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PTCCL05H110HTE

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265 V PTC Thermistors for Overload Protection

FEATURES

- Wide range of trip and non-trip currents: From 11 mA up to 800 mA
- Small ratio between trip and non-trip currents (I_t/I_{nt} = 1.5 at 25 °C)
- High maximum inrush current (up to 5.5 A)
- Leaded parts withstand mechanical stresses and vibration
- UL file E148885 according to XGPU standard UL1434
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

APPLICATIONS

Overload (current, voltage, temperature) protection in:

- Industrial electronics
- Consumer electronics
- Electronic data processing

DESCRIPTION

These directly heated ceramic-based thermistors have a positive temperature coefficient and are primarily intended for overload protection. They consist of a ceramic pellet soldered between two tinned CCS wires and coated with a UL 94 V-0 high temperature hard silicone lacquer.

MOUNTING

PTC thermistors can be mounted by wave, reflow, or hand-soldering. Current levels have been determined according IEC 60738 conditions. Different ways of mounting or connecting the thermistors can influence their thermal and electrical behavior. Standard operation is in still air, any potting or encapsulation of PTC thermistors is not recommended and will change its operating characteristics.

Typical Soldering
235 °C; duration: 5 s (Lead (Pb)-bearing)
245 °C, duration: 5 s (Lead (Pb)-free)

Resistance to Soldering Heat
260 °C, duration: 10 s max.

MARKING

Only the gray lacquered thermistors with a diameter of 8.5 mm to 20.5 mm are marked with BC, R_{25} value (example 1R9) on one side and I_{nt}, $V_{max.}$ on the other side.

QUICK REFERENCE DATA

PARAMETER	VALUE	UNIT
Maximum voltage (RMS or DC)	265	V
Maximum holding current (I_{nt})	0.011 to 0.8	A
Resistance at 25 °C (R_{25})	2.1 to 3000	Ω
Tolerance on R_{25} value	20	%
Maximum overload current I_{ol}	0.8 to 5.5	A
Switching temperature	135 to 145	°C
Operating temperature range at max. voltage	0 to 70	°C
Storage temperature	-40 to +175	°C

QUALITY

UL approved PTCs are guaranteed to withstand severe test programs and have factory audited follow-up programs. Major UL qualification tests are long-life (6000 cycles) electrical cycle tests at trip-current, long-life stability storage tests (3000 h at 250 °C), damp heat and water immersion tests and over-voltage tests up to 200 % of rated voltage.

UL approved PTCs are guaranteed to withstand severe test programs

- Long-life cycle tests (over 5000 trip cycles)
- Long-life storage tests (3000 h at 250 °C)
- Electrical cycle tests at low ambient temperatures (-40 °C or 0 °C)
- Damp-heat and water immersion tests
- Overvoltage tests at up to 200 % of rated voltage

ELECTRICAL DATA AND ORDERING INFORMATION

I_{nt} MAX. at 25 °C (mA) (1)	I_t MIN. at 25 °C (mA) (1)	R_{25} ± 20 % (Ω)	I_{ol} MAX. at 25 °C (mA) (2)	I_{res} MAX. at $V_{max.}$ and 25 °C (mA) (1)	DISSIP. FACTOR (mW/K) (1)	Ø D MAX. (mm)	ORDERING PART NUMBERS	
							BULK	TAPE ON REEL
11	17	3000	80	6.5	7.3	5	PTCCL05H110HBE	PTCCL05H110HTE
15	23	1900	110	6.5	7.3	5	PTCCL05H150HBE	PTCCL05H150HTE
19	29	1200	140	6.5	7.3	5	PTCCL05H190HBE	PTCCL05H190HTE
28	42	500	200	6.8	7.3	5	PTCCL05H280HBE	PTCCL05H280HTE
39	59	260	300	6.8	7.3	5	PTCCL05H390HBE	PTCCL05H390HTE
63	95	120	450	7	7.3	5	PTCCL05H630HBE	PTCCL05H630HTE
76	115	85	550	7	7.3	5	PTCCL05H760HBE	PTCCL05H760HTE
95	143	56	600	7	7.3	5	PTCCL05H950HBE	PTCCL05H950HTE
110	165	48	650	7.5	8.3	7	PTCCL07H111HBE	PTCCL07H111HTE
140	210	29	800	8	8.3	7	PTCCL07H141HBE	PTCCL07H141HTE
170	255	22	900	9	9	8.5	PTCCL09H171HBE	PTCCL09H171HTE
190	285	18	1000	9.5	9	8.5	PTCCL09H191HBE	PTCCL09H191HTE
210	315	17	1300	10	10.5	10.5	PTCCL11H211HBE	PTCCL11H211HTE
250	375	12	1500	11	10.5	10.5	PTCCL11H251HBE	PTCCL11H251HTE
280	420	11	1800	12	11.7	12.5	PTCCL13H281HBE	PTCCL13H281HTE
320	480	8.4	2200	13	11.7	12.5	PTCCL13H321HBE	PTCCL13H321HTE
400	600	6.6	3000	15	15.5	16.5	PTCCL17H401HBE	-
490	735	4.4	3500	16	15.5	16.5	PTCCL17H491HBE	-
590	855	4	4500	19.5	19.8	20.5	PTCCL21H591HBE	-
700	1050	2.8	5500	21	19.8	20.5	PTCCL21H701HBE	-
800	1200	2.1	5500	22.5	19.8	20.5	PTCCL21H801HBE (3)	-

