NTC Thermistors, MegaSurge™ Inrush Current Limiters



FEATURES

- Ability to withstand high steady-state currents to 50 A and up to 1000 J of input energy
- Protect rectifiers and other downstream components from damage caused by sudden current spikes
- Increase safety by eliminating the fire hazard associated with failed relays
- Handle the same amount of energy as power resistors in a smaller package, saving valuable circuit board space
- Provide simple one-component alternatives to using power resistors with timers and relays, reducing costs and greatly simplifying designs
- UL-recognized MegaSurge™ devices are certified for single- and three-phase input voltages up to 480 V_{AC}

DESCRIPTION

These power thermistors are rugged and built to last even in the most demanding high power applications.

These inrush current limiters are also used to regulate the release of battery energy in electric vehicles and in pre-charge circuits for many different types of battery chargers.

APPLICATIONS

- Alternative energy
- Electric vehicles
- Inrush current protection of power supplies, motor controllers, audio amplifiers, battery chargers, frequency generators, plasma cutting tools, MRI machines, and toroidal transformers

QUICK REFERENCE DATA

PART NUMBER	RESISTANCE AT 25 °C (R_{25}) (Ω)	TOLERANCE ON R_{25} VALUE (%)	MAX. STEADY-STATE CURRENT UP TO 65 °C (A)	MAX. RECOMMENDED ENERGY RATING (J)	MAX. VOLTAGE (V_{AC})	MAX. CAPACITANCE AT 120 V_{AC} (µF)	UL RECOGNITION FILE NUMBER
MS1215102	150	± 20	2	110	265	6900	E209153
MS1515004	15	± 25	4.5	155	265	10 500	-
MS1515004A	15	± 25	4.5	155	265	10 500	-
MS1530004	30	± 25	4.2	135	265	9300	E209153
MS1540004	40	± 25	4.1	135	265	9300	E209153
MS1566003	66	± 25	3.5	125	265	8500	-
MS225R015	5	± 25	15	200	480	13 850	-
MS2210008	10	± 25	8	200	480	13 850	E209153
MS2210008B	10	± 25	8	200	480	13 850	E209153
MS2220005	20	± 25	5	180	480	12 000	E209153
MS2220005A324	20	± 25	5	180	480	12 000	-
MS2230005	30	± 20	5	150	480	10 300	E209153
MS2250004	50	± 25	4	240	480	16 400	E209153
MS2250004B	50	± 25	4	240	480	16 400	E209153
MS2275004	75	± 25	4	240	480	16 400	E209153
MS2212102	120	± 25	2	220	480	15 000	E209153
MS2212103	120	± 25	3	220	480	15 000	E209153
MS2212103B	120	± 25	3	220	480	15 000	E209153
MS2212104	120	± 25	4	220	480	15 220	E209153
MS2212104B	120	± 25	4	220	480	15 220	E209153

