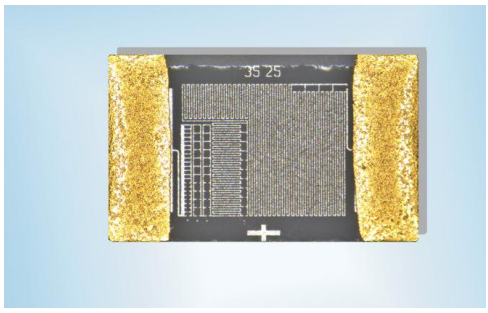
SMD high temperature Series

Platinum thin film RTD

For automated assembly on PCBs



Sensor side up (top view)

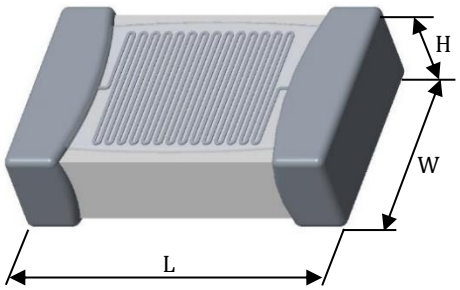

Taped on reel

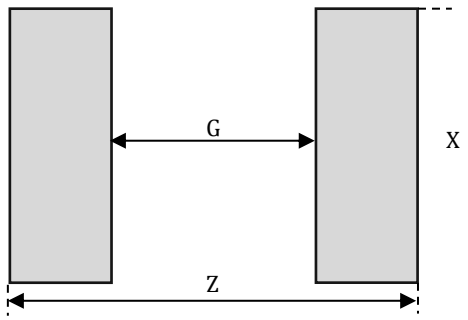

Reel

Benefits & characteristics

- Excellent long-term stability
- Low self-heating
- Fast response time
- Automatic assembly in large-volume applications
- For high temperature PCB applications

Dimensions





Sensor type	Dimensions in mm			Land pattern in mm		
	L ± 0.15	W ± 0.15	H ± 0.1	Z	G	X
0603 4ST	1.6	0.8	0.5	2.30	0.80	0.93
0805 4ST	2.0	1.25	0.5	2.70	1.10	1.40
1206 4ST	3.1	1.6	0.5	4.00	1.90	1.75

Technical data

Electrical Specifications

Temperature range: [1)]	-50 °C to +250 °C	
Nominal resistance:	100 Ω at 0 °C, 1000 Ω at 0 °C	
Temperature coefficient	3850 ppm/K	
Tolerance class: [2)] (dependent on temperature range)		iST reference
	IEC 60751 F0.15	A
	IEC 60751 F0.3	B
	IEC 60751 F0.6	C
Temperature dependence of resistivity	According to IEC 60751:	
	-50 °C to 0 °C $R(T) = R_0 \times (1+AxT + BxT^2 + Cx[T-100] \times T^3$	
	0 °C to +250 °C $R(T) = R_0 \times (1+AxT + BxT^2)$	
	$A=3.9083 \times 10^{-3} \times °C^{-1}$	
	$B=-5.775 \times 10^{-7} \times °C^{-2}$	
	$C=-4.183 \times 10^{-12} \times °C^{-4}$	
	R_0= resistance value in Ω at 0°C	
	T= temperature in accordance with ITS90	

General Specifications

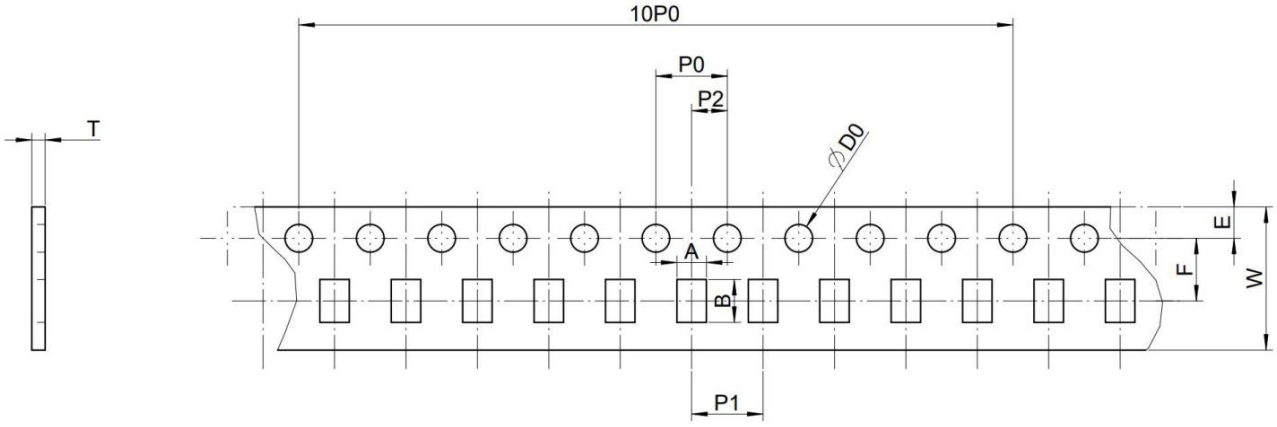
Pads: (Soldering Connection)	Soft-Termination galvanic gold plated with nickel barrier layer	
Soldering (according to J-STD-002E): see general notes 4	1. Solderability: following Test A and A1 in the standard 2. Resistance to soldering heat: following Test A and A1 in the standard	
Measuring current:	**Pt 100**	**Pt 1000**
(self-heating must be considered)	1mA	0.3 mA
Long-term stability:	Max. 0.05 % after 1000 hrs at +250 °C	
Taping & packaging:	EIA-481 (for dimensions see [3)])	
Storage property	12 months (original packaging and dry conditions)	
REACH + RoHs compliance	Yes	

