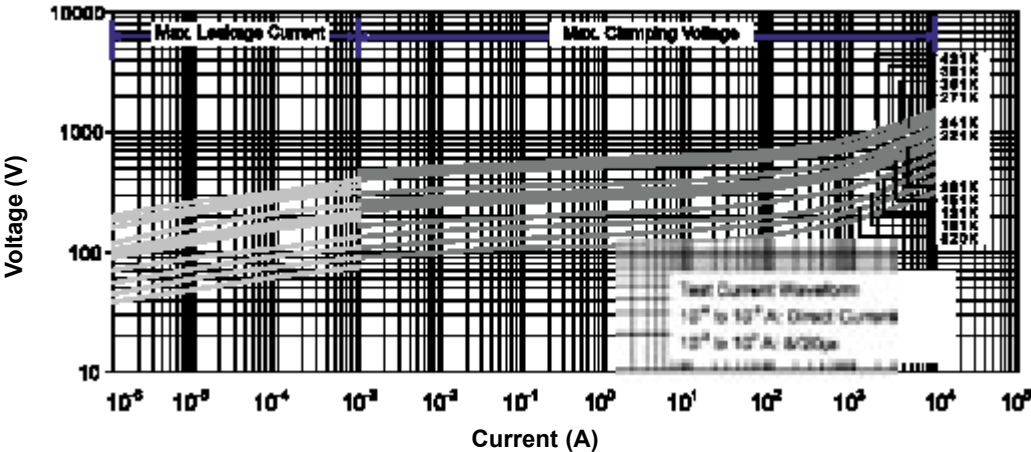


V-I Curve for SR471K to 112K10D(E) Series

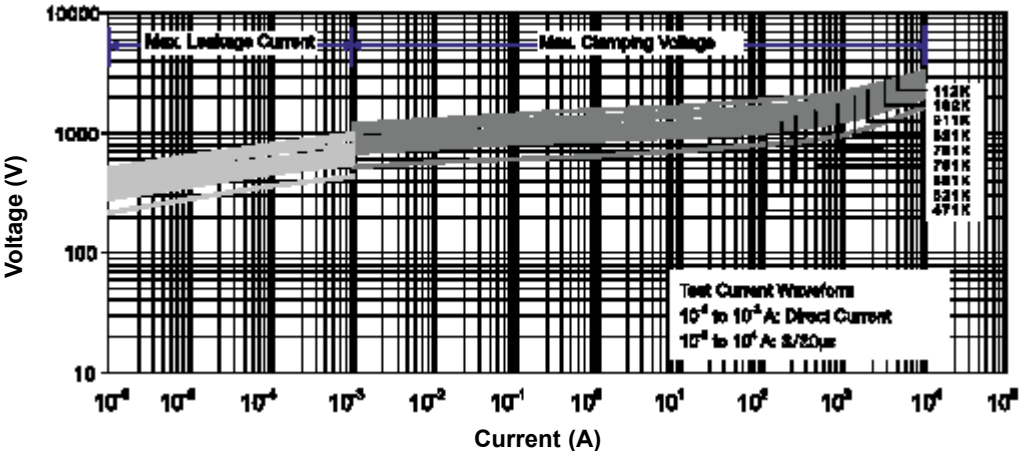


Metal Oxide Disc Thermistors

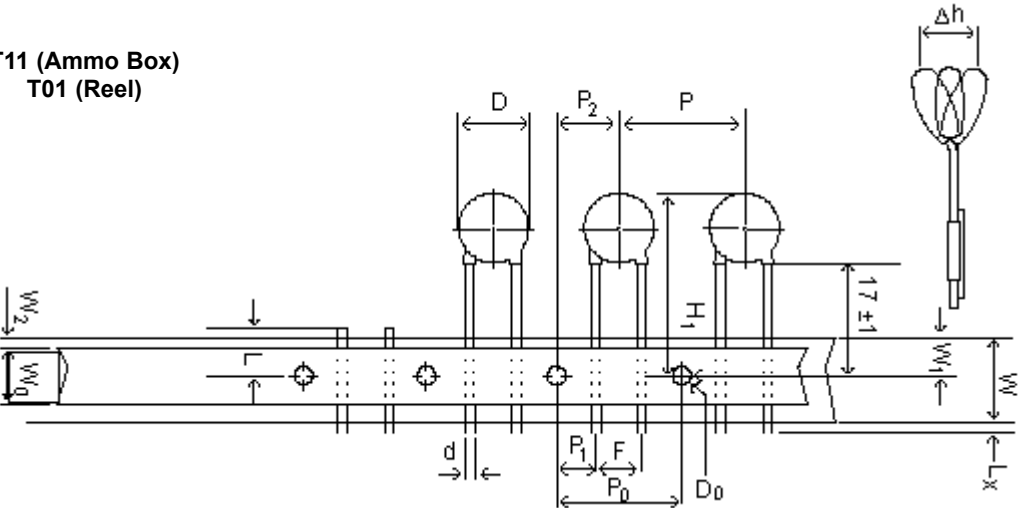
V-I Curve for SR280K to 431K20D(E) Series



