EPCOS Product Brief 2012

Thermal Fuse Varistors

T-series for Household Appliances and Industrial Applications

The new thermal fuse varistors consist of a disk varistor connected in series with a thermally coupled fuse integrated in a package. The ThermoFuse is encapsulated in a special plastic case and disconnects an overheated varistor from the power circuit, hence preventing the occurrence of flames in the worst case. This increases reliability and protects the equipment. Thanks to their thermal resistance and flameretarding design, ThermoFuse varistors satisfy the specifications of UL 94 V-0 and meet thermal stability test criteria stipulated in Section 8.3.5.2 of IEC 61643-11. The file number as per UL 1449 3rd Ed. is E321126[1]. In addition to the two terminal wires of the varistor, the T-series has a third terminal that may be used to send warning signals to an LED, for instance, to indicate that the fuse has been activated. The product range currently comprises disks with diameters of 14 or 20 mm including the package. The T-series is designed to absorb maximum surge currents with 8/20 µs pulses of between 6 and 10 kA at rated voltages between 130 and 1000 V RMS. These varistors have a surge current capability of 10000 A and a maximum energy absorption capacity of 410 J for 2 ms.

Applications for the T-series include:

- Household appliances,
- Power supplies,
- Inverters for solar installations,
- Drives.

They are also used for the general protection of electrical wiring and installations.

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Thermal Fuse Varistors for Household Appliances and Industrial Applications

EPCOS

Electrical data

Characteristics (85 °C)

Ordering code	Type	V_{RMS} V	V_{DC} V	i_{max} 8/20 µs (1 x) A	W_{max} 2 ms (1 x) J	P_{max} W
T14K V_{RMS} = 130 … 420 V						
B72214T2131K105	T14K130E2	130	170	6000	50	0.6
B72214T2151K105	T14K150E2	150	200	6000	60	0.6
B72214T2171K105	T14K175E2	175	225	6000	70	0.6
B72214T2231K105	T14K230E2	230	300	6000	90	0.6
B72214T2251K105	T14K250E2	250	320	6000	100	0.6
B72214T2271K105	T14K275E2	275	350	6000	110	0.6
B72214T2301K105	T14K300E2	300	385	6000	125	0.6
B72214T2321K105	T14K320E2	320	420	6000	136	0.6
B72214T2351K105	T14K350E2	350	460	6000	113	0.6
B72214T2381K105	T14K385E2	385	505	6000	124	0.6
B72214T2421K105	T14K420E2	420	560	6000	136	0.6
T20K V_{RMS} = 130 … 420 V						
B72220T2131K105	T20K130E2	130	170	10000	100	1.0
B72220T2151K105	T20K150E2	150	200	10000	120	1.0
B72220T2171K105	T20K175E2	175	225	10000	135	1.0
B72220T2231K105	T20K230E2	230	300	10000	180	1.0
B72220T2251K105	T20K250E2	250	320	10000	195	1.0
B72220T2271K105	T20K275E2	275	350	10000	215	1.0
B72220T2301K105	T20K300E2	300	385	10000	250	1.0
B72220T2321K105	T20K320E2	320	420	10000	273	1.0
B72220T2351K105	T20K350E2	350	460	10000	223	1.0
B72220T2381K105	T20K385E2	385	505	10000	248	1.0
B72220T2421K105	T20K420E2	420	560	10000	273	1.0
T20K V_{RMS} = 460 … 1000 V						
B72220T2461K105	T20K460E2	460	615	10000	300	1.0
B72220T2511K105	T20K510E2	510	670	10000	325	1.0
B72220T2551K105	T20K550E2	550	745	10000	360	1.0
B72220T2621K105	T20K625E2	625	825	10000	400	1.0
B72220T2681K105	T20K680E2	680	895	10000	440	1.0
B72220T0102K105	T20K1000	1000	1465	6500	410	1.0

