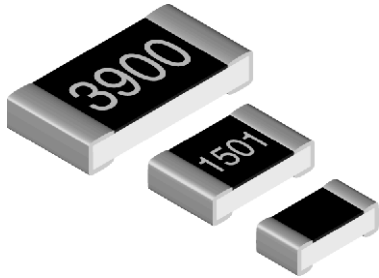


SMD PTC - Nickel Thin Film Linear Thermistors



FEATURES

- Alumina substrate base with nickel based PTC thin film element
- 0603, 0805 and 1206 sizes available
- Available in tape and reel packaging
- Standard R_{25} tolerances: $\pm 0.5\%$, $\pm 1\%$, $\pm 5\%$
- Operation range - 55 °C to + 125 °C (+ 150 °C)
- Compliant to RoHS directive 2002/95/EC



RoHS
COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS						
TCR AT ROOM TEMPERATURE (25 °C) SEE TYPICAL CURVE FOR TCR AT OTHER TEMPS.	TCR (1) TOLERANCE ppm/K	R_{25} VALUE RANGE in Ω (0.5 %, 1 %, 5 % TOLERANCE) (2)				
		0603		0805		1206
		MIN.	MAX.	MIN.	MAX.	MIN.
4110 ppm/K	± 400	100 to 1K		100 to 5K		100 to 10K

Notes

- (1) Contact Vishay if closer TCR lot tolerance is desired
 (2) Other R_{25} values and tolerances are available upon request

STANDARD RESISTANCE VALUES at 25 °C in Ω				
100	270	680	1.8K	4.7K
120	330	820	2.2K	5.6K
150	390	1K	2.7K	6.8K
180	470	1.2K	3.3K	8.2K
220	560	1.5K	3.9K	10.0K

STANDARD TECHNICAL SPECIFICATIONS		
PART NUMBER	P_{70} MAXIMUM POWER at 70 °C	MAXIMUM WORKING VOLTAGE RCWV (3)
TFPT 0603	75 mW	30 V _{DC}
TFPT 0805	100 mW	40 V _{DC}
TFPT 1206	125 mW	50 V _{DC}

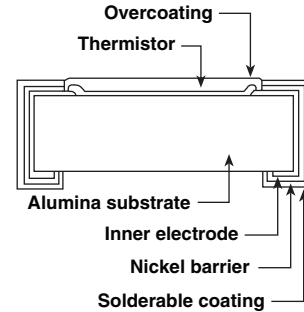
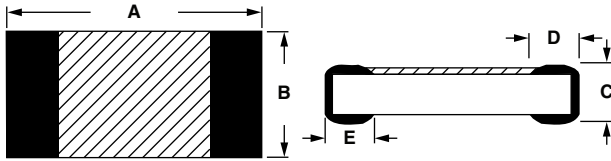
Note

(3) Rated Continuous Working Voltage is maximum working voltage or square root of the power rating times resistance value, whichever is less.

GLOBAL PART NUMBER INFORMATION														
Global Part Numbering: TFPT1206L1002FM (preferred part number format)														
T	F	P	T	1	2	0	6	L	1	0	0	2	F	M
GLOBAL MODEL		CHARACTERISTIC		RESISTANCE VALUE			TOLERANCE CODE			PACKAGING				
TFPT0603 TFPT0805 TFPT1206		L = Linear		1002 = 10K			D = $\pm 0.5\%$ F = $\pm 1\%$ J = $\pm 5\%$			F = Lead (Pb)-free, bulk M = Lead (Pb)-free, T/R (5000 pieces) V = Lead (Pb)-free, T/R (1000 pieces) P = Tin/lead, bulk Z = Tin/lead, T/R (5000 pieces) Y = Tin/lead, T/R (1000 pieces)				

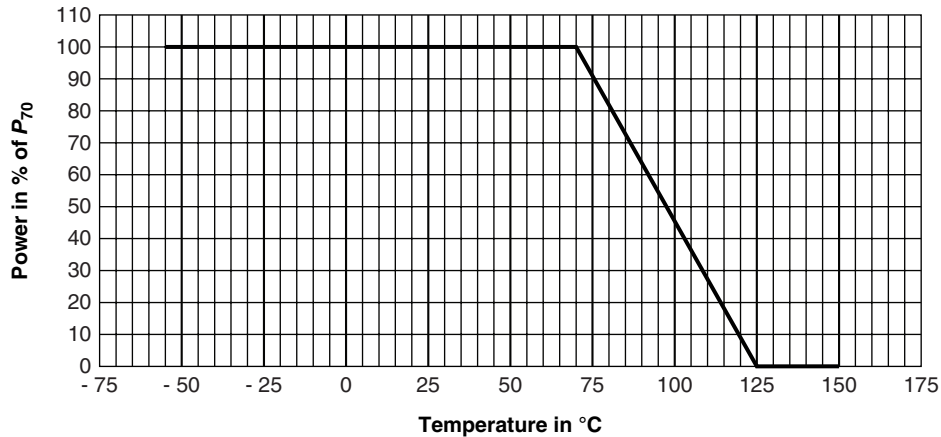
DIMENSIONS in millimeters

CONSTRUCTION



PART NUMBER	A	B	C	D	E
TFPT 0603	1.60 ± 0.10	0.85 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
TFPT 0805	2.00 ± 0.15	1.25 ± 0.15	0.45 ± 0.10	0.40 ± 0.20	0.40 ± 0.20
TFPT 1206	3.20 ± 0.15	1.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.25

