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## **PTC thermistors as limit temperature sensors**

SMD, EIA case sizes 0402, 0603 and 0805,  
superior series

**Series/Type:** B59421, B59641, B59721

**Date:** July 2016

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## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

Superior series

### SMD

#### Applications

- Over-temperature protection of power components
- DC/DC converters
- SMPS
- Notebooks
- Home appliances
- Dimmers
- Electronic ballasts
- Automotive electronics
- Secondary protection of battery packs

#### Features

- Qualification based on AEC-Q200 rev. D
- Reflow soldering only
- Fast and reliable response
- RoHS-compatible
- UL approval to UL1434
- Certified in accordance with IEC 60738-1 and IEC 60730-1; Annex J15 and J17
- Lead-free terminations (tinned) for EIA case sizes 0603 and 0805
- Lead-free ceramics for EIA case sizes 0402 and 0805, except B59421A0135A062

#### Options

- Other  $T_{\text{sense}}$  or resistance values on request

#### Delivery mode

- Blister tape (EIA case size 0805) or cardboard tape (EIA case sizes 0402 and 0603), 180-mm reel with 8-mm tape, taping to IEC 60286-3
- Packing unit: 10.000 pcs. for EIA case size 0402, 4.000 pcs. for EIA case sizes 0805 and 0603

#### General technical data

Max. operating voltage		$V_{\text{max}}$	32	V DC
Minimum operating temperature	$(V \leq V_{\text{max}})$	$T_{\text{op,min}}$	-40	°C
Maximum operating temperature	$(V \leq V_{\text{max}})$	$T_{\text{op,max}}$	125 °C or $T_{\text{sense,1}} + 25$ °C whichever is higher	°C

**Sensors**
**Limit temperature sensors, EIA sizes 0402, 0603 and 0805**
**Superior series**
**SMD**
**Electrical specifications and ordering codes**
**EIA case sizes 0402 and 0603**

$R_R$ ( $V \leq V_{max}$ ) $\Omega$	$\Delta R_R$ %	$T_{sense,1}$ (@ 4.7 k $\Omega$ ) $^{\circ}C$	$T_{sense,2}$ (@ 47 k $\Omega$ ) $^{\circ}C$	Ordering code
<b>EIA case size 0402</b>				
470	$\pm 50$	75 $\pm 5$	-	B59421A0075A062
470	$\pm 50$	85 $\pm 5$	-	B59421A0085A062
470	$\pm 50$	95 $\pm 5$	-	B59421A0095A062
470	$\pm 50$	105 $\pm 5$	-	B59421A0105A062
470	$\pm 50$	115 $\pm 5$	-	B59421A0115A062
470	$\pm 50$	125 $\pm 5$	-	B59421A0125A062
470	$\pm 50$	135 $\pm 5$	-	B59421A0135A062
<b>EIA case size 0603</b>				
470	$\pm 50$	75 $\pm 5$	90 $\pm 7$	B59641A0075A062
470	$\pm 50$	85 $\pm 5$	100 $\pm 7$	B59641A0085A062
470	$\pm 50$	95 $\pm 5$	110 $\pm 7$	B59641A0095A062
470	$\pm 50$	105 $\pm 5$	120 $\pm 7$	B59641A0105A062
470	$\pm 50$	115 $\pm 5$	130 $\pm 7$	B59641A0115A062
470	$\pm 50$	125 $\pm 5$	140 $\pm 7$	B59641A0125A062
470	$\pm 50$	135 $\pm 5$	150 $\pm 7$	B59641A0135A062
470	$\pm 50$	145 $\pm 5$	-	B59641A0145A062

**Note:**

In order to limit self heating effects the electrical power during measurement should be below 2 mW for EIA case size 0402 and below 4 mW for EIA case size 0603.

## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

Superior series

### Electrical specifications and ordering codes

#### EIA case size 0805

$R_R$ ( $V \leq V_{max}$ ) $\Omega$	$\Delta R_R$ %	$T_{sense,1}$ $^{\circ}C$	$R$ ( $T_{sense,1} - 5^{\circ}C$ ) $k\Omega$	$R$ ( $T_{sense,1} + 5^{\circ}C$ ) $k\Omega$	$R$ ( $T_{sense,1} + 15^{\circ}C$ ) $k\Omega$	Ordering code
EIA case size 0805						
680	$\pm 50$	70	$\leq 5.7$	$\geq 5.7$	$\geq 40^{1)}$	B59721A0070A062
680	$\pm 50$	80	$\leq 5.7$	$\geq 5.7$	$\geq 40^{1)}$	B59721A0080A062
680	$\pm 50$	90	$\leq 5.5$	$\geq 13.3$	$\geq 40$	B59721A0090A062
680	$\pm 50$	100	$\leq 5.5$	$\geq 13.3$	$\geq 40$	B59721A0100A062
680	$\pm 50$	110	$\leq 5.5$	$\geq 13.3$	$\geq 40$	B59721A0110A062
680	$\pm 50$	120	$\leq 5.5$	$\geq 13.3$	$\geq 40$	B59721A0120A062
680	$\pm 50$	130	$\leq 5.5$	$\geq 13.3$	$\geq 40$	B59721A0130A062

#### Note:

In order to limit self heating effects the electrical power during measurement should be below 6 mW for EIA case size 0805.

1)  $R(T_{sense,1} + 25^{\circ}C)$

## Sensors

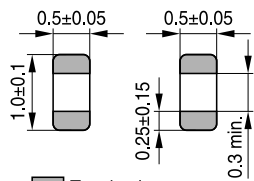
### Limit temperature sensors, EIA sizes 0402, 0603 and 0805

Superior series

### SMD

#### Dimensional drawings in mm

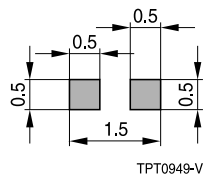
##### EIA case size 0402



Termination

TPT0948-M-E

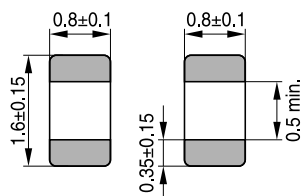
##### Solder pad



TPT0949-V

Recommended maximum dimensions (mm)