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QUICK REFERENCE DATA

PART NUMBER	RESISTANCE AT 25 °C (R_{25}) (Ω)	TOLERANCE ON R_{25} VALUE (%)	MAX. STEADY-STATE CURRENT UP TO 65 °C (A)	MAX. RECOMMENDED ENERGY RATING (J)	MAX. VOLTAGE (V_{AC})	MAX. CAPACITANCE AT 120 V_{AC} (µF)	UL RECOGNITION FILE NUMBER
MS2222103	220	± 25	3	75	480	5100	E209153
MS320R536	0.5	± 25	36	250	480	16 000	-
MS320R540	0.5	± 25	40	250	480	13 500	-
MS320R540B	0.5	± 25	40	250	480	13 500	-
MS321R030	1	± 25	30	250	480	13 500	-
MS321R036	1	± 25	36	300	480	20 700	-
MS322R025	2	± 25	25	300	480	20 700	E209153
MS322R025B	2	± 25	25	300	480	20 700	E209153
MS325R020	5	± 20	20	300	480	20 700	E209153
MS325R020B	5	± 20	20	300	480	20 700	E209153
MS327R015	7	± 20	15	250	480	17 000	E209153
MS3210015	10	± 25	15	250	480	19 250	E209153
MS3210015B	10	± 25	15	250	480	19 250	E209153
MS3215012	15	± 25	12	250	480	17 300	E209153
MS3220008	20	± 25	8	250	480	17 300	E209153
MS3220008B	20	± 25	8	250	480	17 300	E209153
MS3220010	20	± 25	10	250	480	17 000	E209153
MS3220010B	20	± 25	10	250	480	17 000	E209153
MS3250006	50	± 25	6	250	480	17 000	-
MS3250006L	50	± 25	6	250	480	19 250	E209153
MS350R550	0.5	± 25	50	500	480	62 000	-
MS351R040	1	± 25	40	800	480	55 000	-
MS351R040100	1	± 25	30	400	480	27 000	E209153
MS352R035	2	± 25	35	750	480	51 900	-
MS352R035100	2	± 25	25	500	480	32 000	E209153
MS353R030	3	± 25	30	750	480	51 600	-
MS353R030100	3	± 25	20	500	480	32 000	E209153
MS353R725	3.7	± 25	25	800	680	41 250	-
MS355R025	5	± 25	25	600	480	41 250	-
MS355R025100	5	± 25	15	500	480	32 000	E209153
MS3510018	10	± 25	18	500	480	34 000	-
MS3510018100	10	± 25	10	500	480	32 000	E209153
MS3510018D	10	± 25	18	1000	680	1000	-
MS3520010	20	± 25	10	500	480	34 000	-
MS3520010100	20	± 25	5	400	480	27 000	E209153

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ELECTRICAL SPECIFICATIONS

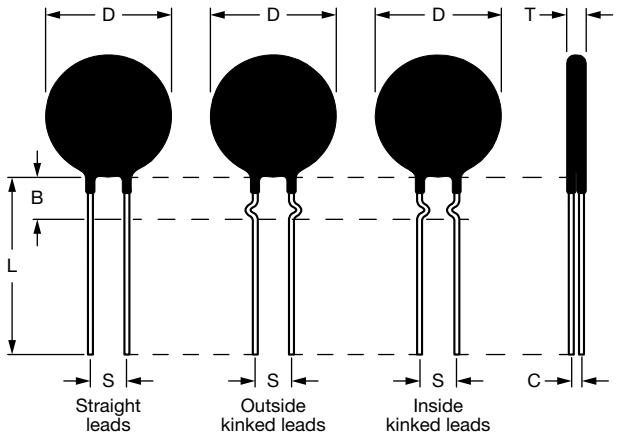
PART NUMBER	RESISTANCE AT 100 % MAX. CURRENT (Ω)	RESISTANCE AT 50 % MAX. CURRENT (Ω)	BODY TEMP. AT 100 % MAX. CURRENT (°C)	DISSIPATION FACTOR (mW/°C)	THERMAL TIME CONSTANT (s)	MATERIAL TYPE (FOR BETA AND CURVE)
MS1215102	1.34	3.5	162	12.7	47	I
MS1515004	0.20	0.85	144	49.4	114	G
MS1515004A	0.20	0.85	144	49.4	114	G
MS1530004	0.23	0.87	150	49.4	114	H
MS1540004	0.28	0.95	154	49.4	114	I
MS1566003	0.40	1.75	134	49.4	114	M
MS225R015	0.35	0.13	194	45.4	112	C
MS2210008	0.01	0.18	194	55	112	G
MS2210008B	0.11	0.18	194	55	112	G
MS2220005	0.19	0.48	170	42.5	114	H
MS2220005A324	0.19	0.485	170	42.5	114	H
MS2230005	0.23	0.65	174	45.4	112	H
MS2250004	0.42	0.79	159	47.8	119	H
MS2250004B	0.42	0.79	159	47.8	119	H
MS2275004	0.49	0.9	169	51.8	122	M
MS2212102	1.78	3.65	155	75.4	124	M
MS2212103	1.28	2.65	165	75.4	124	M
MS2212103B	1.28	2.65	165	75.4	124	M
MS2212104	0.75	1.98	175	75.4	124	M
MS2212104B	0.75	1.98	175	75.4	124	M
MS2222103	1.00	2.75	144	45.4	114	L
MS320R536	0.01	0.02	214	45.4	194	A
MS320R540	0.01	0.01	224	79.8	194	A
MS320R540B	0.01	0.01	224	79.8	194	A
MS321R030	0.01	0.04	190	45.4	194	B
MS321R036	0.01	0.02	255	72	285	B
MS322R025	0.02	0.06	236	65.4	208	C
MS322R025B	0.02	0.06	236	65.4	208	C
MS325R020	0.028	0.1	204	55.4	194	G
MS325R020B	0.028	0.1	204	55.4	194	G
MS327R015	0.049	0.16	214	63.7	194	G
MS3210015	0.056	0.22	224	63.7	194	H
MS3210015B	0.056	0.22	224	63.7	194	H
MS3215012	0.07	0.31	229	75.4	199	I
MS3220008	0.22	0.89	204	45.5	194	I
MS3220008B	0.22	0.89	204	45.5	194	I
MS3220010	0.14	0.64	224	45.4	194	I
MS3220010B	0.14	0.64	224	45.4	194	I
MS3250006	0.33	0.7	177	75.4	294	I
MS3250006L	0.40	0.7	177	75.4	294	I
MS350R550	0.01	0.02	215	78.0	240	B
MS351R040	0.01	0.03	215	78	240	B
MS351R040100	0.017	0.04	215	78	240	B
MS352R035	0.014	0.04	235	96	65	C
MS352R035100	0.027	0.069	235	96	65	C
MS353R030	0.03	0.07	215	78	240	C
MS353R030100	0.043	0.090	215	78	240	C