V-I Curve for SR471K to 112K14D(E) Series

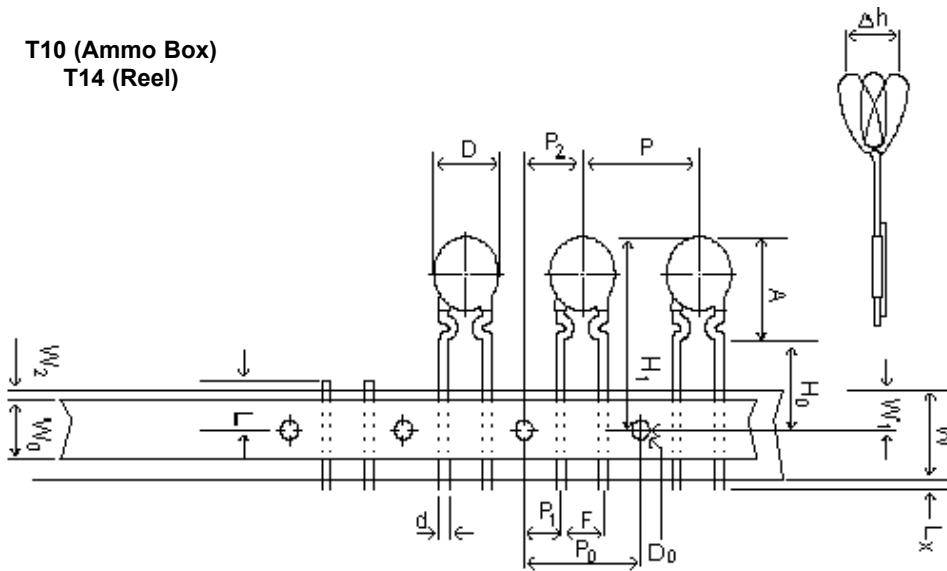


T11 (Ammo Box)
T01 (Reel)

