NTC Thermistors, Miniature Immersion, Liquid Cooled Automotive Systems



LINKS TO ADDITIONAL RESOURCES

3D Models | Design Tools | Calculators

QUICK REFERENCE DATA		
PARAMETER	VALUE	UNIT
Resistance value at 25 °C	10K	Ω
Tolerance on R_{25}-value	± 2	%
$B_{25/85}$-value	3984	K
Tolerance on $B_{25/85}$-value	± 0.5	%
Operating temperature range at zero power (1)	-40 to +125 Peak: 150	°C
Storage temperature range	-55 to +125	°C
Response time t 63.2 % of ΔT (air 25 °C to 85 °C)	1.5	s
Dissipation factor δ (for information only) In still air In still water	 2.8 5.6	mW/K
Maximum power dissipation at 25 °C $P_{max.25}$	100	mW
Min. dielectric withstanding voltage between terminals and capsule (10 s)	500	V_{AC}
Insulation resistance at 500 V_{DC}	> 100M	Ω
Thermal gradient	< 0.02	K/K
Weight	2	g

DESIGN-IN SUPPORT

- Other resistance curves and tolerances are available on request
- Consult Vishay for other lead length or connector options
- The part can be provided with bare copper conductors for optimal electrical welding extension cable connection
- The sensor is provided without O-ring
- 3D solid models: www.vishay.com/doc?29247
- NTC curve computation: www.vishay.com/thermistors/ntc-rt-calculator/

FEATURES

- Fast time response to temperature change in automotive fluid immersion applications
- Reduced thermal gradient, due to the use of small tip dimensions and thin insulated wire
- Sensor for permanent contact with water or other liquids
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

APPLICATIONS

Immersion sensor used for temperature measurement, sensing and control in liquid cooled systems:

- Inverters
- On board chargers (OBC)
- Battery management systems (BMS)
- DC/DC converters
- EV charging plugs
- EV charging inlets
- Solar heating systems
- Heat pumps
- Energy storage systems (ESS)

DESCRIPTION

Miniature insulated chip NTC thermistor mounted in a SS316 housing and a 60 V_{AC} rated, 3000 V_{AC} tested, FLR2X type, PEX insulated AWG#22 lead wire connection. The conductors are tin plated.

Optional lead (Pb)-free conductors are available.

MOUNTING

- The sensor can be mounted by means of a sealing O-ring and screw or holder
- The end wire can be soldered, or crimped to a connector
- Optional connector for wire to wire or wire to board connections
- The epoxy lead-wire side can not be in permanent contact with liquids, or water

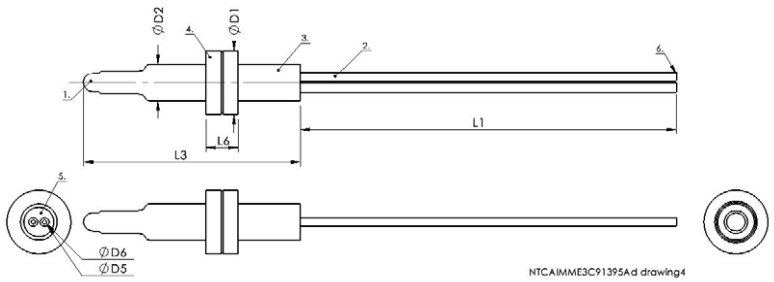
PACKAGING

Available in plastic bags of 500 pieces.

For technical questions, contact: nlr@vishay.com

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DIMENSIONS in millimeters (FOLLOW ISO2768-M FOR TOLERANCES NOT INDICATED)



L_1	L_3	L_6	Ø D_1	Ø D_2	Ø D_5	Ø D_6
Refer to the ordering table	23 ± 1	3.4 ± 0.2	6.8 ± 0.1	3.9 ± 0.1	1.27 + 0.13 / - 0.07	0.8 ± 0.1

