Metal oxide varistor

ThermoFuse varistor (E4 series)

Series/Type:	**ETFV25K***E4**
Ordering code:	**B72225T4***K101**
Date:	2007-04-26
Version:	a

Applications

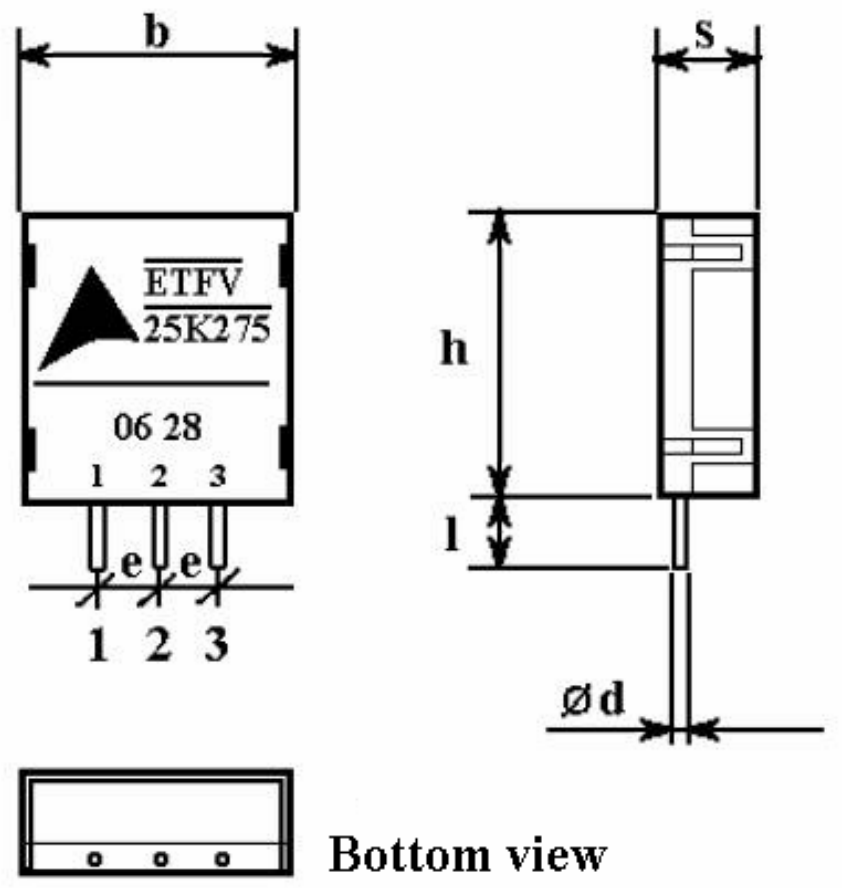
Overvoltage protection with integrated thermal fuse.

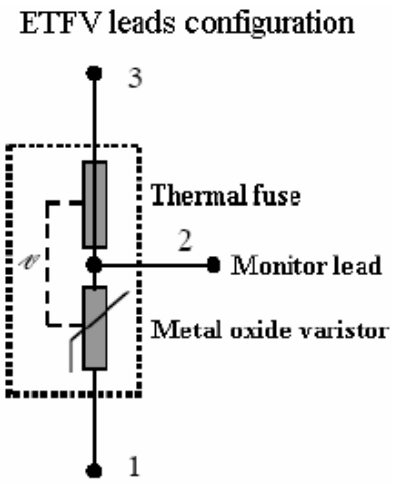
Suitable for use in industrial and household appliance applications.

Nomenclature

ETFV	=	EPCOS ThermoFuse varistor
25	=	Rated disk diameter (mm)
K	=	Tolerance of V_V at 1 mA: ±10%
***	=	Max. AC voltage (see table on page 3)
E4	=	Energy absorption characteristics, E4 series

Dimensional drawings in mm





b_{max}	= 30.2
h_{max}	= 35.2
s_{max}	= 11.2
e	= 6.35 ±0.5
l	= 5.0 ±0.5
∅d	= 1.0 ±0.05

