



XGPU2.E148885 - Thermistor-type Devices - Component

Thermistor-type Devices - Component

VISHAY RESISTORS BELGIUM BVBA
TWEE HUIZENSTRAAT 37
BRUSSELS (EVERE), 1140 Belgium

E148885

PTC current limiters

Model No.	Voltage (V)		Current (A)					T _{moa} (°C)	Class	CA
	V _{max}	V _r	I _h (mA)	I _t (mA)	I _{max} (A)	I _{sc} (A)				
2322 660 x9491 and PTCCL05H 940ExC(E)	60	48	94	145	0.68	0.8	-40 to 85	C2	4,#	
2322 660 x1311 and PTCCL05H 131ExC(E)	60	48	130	195	1.02	1.2	-40 to 85	C2	4,#	
2322 660 x1811 and PTCCL05H 181DxC(E)	30	24	180	270	1.445	1.7	-40 to 85	C2	4,#	
2322 660 x2711 and PTCCL05H 271DxC(E)	30	24	270	405	2.125	2.5	-40 to 85	C2	4,#	
2322 661 x3211 and PTCCL07H 321DxC(E)	30	24	320	480	2.975	3.5	-40 to 85	C2	4,#	
2322 661 x4111 and PTCCL07H 411DxC(E)	30	24	410	615	3.825	4.5	-40 to 85	C2	4,#	
2322 661 x4711 and PTCCL09H 471DxC(E)	30	24	470	705	4.25	5	-40 to 85	C2	4,#	
2322 661 x5411 and PTCCL09H 541DxC(E)	30	24	540	810	5.1	6	-40 to 85	C2	4,#	
2322 661 91068 and PTCCL09H 851CBC(E)068	20	16	850	1350	4.25	5	-40 to 85	C2	4,#	
2322 661 91069 and PTCCL09H 851CTC(E)069	20	16	850	1350	4.25	5	-40 to 85	C2	4,#	
2322 662 x6111 and PTCCL11H 611DxC(E)	30	24	610	915	5.95	7	-40 to 85	C2	4,#	
2322 662 x7011 and PTCCL11H 701DxC(E)	30	24	700	1050	6.8	8	-40 to 85	C2	4,#	
2322 662 x8311 and PTCCL13H 831DxC(E)	30	24	830	1245	8.5	10	-40 to 85	C2	4,#	
2322 662 x9211 and PTCCL13H 921DxC(E)	30	24	920	1380	9.35	11	-40 to 85	C2	4,#	
2322 662 91037 and PTCCL12H 701DTC(E)037	35	28	700	1050	6.8	8	-40 to 85	C2	4,#	
2322 663 x1121 and PTCCL17H 112DBC(E)	30	24	1170	1755	11.475	13.5	-40 to 85	C2	4,#	
2322 663 x1321 and PTCCL17H 132DBC(E)	30	24	1390	2085	13.6	16	-40 to 85	C2	4,#	
2322 664 x1721 and PTCCL21H 172DBC(E)	30	24	1770	2655	17	20	-40 to 85	C2	4,#	

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2322 664 x2021 and PTCCL21H 202DBC(E)	30	24	2050	3075	19.55	23	-40 to 85	C2	4,#
2322 660 x4792 and PTCCL05H 470FxC(E)	130	120	47	70	0.16	200	0 to 70	C2	4,#
2322 660 x6592 and PTCCL05H 650FxC(E)	130	120	65	100	0.24	200	0 to 70	C2	4,#
2322 660 x9392 and PTCCL05H 930FxC(E)	130	120	93	140	0.36	200	0 to 70	C2	4,#
2322 660 x1112 and PTCCL05H 111FxC(E)	130	120	110	165	0.4	200	0 to 70	C2	4,#
2322 660 x1312 and PTCCL05H 131FxC(E)	130	120	130	195	0.48	200	0 to 70	C2	4,#
2322 661 x1712 and PTCCL07H 171FxC(E)	130	120	170	255	0.8	200	0 to 70	C2	4,#
2322 661 x2112 and PTCCL07H 211FxC(E)	130	120	210	315	1.12	200	0 to 70	C2	4,#
2322 661 x2512 and PTCCL09H 251FxC(E)	130	120	250	375	1.6	200	0 to 70	C2	4,#
2322 661 x2712 and PTCCL09H 271FxC(E)	130	120	270	405	1.76	200	0 to 70	C2	4,#
2322 662 x3212 and PTCCL11H 321FxC(E)	130	120	320	480	2.4	200	0 to 70	C2	4,#
2322 662 x3612 and PTCCL11H 361FxC(E)	130	120	360	540	2.8	200	0 to 70	C2	4,#
2322 662 x4112 and PTCCL13H 411FxC(E)	130	120	410	615	3.6	200	0 to 70	C2	4,#
2322 662 x4512 and PTCCL13H 451FxC(E)	130	120	450	675	4	200	0 to 70	C2	4,#
2322 663 x6012 and PTCCL17H 601FxC(E)	130	120	600	900	5.76	200	0 to 70	C2	4,#
2322 663 x7112 and PTCCL17H 711FxC(E)	130	120	710	1065	6.8	200	0 to 70	C2	4,#
2322 664 x8812 and PTCCL21H 881FxC(E)	130	120	880	1320	8.8	200	0 to 70	C2	4,#
2322 664 x1022 and PTCCL21H 102FxC(E)	130	120	1000	1500	10.4	200	0 to 70	C2	4,#
2322 660 x1193 and PTCCL05H 110HxC(E)	230	230	11	17	0.06	200	0 to 70	C2	4,#
2322 660 x1593 and PTCCL05H 150HxC(E)	230	230	15	23	0.0825	200	0 to 70	C2	4,#
2322 660 x1993 and PTCCL05H 190HxC(E)	230	230	19	29	0.105	200	0 to 70	C2	4,#
2322 660 x2893 and PTCCL05H 280HxC(E)	230	230	28	42	0.15	200	0 to 70	C2	4,#
2322 660 x3993 and PTCCL05H 390HxC(E)	230	230	39	59	0.225	200	0 to 70	C2	4,#
2322 660 x6393 and PTCCL05H 630HxC(E)	230	230	63	95	0.3375	200	0 to 70	C2	4,#
2322 660 x7693 and PTCCL05H 760HxC(E)	230	230	76	115	0.4125	200	0 to 70	C2	4,#
2322 660 x9593 and PTCCL05H 950HxC(E)	230	230	95	143	0.45	200	0 to 70	C2	4,#
2322 660 93034 and PTCCL05H 100SBC(E)	600	480	10	20	0.375	1000	0 to 55	C2	4,#
2322 660 93072 and PTCCL05H090TBE072	500	480	9	18	0.1	1000	0 to 55	C2	4,#
2322 660 93084 and PTCCL06H 760HBC(E)084	230	230	76	115	0.4125	200	0 to 70	C2	4,#

