TNC Series

Thick Film NTC Thermistor

Stackpole Electronics, Inc.

Resistive Product Solutions

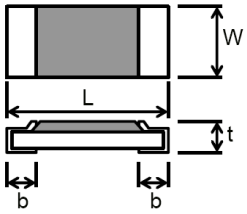
Features:

- High mechanical strength and reliability thick film technology
- Stable part thickness regardless of resistance value
- High solderability and heat resistance
- RoHS compliant, REACH compliant, and halogen free
- AEC-Q200 qualified

Electrical Specifications

Type/Code	Rated Power @ 25°C (mW)	Resistance Tolerance	B-Value Tolerance	Dissipation Factor in Air	Thermal Time Constant in Air	Max Power (mW)
TNC0402	110	± 0.5%, ± 1%, ± 2%, ± 3%, ± 5%, ± 10%	± 0.5%, ± 0.7% ± 1%, ± 2%, ± 3%, ± 5%	≤ 1.5 mW/°C	≤ 5 seconds	5
TNC0603	120					
TNC0805	130					

Mechanical Specifications



Type/Code	L	W	t	b	Unit
TNC0402	0.039 ± 0.002 1.00 ± 0.05	0.020 ± 0.002 0.50 ± 0.05	0.014 ± 0.002 0.35 ± 0.05	0.010 +0.002/-0.004 0.25 +0.05/-0.10	inches mm
TNC0603	0.063 ± 0.006 1.60 ± 0.15	0.031 ± 0.006 0.80 ± 0.15	0.020 ± 0.004 0.50 ± 0.10	0.012 ± 0.008 0.30 ± 0.20	inches mm
TNC0805	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.022 ± 0.004 0.55 ± 0.10	0.016 ± 0.008 0.40 ± 0.20	inches mm

Operating Temperature Range

B-Value	Temperature
≥ 3300K	-40 to +150°C
< 3300K	-40 to +125°C

Standard Resistance Range at 25°C

B-Value at 25°C/85°C	TNC0402	TNC0603	TNC0805
4510 to 4800K	75K to 1M	50K to 2M	25K to 500K
4410 to 4500K	45K to 500K	20K to 1M	15K to 400K
4210 to 4400K	30K to 100K	15K to 200K	10K to 100K
4010 to 4200K	8K to 100K	5K to 200K	3K to 100K
3810 to 4000K	4K to 50K	2K to 100K	1K to 50K
3610 to 3800K	1.5K to 30K	1K to 50K	500 to 30K
3410 to 3600K	1.5K to 30K	1K to 50K	500 to 30K
3210 to 3400K	1.5K to 30K	1K to 50K	500 to 30K
3010 to 3200K	1.2K to 10K	650 to 20K	400 to 10K
2810 to 3000K	750 to 5K	400 to 10K	250 to 5K
2610 to 2800K	270 to 2K	100 to 5K	80 to 2K
2410 to 2600K	150 to 1K	80 to 2K	50 to 1K

B-Value Temperature Range 25°C / 50°C

Size	Part Number	Resistance (25C)	Resistance Tol.	B25/50 Specified	B25/85 (Reference)	B25/100 (Reference)	B-Value Tol.
0402	TNC0402JTD4K70J350	4.7K	5%	3500K	3529K	3538K	5%
	TNC0402FTD10K0F338	10K	1%	3380K	3409K	3418K	1%
	TNC0402FTD47K0F405	47K	1%	4050K	4079K	4088K	1%
0603	TNC0603FTD10K0F338	10K	1%	3380K	3409K	3418K	1%
	TNC0603FTD10K0F391	10K	1%	3910K	3940K	3948K	1%
0805	TNC0805FTD10K0F343	10K	1%	3435K	3464K	3473K	1%
	TNC0805FTD10K0F390	10K	1%	3900K	3928K	3938K	1%
	TNC0805FTD47K0F405	47K	1%	4050K	4079K	4088K	1%

Other resistance values, B-values, and tolerances may be possible. Contact Stackpole for more information.