Electrical data

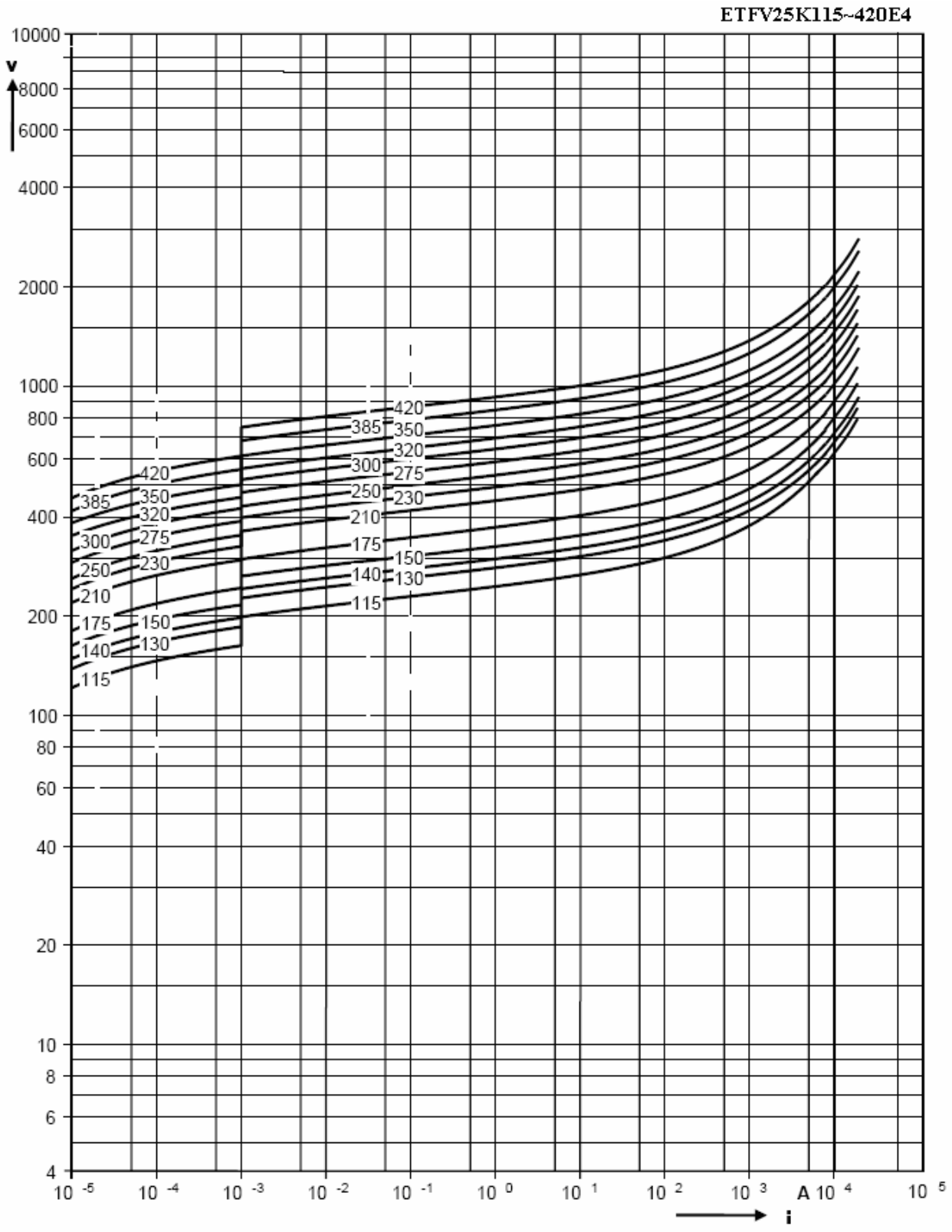
Maximum ratings (85 °C)

Ordering code	Type	Max. operating AC voltage [V]	Max. operating DC voltage [V]	Surge current (8/20 µs) 1 time [A]	Energy absorption (2 ms) 1 time [J]	Average power dissipation [W]
B72225T4111K101	ETFV25K115E4	115	150	20000	170	1.0
B72225T4131K101	ETFV25K130E4	130	170	20000	185	1.0
B72225T4141K101	ETFV25K140E4	140	180	20000	195	1.0
B72225T4151K101	ETFV25K150E4	150	200	20000	215	1.0
B72225T4171K101	ETFV25K175E4	175	225	20000	245	1.0
B72225T4211K101	ETFV25K210E4	210	270	20000	290	1.0
B72225T4231K101	ETFV25K230E4	230	300	20000	315	1.0
B72225T4251K101	ETFV25K250E4	250	320	20000	345	1.0
B72225T4271K101	ETFV25K275E4	275	350	20000	375	1.0
B72225T4301K101	ETFV25K300E4	300	385	20000	410	1.0
B72225T4321K101	ETFV25K320E4	320	420	20000	445	1.0
B72225T4351K101	ETFV25K350E4	350	460	20000	495	1.0
B72225T4381K101	ETFV25K385E4	385	505	20000	600	1.0
B72225T4421K101	ETFV25K420E4	420	560	20000	700	1.0