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2322 661 x1113 and PTCCL07H 111HxC(E)	265	230	110	165	0.4875	200	0 to 70	C2	4,#
2322 661 x1413 and PTCCL07H 141HxC(E)	230	230	140	210	0.6	200	0 to 70	C2	4,#
2322 661 x1713 and PTCCL09H 171HxC(E)	230	230	170	255	0.675	200	0 to 70	C2	4,#
2322 661 x1913 and PTCCL09H 191HxC(E)	230	230	190	285	0.75	200	0 to 70	C2	4,#
2322 661 93113 and PTCCL10H 010SBC(E)	600	480	10	100	1.5	1000	-10 to 55	C2	4,#
2322 661 93134 and PTCCL08H 121HBC(E)134	250	200	125	175	1	200	0 to 70	C2	4,#
2322 662 x2113 and PTCCL11H 211HxC(E)	230	230	210	315	0.975	200	0 to 70	C2	4,#
2322 662 x2513 and PTCCL11H 251HxC(E)	230	230	250	375	1.125	200	0 to 70	C2	4,#
2322 662 x2813 and PTCCL13H 281HxC(E)	230	230	280	420	1.35	200	0 to 70	C2	4,#
2322 662 x3213 and PTCCL13H 321HxC(E)	230	230	320	480	1.65	200	0 to 70	C2	4,#
2322 662 93114 and PTCTL7MR 100SBC(E)	300	240	175	280	3	200	0 to 70	C2	4,#
2322 662 93131 and PTCTL7NR 100SBC(E)	300	240	175	280	3	200	0 to 70	C2	4,#
2322 663 x4013 and PTCCL17H 401HxC(E)	230	230	400	600	2.25	200	0 to 70	C2	4,#
2322 663 x4913 and PTCCL17H 491HxC(E)	230	230	490	735	2.625	200	0 to 70	C2	4,#
2322 664 x5913 and PTCCL21H 591HxC(E)	230	230	590	855	3.375	200	0 to 70	C2	4,#
2322 664 x7013 and PTCCL21H 701HxC(E)	230	230	700	1050	4.125	200	0 to 70	C2	4,#
2322 662 93137 and PTCTL7MR 100STC(E)	300	240	175	280	3	200	0 to 70	C2	4,#
2322 662 93138 and PTCTL7NR 100STC(E)	300	240	175	280	3	200	0 to 70	C2	4,#
2381 673 97008 and PTCTT95R500GTE008	300	240	90	200	5	200	0 to 85	C2	2,4, #

Note: Prefix 2322 may be replaced by prefix 2381.
Note: where "x" can be any alphanumeric character.

PTC current limiter:

Model No.	Voltage (V)		Current (A)				T _{moa} (°C)	Class	CA
	V _{max}	V _r	I _h (mA)	I _t (mA)	I _{max} (A)	I _{sc} (A)			
307C1254	265 ac/dc	240 Vac/dc	125	250	4.0	200	25	C1	2,4,#
307C1262	300 ac/dc	240 Vac/dc	110	220	4.0	200	25	C1	2,4,#
307C1548	60 ac/dc	50 Vac/dc	150	300	2.6	200	70	C1	2,4,#
307C1170	165 ac/dc	120 Vac/dc	160	320	3.0	200	70	C1	2,4,#
307C1343	265 ac/dc	240 Vac/dc	90	180	1.0	200	70	C1	2,4,#
307C1711(+)	145 ac/dc	120 ac/dc	280	560	12	200	85	C1	2,4,#

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PTCEL13R600LxE(*)	350 ac/350 dc	300 ac/350 dc	120	480	12	1000	105	C1	1(176),2,4,#
PTCEL13R121MxE(*)	440 ac/500 dc	400 ac/500 dc	85	340	8	1000	105	C1	1(179),2,4,#
PTCEL13R251NxE(*)	480 ac/680 dc	400 ac/680 dc	60	240	6	1000	105	C1	1(179),2,4,#
PTCEL13R501RxE(*)	560 ac/800 dc	480 ac/800 dc	42	170	4	1000	105	C1	1(179),2,4,#
PTCEL13R102SxE(*)	600 ac/850 dc	560 ac/850 dc	30	120	1.5	1000	105	C1	1(179),2,4,#
PTCEL17R600MxE(*)	440 ac/520 dc	400 ac/520 dc	140	560	15	1000	105	C1	1(179),2,4,#
PTCEL17R121NxE(*)	460 ac/650 dc	400 ac/650 dc	100	400	9	1000	105	C1	1(179),2,4,#
PTCEL17R251SxE(*)	600 ac/850 dc	560 ac/850 dc	70	280	7	1000	105	C1	1(179),2,4,#
PTCEL17R501TxE(*)	700 ac/1000 dc	560 ac/1000 dc	50	200	5	1000	105	C1	1(173),2,4,#

(+) - followed by B or T.