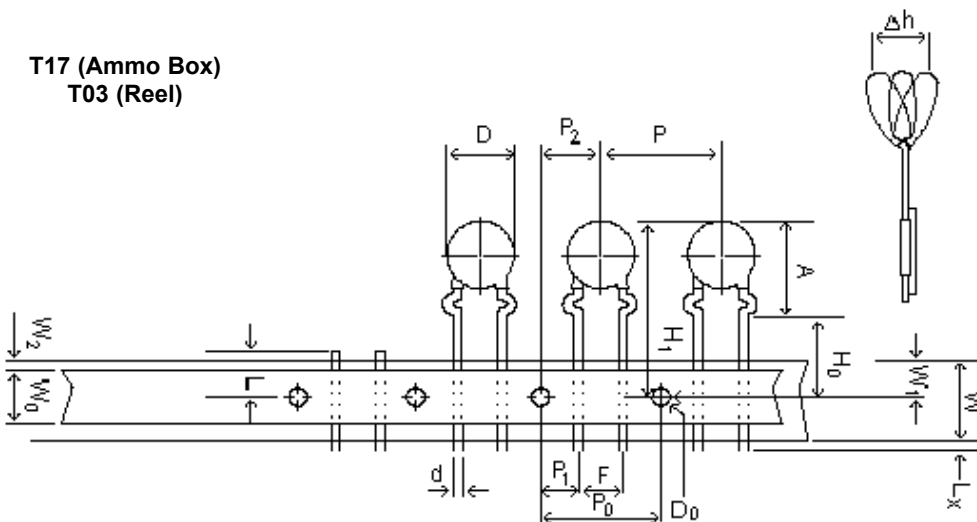


Metal Oxide Disc Thermistors

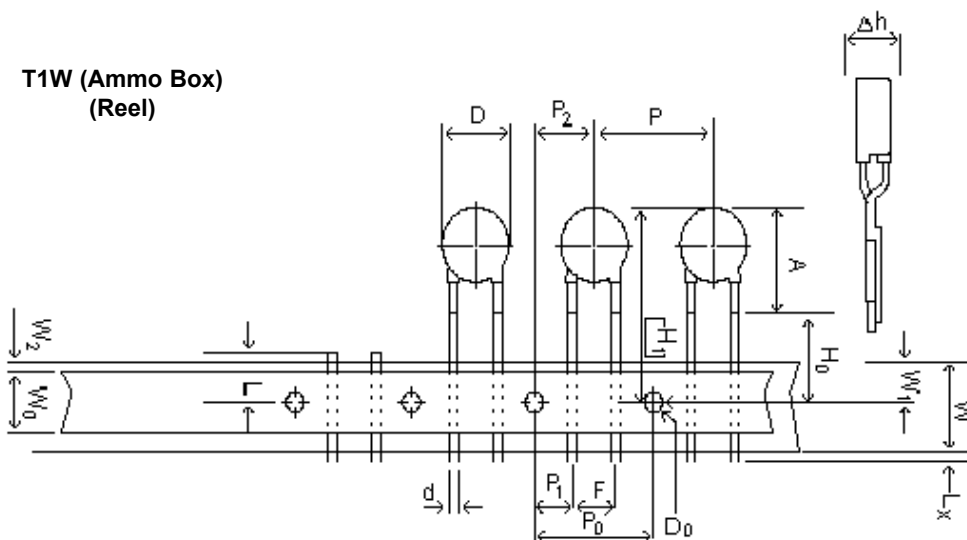
**T10 (Ammo Box)
T14 (Reel)**



**T17 (Ammo Box)
T03 (Reel)**



**T1W (Ammo Box)
(Reel)**



Dimensions : Millimetres

Metal Oxide Disc Thermistors

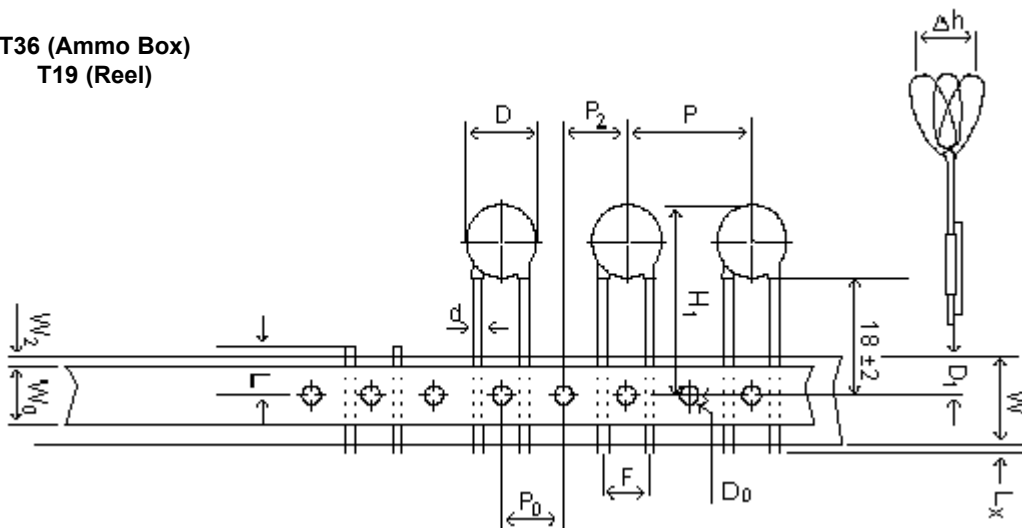


Specification Table

Item		Disk Size					
		5D			7D		
Taping Code		T11, T1	T17, T03, T14, T1D	T32, T1W	T11, T01	T17, T03, T14, T1D	T32, T1W
Body Diameter	D	7 Maximum			9 Maximum		
Lead Wire Diameter	d	0.6					
Pitch of Component	P	12.7 ±1					
Feed Hole Pitch	P ₀	12.7 ±0.3					
Feed Hole Centre to Lead	P ₁	3.85 ±0.7					
Lead to Lead Distance (Centre to Centre)	F	5 ±0.8					