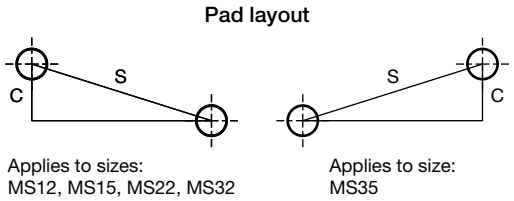
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ELECTRICAL SPECIFICATIONS

PART NUMBER	RESISTANCE AT 100 % MAX. CURRENT (Ω)	RESISTANCE AT 50 % MAX. CURRENT (Ω)	BODY TEMP. AT 100 % MAX. CURRENT (°C)	DISSIPATION FACTOR (mW/°C)	THERMAL TIME CONSTANT (s)	MATERIAL TYPE (FOR BETA AND CURVE)
MS353R725	0.037	0.09	215	102.5	134	H
MS355R025	0.03	0.08	212	102.5	134	H
MS355R025100	0.08	0.159	212	102.5	134	H
MS3510018	0.05	0.15	215	78	240	I
MS3510018100	0.186	0.37	215	78	240	I
MS3510018D	0.05	0.15	215	78	240	I
MS3520010	0.1	0.48	235	80	65	M
MS3520010100	0.465	0.9	235	80	65	M