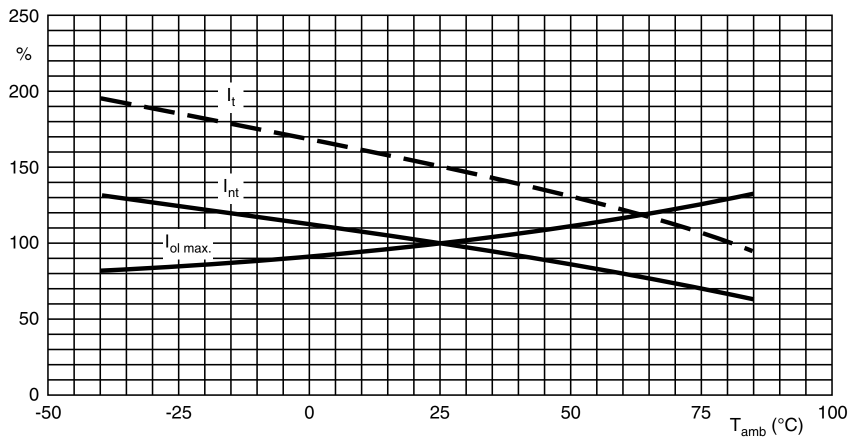
Notes

(1) The indicated current levels are guaranteed according IEC 60738 mounting conditions. For different mounting conditions the indicated current levels can change and should be evaluated in the application.

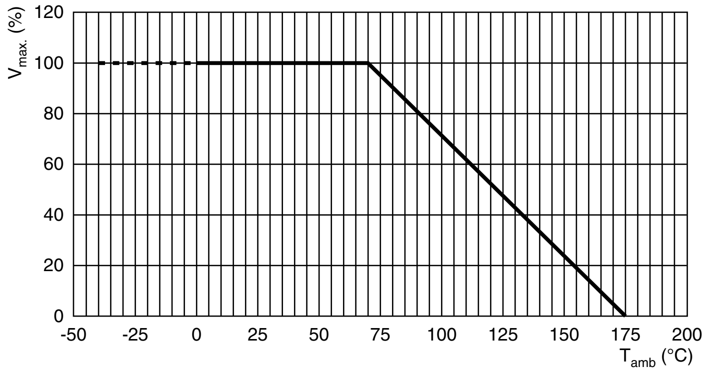
(2) $I_{ol\ max.}$ is the maximum overload current that may flow through the PTC when it passes from the low ohmic to the high ohmic state. UL approval: $I_{ol\ max.}$ x 0.85

(3) Not UL approved

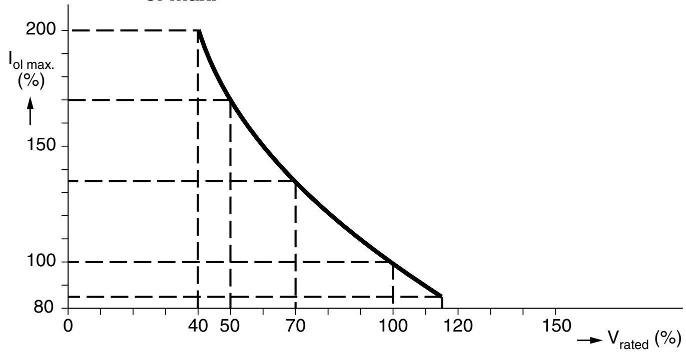
CURRENT DEVIATION AS A FUNCTION OF THE AMBIENT TEMPERATURE



VOLTAGE DERATING AS A FUNCTION OF AMBIENT TEMPERATURE



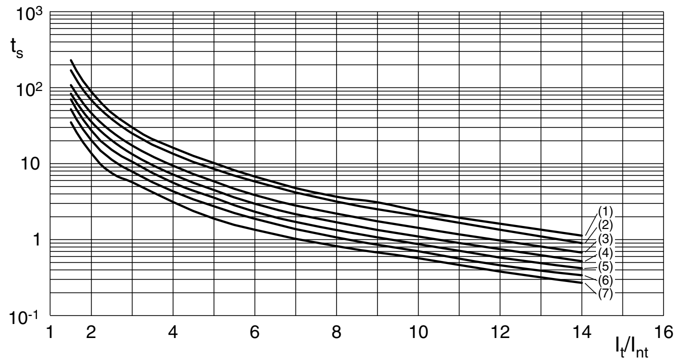
MAXIMUM OVERLOAD CURRENT $I_{ol\ max.}$ DERATING AS A FUNCTION OF VOLTAGE



