

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)		mW/K
In still air	2.8	
In still water	5.6	
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


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.

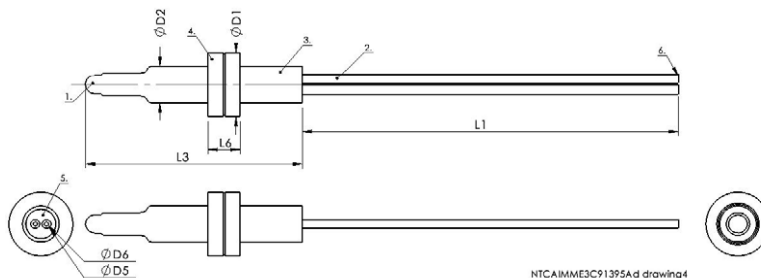
Optional lead (Pb)-free conductors are available.

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.

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


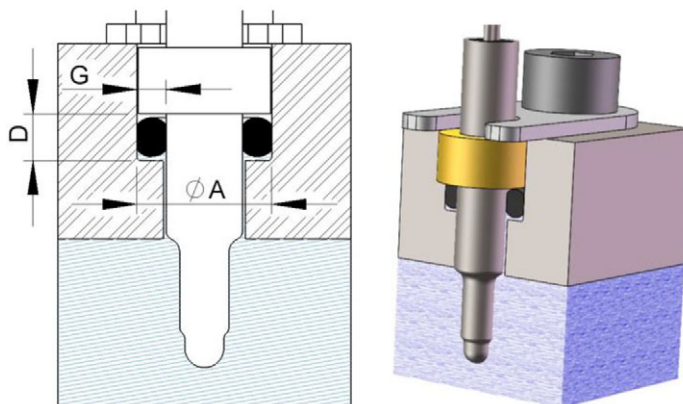
L ₁	L ₃	L ₆	Ø D ₁	Ø D ₂	Ø D ₅	Ø D ₆
Refer to the ordering table	23 ± 1	3.4 ± 0.2	6.8 ± 0.1	3.9 ± 0.1	1.27 + 0.13 / - 0.07	0.8 ± 0.1

Notes

1. Vishay thermistor chip NTC, epoxy insulated
2. PEX insulated cables, 600 V rated, 3000 V tested, 0.35 mm² / 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


**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 $\Delta R_{25}/R_{25} \leq \pm 5 \% \text{ after test}$
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 $\Delta R_{25}/R_{25} \leq \pm 5 \% \text{ after test}$
Humidity bias	7	MIL-STD-202 Method 103	1000 h 85 °C / 85 % RH 5 V_{DC}, R_S = 1 kΩ $\Delta R_{25}/R_{25} \leq \pm 5 \% \text{ after test}$
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 $\Delta R_{25}/R_{25} \leq \pm 5 \% \text{ after test}$
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 $\Delta R_{25}/R_{25} \leq \pm 5 \% \text{ after test}$
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 $\Delta R_{25}/R_{25} \leq \pm 5 \% \text{ after test}$
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 $\Delta R_{25}/R_{25} \leq \pm 5 \% \text{ after test}$
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- $\Delta R_{25}/R_{25} \leq \pm 5 \% \text{ after test}$
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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