(*) - PTCEL types may be followed by additional digits, Customized Code (Client self-declared, not been evaluated by UL). Any 3 digits number or blank for customized part which not related to product/construction/material/rating.

x - may be B, T, A, Y or C

#Unique conditions of acceptability.

1. The trip state of these devices shall be apparent in the end-use application and a manual intervention is required in order to reset the device.
2. Calibration Class C1 corresponds to a temperature drift of 5%.

NTC sensors, Type 2322 640 yx abc where "y" can be 3, 4, 5, 6 or 9 and for "x abc", prefix 2322 may be replaced with 2381 and 2355. See table below.

NTC sensors, Type NTC g hhhh (Ei) - abc jkl, where "g" can be L, "hhhh" can be E100 or E203, "i" can be 3 or 4, "k" can be B or T, "l" can be 0, 1 or 2 and for "abc j", may be followed by "A". See table below.

Cat. Nos. "x abc"	Cat. Nos."abc j"	Calibration Class #	R25 Range [ohm]	T max
4339	339 G	C4	32.34 - 33.66	125°C
6339	339 H	C4	32.01 - 33.99	125°C
3339, 90228, 90233	339 J, C90228, C90233	C4	31.35 - 34.65	125°C
4479	479 G	C4	46.06 - 47.94	125°C
6479	479 H	C4	45.59 - 48.41	125°C
3479	479 J	C4	44.65 - 49.35	125°C
4689	689 G	C4	66.64 - 69.36	125°C
6689	689 H	C4	65.96 - 70.04	125°C
3689	689 J	C4	64.60 - 71.40	125°C
5101	101 F	C4	99 - 101	125°C
4101	101 G	C4	98 - 102	125°C
6101	101 H	C4	97 - 103	125°C
3101	101 J	C4	95 - 105	125°C
5151	151 F	C4	148.5 - 151.5	125°C

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4151	151 G	C4	147 - 153	125°C
6151	151 H	C4	145.5 - 154.5	125°C
3151	151 J	C4	142.5 - 157.5	125°C
5221	221 F	C4	217.8 - 222.2	125°C
4221	221 G	C4	215.6 - 224.4	125°C
6221	221 H	C4	213.4 - 226.6	125°C
3221	221 J	C4	209 - 231	125°C
5331	321 F	C4	326.7 - 333.3	125°C
4331	321 G	C4	323.4 - 336.6	125°C
6331	321 H	C4	320.1 - 339.9	125°C
3331	321 J	C4	313.5 - 346.5	125°C
5471	471 F	C4	465.3 - 474.7	125°C
4471	471 G	C4	460.6 - 479.4	125°C
6471	471 H	C4	455.9 - 484.1	125°C
3471	471 J	C4	446.5 - 493.5	125°C
5681	681 F	C4	673.2 - 686.8	125°C
4681	681 G	C4	666.4 - 693.6	125°C
6681	681 H	C4	659.6 - 700.4	125°C
3681	681 J	C4	646 - 714	125°C
5102	102 F	C4	990 - 1010	125°C
4102	102 G	C4	980 - 1020	125°C
6102	102 H	C4	970 - 1030	125°C
3102	102 J	C4	950 - 1050	125°C
5152	152 F	C4	1485 - 1515	125°C
4152	152 G	C4	1470 - 1530	125°C
6152	152 H	C4	1455 - 1545	125°C
3152	152 J	C4	1425 - 1575	125°C
5202	202 F	C4	1980 - 2020	125°C
4202	202 G	C4	1960 - 2040	125°C
6202	202 H	C4	1940 - 2060	125°C
3202	202 J	C4	1900 - 2100	125°C
5222	222 F	C4	2178 - 2222	125°C
4222	222 G	C4	2156 - 2244	125°C
6222, 90168	222 H, C90168	C4	2134 - 2266	125°C
3222, 90227, 90232,	222 J, C90227, C90232	C4	2090 - 2310	125°C
5272	272 F	C4	2673 - 2727	125°C
4272	272 G	C4	2646 - 2754	125°C

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6272	272 H	C4	2619 - 2781	125°C
3272	272 J	C4	2565 - 2835	125°C
5332	332 F	C4	3267 - 3333	125°C
4332	332 G	C4	3234 - 3366	125°C
6332	332 H	C4	3201 - 3399	125°C
3332	332 J	C4	3135 - 3465	125°C
5472	472 F	C4	4653 - 4747	125°C
4472	472 G	C4	4606 - 4794	125°C
6472	472 H	C4	4559 - 4841	125°C
3472	472 J	C4	4465 - 4935	125°C
5502	502 F	C4	4950 - 5050	125°C
4502	502 G	C4	4900 - 5100	125°C
6502	502 H	C4	4850 - 5150	125°C
3502	502 J	C4	4750 - 5250	125°C
5602	602 F	C4	5940 - 6060	125°C
4602	602 G	C4	5880 - 6120	125°C
6602	602 H	C4	5820 - 6180	125°C
3602	602 J	C4	5700 - 6300	125°C
5682	682 F	C4	6732 - 6868	125°C
4682	682 G	C4	6664 - 6936	125°C
6682	682 H	C4	6596 - 7004	125°C
3682	682 J	C4	6460 - 7104	125°C
5802	802 F	C4	7920 - 8080	125°C
4802	802 G	C4	7840 - 8160	125°C
6802	802 H	C4	7760 - 8240	125°C
3802	802 J	C4	7600 - 8400	125°C
5103	103 F	C4	9900 - 10100	125°C
4103	103 G	C4	9800 - 10200	125°C
6103	103 H	C4	9700 - 10300	125°C
3103	103 J	C4	9500 - 10500	125°C
90222	C90222	C4	10000+/-3.72%	125°C
20103	NTCLE203E3103SB0	C4	10000+/-2.2%	125°C
50103 (90557)	NTCLE203E3C90557	C4	10000+/-3%	125°C
06103 (90560)	NTCLE203E3C90560	C4	10000+/-3%	125°C
5123	123 F	C4	11880 - 12120	125°C
4123	123 G	C4	11760 - 12240	125°C
6123	123 H	C4	11640 - 12360	125°C