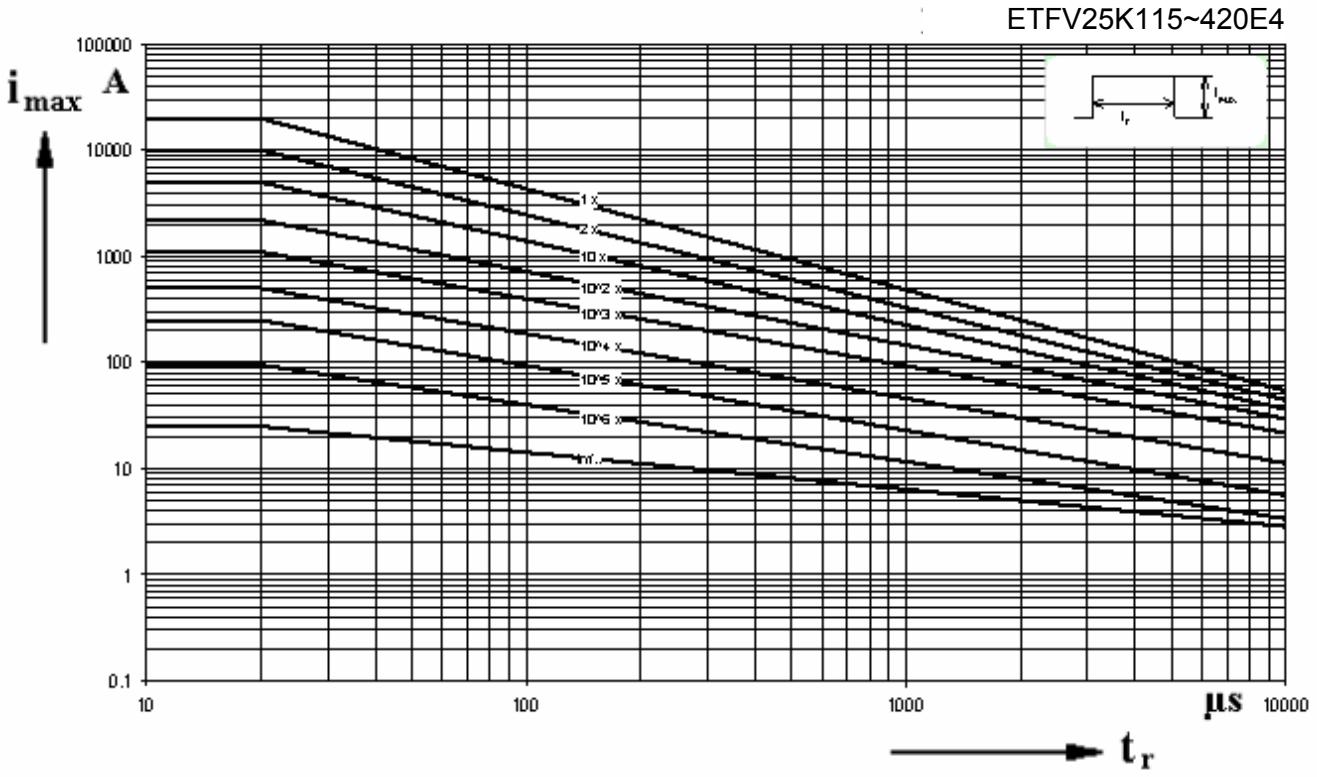
Characteristics (25 °C)