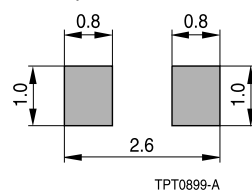
##### EIA case size 0603



Termination

TPT0698-5-E

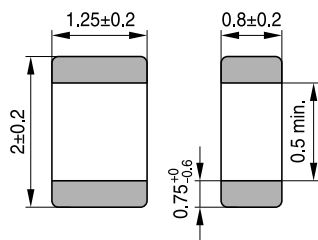
##### Solder pad



TPT0899-A

Recommended maximum dimensions (mm)

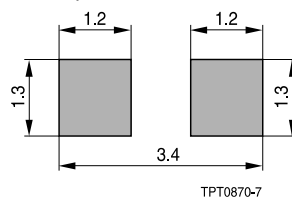
##### EIA case size 0805



Termination

TPT0650-F-E

##### Solder pad



TPT0870-7

Recommended maximum dimensions (mm)

**Sensors**
**Limit temperature sensors, EIA sizes 0402, 0603 and 0805**
**Superior series**
**SMD**
**Reliability data**

Test	Standard	Test conditions	$ \Delta R_{25}/R_{25} $
Electrical endurance, cycling	IEC 60738-1	Room temperature: $I_{smax}, V_{max}$ Number of cycles: 100	< 10%
Electrical endurance, constant	IEC 60738-1	Storage at $V_{max}$ and $T_{op,max}$ (@ $V_{max}$ ) Test duration: 1000 h	< 20%
Damp heat	IEC 60738-1	Temperature of air: 40 °C Relative humidity of air: 93% Duration: 56 days Test according to IEC 60068-2-78	< 10%
Rapid change of temperature I	IEC 60738-1	$T_{LCT} = T_{op,min}, T_{UCT} = T_{op,max}$ Number of cycles: 5 Test duration: 30 min Test according to IEC 60068-2-14, test Na	< 10%
Rapid change of temperature II	AEC-Q200 / IEC 60738-1, item 4.17	$T_{LCT} = -55\text{ °C}$ , $T_{UCT} = 125\text{ °C}$ Number of cycles: 1000	< 25%
Vibration I	IEC 60738-1	Frequency: 10 ... 2000 Hz Displacement amplitude: 0.75 mm, resp. Acceleration: 98 m/s <sup>2</sup> Test duration: 3 × 2 h Test according to IEC 60028-2-6, test Fc	< 10%
Vibration II	MIL-STD-202, method 204	Frequency: 10 ... 2000 Hz Displacement amplitude: 0.75 mm, resp. Acceleration: 50 m/s <sup>2</sup> Test duration: 3 × 2 h Test according to IEC 60028-2-6, test Fc	< 10%
Shock	IEC 60738-1	Pulse shape: half-sine Acceleration: 400 m/s <sup>2</sup> Pulse duration: 6 ms; 6 × 5000 pulses Test according to IEC 60068-2-27, test Ea	< 10%
Climatic sequence	IEC 60738-1	Dry heat: $T_{UCT} = 125\text{ °C}$ Test duration: 16 h Damp heat first cycle Cold: $T_{LCT} = -40\text{ °C}$ Test duration: 2 h Damp heat 5 cycles Tests performed according to IEC 60068-2-30	< 10%
Bending test	IEC 60738-1	Components reflow-soldered to test board Maximum bendig: 2 mm Test according to IEC 60068-2-21, test Ue	< 10%

**Sensors**
**Limit temperature sensors, EIA sizes 0402, 0603 and 0805**
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SMD

Test	Standard	Test conditions	$ \Delta R_{25}/R_{25} $
Shear test		Shearing of the component soldered on PCB by a force of 5 N normal to components longitudinal axis	No visible damage
Humidity	AEC-Q200 / MIL-STD-202, method 103	T = 85 °C; H = 85% r.H.; t = 1000 h V = 0.05 · V <sub>max</sub>	< 20%
Resistance to soldering heat	AEC-Q200 / IEC 60068-2-20, test Tb	Soldering bath: 260 °C; t = 20 s	< 20%
ESD	AEC-Q200-002	150 pF/ 330 Ω; 8 kV contact discharge, 10 pulses in each polarity	< 10% for case sizes 0603 and 0805 < 50% for case size 0402
High temperature load		Soldered PTC to PCB @ 85 °C, load maximum operating voltage for 1.5 h on and 0.5 h off. This cycle is repeated for 1000 ±12 h	< 20%



## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

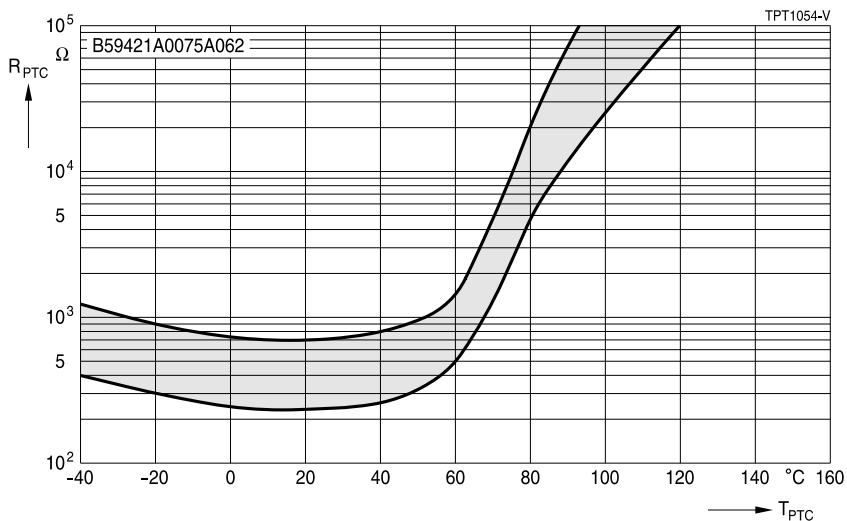
Superior series

### SMD

#### Characteristics (typical) for case size 0402

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.