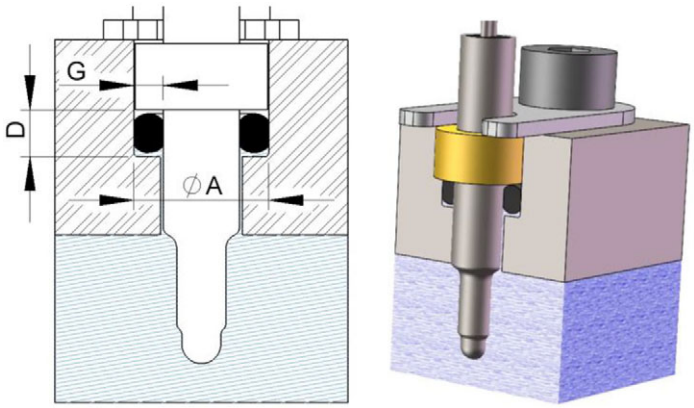
Notes

1. Vishay thermistor chip NTC, epoxy insulated
2. PEX insulated cables, 600 V rated, 3000 V tested, 0.35 mm^2 / AWG#22 multi-stranded tin plated copper
3. Stainless steel (SS316) housing with lead (Pb)-free brass

ELECTRICAL DATA AND ORDERING INFORMATION

R_{25} (Ω)	R_{25}-TOL. (%)	$B_{25/85}$ (K)	$B_{25/85}$-TOL. (± %)	L_1	DESCRIPTION	SAP MATERIAL AND ORDERING NUMBER
10 000	± 2	3984	0.5	300 mm ± 5	NTC Immersion 10K 3984K 300 mm 0.35 mm^2 AWG#22	NTCAIMM66H103G301A

MOUNTING



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AEC-Q200 STRESS QUALIFICATIONS FOR THERMISTORS NTC			
STRESS	**NO.**	**REFERENCE**	**ADDITIONAL REQUIREMENTS**
High temperature exposure (storage)	3	MIL-STD-202 Method 108	• Unpowered • Tested at 150 °C • 1000 h $\Delta R_{25}/R_{25} \leq \pm 5$ % after test
Temperature cycling	4	JESD22-A104	• Unpowered • 1000 cycles • Lower temperature of the chamber: -55 °C • Upper temperature of the chamber: maximum specified operating temperature and shall not exceed 125 °C • Dwell time: 15 minutes • Transition time: 1 minute maximum $\Delta R_{25}/R_{25} \leq \pm 5$ % after test
Humidity bias	7	MIL-STD-202 Method 103	• 1000 h • 85 °C / 85 % RH • 5 V_{DC}, R_S = 1 kΩ $\Delta R_{25}/R_{25} \leq \pm 5$ % after test
High temperature operating life	8	MIL-STD-202 Method 108	• 1000 h • 5 V_{DC}, R_S = 1 kΩ • Temperature of the chamber: maximum specified operating temperature up to 150 °C $\Delta R_{25}/R_{25} \leq \pm 5$ % after test
External visual	9	MIL-STD-883 Method 2009	• Inspect device construction, marking and workmanship • Pre and post electrical test not required
Physical dimensions	10	JESD22-B100	• Verify physical dimensions to the applicable component specification • Pre and post electrical test not required
Terminal strength (pull test)	11	MIL-STD-202 Method 211	• Test THT component lead integrity only • Test condition A (pull test): 2.27 kg $\Delta R_{25}/R_{25} \leq \pm 5$ % after test
Resistance to solvents	12	MIL-STD-202 Method 215	• All parts OK, no visible damage after test
Mechanical shock	13	MIL-STD-202 Method 213	• Figure 1 of Method 213 • THT: condition C $\Delta R_{25}/R_{25} \leq \pm 5$ % after test
Vibration	14	MIL-STD-202 Method 204	• 5 *g*'s for 20 minutes • 12 cycles each of 3 orientations • Test from 10 Hz to 2000 Hz $\Delta R_{25}/R_{25} \leq \pm 5$ % after test
Resistance to soldering heat	15	MIL-STD-202 Method 210	• Non-soldered type mounting / attach are not applicable
ESD	17	AEC-Q200-002	• 25 kV air discharge • 2 pulses 1+ / 1- $\Delta R_{25}/R_{25} \leq \pm 5$ % after test
Solderability	18	J-STD-002	• n/a
Electrical characterization	19	User specification	• All parts are within specification limits
Flammability	20	UL 94 or IEC 60695-11-5 fixed	• UL 94 V-0 or UL 94 V-1; within specification of the flammability norm
Board flex (SMD)	21	AEC-Q200-005	• n/a
Terminal strength (SMD)	22	AEC-Q200-006	• n/a

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