Ordering code	Type	Varistor voltage at 1 mA [V]	Clamping voltage at 150 A (8/20 µs) [V]	Typ. capacitance at 1 kHz [pF]
B72225T4111K101	ETFV25K115E4	180 ±10%	300	2280
B72225T4131K101	ETFV25K130E4	205 ±10%	340	2010
B72225T4141K101	ETFV25K140E4	220 ±10%	360	1860
B72225T4151K101	ETFV25K150E4	240 ±10%	395	1740
B72225T4171K101	ETFV25K175E4	270 ±10%	455	1500
B72225T4211K101	ETFV25K210E4	330 ±10%	550	1245
B72225T4231K101	ETFV25K230E4	360 ±10%	595	1140
B72225T4251K101	ETFV25K250E4	390 ±10%	650	1050
B72225T4271K101	ETFV25K275E4	430 ±10%	710	945
B72225T4301K101	ETFV25K300E4	470 ±10%	775	870
B72225T4321K101	ETFV25K320E4	510 ±10%	840	810
B72225T4351K101	ETFV25K350E4	560 ±10%	910	750
B72225T4381K101	ETFV25K385E4	620 ±10%	1025	675
B72225T4421K101	ETFV25K420E4	680 ±10%	1120	630

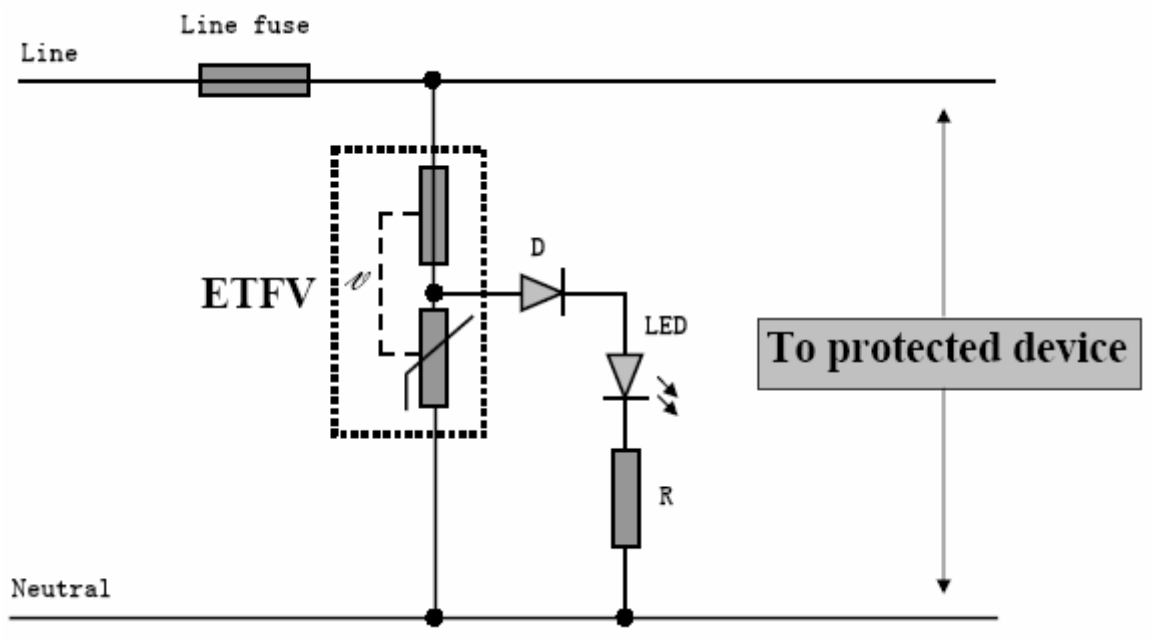
v/i characteristic



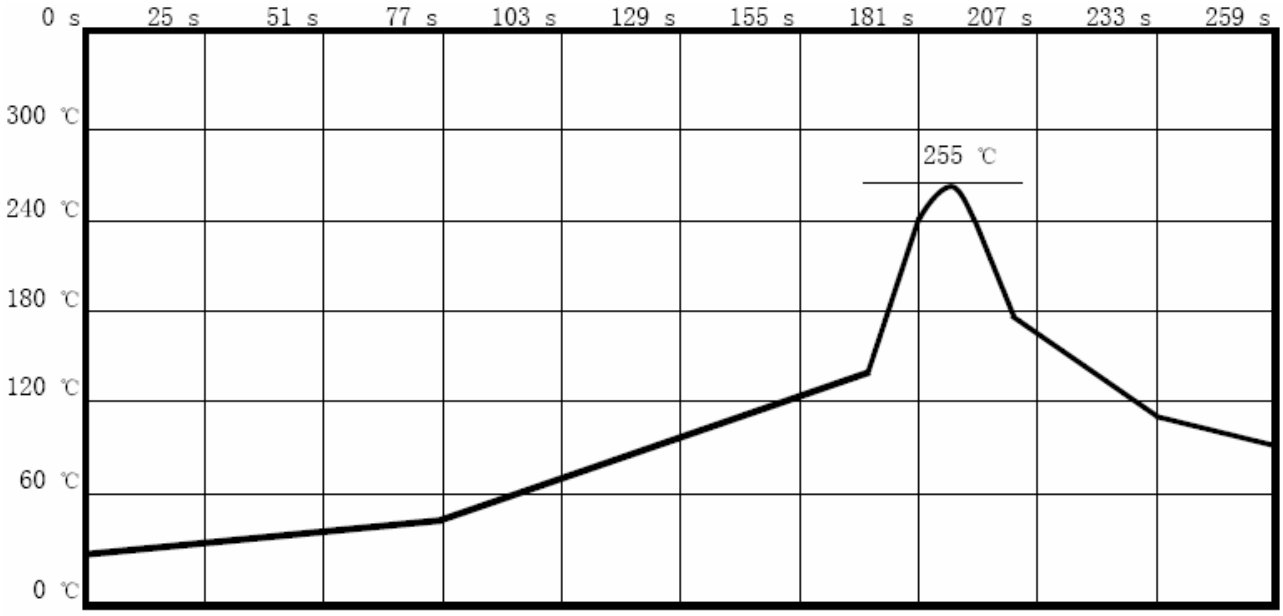
Maximum surge current i_{max} = f (t_r, pulse train)