General notes

[1] The thermal expansion coefficient of the circuit board has to be considered.

[2] IEC60751 tolerances (F0.15, F0.3 and F0.6) are classified by one temperature measurement. Temperature coefficient of flip-chip sensor is random sample determined in the measuring bath while the sensors were faced-down soldered on a PCB board.
Accuracy, self-heating and response time might vary depending on the mounting method (e.g. face-down soldering or wire bonding), and the measuring conditions.
Furthermore, thermal expansion coefficient of the PCB must be considered within the operation temperature range, since it influences the accuracy level.

[3] Taping and packaging:



SMD 0603 4ST

Item	A	B	W	E	F	P0	P1	P2	D0	T	10P0
Dimension	1.07	1.78	8.00	1.75	3.50	4.00	4.00	2.00	1.50	0.60	40.00
Min. tolerance	-0.05	-0.05	-0.1	-0.05	-0.05	-0.10	-0.10	-0.05	-0.05	-0.03	-0.1
Max. tolerance	0.05	0.05	0.31	0.05	0.05	0.10	0.10	0.05	0.1	0.03	0.1

SMD 0805 4ST

Item	A	B	W	E	F	P0	P1	P2	D0	T	10P0
Dimension	1.65	2.40	8.00	1.75	3.50	4.00	4.00	2.00	1.55	0.75	40.00
Min. tolerance	-0.05	-0.05	-0.10	-0.05	-0.05	-0.10	-0.10	-0.05	-0.05	-0.03	-0.10
Max. tolerance	0.05	0.05	0.10	0.05	0.05	0.10	0.10	0.05	0.05	0.03	0.10

SMD 1206 4ST

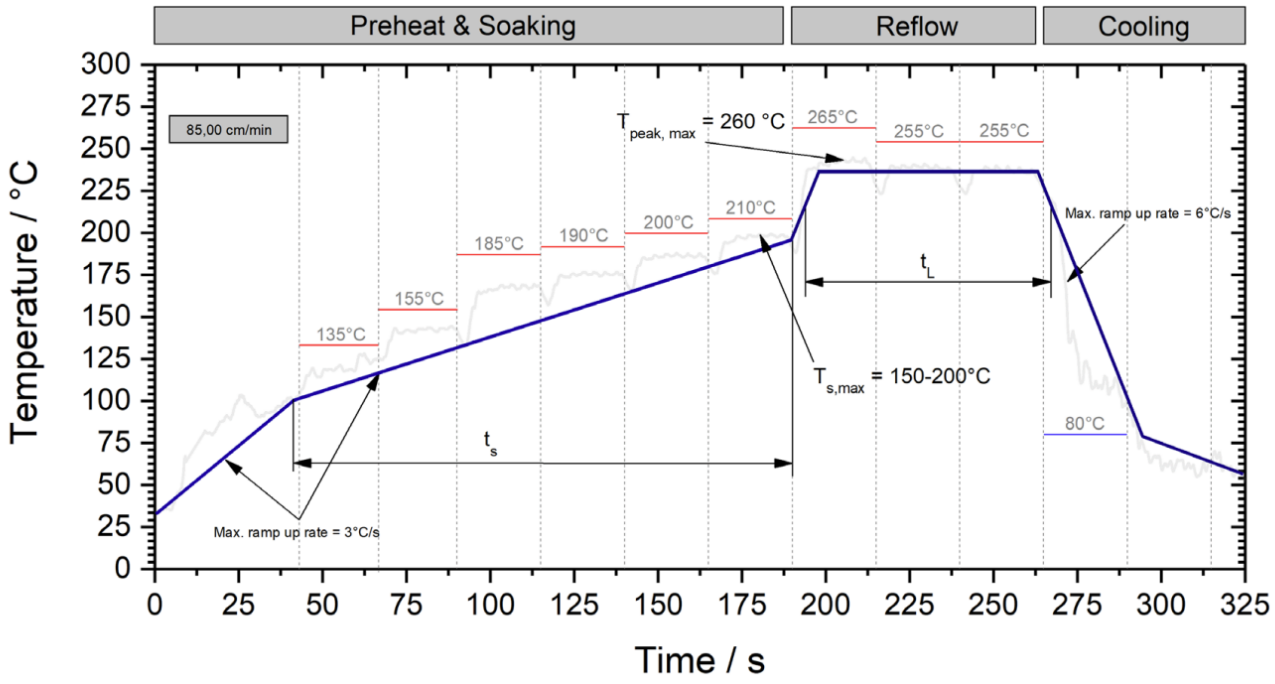
Item	A	B	W	E	F	P0	P1	P2	D0	T	10P0
Dimension	1.9	3.5	8.00	1.75	3.50	4.00	4.00	2.00	1.50	0.60	40.00
Min. tolerance	-0.1	-0.1	-0.3	-0.1	-0.05	-0.10	-0.10	-0.05	-0.0	-0.1	-0.2
Max. tolerance	0.1	0.1	0.3	0.1	0.05	0.10	0.10	0.05	0.1	0.1	0.2

Dimensions in mm. Packaging unit in tape and reel, special variants, small quantities or other packaging unit are available on request.