Component Alignment	Δh	2 Maximum					
Base paper Tape Width	W	18*					
Adhesive Tape Width	W ₀	10 Minimum					
Hole Position	W ₁	9 ±0.5					
Adhesive Tape Border	W ₂	1.5 Maximum					
Component Height	H ₁	30 Maximum			32 Maximum		
Lead-Wire Clinch Height	H ₀	-	16 ±0.5		-	16 ±0.5	
Lead-Wire Protrusion	L _x	1 Maximum					
Feed Hole Diameter	D ₀	4 ±0.2					
Total Tape Thickness	t	< 0.7					
Length of Clipped Lead	L	11 Maximum					
Component Height from Seating Plane	A	-	13 Maximum		-	15 Maximum	
Hole Centre to Component Centre	P ₂	6.35 ±0.7					

* Tolerances are +1 and -0.5

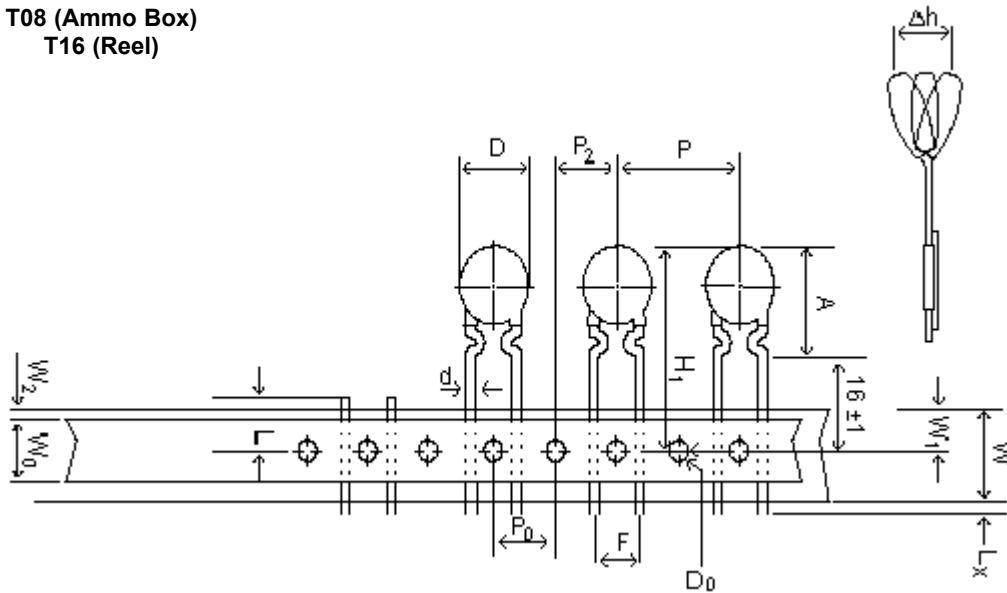
T36 (Ammo Box) T19 (Reel)