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3123, 90226, 90231, 90112, 90207, 90206, 90549	123 J, C90226, C90231, C90112, C90207, 90206, 90549	C4	11400 - 12600	125°C
5153	153 F	C4	14850 - 15150	125°C
4153	153 G	C4	14700 - 15300	125°C
6153	153 H	C4	14550 - 15450	125°C
3153	153 J	C4	14250 - 15750	125°C
5223	223 F	C4	21780 - 22220	125°C
4223	223 G	C4	21560 - 22440	125°C
6223	223 H	C4	21340 - 22660	125°C
3223	223 J	C4	20900 - 23100	125°C
5333	333 F	C4	32670 - 33330	125°C
4333	333 G	C4	32340 - 33660	125°C
6333	333 H	C4	32010 - 33990	125°C
3333	333 J	C4	31350 - 34650	125°C
5473	473 F	C4	46530 - 47470	125°C
4473	473 G	C4	46060 - 47940	125°C
6473	473 H	C4	45590 - 48410	125°C
3473	473 J	C4	44650 - 49350	125°C
5503	503 F	C4	49500 - 50500	125°C
4503	503 G	C4	49000 - 51000	125°C
6503	503 H	C4	48500 - 51500	125°C
3503	503 J	C4	47500 - 52500	125°C
5683	683 F	C4	67320 - 68680	125°C
4683	683 G	C4	66640 - 69360	125°C
6683	683 H	C4	65960 - 70040	125°C
3683	683 J	C4	64600 - 71400	125°C
5104	104 F	C4	99000 - 101000	125°C
4104	104 G	C4	98000 - 102000	125°C
6104	104 H	C4	97000 - 103000	125°C
3104	104 J	C4	95000 - 105000	125°C
5154	154 F	C4	148500 - 151500	125°C
4154	154 G	C4	147000 - 153000	125°C
6154	154 H	C4	145500 - 154500	125°C
3154	154 J	C4	142500 - 157500	125°C
5224	224 F	C4	217800 - 222200	125°C
4224	224 G	C4	215600 - 224400	125°C
6224	224 H	C4	213400 - 226600	125°C

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3224, 90225, 90229	224 J, C90225, C90229)	C4	209000 - 231000	125°C
Note: Calibration Classes for NTC Sensors in Percent Drift				
Note: C1 = ±0.5 / C2 = ±1.0 / C3 = ±2.0 / C4 = ±5.0				
Note: Prefix 2322 may be replaced by prefix 2381 and 2355.				

NTC sensors, Type 2322 640 yx abc, where "y" can be 2, 3, 4, 5, 6 or 9, "x" can be 0, 2, 3, 4, 5, or 6, and for "abc", prefix 2322 may be replaced with 2381 and 2355. See table below.

NTC sensors, Type NTC g hhhh (Ei) - abc jkl, where "g" can be L, "hhhh" can be E100 or E203, "Ei" can be E3, E4, or blank, for "abc" see table below, "j" can be F, G, H, S or J, "k" can be B or T, and "l" can be 0, 1 or 2. May be followed by "A".

Cat. Nos. "abc"	Cat. Nos. "abc"	Calibration Class #	R25 Range [ohm]	T max	CA
252	C90252	C3	47505 - 50504	125°C	—
308	C90308	C3	44856 - 48027	125°C	—
361	C90361	C3	45187 - 47966	125°C	—
389	C90389	C3	43379 - 46431	125°C	—
Note: Calibration Classes for NTC Sensors in Percent Drift.					
Note: C1 = ±0.5 / C2 = ±1.0 / C3 = ±2.0 / C4 = ±5.0.					
Note: Prefix 2322 may be replaced by prefix 2381 and 2355.					

NTC sensors, Type 2381 645 yx abc where "y" can be 9 and for "x abc". Prefix 2381 may be replaced with 2355. See table below.

NTC sensors, Type NTC g hhhh (Ei)C - x abc, where "g" can be L, "hhhh" can be E305, "i" can be 4, and for "x abc", May be followed by "A". See table below.

Model No.	Resistance at 25°C (k ohm)	Voltage (V)	T _{mos} (°C)	Class	CA
0392	12 +/-4.98%	100	125	C2	2
0416	12 +/-4.98%	100	125	C2	2

PTC Heater Subassembly

Model No.	Voltage (V)	Power (W)	Current (A)		Class	TS(°C)	CA
			I _{in}	I _{ss}			
2322 662 93078 and PTCHPS 155HYE078	220-240	—	1.2	0.0125	C2	155	4
2322 662 93079 and PTCHPS 130HYE079	220-240	—	2.5	0.0105	C2	140	4
2322 662 93139 and PTCHPS 140HYE139	220-240	—	1.0	0.0105	C2	140	4
Note: Prefix 2322 may be replaced by prefix 2381.							



