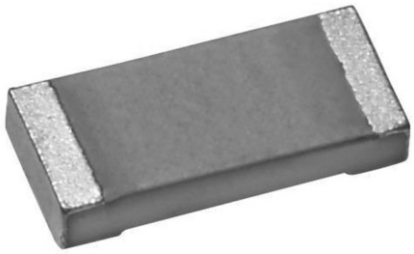
Platinum SMD Flat Chip Temperature Sensor



PTS SMD Flat Chip Temperature sensors are the perfect choice for temperature control of electronics operating under varying environmental conditions. The highly controlled platinum thin film manufacturing process guarantees an outstanding stability of temperature characteristics which ensures reliable operation even under harsh conditions. Typical applications include automotive, aviation and industrial electronics.

FEATURES

- Specification according to IEC 60751
- Advanced thin film technology
- Short reaction times down to $t_{0.9} \leq 2$ s (in air)
- Outstanding stability of temperature characteristic
- Standard SMD sizes
- Green product, supports lead (Pb)-free soldering

APPLICATIONS

Temperature measurement in

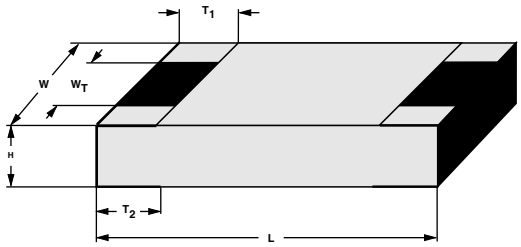
- Automotive electronics
- Aviation electronics
- Industrial electronics

TECHNICAL SPECIFICATIONS

DESCRIPTION		PTS 0603	PTS 0805	PTS 1206
Resistance values R_0 at 0 °C		100 Ω	100 Ω, 500 Ω	100 Ω, 500 Ω, 1000 Ω
Temperature coefficient (0 °C ... + 100 °C)		+ 3850 ppm/K		
Tolerance classes		B, 2B		
Temperature range		- 55 °C to + 155 °C		
Long term stability $\Delta R_0/R_0$; R_0 change after 1000 h at + 155 °C		< ± 0.04 %		
Insulation resistance		> 10 MΩ		
Measurement current $I_{meas.}$ (DC)	100 Ω	0.1 mA to 0.25 mA	0.1 mA to 1.0 mA	0.1 mA to 1.0 mA
	500 Ω	-	0.1 mA to 0.25 mA	0.1 mA to 0.25 mA
	1000 Ω	-	-	0.1 mA to 0.25 mA
Self-heating (1)	still air (v = 0 m/s)	≤ 0.9 K/mW	≤ 0.8 K/mW	≤ 0.7 K/mW
Thermal response time (1)	flowing water (v = 0.4 m/s)	$t_{0.5} \leq 0.1$ s	$t_{0.5} \leq 0.2$ s	$t_{0.5} \leq 0.3$ s
		$t_{0.9} \leq 0.2$ s	$t_{0.9} \leq 0.3$ s	$t_{0.9} \leq 0.4$ s
	flowing air (v = 3.0 m/s)	$t_{0.5} \leq 1.0$ s	$t_{0.5} \leq 1.5$ s	$t_{0.5} \leq 2.0$ s
		$t_{0.9} \leq 2.0$ s	$t_{0.9} \leq 3.0$ s	$t_{0.9} \leq 5.0$ s

Note:
(1) Valid for sensor element only.

DIMENSIONS



DIMENSIONS - PTS sensor types, mass and relevant physical dimensions							
TYPE	**H (mm)**	**L (mm)**	**W (mm)**	**W_T (mm)**	**T_1 (mm)**	**T_2 (mm)**	**MASS (mg)**
PTS 0603	0.45 + 0.1/- 0.05	1.55 ± 0.05	0.85 ± 0.1	> 75 % of W	0.3 + 0.15/- 0.2	0.3 + 0.15/- 0.2	1.9
PTS 0805	0.45 + 0.1/- 0.05	2.0 ± 0.1	1.25 ± 0.15	> 75 % of W	0.4 + 0.1/- 0.2	0.4 + 0.1/- 0.2	4.6
PTS 1206	0.55 ± 0.1	3.2 + 0.1/- 0.2	1.6 ± 0.15	> 75 % of W	0.4 + 0.1/- 0.2	0.4 + 0.1/- 0.2	9.2

PRODUCTION

Production is strictly controlled and follows an extensive set of instructions established for reproducibility. A homogeneous film of platinum is deposited on a high grade ceramic body (96 % Al_2O_3). The sensor-elements are covered by a protective coating designed for electrical, mechanical and climatic protection. The terminations receive a final pure tin on nickel plating.