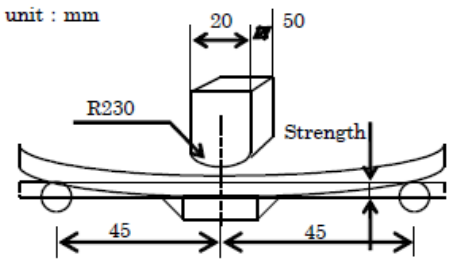
B-Value Temperature Range 25°C / 85°C

Size	Part Number	Resistance (25C)	Resistance Tol.	B25/50 (Reference)	B25/85 Specified	B25/100 (Reference)	B-Value Tol.
0402	TNC0402FTC10K0F343	10K	1%	3406K	3435K	3444K	1%
	TNC0402GTC10K0F345	10K	2%	3421K	3450K	3459K	1%
	TNC0402JTC10K0H405	10K	5%	4021K	4050K	4059K	3%
	TNC0402KTC10K0H343	10K	10%	3406K	3435K	3444K	3%
	TNC0402GTC30K0G395	30K	2%	3920K	3950K	3959K	2%
	TNC0402FTC47K0F405	47K	1%	4021K	4050K	4059K	1%
	TNC0402GTC100KF410	100K	2%	4071K	4100K	4109K	1%
	TNC0402KTC100KH410	100K	10%	4071K	4100K	4109K	3%
0603	TNC0603HTC3K00F399	3K	3%	3962K	3990K	3999K	1%
	TNC0603KTC10K0H343	10K	10%	3406K	3435K	3444K	3%
	TNC0603JTC47K0H450	47K	5%	4438K	4500K	4518K	3%
	TNC0603FTC100KF439	100K	1%	4329K	4390K	4408K	1%
	TNC0603FTC100KF470	100K	1%	4639K	4700K	4718K	1%
0805	TNC0805JTC5K00H343	5K	5%	3406K	3435K	3444K	3%
	TNC0805KTC10K0H343	10K	10%	3406K	3435K	3444K	3%
	TNC0805GTC30K0G395	30K	2%	3920K	3950K	3959K	2%
	TNC0805GTC100KF410	100K	2%	4071K	4100K	4109K	1%
	TNC0805KTC100KH410	100K	10%	4071K	4100K	4109K	3%

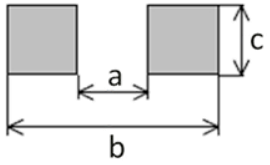
Other resistance values, B-values, and tolerances may be possible. Contact Stackpole for more information.

B-Value Temperature Range 25°C / 100°C							
Size	**Part Number**	**Resistance (25C)**	**Resistance Tol.**	**B25/50 (Reference)**	**B25/85 (Reference)**	**B25/100 Specified**	**B-Value Tol.**
0603	TNC0603FTE100KF410	100K	1%	4062K	4091K	4100K	1%
	TNC0603JTE47K0H448	47K	5%	4402K	4462K	4480K	3%
0805	TNC0805FTE10K0F353	22K	1%	3492K	3521K	3530K	1%
	TNC0805FTE22K0F400	100K	1%	3962K	3991K	4000K	1%

Other resistance values, B-values, and tolerances may be possible. Contact Stackpole for more information.

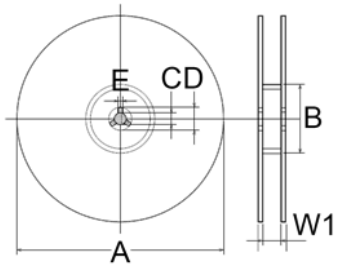
Performance Characteristics		
Test	Test Specification	Test Condition
Resistance to Soldering Heat	Change of resistance: ≤ ± 3% No mechanical damage	Temperature of solder: 260 ± 5°C Immersion time: 10 ± 1 seconds
Solderability	At least 95% of termination covered with new solder	Temperature of solder: 245 ± 5 °C Immersion time: 3 ± 0.5 seconds Preparation: Immersion in flux for 1~2 seconds Flux: rosin: IPA=25 wt%;75 wt% Solder: Sn-3.0Ag-0.5Cu
Bending Strength	Change of resistance: ≤ ± 3% No mechanical damage	Applied bending: 5 mm Holding time: 10 ± 1 seconds Substrate: glass fiber base epoxy resin (t=1.6 mm) 
Vibration	Change of resistance: ≤ ± 3% No mechanical damage	Applied frequency: 10~55~10 Hz/1 minute Amplitude: 1.5 mm in each X, Y, and Z directions Applied time: 2 hours in each X, Y, and Z directions
High Temperature Exposure	Change of resistance: ≤ ± 3% Change of B-Value: ≤ ± 2%	Temperature: 125 ± 3°C Holding time: 1000 + 48/-0 hours
Low Temperature Exposure	Change of resistance: ≤ ± 3% Change of B-Value: ≤ ± 2%	Temperature: -40 ± 3°C Holding time: 1000 + 48/-0 hours
Moisture Resistance	Change of resistance: ≤ ± 3% Change of B-Value: ≤ ± 2%	Temperature: 85 ± 2°C Moisture Resistance: 85 ± 5% RH Holding time: 1000 + 48/-0 hours
Temperature Cycling	Change of resistance: ≤ ± 3% Change of B-Value: ≤ ± 2%	Temperature Cycling to -40 to 125°C, 100 cycles, maximum dwell time 30 minutes
Damp Heat with Load	Change of resistance: ≤ ± 3% Change of B-Value: ≤ ± 2%	Temperature: 85 ± 2°C Moisture Resistance: 85 ± 5% RH Applied power: Max permissible power Holding time: 90 minutes ON, 30 minutes OFF for 1000 +48/-0 hours

Recommended Solder Pad



Type/Code	L	W	t	Unit
TNC0402	0.020 0.50	0.051 1.30	0.020 0.50	inches mm
TNC0603	0.035 0.90	0.102 2.60	0.028 0.70	inches mm
TNC0805	0.053 1.35	0.136 3.45	0.043 1.10	inches mm