PTC Motor Starters

Model	Voltage (V)		Current (A)				T _{moa} Operating range (°C)	T _{sw} (°C)	T _{s max} (°C) at V _{max}	Class	CA
	V _r	V _{max}	I _{max}	I _{sc}	I _{ss} (mA)	R ₂₅ (ohms)					
2322 661 93096 and PTCMP08R 550NYE096	220	350	0.4	200	6	55	-20 - 80	105	170	C1	#1,4
2322 661 93108 and PTCMP08R 161NYE108	220	450	0.45	200	4	160	-20 - 80	65	130	C1	#1,4

Note: Prefix 2322 may be replaced by prefix 2381.

NTC sensors

Model No.	Resistance at 25°C (ohm)	T _{moa} (°C)	Class	CA
2381 615 3y473*, NTCS0603E3473xHT*	47000	125°C	C4	#
2381 641 90111, NTCACAPE3C90111	10000	60°C	C3	#
2381 641 90112, NTCACAPE3C90112	10000	60°C	C3	#
2381 641 90113, NTCACAPE3C90113	10000	60°C	C3	#
2381 641 90114, NTCACAPE3C90114	10000	60°C	C3	#
2381 641 90115, NTCACAPE3C90115	10000	60°C	C3	#
2381 641 90116, NTCACAPE3C90116	10000	60°C	C3	#
2381 641 90117, NTCACAPE3C90117	10000	60°C	C3	#
2381 641 90118, NTCACAPE3C90118	10000	60°C	C3	#
2381 641 90119, NTCACAPE3C90119	10000	60°C	C3	#
2381 641 90121, NTCACAPE3C90121	10000	60°C	C3	#
2381 641 90122, NTCACAPE3C90122	10000	60°C	C3	#
2381 641 90123, NTCACAPE3C90123	10000	60°C	C3	#
2381 641 90124, NTCACAPE3C90124	10000	60°C	C3	#
2381 641 90125, NTCACAPE3C90125	10000	60°C	C3	#
2381 641 90126, NTCACAPE3C90126	10000	60°C	C3	#
2381 641 90127, NTCACAPE3C90127	10000	60°C	C3	#
2381 641 90128, NTCACAPE3C90128	10000	60°C	C3	#
2381 641 90129, NTCACAPE3C90129	10000	60°C	C3	#
2381 641 90201, NTCACAPE3C90201	10000	60°C	C3	#
2381 641 90202, NTCACAPE3C90202	10000	60°C	C3	#



2381 641 90203, NTCACAPE3C90203	10000	60°C	C3	#
2381 641 90204, NTCACAPE3C90204	10000	60°C	C3	#
2381 641 90205, NTCACAPE3C90205	10000	60°C	C3	#
2381 641 90066, NTCACAPE3C90066	2700	60°C	C3	#
NTCS0402E3472*MT	4700	125°C	C3	2, 4, #
NTCS0402E3103*HT	10000	125°C	C4	2, 4, #
NTCS0402E3103*LT	10000	125°C	C4	2, 4, #
NTCS0402E3103*L1T	10000	125°C	C4	2, 4, #
NTCS0402E3153*HT	15000	125°C	C4	2, 4, #
NTCS0402E3223*MT	22000	125°C	C4	2, 4, #
NTCS0402E3333*MT	33000	125°C	C4	2, 4, #
NTCS0402E3473*XT	47000	125°C	C4	2, 4, #
NTCS0402E3683*HT	68000	125°C	C4	2, 4, #
NTCS0402E3104*HT	100000	125°C	C4	2, 4, #
NTCS0603E3202*LT	2000	125°C	C3	2, 4, #
NTCS0603E3222*MT	2200	125°C	C4	2, 4, #
NTCS0603E3272*MT	2700	125°C	C4	2, 4, #
NTCS0603E3472*HT	4700	125°C	C4	2, 4, #
NTCS0603E3103*HT	10000	125°C	C4	2, 4, #
NTCS0603E3103*LT	10000	125°C	C4	2, 4, #
NTCS0603E3103*MT	10000	125°C	C4	2, 4, #
NTCS0603E3223*MT	22000	125°C	C4	2, 4, #
NTCS0603E3333*HT	33000	125°C	C4	2, 4, #
NTCS0603E3473*HT	47000	125°C	C4	2, 4, #
NTCS0603E3683*HT	68000	125°C	C4	2, 4, #
NTCS0603E3104*XT	100000	125°C	C4	2, 4, #
NTCS0805E3222*MT	2200	125°C	C2	2, 4, #
NTCS0805E3472*MT	4700	125°C	C4	2, 4, #
NTCS0805E3103*HT	10000	125°C	C4	2, 4, #
NTCS0805E3103*LT	10000	125°C	C4	2, 4, #
NTCS0805E3103*MT	10000	125°C	C4	2, 4, #
NTCS0805E3153*MT	15000	125°C	C4	2, 4, #
NTCS0805E3223*HT	22000	125°C	C4	2, 4, #
NTCS0805E3333*HT	33000	125°C	C4	2, 4, #
NTCS0805E3473*HT	47000	125°C	C4	2, 4, #
NTCS0805E3683*XT	68000	125°C	C4	2, 4, #
NTCS0805E3104*MT	100000	125°C	C4	2, 4, #