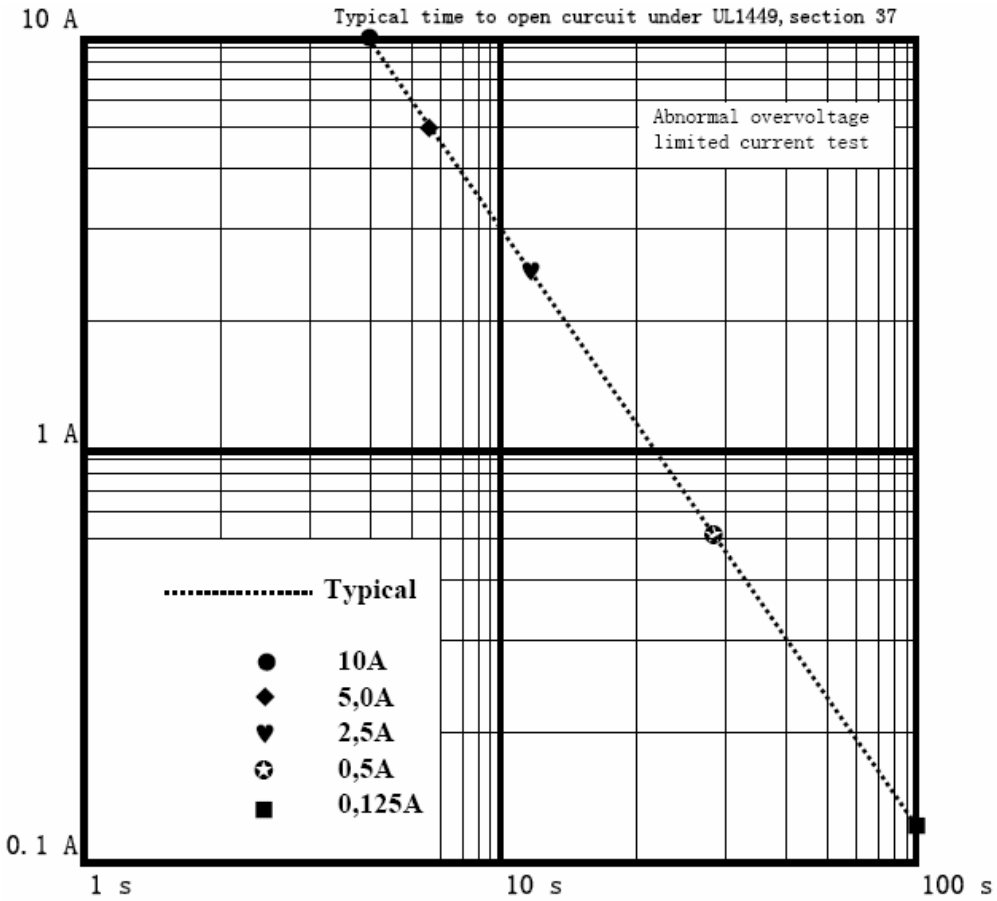
Typical application



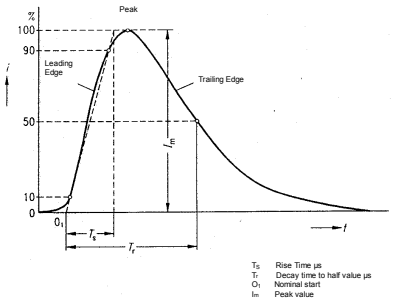
Typical wave soldering curve



Typical thermal characteristic



Reliability data, electrical

Characteristics	Test methods / Description	Specifications
Varistor voltage	The voltage between two terminals with the specified measuring current applied is called V_v (1 mA_{DC} @ 0.2 … 2 s).	To meet the specified value.
Clamping voltage	The maximum voltage between two terminals with the specified standard impulse current (8/20 µs) illustrated below applied.  	To meet the specified value.
Surge current derating, 8/20 µs	CECC 42 000, test C 2.1 100 surge currents (8/20 µs), unipolar, interval 30 s, amplitude corresponding to derating curve for 20 µs	| Δ V/V (1 mA) | ≤10% (measured in direction of surge current) No visible damage
Surge current derating, 2 ms	CECC 42 000, test C 2.1 100 surge currents (2 ms), unipolar, interval 120 s, amplitude corresponding to derating curve for 2 ms	| Δ V/V (1 mA) | ≤10% (measured in direction of surge current) No visible damage

Reliability data, mechanical

Characteristics	Test methods/Description	Specifications
Solderability	IEC 60068-2-20 test Ta, method 1, 245 °C, 3 s: After dipping the terminals to a depth of approximately 3 mm from the body in a soldering bath of 245 ±5 °C for 3 ±0.3 s, the terminals shall be visually examined.	The inspection shall be carried out under adequate light with normal eyesight or with the assistance of a magnifier capable of giving a magnification of 4 times to 10 times. The dipped surface shall be covered with a smooth and bright solder coating with no more than small amounts of scattered imperfections such as pinholes or un-wetted or de-wetted areas. These imperfections shall not be concentrated in one area.