MECHANICAL SPECIFICATIONS in millimeters



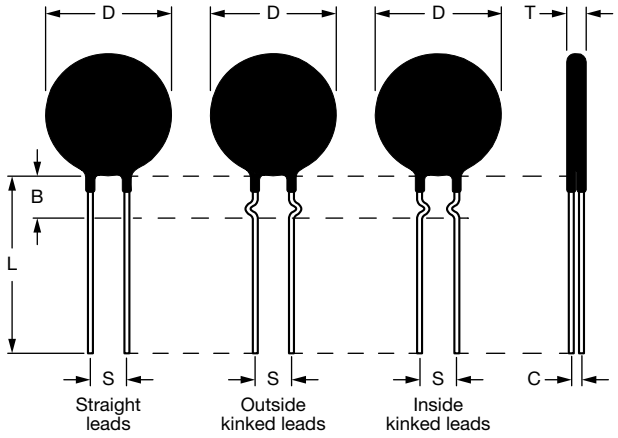


PART NUMBER	B	C	D	L	S	T	LEAD DIAMETER	STRAIGHT LEADS	LEAD STYLE
MS1215102	6.35 ± 0.6	6.5 ± 0.5	12.0 ± 1.0	38.0 ± 9.0	7.8 ± 1.0	8.5 ± 1.0	1.0 ± 0.1	5.0 max.	Straight
MS1515004	6.3 ± 0.6	6.5 ± 0.5	15.0 ± 1.0	38.0 ± 9.0	7.8 ± 2.0	7.0 ± 0.7	1.0 ± 0.1	5.0 ± 1.0	Straight
MS1515004A	6.3 ± 0.6	6.5 ± 0.5	15.0 ± 1.0	38.0 ± 9.0	7.8 ± 2.0	7.0 ± 0.7	1.0 ± 0.1	5.0 ± 1.0	Inside kinked
MS1530004	4.0 nom.	6.0 nom.	17.0 max.	38.0 nom.	7.8 nom.	8.0 max.	1.0 nom.	4.0 max.	Straight
MS1540004	4.0 nom.	6.0 nom.	17.0 max.	38.0 nom.	7.8 nom.	8.0 max.	1.0 nom.	4.0 max.	Straight
MS1566003	6.3 ± 0.6	6.5 ± 0.5	15.0 ± 1.0	38.0 ± 9.0	7.8 ± 2.0	7.0 ± 0.7	1.0 ± 0.1	5.0 ± 1.0	Straight
MS225R015	7.5 ± 2.5	3.82 ± 1.0	20.0 ± 1.0	38.0 ± 9.0	7.8 ± 2.0	7.0 ± 0.7	1.0 ± 0.1	5.0 ± 0.1	Straight
MS2210008	9.22 nom.	3.82 nom.	23.0 max.	38.0 nom.	7.8 nom.	9.5 max.	1.0 nom.	5.0 max.	Straight
MS2210008B	9.22 nom.	3.82 nom.	23.0 max.	38.0 nom.	9.5 ± 1.0	9.5 max.	1.0 nom.	5.0 max.	Outside kinked
MS2220005	9.2 nom.	6.35 nom.	23.0 max.	38.0 nom.	7.8 nom.	8.0 max.	1.0 nom.	4.0 max.	Straight
MS2220005A324	9.35 ± 0.85	3.82 ± 1.0	20.0 ± 1.0	38.0 ± 9.0	7.8 ± 2.0	8.0 max.	1.0 ± 0.1	5.0 ± 1.0	Inside kinked
MS2230005	9.2 nom.	6.7 nom.	23.0 max.	38.0 nom.	7.8 nom.	9.0 max.	1.0 nom.	4.0 max.	Straight
MS2250004	9.2 nom.	6.7 nom.	23.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.0 nom.	4.0 max.	Straight
MS2250004B	9.2 nom.	6.7 nom.	23.0 max.	38.0 nom.	9.5 ± 1.0	10.0 max.	1.0 nom.	4.0 max.	Outside kinked
MS2275004	9.2 nom.	6.9 nom.	23.0 max.	38.0 nom.	7.8 nom.	9.0 max.	1.0 nom.	4.0 max.	Straight
MS2212102	9.2 nom.	7.6 nom.	23.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.0 nom.	4.0 max.	Straight
MS2212103	9.2 nom.	7.6 nom.	23.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.0 nom.	4.0 max.	Straight
MS2212103B	9.2 nom.	7.6 nom.	23.0 max.	38.0 nom.	9.5 ± 1.0	10.0 max.	1.0 nom.	4.0 max.	Outside kinked
MS2212104	9.2 nom.	7.6 nom.	23.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.0 nom.	4.0 max.	Straight
MS2212104B	9.2 nom.	7.6 nom.	23.0 max.	38.0 nom.	9.5 ± 1.0	10.0 max.	1.0 nom.	4.0 max.	Outside kinked
MS2222103	9.2 nom.	7.3 nom.	23.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.0 nom.	4.0 max.	Straight