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NTCS0805E3104*XT	100000	125°C	C4	2, 4, #
NTCS0805E3334*HT	330000	125°C	C4	2, 4, #
NTCS0805E3474*XT	470000	125°C	C4	2, 4, #
NTCS0805E3684*XT	680000	125°C	C4	2, 4, #
NTCLE315E4C91035	11973.4 ±4.4%	125°C	C4	2, 4, #
NTCLE315E4C91036	10000 ±4.25%	125°C	C4	2, 4, #
NTCLE315E4C91037	10300 ±7.44%	125°C	C4	2, 4, #
NTCLE315E4C91038	5000 ±4.48%	125°C	C4	2, 4, #
Note: Calibration Classes for NTC Sensors in Percent Drift				
Note: C1 = ±0.5 / C2 = ±1.0 / C3 = ±2.0 / C4 = ±5.0				

***Note:** x: May be F(±1%), G(±2%), H(±3%), J(±5%) or K(±10%) for resistance tolerance at R25. y: May be 5(±1%), 4(±2%), 6(±3%), 3(±5%) or 2(±10%) for resistance tolerance at R25. May be followed by "A" for NTCS and NTCA models series. Prefix 2381 may be replaced with 2355.

Model No.	Resistance at 25°C (Ohm)	T _{moa} (°C)	Class	CA
NTCALUGwwx103yz, NTCALUGwwx103yz0, NTCALUGwwx103yz1, NTCALUGwwx103yz2, NTCALUG(wwx103yz)(*)	10000	125°C	C4	2, 4 #
NTCALUGwwx103yzL, NTCALUGwwx103yz4, NTCALUGwwx103yz5, NTCALUGwwx103yz6, NTCALUG(wwx103yzL)(*)	10000	125°C	C3	2, 4 #
NTCALUGwwx502yz	5000	125°C	C4	2, 4 #
NTCALUGE2C90169(*)	10000	125	C4	2, 4 #
NTCALUGE2C90226(*)	10000	125	C4	2, 4 #
NTCALUGE3C90570(*)	10000	125	C4	2, 4, #
NTCALUGE3C90634(*)	10000	125	C4	2, 4 #
NTCALUGE4C90935(*)	10000	125	C4	2, 4 #
NTCALUGE2C94(*), NTCALUGE3C94(*), NTCALUGE4C94(*)	10000	125	C4	2, 4 #
NTCALUGE2C95(*), NTCALUGE3C95(*), NTCALUGE4C95(*)	10000	125	C3	2, 4 #
NTCASPEE3C90852 (*)	10000	125	C2	4 #
Note: Calibration Classes for NTC Sensors in Percent Drift.				
Note: C1 = ±0.5 / C2 = ±1.0 / C3 = ±2.0 / C4 = ±5.0.				

Note: Where ww is any number (01, 02, 03, ...) indicating the ring tongue size. x: May be any letter for cable type, insulation, connector and size #AWG. y: May be F(±1%), G(±2%), H(±3%), or J(±5%) for resistance



tolerance at R25. z: May be blank or any number for cable length or a letter (other than "A" or "L") for connector. (*): May be any alpha numeric characters for specific customer specific part numbers L.

Indicate unique Conditions of Acceptability when applicable.

May be followed by "A" for NTCALUGE models series.

NTC sensors, Model NTCASCWE3xxxyzz Series, where xxx may be any number, y may be any letter F, G, H, or J, and zz may be blank, N, L, or LN. See below table for xxx number. May be followed by "A" for NTCASCWE3 models series.

Model No.	Resistance at 25°C (ohm)	T _{moa} (°C)	Class	CA
101	100	100	C4	#
102	1000	100	C4	#
103	10000	100	C4	#
104	100000	100	C3	#
123	12000	100	C4	#
151	150	100	C4	#
152	1500	100	C4	#
153	15000	100	C4	#
154	150000	100	C4	#
202	2000	100	C4	#
221	220	100	C4	#
222	2200	100	C4	#
223	22000	100	C4	#
224	220000	100	C3	#
272	2700	100	C4	#
331	330	100	C4	#
332	3300	100	C4	#
333	33000	100	C4	#
339	33	100	C4	#
471	470	100	C4	#
472	4700	100	C4	#
473	47000	100	C4	#
479	47	100	C4	#
681	680	100	C3	#
682	6800	100	C4	#
683	68000	100	C4	#
689	68	100	C4	#
Note: Calibration Classes for NTC Sensors in Percent Drift.				
Note: C1 = ±0.5 / C2 = ±1.0 / C3 = ±2.0 / C4 = ±5.0.				

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PTC sensors (Surface Mounted Devices)

Model No.	Resistance at 25°C (ohm)	T _{max} (°C)	Class	CA
2381 675 20707	470	85	C3	4
2381 675 20807	470	95	C3	4
2381 675 20907	470	105	C3	4
2381 675 21007	470	115	C3	4
2381 675 21107	470	125	C2	4
2381 675 21207	470	135	C2	4
2381 675 21307	470	145	C2	4
2381 675 21407	470	155	C2	4

Note: Calibration Classes for PTC Sensors in Percent Drift

Note: C1 = ±0.5 / C2 = ±1.0 / C3 = ±2.0 / C4 = ±5.0

Indicates unique Condition of Acceptability.