$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	400	815	1.230
-30	345	692	1.040
-20	300	605	910
-10	270	540	810
0	243	486	730
10	235	470	705
20	232	463	695
25	235	470	705
30	238	477	717
35	247	490	739
40	260	520	790
50	320	660	940
60	500	990	1.400

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
70	1.300	2.700	4.700
75	2.400	4.700	9.800
80	4.700	8.500	20.500
85	7.700	14.200	39.500
90	11.700	23.500	72.000
93	14.900	31.000	100.000
100	25.100	59.000	—
106	38.500	100.000	—
110	51.000	—	—
120	100.000	—	—

## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

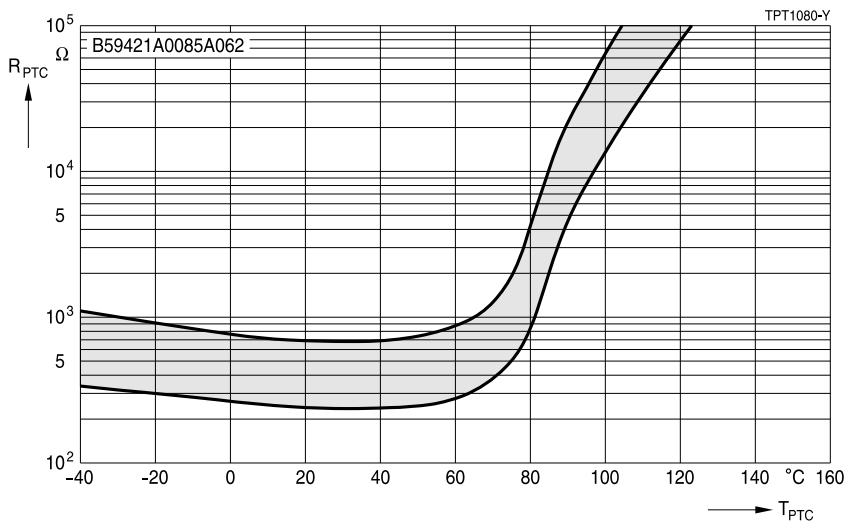
Superior series

### SMD

#### Characteristics (typical) for case size 0402

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.



$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	409	835	1.260
-30	358	724	1.090
-20	316	640	963
-10	287	578	870
0	264	531	800
10	247	498	748
20	237	476	715
25	235	472	709
30	233	468	706
40	235	473	712
50	249	504	760
55	265	537	809
60	289	588	890

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
65	328	670	1.030
70	410	830	1.450
75	590	1.200	2.500
80	1.070	2.250	4.700
85	2.300	4.700	8.900
90	4.700	8.500	16.000
100	12.800	24.000	46.000
108	24.500	49.000	100.000
117	46.000	100.000	—
120	56.000	—	—
130	100.000	—	—

## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

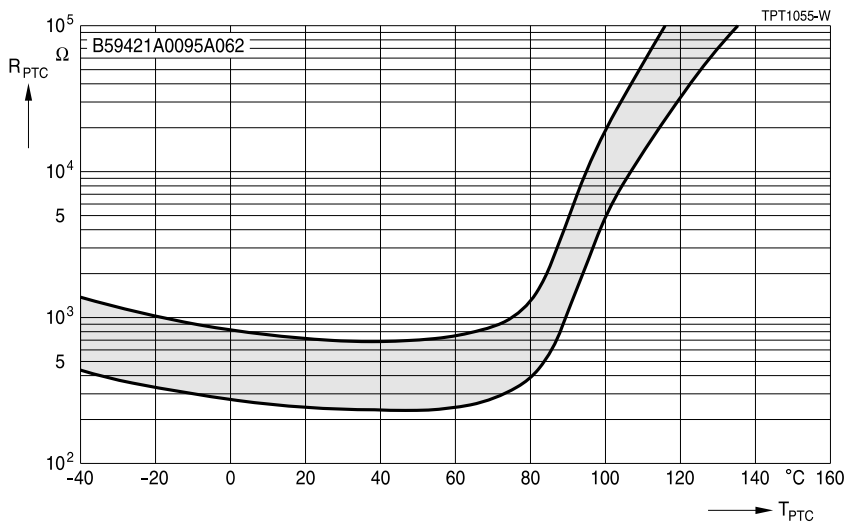
Superior series

### SMD

#### Characteristics (typical) for case size 0402

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.

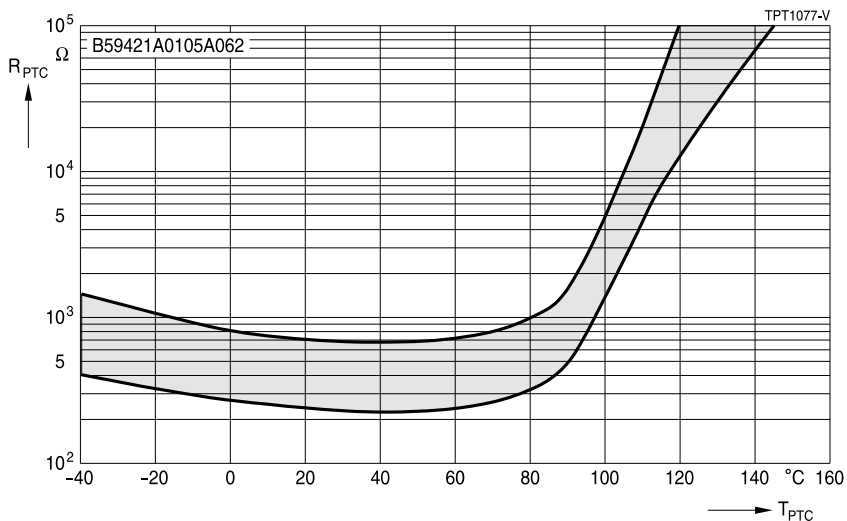


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	429	887	1.346
-30	373	765	1.158
-20	330	673	1.015
-10	297	603	909
0	272	548	824
10	253	508	764
20	240	481	722
25	235	470	705
40	227	452	684
50	231	461	697
60	242	490	743
70	278	570	868
75	316	650	994

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
80	390	810	1.300
85	580	1.200	2.200
90	1.100	2.300	4.700
95	2.300	4.700	10.200
100	4.700	9.300	19.000
110	14.000	27.500	57.000
116	24.000	49.500	100.000
120	33.000	69.000	—
124	45.500	100.000	—
130	71.000	—	—
135	100.000	—	—

SMD
**Characteristics (typical) for case size 0402**

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).  
 $R_{min}$  and  $R_{max}$  values are typical values for reference only.