Power Derating



PERFORMANCE (1)	
TEST	MAXIMUM $\Delta R/R_{25}$ (2)
High Temperature Exposure (100 h at 125 °C)	0.25 %
Effects of Bonding (10 s solder dip at 260 °C)	0.25 %
Thermal Shock (30 min at - 55 °C, 30 min at 125 °C, 5 cycles)	0.25 %
Low Temperature Operation (Maximum rated power for 2 h at - 55 °C)	0.25 %
Short Time Overload (2.5 x RCWV for 5 s)	0.25 %
Load Life (1000 h 70 °C, maximum rated power 1.5 h "ON", 0.5 h "OFF")	0.25 %
Solderability (95 % coverage P/F)	P
Leaching (Physical damage P/F)	P

Notes

(1) Environmental performance specifications use test procedures as outlined in MIL-R-23648D and MIL-STD-202

(2) TFPTs are ESD sensitive



AVERAGE RATIO R/R ₂₅ TFPT ALL SIZES AND VALUES											
TEMP.	R/R ₂₅	TEMP.	R/R ₂₅	TEMP.	R/R ₂₅	TEMP.	R/R ₂₅	TEMP.	R/R ₂₅	TEMP.	R/R ₂₅
		- 20	0.825	20	0.980	60	1.150	100	1.337	140	1.541
		- 19	0.828	21	0.984	61	1.155	101	1.342	141	1.547
		- 18	0.832	22	0.988	62	1.159	102	1.347	142	1.552
		- 17	0.836	23	0.992	63	1.164	103	1.352	143	1.557
		- 16	0.839	24	0.996	64	1.168	104	1.357	144	1.563
- 55	0.702	- 15	0.843	25	1.000	65	1.173	105	1.362	145	1.568
- 54	0.705	- 14	0.847	26	1.004	66	1.177	106	1.367	146	1.574
- 53	0.708	- 13	0.851	27	1.008	67	1.182	107	1.372	147	1.579
- 52	0.712	- 12	0.854	28	1.012	68	1.186	108	1.377	148	1.584
- 51	0.715	- 11	0.858	29	1.017	69	1.191	109	1.382	149	1.590
- 50	0.719	- 10	0.862	30	1.021	70	1.196	110	1.387	150	1.595
- 49	0.722	- 9	0.866	31	1.025	71	1.200	111	1.392		
- 48	0.725	- 8	0.869	32	1.029	72	1.205	112	1.397		
- 47	0.729	- 7	0.873	33	1.033	73	1.209	113	1.402		
- 46	0.732	- 6	0.877	34	1.037	74	1.214	114	1.407		
- 45	0.736	- 5	0.881	35	1.042	75	1.219	115	1.412		
- 44	0.739	- 4	0.885	36	1.046	76	1.223	116	1.417		
- 43	0.743	- 3	0.889	37	1.050	77	1.228	117	1.422		
- 42	0.746	- 2	0.892	38	1.054	78	1.232	118	1.427		
- 41	0.749	- 1	0.896	39	1.059	79	1.237	119	1.432		
- 40	0.753	0	0.900	40	1.063	80	1.242	120	1.437		
- 39	0.756	1	0.904	41	1.067	81	1.246	121	1.442		
- 38	0.760	2	0.908	42	1.071	82	1.251	122	1.448		
- 37	0.763	3	0.912	43	1.076	83	1.256	123	1.453		
- 36	0.767	4	0.916	44	1.080	84	1.261	124	1.458		
- 35	0.771	5	0.920	45	1.084	85	1.265	125	1.463		
- 34	0.774	6	0.924	46	1.089	86	1.270	126	1.468		
- 33	0.778	7	0.927	47	1.093	87	1.275	127	1.473		
- 32	0.781	8	0.931	48	1.097	88	1.280	128	1.478		
- 31	0.785	9	0.935	49	1.102	89	1.284	129	1.484		
- 30	0.788	10	0.939	50	1.106	90	1.289	130	1.489		
- 29	0.792	11	0.943	51	1.110	91	1.294	131	1.494		
- 28	0.796	12	0.947	52	1.115	92	1.299	132	1.499		
- 27	0.799	13	0.951	53	1.119	93	1.303	133	1.505		
- 26	0.803	14	0.955	54	1.124	94	1.308	134	1.510		
- 25	0.806	15	0.959	55	1.128	95	1.313	135	1.515		
- 24	0.810	16	0.963	56	1.133	96	1.318	136	1.520		
- 23	0.814	17	0.967	57	1.137	97	1.323	137	1.526		
- 22	0.817	18	0.971	58	1.141	98	1.328	138	1.531		
- 21	0.821	19	0.975	59	1.146	99	1.333	139	1.536		