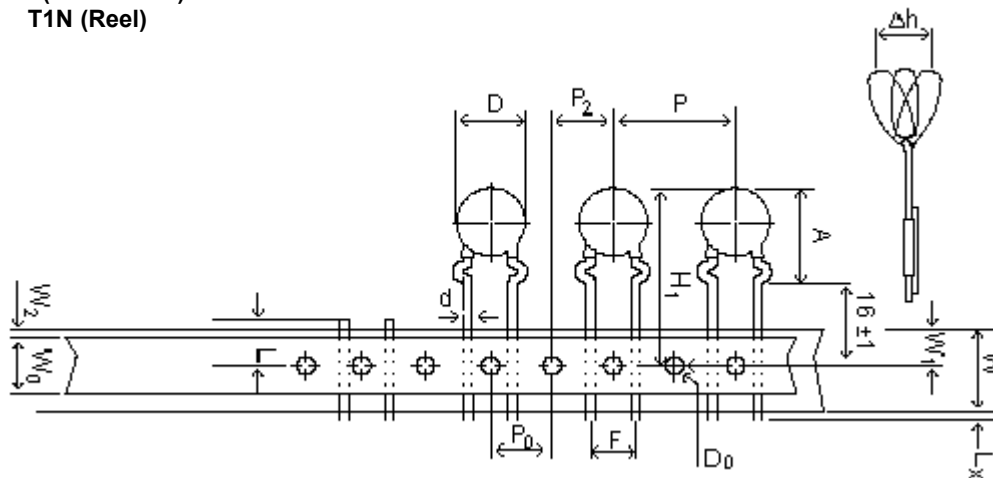
Dimensions : Millimetres

Metal Oxide Disc Thermistors

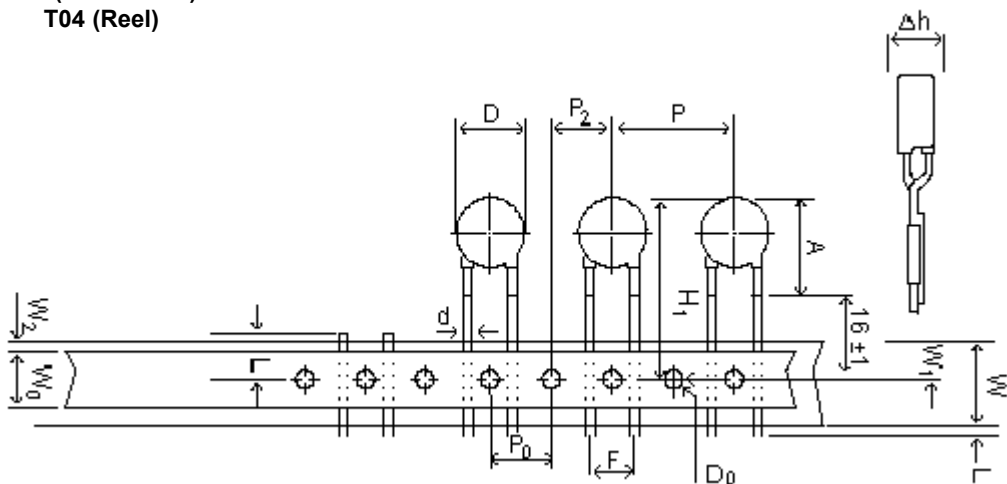
T08 (Ammo Box)
T16 (Reel)



T1U (Ammo Box)
T1N (Reel)



T43 (Ammo Box)
T04 (Reel)



Dimensions : Millimetres

Metal Oxide Disc Thermistors



Specification Table

Item		Disk Size					
		10D			14D		
Taping Code		T19, T36	T1N, T1U, T08, T16	T43, T04	T19, T36	T1N, T1U, T08, T16	T43, T04
Body Diameter	D	14 Maximum			7.5 Maximum		
Lead Wire Diameter	d	0.8 ±0.05					
Pitch of Component	P	25.4 ±1					
Hole Centre to Component Centre	P ₂	12.7 ±0.3					
Feed Hole Pitch	P ₀						
Lead to Lead Distance (Centre to Centre)	F	7.5 ± 0.8					
Component Alignment	Δh	2 Maximum					
Base paper Tape Width	W	18*					
Adhesive Tape Width	W ₀	10 Minimum					
Hole Position	W ₁	9 ±0.5					
Adhesive Tape Border	W ₂	1.5 Maximum					
Component Height	H ₁	33 Maximum	38.5 Maximum	35.5 Maximum	37 Maximum	40 Maximum	
Lead-Wire Protrusion	L _x	1 Maximum					
Feed Hole Diameter	D ₀	4 ±0.2					
Total Tape Thickness	t	< 0.7					
Length of Clipped Lead	L	11 Maximum					
Component Height from Seating Plane	A	-	19.5 Maximum		-	22.5 Maximum	