$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	420	880	1.340
-30	368	774	1.180
-20	329	679	1.030
-10	298	604	910
0	273	557	840
10	254	517	780
25	235	470	705
40	222	445	667
50	218	436	655
60	219	439	658
70	229	458	687
80	256	518	780

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
90	330	743	1.150
95	460	1.150	2.000
100	930	2.200	4.700
105	2.250	4.700	9.900
110	4.700	9.500	19.000
115	7.500	16.500	35.000
120	11.500	26.000	61.000
125	16.700	42.000	100.000
130	24.000	64.000	—
136	36.000	100.000	—
140	46.000	—	—
153	100.000	—	—

## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

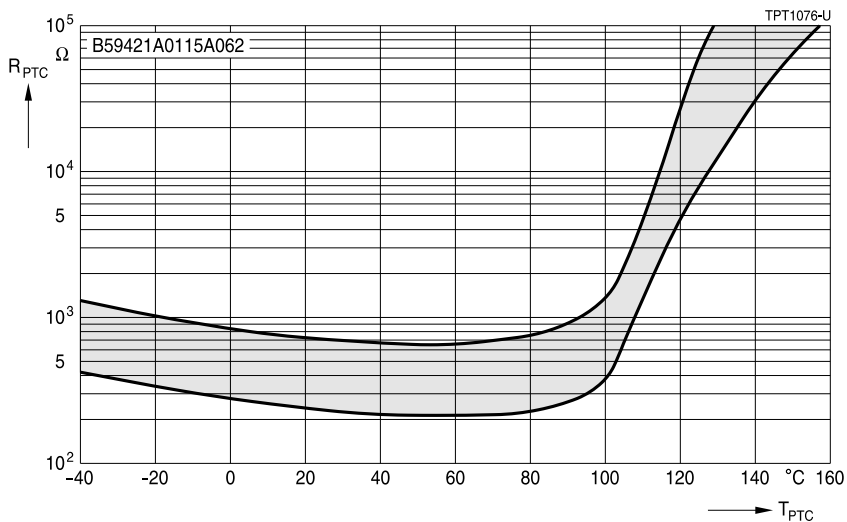
Superior series

### SMD

#### Characteristics (typical) for case size 0402

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.

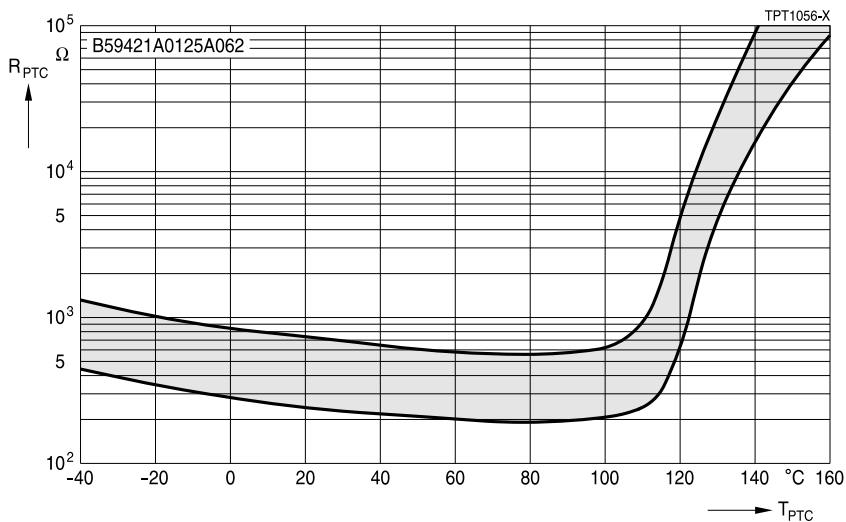


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	420	880	1.340
-30	368	774	1.180
-20	329	679	1.030
-10	298	608	910
0	273	556	840
10	254	514	780
25	235	470	705
40	220	433	655
50	213	416	632
60	207	402	615
70	206	400	605
80	209	408	630
90	226	440	710

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
100	283	580	990
105	372	830	1.750
110	640	1.800	4.700
115	1.700	4.700	12.500
120	4.700	10.500	29.000
129	12.400	29.000	100.000
130	13.500	32.000	—
140	29.600	82.000	—
142	34.500	100.000	—
150	61.000	—	—
157	100.000	—	—

**Sensors**
**Limit temperature sensors, EIA sizes 0402, 0603 and 0805**
**Superior series**
SMD
**Characteristics (typical) for case size 0402**

 PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

 $R_{min}$  and  $R_{max}$  values are typical values for reference only.


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	435	860	1.310
-30	385	752	1.140
-20	342	675	1.025
-10	308	608	930
0	278	558	848
10	258	514	780
25	235	470	705
40	218	431	645
50	208	410	610
60	200	391	580
70	195	380	562
80	192	373	555
90	194	383	568

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
100	205	416	622
110	240	520	900
115	322	800	1.700
120	630	1.800	4.700
125	1.850	4.700	11.500
130	4.700	9.900	24.000
140	16.000	33.000	88.000
141	17.800	37.000	100.000
150	40.000	92.000	—
151	43.500	100.000	—
160	87.000	—	—
162	100.000	—	—

## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

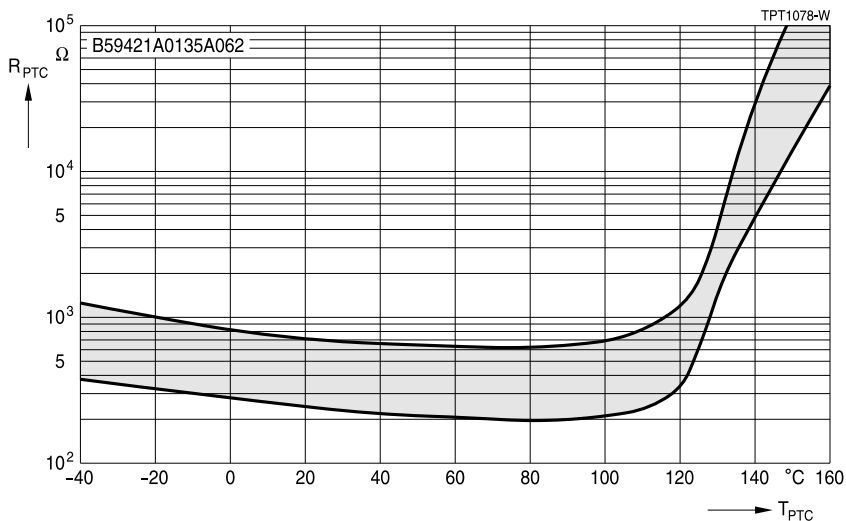
Superior series

### SMD

#### Characteristics (typical) for case size 0402

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.

