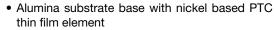


## **SMD PTC - Nickel Thin Film Linear Thermistors**





### **FEATURES**





ROHS COMPLIANT HALOGEN

**FREE** 

- 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 +150 °C
- · High stability over the entire temperature range
- cUL recognized component: File E148885
- Material categorization: For definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

QUICK REFERENCE DATA							
PARAMETER	VALUE						
DESCRIPTION	TFPT0603	UNIT					
Resistance value at 25 °C (2)	100 to 1K	100 to 10K	Ω				
Tolerance on R <sub>25</sub> -value <sup>(2)</sup>		%					
TCR at 25 °C		ppm/K					
Tolerance on TCR at 25 °C (1)	± 400						
Operating temperature range:							
at rated power		°C					
at zero dissipation (4)		-0					
Dissipation factor $\delta$ (for information only)	1.8 2.3		4	mW/K			
Maximum rated power at 70 °C (P <sub>70</sub> )	75	mW					
Maximum working voltage RCWV (3)	30	V					
Climatic category (LCT/UCT/days)	55/150/56						
Weight	2 5.5 10						

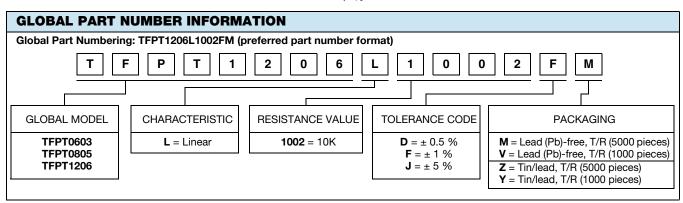
#### Notes

- (1) Contact Vishay if closer TCR lot tolerance is desired
- (2) Other R<sub>25</sub>-values and tolerances are available upon request
- (3) Rated continuous working voltage is maximum working voltage or  $\sqrt{P_{70} \times R}$  whichever is less
- $^{(4)}$  Zero power or zero dissipation is considered as measuring power max. 1 % of rated power  $P_{70}$

STANDARD RESISTANCE VALUES at 25 °C in $\Omega$								
100	180	330	560	1.0K	1.8K	3.3K	5.0K	8.2K
120	220	390	680	1.2K	2.2K	3.9K	5.6K	10.0K
150	270	470	820	1.5K	2.7K	4.7K	6.8K	

#### Note

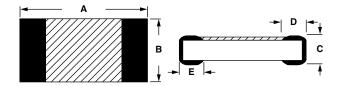
Rated continuous working voltage is maximum working voltage or \( \overline{P\_{70}} \) x \( \overline{R} \) whichever is less



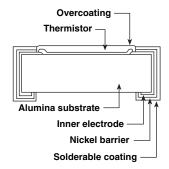


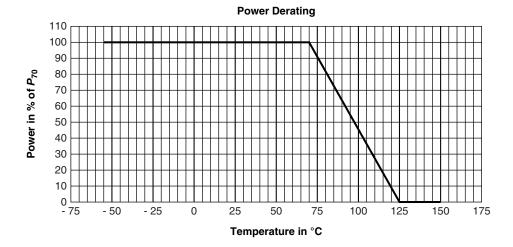
## **DIMENSIONS** in millimeters

### **CONSTRUCTION**



PART NUMBER	Α	В	С	D	E
TFPT 0603	1.60	0.85	0.45	0.30	0.30
	± 0.10	± 0.10	± 0.10	± 0.20	± 0.20
TFPT 0805	2.00	1.25	0.45	0.40	0.40
	± 0.15	± 0.15	± 0.10	± 0.20	± 0.20
TFPT 1206	3.20	1.60	0.55	0.50	0.50
	± 0.15	± 0.15	± 0.10	± 0.25	± 0.25





#### Note

Zero power is considered as measuring power max. 1 % of rated power P<sub>70</sub>

PERFORMANCE (1)					
TEST	MAXIMUM ΔR/R <sub>25</sub> (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)	Р				
Leaching (physical damage P/F)	Р				

#### Notes

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



ГЕМР.	R/R <sub>25</sub>	TEMP.	R/R <sub>25</sub>								
		-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	1.55
		-16	0.839	24	0.996	64	1.168	104	1.357	144	1.56
-55	0.702	-15	0.843	25	1.000	65	1.173	105	1.362	145	1.56
-54	0.705	-14	0.847	26	1.004	66	1.177	106	1.367	146	1.57
-53	0.708	-13	0.851	27	1.008	67	1.182	107	1.372	147	1.57
-52	0.712	-12	0.854	28	1.012	68	1.186	108	1.377	148	1.58
-51	0.715	-11	0.858	29	1.017	69	1.191	109	1.382	149	1.59
-50	0.719	-10	0.862	30	1.021	70	1.196	110	1.387	150	1.59
-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**

 $R_{\rm T} = R_{25} \times (9.0014 \times 10^{-1} + 3.87235 \times 10^{-3} \, (^{\circ}{\rm C})^{-1} \times T + 4.86825 \times 10^{-6} \, (^{\circ}{\rm C})^{-2} \times T^2 + 1.37559 \times 10^{-9} \, (^{\circ}{\rm C})^{-3} \times T^3)$   $T_{(^{\circ}{\rm C})} = 28.54 \times (R_{\rm T}/R_{25})^3 - 158.5 \times (R_{\rm T}/R_{25})^2 + 474.8 \times (R_{\rm T}/R_{25}) - 319.85)$ 

RATIO TOLERANCES						
LOW 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 %				

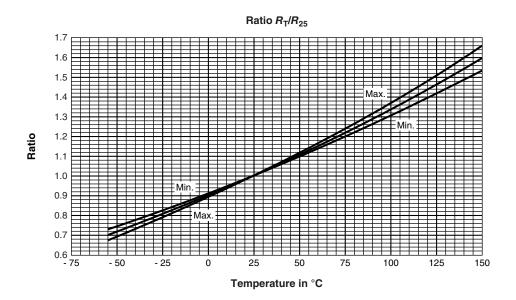
## **RATIO TOLERANCE EXAMPLES:**

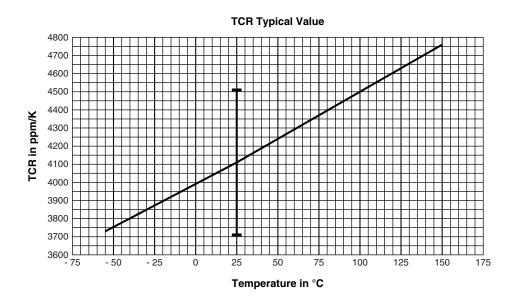
At 40 °C, ratio =  $1.063 \pm 0.5 \%$  (0.005) so, ratio = 1.058 to 1.068

SO, TallO = 1.056 to 1.066

At 125 °C, ratio =  $1.460 \pm 3 \%$  (0.044)

so, ratio = 1.416 to 1.504







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Vishay

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Revision: 02-Oct-12 Document Number: 91000