RATIO FORMULA

$$R_T = R_{25} \times (9.0014 \times 10^{-1} + 3.87235 \times 10^{-3} (^\circ\text{C})^{-1} \times T + 4.86825 \times 10^{-6} (^\circ\text{C})^{-2} \times T^2 + 1.37559 \times 10^{-9} (^\circ\text{C})^{-3} \times T^3)$$

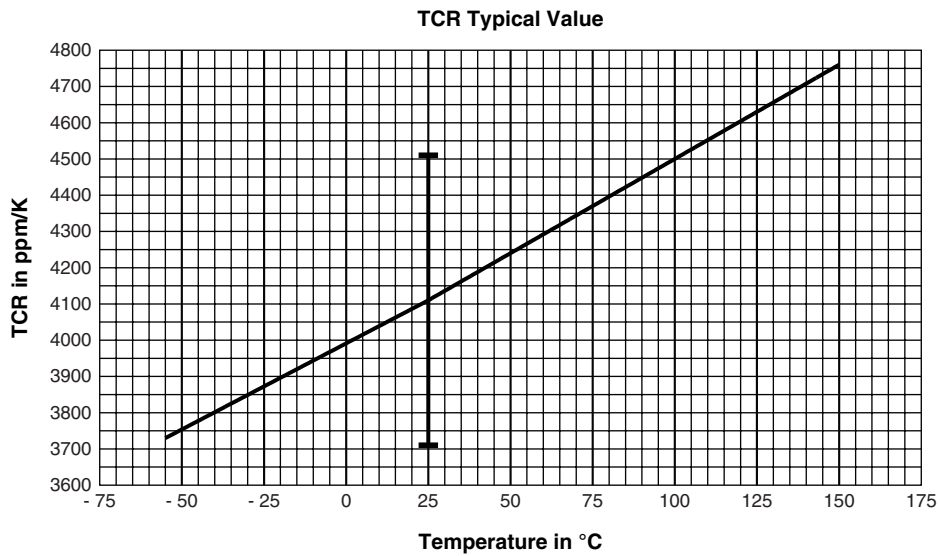
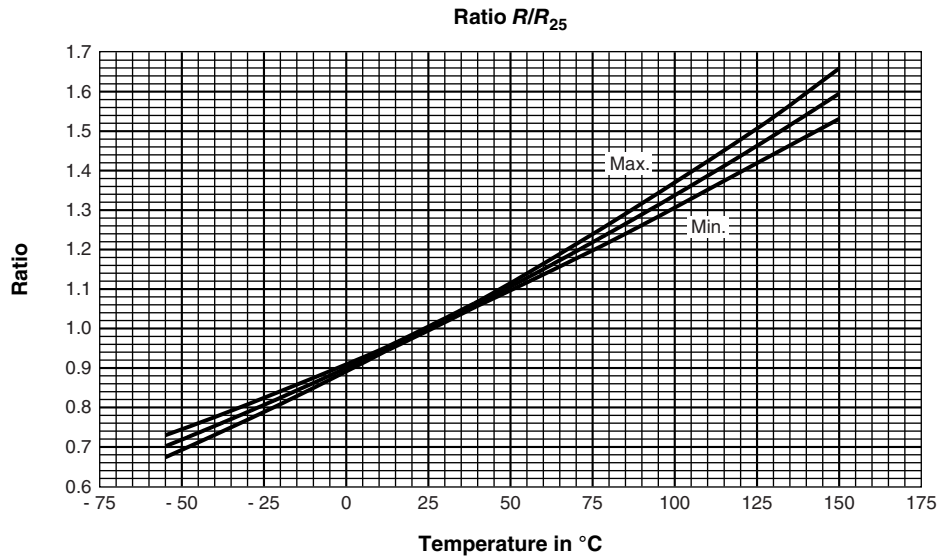
$$T(^\circ\text{C}) = 28.54 \times (R_T/R_{25})^3 - 158.5 \times (R_T/R_{25})^2 + 474.8 \times (R_T/R_{25}) - 319.85$$

RATIO TOLERANCES		
LOW TEMP.	HIGH TEMP.	TOL.
- 55 °C	+ 150 °C	± 4 %
- 40 °C	+ 125 °C	± 3 %
- 20 °C	+ 85 °C	± 2 %
0 °C	+ 55 °C	± 1 %
+ 12 °C	+ 40 °C	± 0.5 %

Ratio Tolerance Examples:

At 40 °C, ratio = 1.063 ± 0.5 % (0.005)
so, ratio = 1.058 to 1.068

At 125 °C, ratio = 1.460 ± 3 % (0.044)
so, ratio = 1.416 to 1.504





Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.