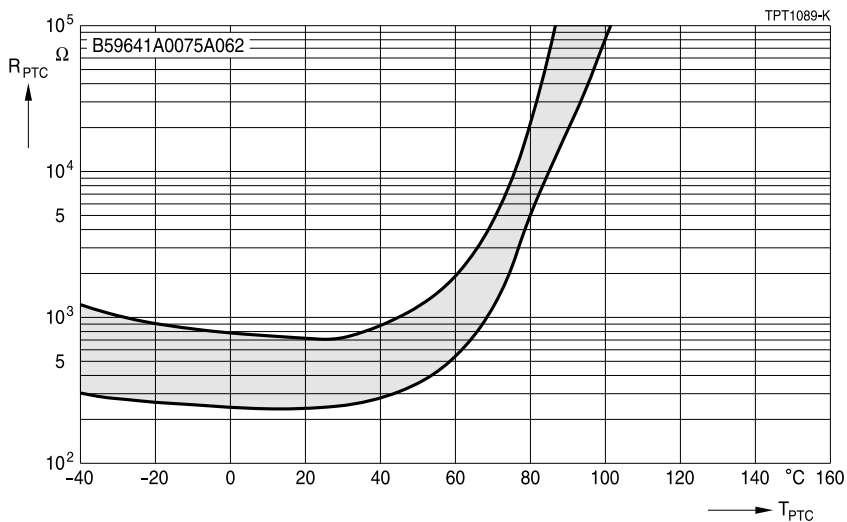


$T_{PTC}$ $^{\circ}\text{C}$	$R_{min}$ $\Omega$	$R_{typical}$ $\Omega$	$R_{max}$ $\Omega$
-40	467	966	1.465
-30	398	820	1.241
-20	348	710	1.072
-10	310	628	946
0	281	566	852
10	258	517	777
20	241	484	727
25	235	470	705
40	224	447	670
50	219	439	659
60	219	441	662
70	224	453	682
80	235	480	726
90	253	523	810

$T_{PTC}$ $^{\circ}\text{C}$	$R_{min}$ $\Omega$	$R_{typical}$ $\Omega$	$R_{max}$ $\Omega$
95	270	560	880
100	293	604	970
105	325	670	1.090
110	368	760	1.270
115	438	900	1.530
120	570	1.100	1.960
125	830	1.550	2.800
130	1.350	2.500	4.700
135	2.400	4.700	9.100
140	4.700	9.000	19.000
150	15.000	33.000	88.000
151	16.700	37.000	100.000
160	40.000	95.000	—

SMD
**Characteristics (typical) for case size 0603**

 PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

 $R_{min}$  and  $R_{max}$  values are typical values for reference only.


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	296	680	1.100
-30	270	610	980
-20	255	550	870
-10	244	510	790
0	235	485	740
10	231	470	705
20	232	465	700
25	235	470	705
30	240	480	720
40	265	520	800
50	310	620	990

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
60	430	920	1.600
65	590	1.350	2.500
70	1.000	2.300	4.700
75	2.050	4.700	10.000
80	4.700	10.300	25.000
83	7.300	17.000	47.000
96	11.100	26.500	100.000
90	19.000	47.000	—
95	37.000	100.000	—
97	47.000	—	—
103	100.000	—	—



## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

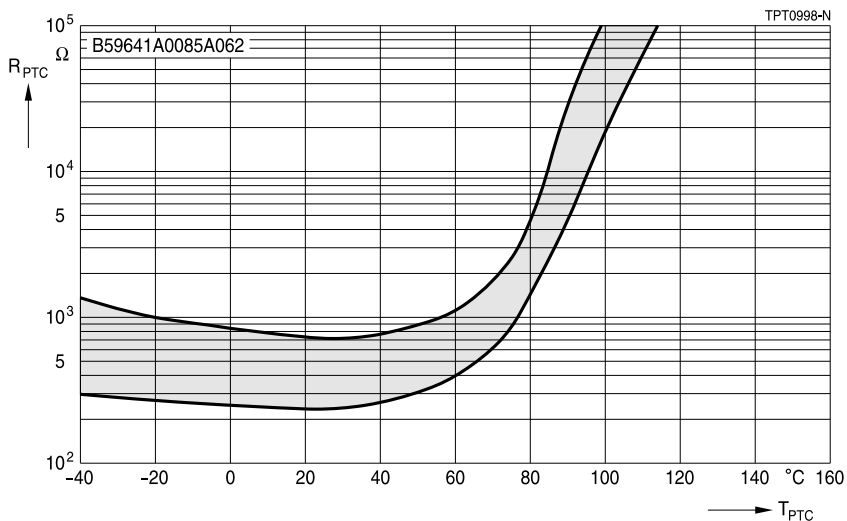
Superior series

### SMD

#### Characteristics (typical) for case size 0603

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.

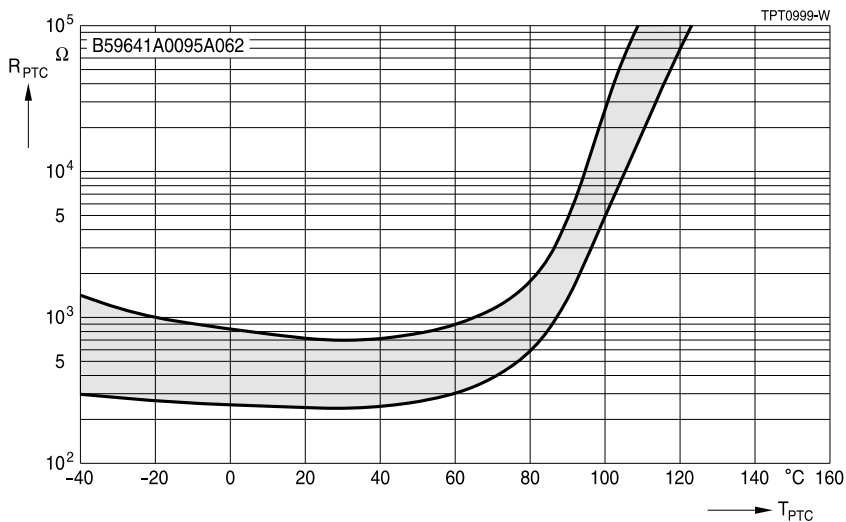


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	350	772	1.250
-20	290	620	970
-10	270	568	880
0	252	522	805
10	242	490	750
25	235	470	705
40	248	490	736
50	278	550	830
60	346	690	1.050
70	498	1.030	1.530
75	680	1.450	2.300
80	1.080	2.300	4.700
85	2.150	4.700	12.000

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
90	4.700	11.000	29.000
93	7.300	17.500	47.000
95	9.700	23.500	61.000
99	17.000	42.000	100.000
100	19.500	47.000	—
105	37.000	82.000	—
107	47.000	100.000	—
110	65.500	—	—
114	100.000	—	—

SMD
**Characteristics (typical) for case size 0603**

 PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

 $R_{min}$  and  $R_{max}$  values are typical values for reference only.