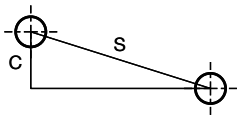
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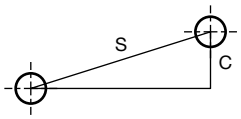
MECHANICAL SPECIFICATIONS in millimeters



Pad layout



Applies to sizes:
MS12, MS15, MS22, MS32



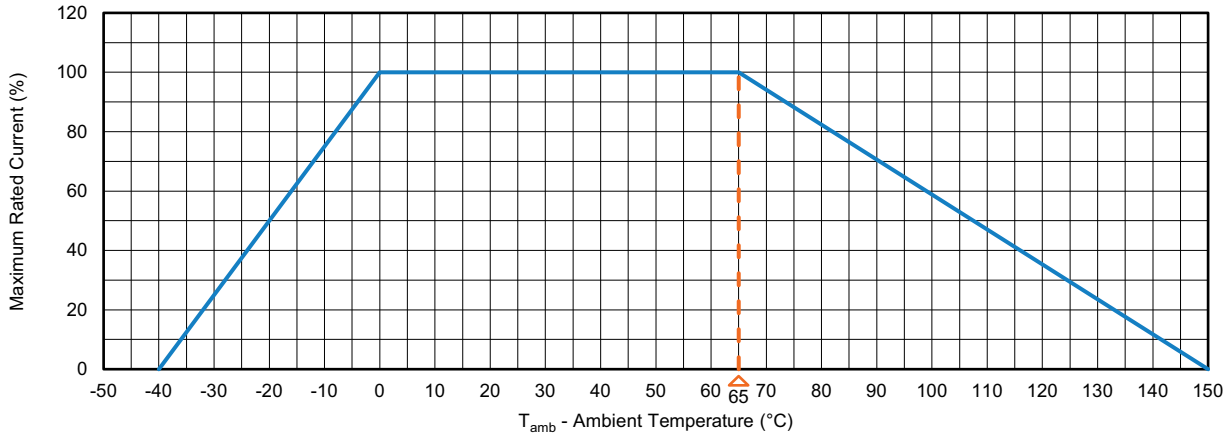
Applies to size:
MS35

PART NUMBER	B	C	D	L	S	T	LEAD DIAMETER	STRAIGHT LEADS	LEAD STYLE
MS320R536	7.8 nom.	4.5 nom.	31.0 max.	38.0 nom.	7.8 nom.	7.0 max.	1.0 nom.	4.0 max.	Straight
MS320R540	7.8 nom.	4.5 nom.	31.0 max.	38.0 nom.	7.8 nom.	7.0 max.	1.0 nom.	4.0 max.	Straight
MS320R540B	7.8 nom.	6.7 nom.	31.0 max.	38.0 nom.	9.5 ± 1.0	7.0 max.	1.0 nom.	4.0 max.	Outside kinked
MS321R030	11.5 nom.	3.82 nom.	30.0 max.	38.0 nom.	7.8 nom.	7.0 max.	1.0 nom.	5.0 max.	Straight
MS321R036	7.8 nom.	4.5 nom.	31.0 max.	38.0 nom.	7.8 nom.	7.0 max.	1.0 nom.	5.0 max.	Straight
MS322R025	7.8 nom.	6.7 nom.	31.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.0 nom.	4.0 max.	Straight
MS322R025B	7.8 nom.	6.7 nom.	31.0 max.	38.0 nom.	9.5 ± 0.5	10.0 max.	1.0 nom.	4.0 max.	Outside kinked
MS325R020	7.8 nom.	5.7 nom.	31.0 max.	38.0 nom.	7.8 nom.	8.0 max.	1.0 nom.	5.0 max.	Straight
MS325R020B	7.8 nom.	5.7 nom.	31.0 max.	38.0 nom.	9.5 ± 0.5	8.0 max.	1.0 nom.	5.0 max.	Outside kinked
MS327R015	7.8 nom.	6.7 nom.	31.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.0 nom.	4.0 max.	Straight
MS3210015	7.8 nom.	6.75 nom.	31.0 max.	38.0 nom.	7.8 nom.	9.3 max.	1.0 nom.	6.0 max.	Straight
MS3210015B	7.8 nom.	6.75 nom.	31.0 max.	38.0 nom.	9.5 ± 0.5	9.3 max.	1.0 nom.	6.0 max.	Outside kinked
MS3215012	7.8 nom.	6.7 nom.	31.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.0 nom.	4.0 max.	Straight
MS3220008	7.8 nom.	6.7 nom.	31.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.0 nom.	4.0 max.	Straight
MS3220008B	7.8 nom.	6.7 nom.	31.0 max.	38.0 nom.	9.5 ± 0.5	10.0 max.	1.0 nom.	4.0 max.	Outside kinked