QUALITY

The result of the determined production is verified by an extensive testing procedure performed on 100 % of the individual sensors. Only accepted products are laid directly into the paper tape in accordance with **IEC 60286-3**.

STORAGE

Solderability is specified for 2 years after production or re-qualification. The permitted storage time is 20 years.

ASSEMBLY

The Pt-sensors are suitable for processing on automatic SMD assembly systems. They are suitable for automatic soldering using wave, reflow or vapour phase. The encapsulation is resistant to all cleaning solvents commonly used in the electronics industry, including alcohols, esters and aqueous solutions. The Pt-sensors are RoHS compliant, the pure tin plating provides compatibility with lead (Pb)-free and lead-containing soldering processes. The immunity of the plating against tin whisker growth has been proven under extensive testing.

All products comply with the CEFIC-EECA-EICTA list of legal restrictions on hazardous substances.

This includes full compatibility with the following directives:

- 2000/53/EC End of Vehicle life Directive (ELV)
- 2000/53/EC Annex II to End of Vehicle Life Directive (ELV II)
- 2002/95/EC Restriction of the use of Hazardous Substances Directive (RoHS)
- 2002/96/EC Waste Electrical and Electronic Equipment Directive (WEEE)

APPROVALS

The Pt-sensors are tested in accordance with **IEC 60751** and **IEC 60068** series.

Pb e3

Lead (Pb)-free Identification on the Package Label

PART NUMBER AND PRODUCT DESCRIPTION (1)

PART NUMBER (2): PTS060301B100RPW000

P	T	S	0	6	0	3	0	1	B	1	0	0	R	P	W	0	0

TYPE	SIZE CODE	SPECIAL CHARACTER	TOLERANCE CLASS	RESISTANCE VALUE	PACKAGING (3)	SPECIAL
3 digits	4 digits	1 digit	2 digits	4 digits	2 digits	2 digits
PTS = Platinum Temperature Sensor SMD	0603 0805 1206	0 = neutral	1B = Class B 2B = Class 2B	100R = 100 Ω 500R = 500 Ω 1K00 = 1000 Ω	PU P1 P5 PW	00 = standard

PRODUCT DESCRIPTION (4): PTS 0603-B PW 100R

PTS	0603	-B	PW	100R
TYPE	SIZE CODE	TOLERANCE CLASS	PACKAGING (3)	RESISTANCE VALUE
PTS = Platinum Temperature Sensor SMD	0603 0805 1206	B = Class B 2B = Class 2B	PU P1 P5 PW	100R = 100 Ω 500R = 500 Ω 1K = 1000 Ω

Notes:
(1) Products can be ordered using either the PART NUMBER or the PRODUCT DESCRIPTION
(2) The Part Number is shown to facilitate the introduction of a unified part numbering system
(2) Please refer to table PACKAGING
(4) We recommend that the Production Description is used to minimize the possibility of errors in order handling

PACKAGING

MODEL	DIAMETER	PIECES	CODE	BOX/REEL
PTS 0603	114 mm	100	PU	BOX
	180 mm/7"	1000	P1	REEL
	180 mm/7"	5000	P5	REEL
	330 mm/13"	20 000	PW	REEL
PTS 0805	114 mm	100	PU	BOX
	180 mm/7"	1000	P1	REEL
	180 mm/7"	5000	P5	REEL
	330 mm/13"	20 000	PW	REEL
PTS 1206	114 mm	100	PU	BOX
	180 mm/7"	1000	P1	REEL
	180 mm/7"	5000	P5	REEL
	330 mm/13"	20 000	PW	REEL

FUNCTIONAL PERFORMANCE

The temperature resistance relationships of the PTS series follow different equations:

for the temperature range of - 55 °C up to 0 °C:

$$R_{(\vartheta)} = R_0 \times (1 + A \times \vartheta + B \times \vartheta^2 + C \times (\vartheta - 100\ °C) \times \vartheta^3)$$

and for the temperature range of 0 °C up to + 155 °C:

$$R_{(\vartheta)} = R_0 \times (1 + A \times \vartheta + B \times \vartheta^2)$$

$R_{(\vartheta)}$: resistance as a function of temperature
R_0: nominal resistance value at 0 °C
ϑ: temperature in °C

According to IEC 60751 the values of the coefficients are:

$A = 3.9083 \times 10^{-3}\ °C^{-1}$
$B = -5.775 \times 10^{-7}\ °C^{-2}$
$C = -4.183 \times 10^{-12}\ °C^{-4}$