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	350	770	1.300
-20	298	585	999
-10	277	540	900
0	261	510	820
10	248	485	755
20	238	472	715
25	235	470	705
30	237	472	708
40	243	480	725
50	257	510	770
60	285	570	870
70	345	710	1.050
80	478	995	1.550

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
85	640	1.350	2.350
90	1.030	2.210	4.700
95	2.050	4.700	11.000
100	4.700	10.500	28.000
103	7.200	17.000	47.000
108	14.000	35.500	100.000
110	18.300	47.000	
115	36.000	100.000	
117	47.000		
123	100.000		

## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

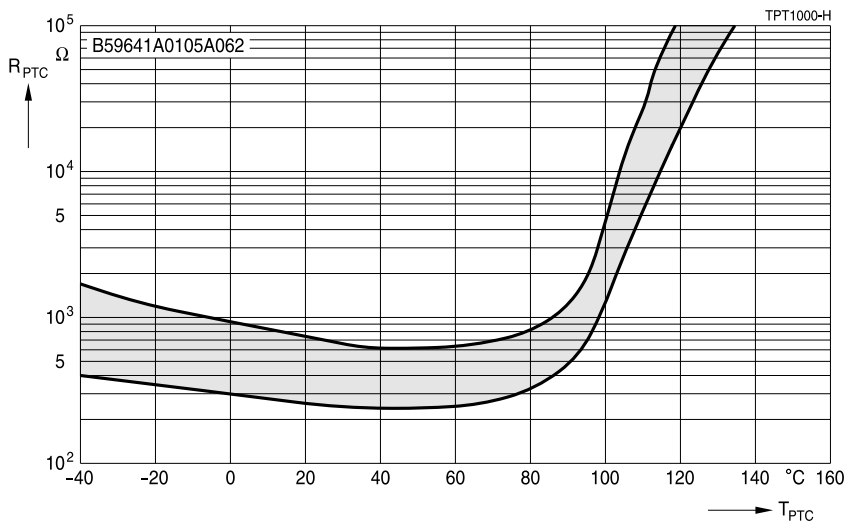
Superior series

### SMD

#### Characteristics (typical) for case size 0603

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.



$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	500	1.050	1.720
-20	355	743	1.130
-10	310	635	965
0	275	558	850
10	255	508	770
20	240	479	718
25	235	470	705
30	230	460	690
40	222	447	674
50	222	448	676
60	231	465	698
70	252	503	762

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
80	300	585	900
90	450	810	1.380
95	645	1.200	2.200
100	1.100	2.200	4.700
105	2.200	4.700	12.600
110	4.700	10.900	29.500
113	7.500	18.000	47.000
118	15.800	37.000	100.000
120	21.000	47.000	—
125	38.000	83.000	—
127	47.000	100.000	—
136	100.000	—	—

## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

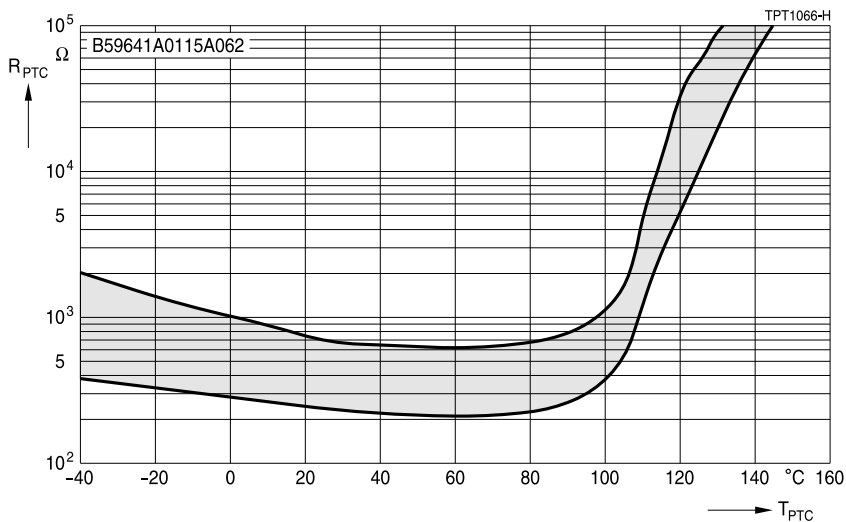
Superior series

### SMD

#### Characteristics (typical) for case size 0603

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.

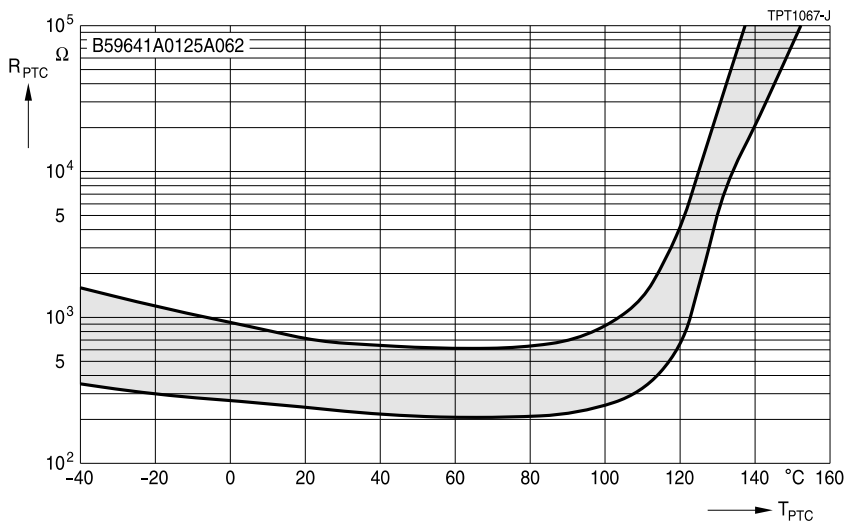


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	410	900	1.700
-20	335	690	1.200
-10	305	612	1.020
0	278	552	890
10	256	510	790
20	241	482	728
25	235	470	705
30	231	460	690
40	225	441	670
50	221	430	655
60	220	425	650
70	225	438	665
80	243	475	710

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
90	290	560	840
100	410	780	1.250
105	570	1.090	2.050
110	960	2.050	4.700
115	1.950	4.700	12.000
120	4.700	11.000	29.000
123	7.700	17.500	47.000
128	15.400	36.000	100.000
130	20.000	47.000	
136	42.500	100.000	
137	47.000		
145	100.000		

SMD
**Characteristics (typical) for case size 0603**

 PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

 $R_{min}$  and  $R_{max}$  values are typical values for reference only.