PTC sensors (Surface Mounted Devices or Leaded)

Model No.	Resistance at 25°C (ohm)	T _{max} (°C)	Class	CA
0603L or L10L Series				
TFPT0603Labc0	100 - 999	150	C4	4
TFPT0603L1001	1000	150	C4	4
TFPTL10Labc0	100 - 999	150	C4	4
TFPTL10L1001	1000	150	C4	4
Where abc can be any value between 100 and 999				
0805L or L15L Series				
TFPT0805Labc0	100 and 390	150	C4	4
TFPT0805Labc0	101 - 389 391 - 999	150	C3	4
TFPT0805Ldef1	1000 - 5000	150	C3	4
TFPTL15Labc0	100 and 390	150	C4	4
TFPTL15Labc0	101 - 389 391 - 999	150	C3	4
TFPTL15Ldef1	1000 - 5000	150	C3	4
Where abc can be any value between 100 and 999, and def can be any value between 100 and 500.				
TFPT0805L5001FM02 (Leaded)	5000	150	C3	4
TFPT0805L5001FM02 (SMD)	5000	125	C3	2, 4
1206L or L20L Series				
TFPT1206Labc0	100 - 999	150	C4	4
TFPT1206Ldef1	1000 - 9999	150	C4	4

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TFPT1206L1002	10000	150	C4	4
TFPTL20Labc0	100 - 999	150	C4	4
TFPTL20Ldef1	1000 - 9999	150	C4	4
TFPTL20L1002	10000	150	C4	4
Where abc can be any value between 100 and 999, and def can be any value between 100 and 999.				
All types may be followed by additional letters and/or numbers.				
Note: Calibration Classes for PTC Sensors in Percent Drift - C1 = ±0.5 / C2 = ±1.0 / C3 = ±2.0 / C4 = ±5.0.				

PTC Motor Starting Subassembly (pellet):

Model No.	Voltage (V)		Current (A)		Class	CA
	Vmax	Vr	Imax	Iss		
307C1014(+)	180	120	12	15	C1	1(190), 4, #
307C1024(+)	400	120	9	8.5	C1	1(175), 4, #
307C1643(+)	200	120	10	15	C1	1(180), 4, #
307C1644(+)	200	120	10	15	C1	1(180), 4, #
307C1650(+)	200	120	10	14	C1	1(175), 4, #
307C1651(+)	200	120	10	14	C1	1(175), 4, #
307C1668(+)	180	120	12	15	C1	1(190), 4, #
307C1024(+)	410	240	10	8.5	C1	1(165), 4, #
307C1409(+)	410	240	8	8.5	C1	1(160), 4, #
307C1410(+)	410	240	6	8.5	C1	1(156), 4, #
307C1682(+)	500	240	18	14	C1	1(160), 4, #
307C1693(+)	500	240	15	14	C1	1(158), 4, #
307C1702(+)	500	240	12	14	C1	1(150), 4, #
307C1674(+)	180	120	10	0.0145	C1	1(155),4,#
	200		12			
307C1700(+)	180	120	10	0.0135	C1	1(155),4,#
	200		12			
307C1711(@)	180	120	10	0.012	C1	1(155),4,#
	200		12			
307C1282(+)	355	240	6	0.015	C1	1(185),4,#
307C1720(+)	320	240	8	0.015	C1	1(180),4,#
307C1282(+)	355	265	6	0.0075	C1	1(167),4,#
307C1292(+)	430	265	4	0.0065	C1	1(167),4,#
307C1399(+)	180	145	10	0.013	C1	1(167),4,#

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307C1411(+)	160	145	12	0.020	C1	1(167),4,#
307C1476(+)	250	145	8.5	0.011	C1	1(167),4,#
307C1484(+)	180	145	12	0.014	C1	1(167),4,#
307C1487(+)	175	145	17	0.016	C1	1(167),4,#
307C1489(+)	230	145	9	0.013	C1	1(167),4,#
307C1529(+)	350	265	8	0.010	C1	1(167),4,#
307C1530(+)	300	265	8	0.010	C1	1(167),4,#
307C1531(+)	400	265	8	0.008	C1	1(167),4,#
307C1533(+)	400	265	5	0.0075	C1	1(167),4,#
307C1544(+)	180	145	12	0.014	C1	1(167),4,#
307C1545(+)	180	145	12	0.014	C1	1(167),4,#
307C1640(+)	380	265	12	0.007	C1	1(167),4,#
307C1740(+)	450	265	7	0.006	C1	1(167),4,#

(+) followed by any alphanumeric suffix.

(@) followed by any alphanumeric suffix, except for the letters B or T.


PTC sensors

Model No.	Resistance at 25°C (k ohm)	Tmax (°C)	Class	CA
PTCSL03T081DxxE	0.07+/-0.05	95	C3	2, 4, #
PTCSL03T091DxxE	0.07+/-0.05	105	C3	2, 4, #
PTCSL03T101DxxE	0.07+/-0.05	115	C3	2, 4, #
PTCSL03T111DxxE	0.07+/-0.05	125	C3	2, 4, #
PTCSL03T121DxxE	0.07+/-0.05	135	C3	2, 4, #
PTCSL03T131DxxE	0.07+/-0.05	145	C3	2, 4, #
PTCSL03T141DxxE	0.07+/-0.05	155	C3	2, 4, #
PTCSL03T151DxxE	0.07+/-0.05	165	C3	2, 4, #

Note: Where xx - May be followed by B1, B2, T1 or T2 for packing code (Bulk or Tape on Reel).

#Unique conditions of acceptability:

1. The acceptability of connections including temperature and secureness, shall be determined in the ultimate application.
2. The device shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.

Marking: Company name, the Recognized Component Mark  and model, catalog or type designation permanently and legibly marked on individual parts or on the smallest shipping container.

Last Updated on 2022-08-09



Thermistor-type Devices - Component

The devices covered under this category are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. THE FINAL ACCEPTANCE OF THE COMPONENT IS DEPENDENT UPON ITS INSTALLATION AND USE IN COMPLETE EQUIPMENT SUBMITTED TO UL.

USE

This category covers thermistor type devices, which exhibit large changes in resistivity corresponding to relatively small changes of temperature. These devices incorporate inorganic or polymeric elements that have positive temperature coefficient (PTC) and negative temperature coefficient (NTC) characteristics. They are intended for use as current limiters, self-limiting heaters or sensors. These products may be applied in electronic circuits, motor windings, transformer windings, heating appliances, and the like.