* Tolerances are +1 and -0.5

7.5 mm Lead Spacing

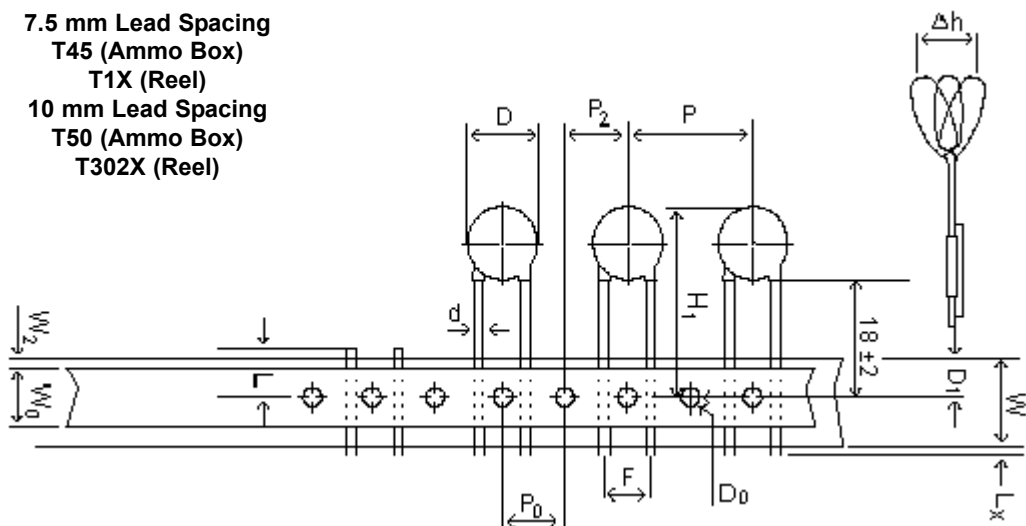
T45 (Ammo Box)

T1X (Reel)

10 mm Lead Spacing

T50 (Ammo Box)

T302X (Reel)



Dimensions : Millimetres

Metal Oxide Disc Thermistors



7.5 mm Lead Spacing

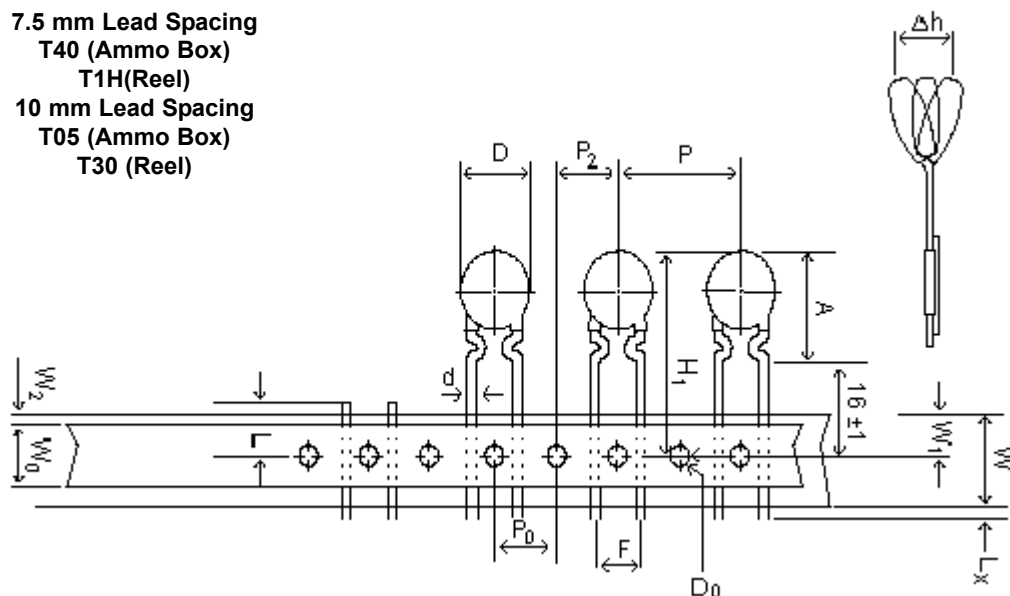
T40 (Ammo Box)

T1H (Reel)

10 mm Lead Spacing

T05 (Ammo Box)

T30 (Reel)



7.5 mm Lead Spacing

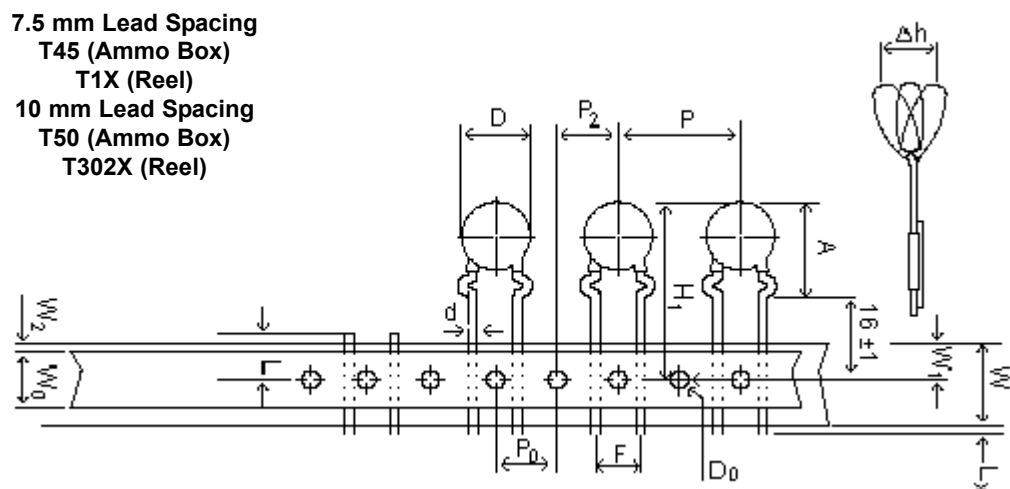
T45 (Ammo Box)