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	380	810	1.500
-20	320	668	1.140
-10	296	612	1.010
0	275	563	900
10	256	520	800
20	241	486	728
25	235	470	705
30	229	458	688
40	220	439	660
50	211	425	641
60	207	417	630
70	206	415	634
80	210	426	655

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
90	222	461	716
100	250	541	900
110	325	765	1.350
115	430	1.060	2.200
120	700	1.900	4.700
125	1.680	4.700	11.000
130	4.700	10.000	28.000
133	7.700	15.500	47.000
137	13.500	29.000	100.000
140	20.000	47.000	–
145	36.700	100.000	–
147	47.000	–	–
154	100.000	–	–

## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

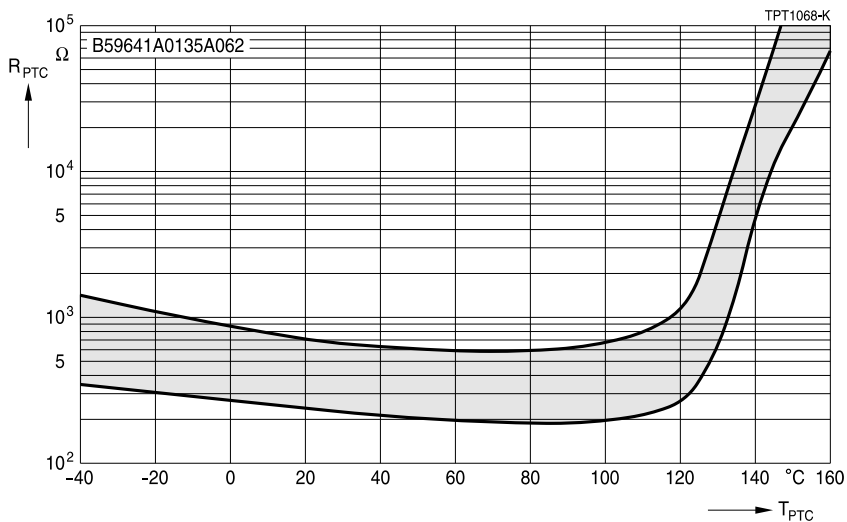
Superior series

### SMD

#### Characteristics (typical) for case size 0603

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.



$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	380	810	1.460
-20	320	668	1.130
-10	296	612	1.008
0	275	563	900
10	256	520	800
20	241	486	728
25	235	470	705
30	229	456	687
40	218	433	655
50	209	416	630
60	202	404	614
70	198	396	609
80	195	397	615
90	196	405	635

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
100	203	432	690
110	225	495	825
120	292	665	1.230
125	402	980	2.100
130	680	1.950	4.700
135	1.610	4.700	11.000
140	4.700	10.500	28.000
143	7.700	16.500	47.000
147	13.500	30.000	100.000
150	19.800	47.000	—
155	36.800	100.000	—
157	47.000	—	—
163	100.000	—	—

## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

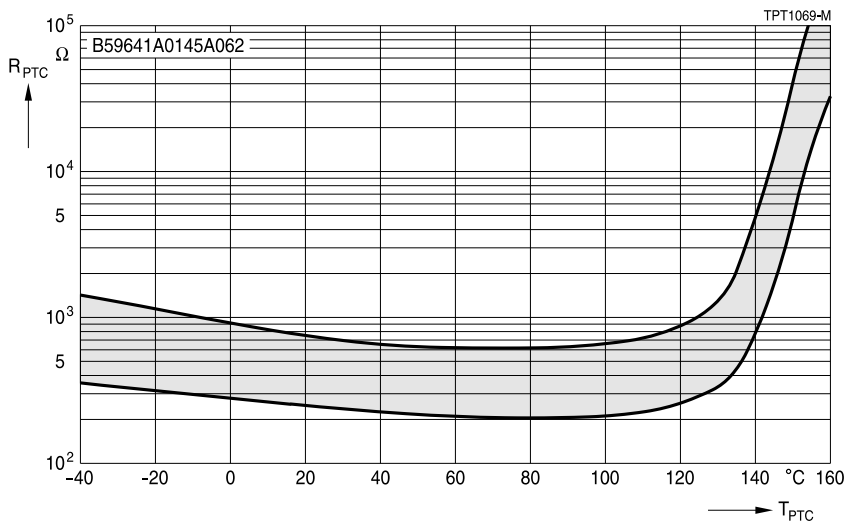
Superior series

### SMD

#### Characteristics (typical) for case size 0603

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.

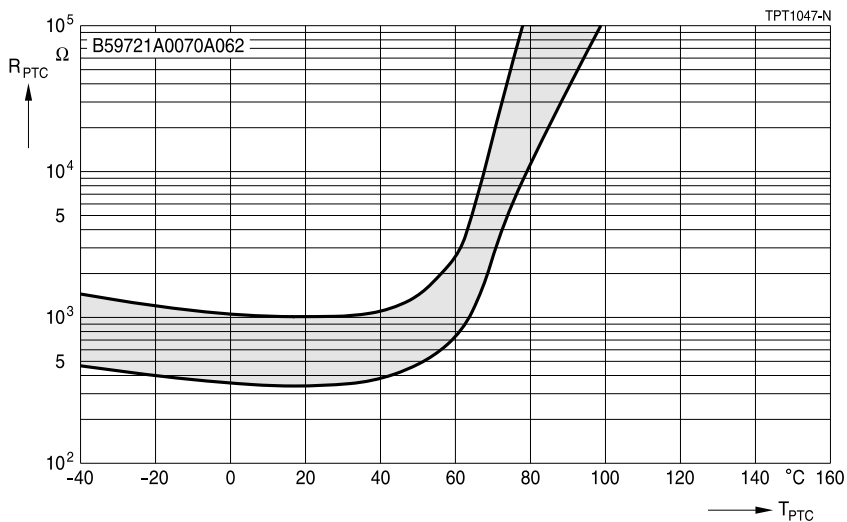


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	380	800	1.400
-20	320	662	1.100
-10	296	608	990
0	275	561	892
10	256	519	795
20	241	485	728
25	235	470	705
30	229	456	687
40	218	433	655
50	209	414	630
60	202	400	614
70	198	392	605
80	195	390	610
90	196	395	625