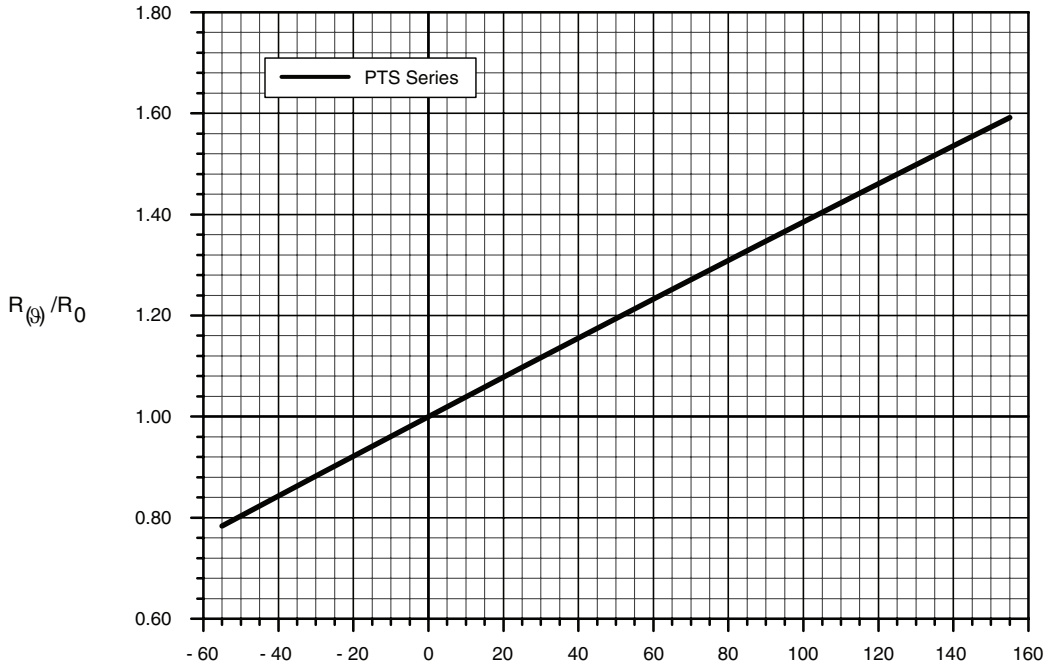
The tolerances values of the PTS series are classified by the following equations:

Class B: $\Delta\vartheta_B = \pm (0.3 + 0.005 \times |\vartheta|)$

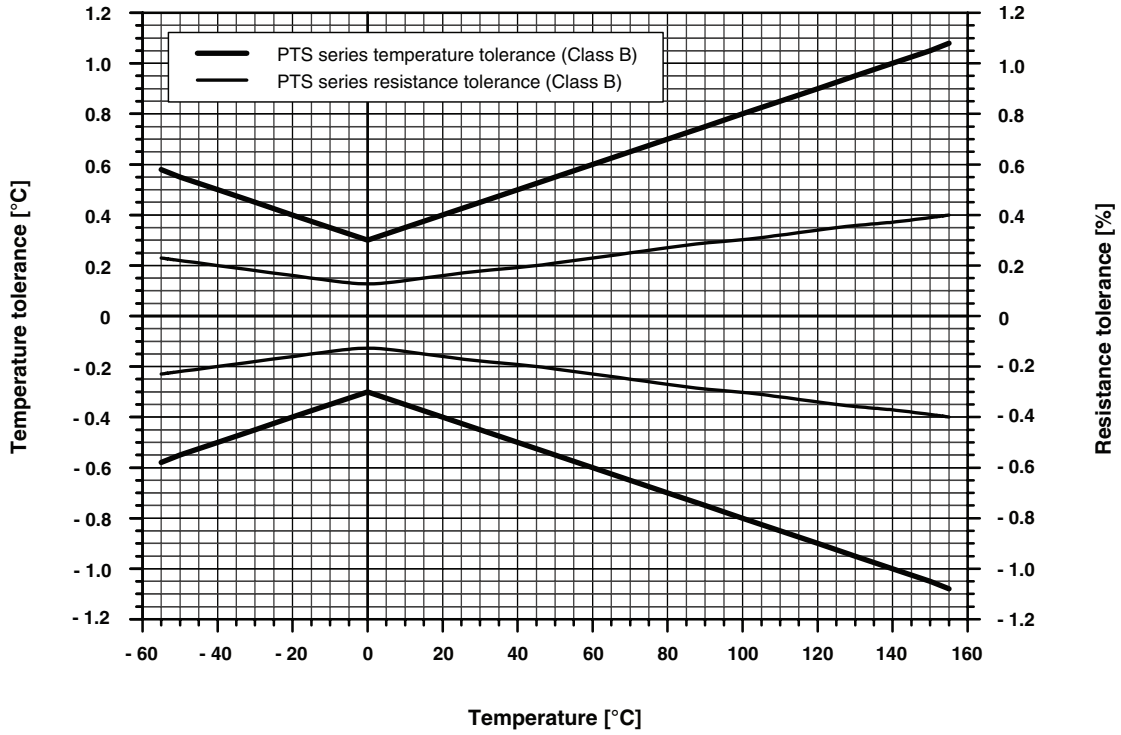
Class 2B: $\Delta\vartheta_{2B} = \pm (0.6 + 0.010 \times |\vartheta|)$