MS3220010	7.8 nom.	6.7 nom.	31.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.0 nom.	4.0 max.	Straight
MS3220010B	7.8 nom.	6.7 nom.	31.0 max.	38.0 nom.	9.5 ± 0.5	10.0 max.	1.0 nom.	4.0 max.	Outside kinked
MS3250006	9.35 nom.	3.82 nom.	30.0 max.	38.0 nom.	7.8 nom.	10.0 max.	1.2 nom.	5.0 max.	Straight
MS3250006L	-	6.7 nom.	31.0 max.	38.0 nom.	7.8 nom.	8.3 max.	1.2 nom.	5.0 max.	Straight
MS350R550	-	5.2 nom.	37.0 max.	40.0 nom.	19.0 nom.	9.0 max.	2.7 ± 0.1	7.0 max.	Straight
MS351R040	-	7.5 nom.	37.0 max.	39.0 nom.	19.0 nom.	11.0 max.	2.5 nom.	7.0 max.	Straight
MS351R040100	-	7.5 nom.	37.0 max.	39.0 nom.	19.0 nom.	11.0 max.	2.5 nom.	7.0 max.	Straight
MS352R035	-	7.3 ± 0.5	35.0 ± 2.0	32.0 ± 5.0	19.0 ± 1.0	10.0 ± 1.0	2.5 nom.	9.0 max.	Straight
MS352R035100	-	7.3 ± 0.5	35.0 ± 2.0	32.0 ± 5.0	19.0 ± 1.0	10.0 ± 1.0	2.5 nom.	9.0 max.	Straight
MS353R030	-	7.5 nom.	37.0 max.	39.0 nom.	19.0 nom.	10.0 max.	2.5 nom.	7.0 max.	Straight
MS353R030100	-	7.5 nom.	37.0 max.	39.0 nom.	19.0 nom.	10.0 max.	2.5 nom.	7.0 max.	Straight
MS353R725	-	14.0 ± 2.0	37.0 max.	38.0 nom.	19.1 ± 2.0	15.0 ± 2.0	2.5 ± 0.2	-	Straight
MS355R025	-	7.5 nom.	38.0 max.	40.0 nom.	19.0 nom.	10.0 max.	2.5 nom.	7.0 max.	Straight
MS355R025100	-	7.5 nom.	38.0 max.	40.0 nom.	19.0 nom.	10.0 max.	2.5 nom.	7.0 max.	Straight
MS3510018	-	7.5 nom.	37.0 max.	40.0 nom.	19.0 nom.	11.0 max.	2.5 nom.	7.0 max.	Straight
MS3510018100	-	7.5 nom.	37.0 max.	40.0 nom.	19.0 nom.	11.0 max.	2.5 nom.	7.0 max.	Straight
MS3510018D	-	13.0 ± 1.0	35.0 ± 2.5	39.0 ± 5.0	19.0 ± 1.0	18.0 ± 2.0	2.6 ± 0.1	9.0 max.	Straight
MS3520010	-	7.5 nom.	37.0 max.	40.0 nom.	19.0 nom.	11.0 max.	2.5 nom.	7.0 max.	Straight
MS3520010100	-	7.5 nom.	37.0 max.	40.0 nom.	19.0 nom.	11.0 max.	2.5 nom.	7.0 max.	Straight

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DERATING CURVE



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