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
100	205	410	650
110	218	438	710
120	245	505	845
130	310	685	1.280
135	410	1.000	2.150
140	710	2.030	4.700
145	1.610	4.700	11.000
150	4.700	10.500	28.000
153	7.700	16.800	47.000
157	13.500	30.500	100.000
160	19.800	47.000	—
165	37.000	100.000	—
167	47.000	—	—
174	100.000	—	—

**Sensors**
**Limit temperature sensors, EIA sizes 0402, 0603 and 0805**
**Superior series**
SMD
**Characteristics (typical) for case size 0805**

 PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

 $R_{min}$  and  $R_{max}$  values are typical values for reference only.


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	460	940	1.430
-20	395	795	1.190
-10	370	745	1.110
0	350	709	1.050
10	340	685	1.022
20	337	678	1.015
25	340	680	1.020
30	345	688	1.030
40	380	735	1.110

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
50	470	870	1.420
60	720	1.370	2.610
65	1.160	2.400	5.700
70	2.500	5.700	16.500
75	5.700	12.500	52.000
78	8.700	19.700	100.000
80	11.200	26.000	—
89	32.500	100.000	—
99	100.000	—	—



## Sensors

Limit temperature sensors, EIA sizes 0402, 0603 and 0805

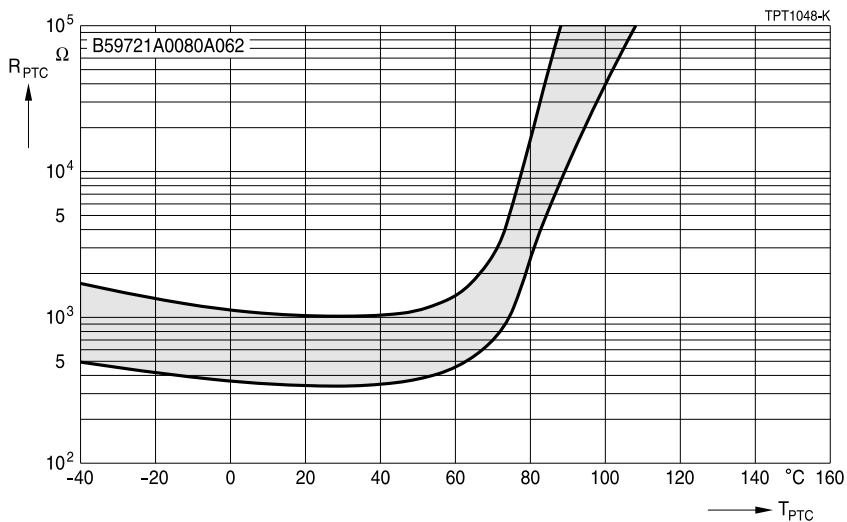
Superior series

### SMD

#### Characteristics (typical) for case size 0805

PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

$R_{min}$  and  $R_{max}$  values are typical values for reference only.

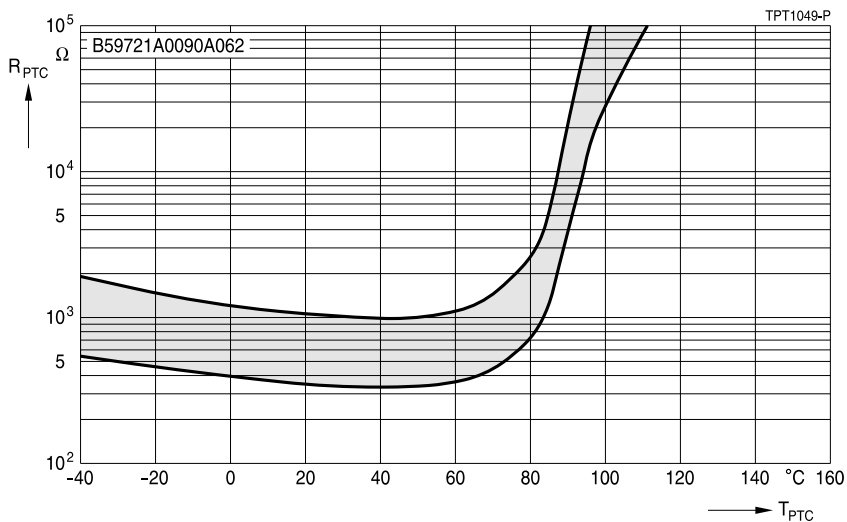


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	490	1.110	1.690
-20	415	905	1.340
-10	388	822	1.210
0	365	755	1.120
10	350	710	1.060
20	342	683	1.025
25	340	680	1.020
30	339	677	1.016
40	348	697	1.045
50	378	750	1.120

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
60	455	900	1.420
70	690	1.390	2.600
75	1.100	2.440	5.700
80	2.500	5.700	17.000
85	5.700	12.700	52.500
88	8.600	20.800	100.000
90	11.400	28.000	—
98	31.500	100.000	—
108	100.000	—	—

**Sensors**
**Limit temperature sensors, EIA sizes 0402, 0603 and 0805**
**Superior series**
SMD
**Characteristics (typical) for case size 0805**

 PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage).

 $R_{min}$  and  $R_{max}$  values are typical values for reference only.


$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
-40	540	1.200	1.900
-20	455	960	1.460
-10	420	870	1.310
0	390	790	1.200
10	365	730	1.110
20	347	690	1.040
25	340	680	1.020
30	335	675	1.010
40	330	670	995
50	335	686	1.010

$T_{PTC}$ °C	$R_{min}$ Ω	$R_{typical}$ Ω	$R_{max}$ Ω
60	360	760	1.110
70	450	960	1.450
80	720	1.700	2.600
85	1.290	2.900	5.500
90	3.800	9.200	22.000
95	13.300	26.000	80.000
96	15.900	30.500	100.000
100	28.000	57.000	—
104	45.000	100.000	—
111	100.000	—	—