This category covers discrete thermistor elements, which consist of the sensing pellet, integrated leads and/or coating for environmental protection. Temperature-sensing probes may also be covered under this category and consist of the thermistor pellet/chip encapsulated within an insulated housing with integrated leads. They are generally hermetically sealed to maintain the integrity of the micro-environment of the thermistor.

Ratings — The ratings noted in the individual Recognitions are defined as follows:

- Voltage, maximum (V_{max}) - The maximum voltage of a thermistor as declared by the manufacturer. V_{max} is higher than rated voltage (V_r) when a higher operating voltage occurs under certain conditions in the end-use equipment, such as for motor starting-coil limiters.
- Voltage, rated (V_r) - The input voltage of a thermistor as declared by the manufacturer. V_r is typically equal to the supply source voltage.
- Current, functioning (I_{fun}) or trip (I_t) - For a current-limiting PTC thermistor, the minimum current value declared by the manufacturer at which a PTC thermistor switches from low to high resistance at a specified temperature or temperature range.
- Current, hold (I_h) - The maximum current a current-limiting PTC thermistor is able to maintain in a low-resistance "on" state at rated ambient for a period of time specified by the manufacturer.
- Current, inrush (I_m) - As related to a PTC heater, the peak current measured following energization at rated voltage and at $25 \pm 2^\circ\text{C}$ ($77 \pm 3.6^\circ\text{F}$) or at the manufacturer's specified temperature.
- Current, maximum (I_{max}) - The current value assigned by the manufacturer that complies with all the requirements of the standard. For the various devices, the associated current designated as I_{max} is shown in the table below.

Device	Associated Current Designated I_{max}
PTC heater	Maximum steady-state current
PTC control, motor starting	Maximum start winding current
PTC control, other than motor starting	Maximum trip current
NTC control	Maximum steady-state current
PTC or NTC sensor	Not applicable

- Current, short circuit (I_{sc}) - The maximum current available from the impedance-limited source (such as a power supply).

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- Current, steady-state (I_{ss}) - The current measured after a thermistor's temperature stabilizes in still air at $25 \pm 2^\circ\text{C}$ ($77 \pm 3.6^\circ\text{F}$) ambient or at an ambient specified by the manufacturer, while connected to rated voltage and while operating in its high-resistance state for PTC thermistors or low-resistance state for NTC thermistors. For some NTC thermistors, I_{ss} is the same as I_{max} .
- Temperature, surface (T_s) - The temperature of the surface of a thermistor while the thermistor is energized under normal operating conditions.
- Temperature, maximum operating ambient (T_{moa}) - The maximum operating ambient in which the manufacturer recommends the device be used.

Class — The following classes apply:

Product Type	Property (+)	Class No.			
		C1	C2	C3	C4
PTC heater thermistor	Surface temperature in °C, percent drift	±5	±10	±15	±20
PTC control thermistor	Temperature in °C at the tripped resistance (R_{tr}), percent drift	±5	±10	±15	±20
PTC sensing thermistor	Temperature drift in K for a given resistance	±0.5	±1.0	±2.0	±5.0
NTC inrush-current-limiter thermistor	Temperature in °C for a given resistance, percent drift	±5	±10	±15	±20
NTC sensing thermistor	Temperature drift in K for a given resistance	±0.5	±1.0	±2.0	±5.0

CONDITIONS OF ACCEPTABILITY

Unless specified otherwise in the individual Recognitions, consideration is to be given to the following Conditions of Acceptability when these components are employed in the end-use equipment. The following conditions of use apply when the item number is specified in the last column (CA). The number in parentheses following an item number is used in that Condition of Acceptability statement.

1. These devices have an operating surface temperature of ()°C. Adjacent components and wiring shall be routed accordingly.
2. These devices have been investigated for use in a safety circuit (i.e., are suitable as a limiting device).
3. These devices have been calibrated to limit the current to 8 amps within 5 seconds per ANSI/NFPA 70, "National Electrical Code."
4. The bodies of these components shall be considered live parts.

Unique Conditions of Acceptability are indicated in the individual Recognition Report available from the manufacturer.

RELATED PRODUCTS

PTC motor-starting thermistors provided in a package are covered under Controllers, Refrigeration ([SDFY2](#)) or Motor-starting Relays, Electrically Operated ([XACS2](#)).

PTC heater assemblies provided in a package are covered under Heaters, Specialty ([KSOT2](#)).

PTC control thermistors provided in a package are covered under Miscellaneous Controls ([XACN2](#)).

REQUIREMENTS

The basic standard used to investigate discrete thermistor elements is [UL 1434](#), "Thermistor-Type Devices," or [ANSI/UL 60730-1](#), Annex J, "Automatic Electrical Controls - Part 1: General Requirements."




The basic standards used to investigate packaged thermistors are:

Temperature-sensing probes using NTC/PTC thermistor elements — [ANSI/UL 60730-1](#), "Automatic Electrical Controls - Part 1: General Requirements," and [ANSI/UL 60730-2-9](#), "Automatic Electrical Controls - Part 2-9: Particular Requirements for Temperature Sensing Controls"

PTC motor-starting packaged assemblies — [ANSI/UL 60730-1](#) and [ANSI/UL 60730-2-10](#), "Automatic Electrical Controls for Household and Similar Use - Part 2-10: Particular Requirements for Motor Starting Relays"

PTC control packaged assemblies — [ANSI/UL 60730-1](#)

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Last Updated on 2021-10-21

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