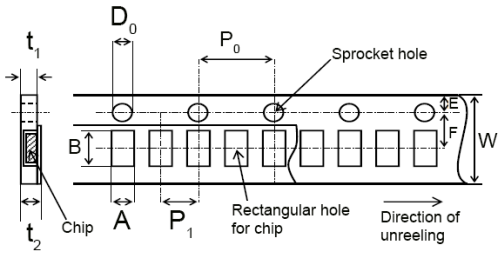
Reel Specifications



Type/Code	Quantity	A	B	C	Unit
TNC0402	10000	7.087 +0.0/-0.118 180.00 +0.0/-3.0	2.362 +0.039/-0.0 60.00 +1.0/-0.0	0.512 ± 0.008 13.00 ± 0.20	inches mm
TNC0603	5000	7.087 +0.0/-0.118 180.00 +0.0/-3.0	2.362 +0.039/-0.0 60.00 +1.0/-0.0	0.512 ± 0.008 13.00 ± 0.20	inches mm
TNC0805	5000	7.087 +0.0/-0.118 180.00 +0.0/-3.0	2.362 +0.039/-0.0 60.00 +1.0/-0.0	0.512 ± 0.008 13.00 ± 0.20	inches mm
Type/Code	Quantity	D	E	W1	Unit
TNC0402	10000	0.827 ± 0.031 21.00 ± 0.80	0.079 ± 0.020 2.00 ± 0.50	0.354 +0.039/-0.0 9.00 +1.0/-0.0	inches mm
TNC0603	5000	0.827 ± 0.031 21.00 ± 0.80	0.079 ± 0.020 2.00 ± 0.50	0.354 +0.039/-0.0 9.00 +1.0/-0.0	inches mm
TNC0805	5000	0.827 ± 0.031 21.00 ± 0.80	0.079 ± 0.020 2.00 ± 0.50	0.354 +0.039/-0.0 9.00 +1.0/-0.0	inches mm

Taping Specifications 0402 - Paper Tape

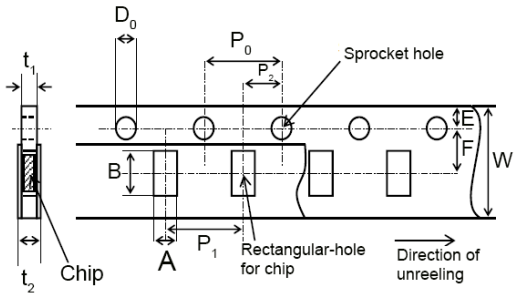
Press Carrier Tape



Type/Code	A	B	W	F	E	Unit
TNC0402	0.026 ± 0.004 0.65 ± 0.10	0.045 ± 0.004 1.15 ± 0.10	0.315 ± 0.008 8.00 ± 0.20	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
	P1	P0	D0	t1	t2	Unit
	0.079 ± 0.002 2.00 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	0.061 ± 0.002 1.55 ± 0.05	0.020 max. 0.50 max.	0.039 max. 1.00 max.	inches mm

Taping Specifications 0603 and 0805 - Paper Tape

Punching Carrier Tape



Type/Code	A	B	W	F	E	P1	Unit
TNC0603	0.043 ± 0.008 1.10 ± 0.20	0.075 ± 0.008 1.90 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	inches mm
TNC0805	0.065 ± 0.008 1.65 ± 0.20	0.094 ± 0.008 2.40 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	inches mm

Type/Code	P2	P0	D0	t1	t2	Unit
TNC0603	0.079 ± 0.002 2.00 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	0.061 ± 0.002 1.55 ± 0.05	0.039 max. 1.00 max.	0.055 max. 1.40 max.	inches mm
TNC0805	0.079 ± 0.002 2.00 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	0.061 ± 0.002 1.55 ± 0.05	0.039 max. 1.00 max.	0.055 max. 1.40 max.	inches mm

RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status

Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition
TNC	Thick Film NTC Thermistor	SMD	YES	100% Matte Sn over Ni

"Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

How to Order

T	N	C	0	4	0	2	F	T	C	1	0	K	0	F	3	2	0

Product Series

Code	Description
TNC	Chip Thermistor NTC

Size

Code
0402
0603
0805

Resistance Tolerance

Code	Tol
D	0.5%
F	1%
G	2%
H	3%
J	5%
K	10%

Packaging

Code	Description	Size	Quantity
T	7" Reel Paper Tape	0402	10000
		0603	5000
		0805	

B-Value Temperature

Code	Description
C	25/85
D	25/50
E	25/100

Nominal Resistance

Four characters with the multiplier used as the decimal holder.

Examples:
100R = 100 ohm
1K00 = 1 Kohm
10K0 = 10 Kohm
1M00 = 1 Mohm

B-Value Tolerance

Code	Tol
D	0.5%
A	0.7%
F	1%
G	2%
H	3%
J	5%

B-Value Code at Specified

First three significant digits of B-value at specified temperature; fourth character is dropped.

Examples:
Code = B-Value
241 = 2410
343 = 3435
391 = 3910
439 = 4390
448 = 4480
480 = 4800