Resistance to soldering heat	IEC 60068-2-20 test Tb, method 1 A, 260 °C, 10 s: Each lead shall be dipped into a solder bath having a temperature of 260 ±5 °C to a point 2.0 to 2.5 mm from the body of the unit, be held there for 10 ±1 s and then be stored at room temperature and normal humidity for 1 to 2 hours. The change of V_v and mechanical damage shall be examined.	$\lvert \Delta V/V \ (1\ mA) \rvert \leq 5\%$ No visible damage

Reliability data, environmental

Characteristics	Test methods/Description	Specifications
Max. AC operating voltage	CECC 42 000, test 4.20 1000 h at 85 ±2 °C): After being continuously applied the maximum allowable voltage at 85 ±2 °C for 1000 hours, the specimen shall be stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_v shall be measured.	| Δ V/V (1 mA) | ≤10%
Damp heat, steady state	IEC 60068-2-3 56 days, 40 °C, 93% r.H.: The specimen shall be subjected to 40 ±2 °C, 90 to 95% r.H. for 56 days, then stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_v shall be measured.	| Δ V/V (1 mA) | ≤10%
Climatic sequence	CECC 42 000, test 4.16 The specimen shall be subjected to: a) dry heat at +85 °C, 16 h b) damp heat, 1st cycle: 55 °C/25 °C, 93% r.H., 24 h c) cold, –40 °C, 2 h d) damp heat, additional 5 cycles: 55/25 °C, 93% r.H., 24 h/cycle Then the specimen shall be stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_v shall be measured.	| Δ V/V (1 mA) | ≤10%
Fast temperature cycling	IEC 60068-2-14, test Na, +85/–40 °C dwell time 30 min, 5 cycles: The temperature cycle shown below shall be repeated 5 times. Then the specimen shall be stored at room temperature and normal humidity for 1 to 2 hours. The change of V_v and mechanical damage shall be examined. Step / Temperature (°C) / Period (min.) 1 / –40 ±3 / 30 ±3 2 / transition time / <10 s 3 / +85 ±2 / 30 ±3	| Δ V/V (1 mA) | ≤5% No visible damage

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