NOMINAL RESISTANCE VALUE

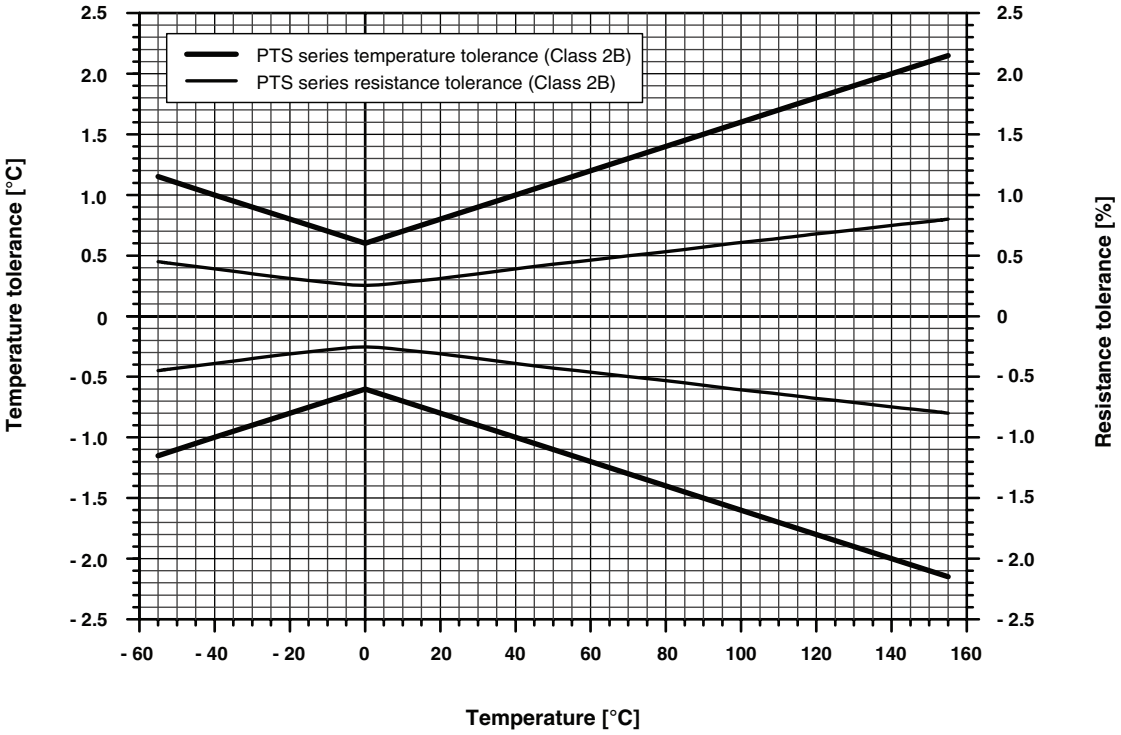
TEMPERATURE IN °C	R_0 = 100 Ω	R_0 = 500 Ω	R_0 = 1000 Ω	CLASS B	CLASS 2B
	Nominal Resistance in Ω	Nominal Resistance in Ω	Nominal Resistance in Ω	Tolerance in K	Tolerance in K
- 50	80.31	401.54	803.07	± 0.55	± 1.10
- 25	90.19	450.95	901.90	± 0.43	± 0.85
0	100	500	1000	± 0.30	± 0.60
25	109.73	548.65	1097.30	± 0.43	± 0.85
50	119.40	596.98	1193.95	± 0.55	± 1.10
75	128.99	644.90	1289.80	± 0.68	± 1.35
100	138.51	692.50	1385.00	± 0.80	± 1.60
125	147.95	739.76	1479.51	± 0.93	± 1.85
150	157.33	786.58	1573.15	± 1.05	± 2.10



Nominal Resistance Value



Tolerance Class B



Tolerance Class 2B

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