$I_{ol\ max.}$ as stated in the electrical data and ordering information tables, is the maximum overload current that may flow through the PTC when passing from the low ohmic to high ohmic state at rated voltage.

When other voltages are present after tripping, the $I_{ol\ max.}$ value can be derived from the above $I_{max.}$ as a function of voltage graph. Voltages below V_{rated} will allow higher overload currents to pass the PTC.

TYPICAL TRIP-TIME AS A FUNCTION OF TRIP CURRENT RATIO



Curve 1: Ø $D_{max.}$ = 20.5 mm
Curve 2: Ø $D_{max.}$ = 16.5 mm
Curve 3: Ø $D_{max.}$ = 12.5 mm
Curve 4: Ø $D_{max.}$ = 10.5 mm
Curve 5: Ø $D_{max.}$ = 8.5 mm
Curve 6: Ø $D_{max.}$ = 7.0 mm
Curve 7: Ø $D_{max.}$ = 5.0 mm
Measured in accordance with *"IEC 60738"*.

Trip-Time or Switching Time (t_s)

To check the trip-time for a specific PTC, refer to the Electrical Data and Ordering Information tables for the value I_{nt}. Divide the overload or trip current by this I_{nt} and you realize the factor I_t/I_{nt}. This rule is valid for any ambient temperature between 0 °C and 70 °C. Adapt the correct non-trip current with the appropriate curve in the Current Deviation as a Function of the Ambient Temperature graph. The relationship between the It/Int factor and the switching time is a function of the PTC diameter; see the above graphs.

Example

What will be the trip-time at I_{ol} = 0.8 A and T_{amb} = 50 °C of a thermistor type PTCCL09H171HBE; 22 Ω; Ø $D_{max.}$ = 8.5 mm:

I_{nt} from the table: 170 mA at 25 °C
I_{nt}: 170 x 0.87 = 148 mA (at 50 °C)

Overload current = 0.8 A; factor I_t/I_{nt}: 0.8/0.148 = 5.40. In the Typical trip-time as a function of trip current ratio graph, at the 8.5 mm line and I_t/I_{nt} = 5.40, the typical trip-time is 3.0 s.

COMPONENTS PACKING INFORMATION			
SAP ORDERING PART NUMBER		SPQ	PACKING OUTLINE
PTCCL05H....BE		500	Bulk
PTCCL05H....TE		1500	Tape and reel
PTCCL07H....BE	PTCCL09H....BE	250	Bulk
PTCCL07H....TE	PTCCL09H....TE	1500	Tape and reel
PTCCL11H....BE	PTCCL13H....BE	200	Bulk
PTCCL11H....TE		1500	Tape and reel
PTCCL13H....TE		750	Tape and reel
PTCCL17H....BE		100	Bulk
PTCCL21H....BE		50	Bulk

PTC THERMISTORS IN BULK

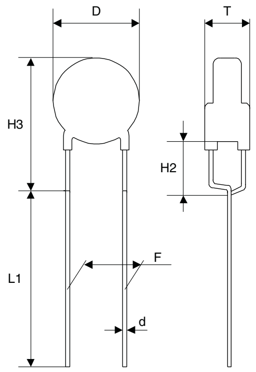


Fig. 1

DIMENSIONS OF BULK TYPE PTCs (in mm)	
D	See table
d	0.6 ± 0.05
T	5.5 max.
H2	4.0 ± 1.0
H3	D + 5 max.
L1	20 min.
F	5.0

PTC THERMISTORS ON TAPE AND REEL

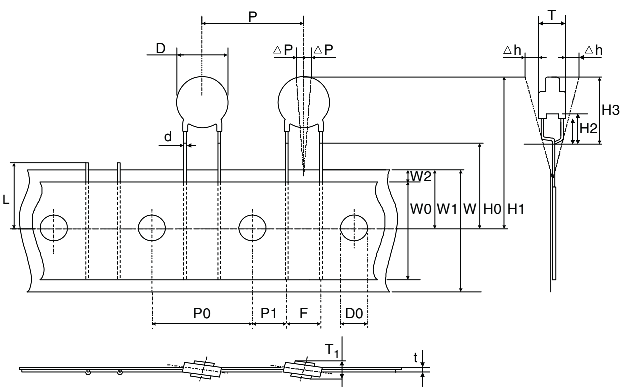
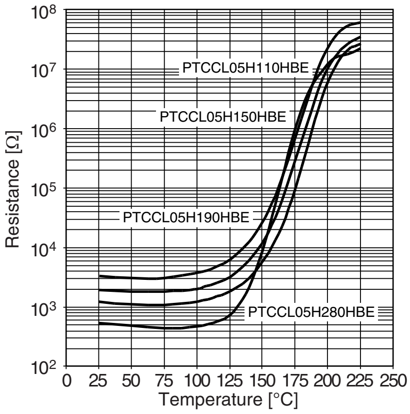