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Maximum ratings (25 °C)				
Ordering code	**Type**	**V_V 1 mA V**	**V_{clamp} at 50 A, 8/20 µs V**	**C_{typ} at 1 kHz pF**
T14K V_{RMS} = 130 … 420 V				
B72214T2131K105	T14K130E2	205 ±10%	340	880
B72214T2151K105	T14K150E2	240 ±10%	395	750
B72214T2171K105	T14K175E2	270 ±10%	455	670
B72214T2231K105	T14K230E2	360 ±10%	595	530
B72214T2251K105	T14K250E2	390 ±10%	650	490
B72214T2271K105	T14K275E2	430 ±10%	710	440
B72214T2301K105	T14K300E2	470 ±10%	775	400
B72214T2321K105	T14K320E2	510 ±10%	840	370
B72214T2351K105	T14K350E2	560 ±10%	910	340
B72214T2381K105	T14K385E2	620 ±10%	1025	315
B72214T2421K105	T14K420E2	680 ±10%	1120	290
T20K V_{RMS} = 130 … 420 V				
B72220T2131K105	T20K130E2	205 ±10%	340	1850
B72220T2151K105	T20K150E2	240 ±10%	395	1550
B72220T2171K105	T20K175E2	270 ±10%	455	1350
B72220T2231K105	T20K230E2	360 ±10%	595	1000
B72220T2251K105	T20K250E2	390 ±10%	650	940
B72220T2271K105	T20K275E2	430 ±10%	710	850
B72220T2301K105	T20K300E2	470 ±10%	775	780
B72220T2321K105	T20K320E2	510 ±10%	840	720
B72220T2351K105	T20K350E2	560 ±10%	910	660
B72220T2381K105	T20K385E2	620 ±10%	1025	600
B72220T2421K105	T20K420E2	680 ±10%	1120	550
T20K V_{RMS} = 460 … 1000 V				
B72220T2461K105	T20K460E2	750 ±10%	1240	500
B72220T2511K105	T20K510E2	820 ±10%	1355	460
B72220T2551K105	T20K550E2	910 ±10%	1500	410
B72220T2621K105	T20K625E2	1000 ±10%	1650	380
B72220T2681K105	T20K680E2	1100 ±10%	1815	340
B72220T0102K105	T20K1000	1800 ±10%	2970	210

Symbol and Terms

V_{RMS}	Max. operating AC voltage
V_{DC}	Max. operating DC voltage
i_{max}	Surge current
W_{max}	Energy absorption
P_{max}	Max. average power dissipation
V_V	Varistor voltage
C_{typ}	Typical capacitance

[1] Approval is pending

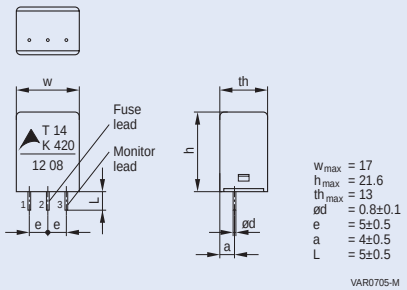
Thermal Fuse Varistors for Household Appliances and Industrial Applications

Benefits

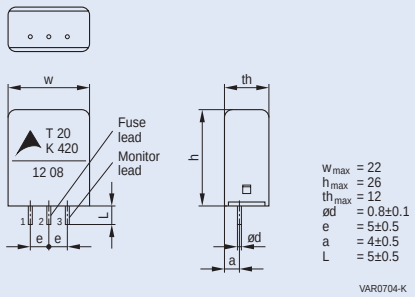
- Leads in line for easy assembly and same PCB layout for different voltages.
- Rated voltages of between 130 and 1000 V RMS.
- Robust housing for physical protection of adjacent components: the varistor ruptures in the event of heavy overload.
- 5 mm spring disconnection distance increases disconnection capability and reliability.
- Disconnection function according to UL 1449, limited overvoltage test, and to IEC 61643-11, Ed.1 2011 Section 8.3.5.2, thermal stability test.
- T14/T20 pin compatible for same PCB layout and different surge current levels (130 to 420 V).
- ThermoFuse varistors satisfy the specifications of UL 94 V-0.

Dimensional drawings

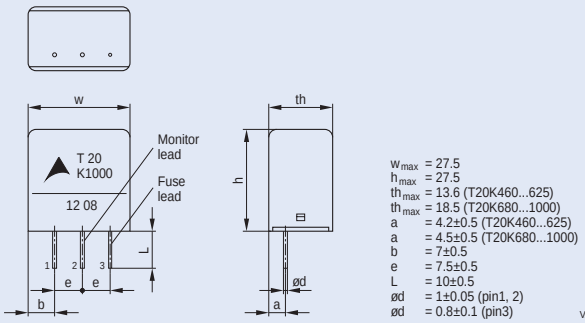
T14K V_{RMS} = 130 … 420 V



T20K V_{RMS} = 130 … 420 V

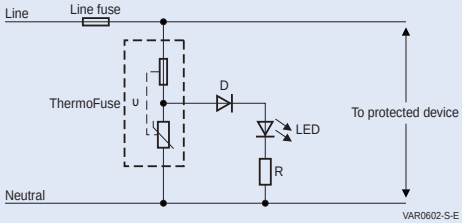


T20K V_{RMS} = 460 … 1000 V

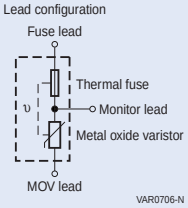


Connection diagram

Typical applications



Lead configuration



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