T1X (Reel)

10 mm Lead Spacing

T50 (Ammo Box)

T302X (Reel)



7.5 mm Lead Spacing

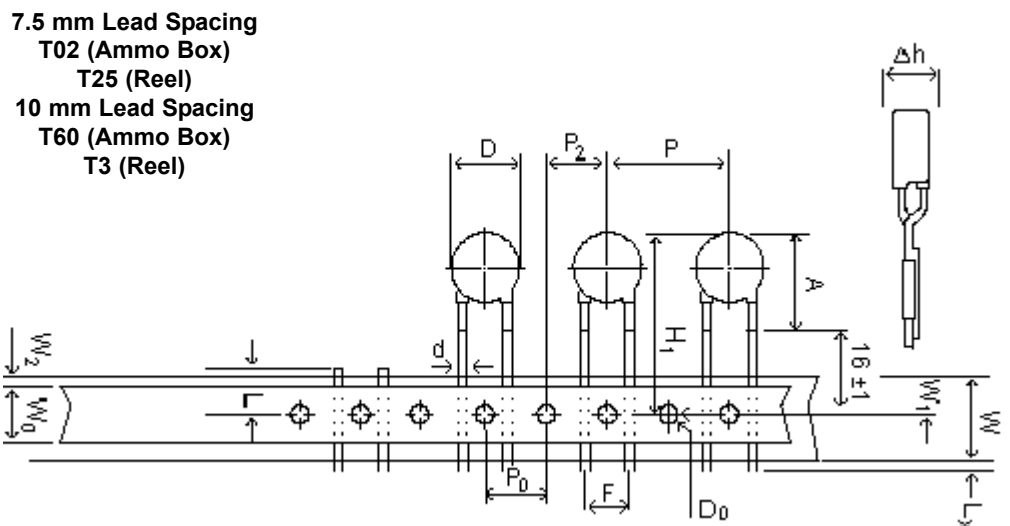
T02 (Ammo Box)

T25 (Reel)

10 mm Lead Spacing

T60 (Ammo Box)

T3 (Reel)



Dimensions : Millimetres



Metal Oxide Disc Thermistors



Specification Table

Item		Disk Size					
		20D					
		Lead Spacing 7.5 mm			Spacing 10 mm		
Taping Code		T44, T1H	T45, T1X, T40, T4X	T02, T25	T05, T30	T50, T2X, T35, T2D	T60, T3X
Body Diameter	D	24 Maximum**			24 Maximum		
Lead Wire Diameter	d	0.8 ±0.1					
Pitch of Component	P	25.4 ±1					
Hole Centre to Component Centre	P ₂	12.7 ±0.3					
Feed Hole Pitch	P ₀						
Lead to Lead Distance (Centre to Centre)	F	7.5 ± 0.8			10 ±1		
Component Alignment	h	2 Maximum					
Base paper Tape Width	W	18*					
Adhesive Tape Width	W ₀	10 Minimum					
Hole Position	W ₁	9 ±0.5					
Adhesive Tape Border	W ₂	1.5 Maximum					
Component Height	H ₁	48 Maximum**			48 Maximum		
Lead-Wire Protrusion	L _x	1 Maximum					
Feed Hole Diameter	D ₀	4 ±0.2					
Total Tape Thickness	t	< 0.7					
Length of Clipped Lead	L	11 Maximum					
Component Height from Seating Plane	A	-	29 Maximum	28 Maximum	-	29 Maximum	28 Maximum

* Tolerances are +1 and -0.5

** For 18Ø, D = 22, H1 = 46 and A = 26 Maximum

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