4) Soldering and reflow profile

For soldering iST recommends lead-free solder paste (Material: SnAgCu 96.5/3.0/0.5) and a temperature characteristic (reflow profile) for reflow soldering according to JEDEC J-STD-002E. The solderability was tested with following assembly conditions:

PCB Material:	FR4 (PCB Layer: 2)
PCB thickness:	1.6 mm
Dimensions:	72 x 32 mm
Solder Paste:	KOKI „S3X58-M406“ (Pb-free assembly)



Profile parameter	Temperature range / °C	Heating rate / °C/s	Time / s
Ramp to preheat	RT to 150	1.9 - 3	
Preaheat /Soak	$T_{s,min}$ = 100, $T_{s,max}$ = 200	1.9 - 3	$t_{s,\ min}$ = 60, $t_{s,\ max}$ = 160
Ramp to Peak	180 - 255	0.6	
Reflow	250 ± 5, $T_{peak,\ max}$ = 260		60 to 120, $t_{peak,\ max}$ = 30
Cooling	255 - RT	1.6 - 3	

5) Important notes:

- The solder or additional fluxes should be halogen-free, mild, and non-activated.
- After soldering, a thorough cleaning with pH-neutral defluxing material is recommended.
- The profile has a significant impact on the solder joint performance, i.e. solderability, wettability and strength.
- The soak profile and all other data serve as a guideline and cannot be regarded as binding statements or guaranteed values. They serve as a starting point for process development. Specifically, a high mix of components or large board sizes might require the development of a different soldering profile.
- Long-term stability in the application and chemical resistance need to be approved by the customer.
- The customer must test and approve the suitability of iST sensors in the customer's application.

Order Information

Nominal Resistance at 0 ° C	Size	Class IEC 60751	Description	Packaging type	Sensor side	Order number
SMD 0603 4ST with solderable Au-Pads,-50°C to +250 °C						
100 Ω	0603	F0.15 (A)	P0K1.0603.4ST.A.S	tape on reel	Up	154299
100 Ω	0603	F0.3 (B)	P0K1.0603.4ST.B.S	tape on reel	Up	154300
100 Ω	0603	F0.6 (C)	P0K1.0603.4ST.C.S	tape on reel	Up	154301
1000 Ω	0603	F0.15 (A)	P1K0.0603.4ST.A.S	tape on reel	Up	154304
1000 Ω	0603	F0.3 (B)	P1K0.0603.4ST.B.S	tape on reel	Up	154094
1000 Ω	0603	F0.6 (C)	P1K0.0603.4ST.C.S	tape on reel	Up	154305
SMD 0805 4ST with solderable Au-Pads,-50°C to +250 °C						
100 Ω	0805	F0.15 (A)	P0K1.0805.4ST.A.S	tape on reel	Up	154309
100 Ω	0805	F0.15 (A)	P0K1.0805.4ST.A	Packed in bags		154307
100 Ω	0805	F0.3 (B)	P0K1.0805.4ST.B.S	tape on reel	Up	154310
100 Ω	0805	F0.3 (B)	P0K1.0805.4ST.B	Packed in bags		153775
1000 Ω	0805	F0.15 (A)	P1K0.0805.4ST.A.S	tape on reel	Up	154882
1000 Ω	0805	F0.3 (B)	P1K0.0805.4ST.B.S	tape on reel	Up	154883
1000 Ω	0805	F0.3 (B)	P1K0.0805.4ST.B	Packed in bags		153774
1000 Ω	0805	F0.6 (C)	P1K0.0805.4ST.C.S	tape on reel	Up	157760
SMD 1206 4ST with solderable Au-Pads,-50°C to +250 °C						
100 Ω	1206	F0.15 (A)	P0K1.1206.4ST.A.S	tape on reel	Up	154892
100 Ω	1206	F0.3 (B)	P0K1.1206.4ST.B.S	tape on reel	Up	154894
1000 Ω	1206	F0.15 (A)	P1K0.1206.4ST.A.S	tape on reel	Up	154886
1000 Ω	1206	F0.3 (B)	P1K0.1206.4ST.B.S	tape on reel	Up	154888
1000 Ω	1206	F0.3 (B)	P1K0.1206.4ST.B.S	taped only (without reel)	Up	157021

Additional documents

Application Note Platinum Temperature Sensors	ATP_E

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RoHS