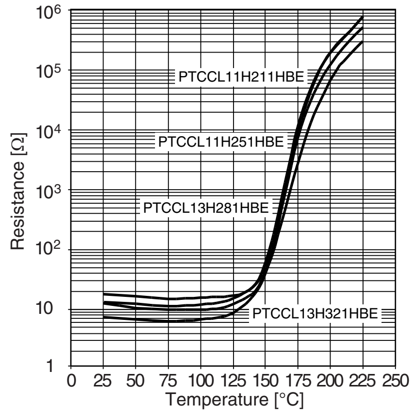
Fig. 2

TAPE AND REEL ACCORDING TO IEC 60286-2 (in mm)			
SYMBOL	PARAMETER	DIMENSIONS	TOLERANCE
D	Body diameter	See table	max.
d	Lead diameter	0.6	± 0.05
P	Pitch of components Diameter < 12 mm Diameter ≥ 12 mm	 12.7 25.4	 ± 1.0 ± 2.0
P_0	Feedhole pitch	12.7	± 0.3
F	Leadcenter to leadcenter distance (between component and tape)	5.0	+ 0.5 / - 0.2
H0	Lead wire clinch height	16.0	± 0.5
H2	Component bottom to seating plane	4.0	± 1.0
H3	Component top to seating plane	D + 5	max.
H4	Seating plane difference (left-right lead)	0	± 0.2
T	Total thinkness	5.5	max.

TYPICAL RESISTANCE / TEMPERATURE CHARACTERISTIC



TYPICAL RESISTANCE / TEMPERATURE CHARACTERISTIC



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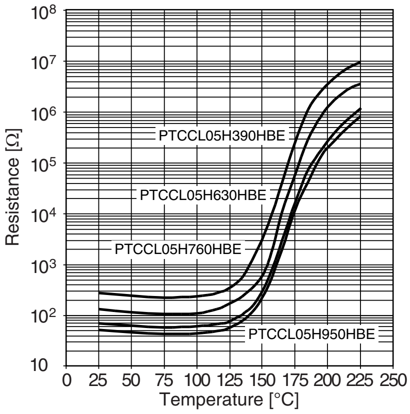

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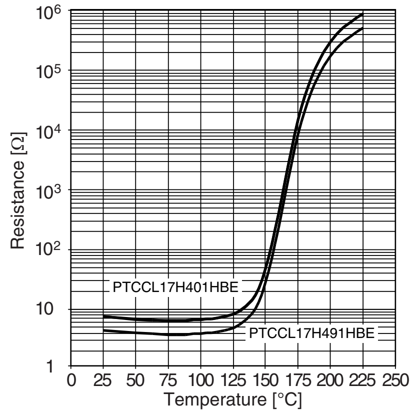
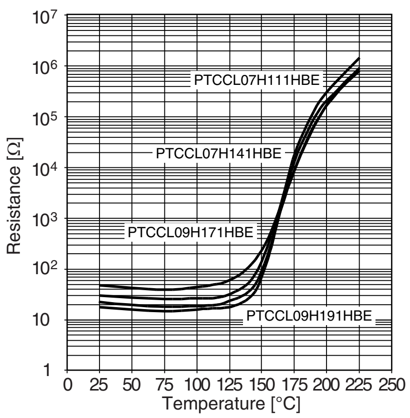
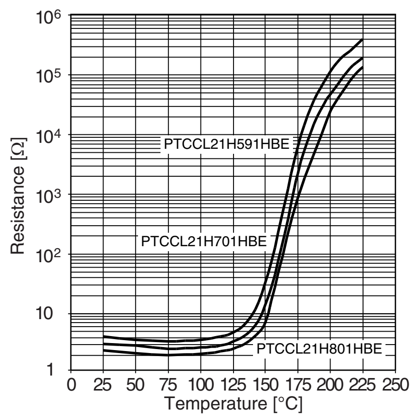


TYPICAL RESISTANCE / TEMPERATURE CHARACTERISTIC



TYPICAL RESISTANCE / TEMPERATURE CHARACTERISTIC



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