

# GE Sensing

## Features

- Tin plated terminations for soldering
- High sensitivity to changes in temperature
- Wide operating temperature range -58°F to 257°F (-50°C to 125°C)
- Rugged construction
- Available in other material systems
- Available packet taped to EIA RS481
- Palladium silver electrodes with nickel barrier and solder plating (unless specified differently)
- Intended for temperature measurement, control and compensation
- Suitable for standard soldering techniques
- Excellent solderability without “tombstoning”
- Ceramic between electrodes glass coated for improved stability
- Supplied in tape-and-reel packaging

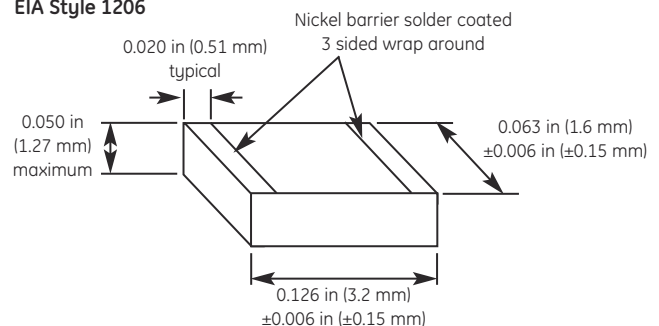
# NTC Type SMD

## Thermometrics Surface Mount Devices

NTC Type SMD is a Thermometrics product. Thermometrics has joined other GE high-technology sensing businesses under a new name—GE Industrial, Sensing.



EIA Style 1206



# Type NB Specification

Nickel barrier SMD chip thermistor 1206/0805 and 0603 size.

## Description

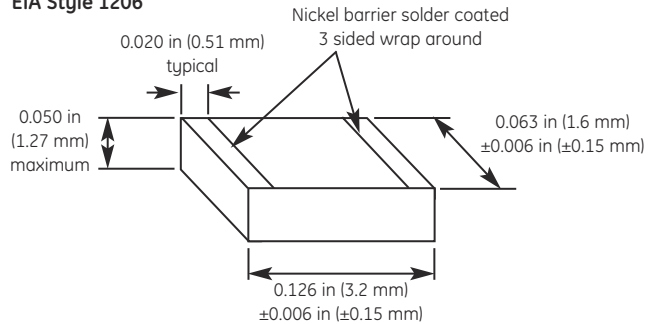
1206, 0805 and 0603 negative temperature coefficient (NTC) ceramic chip thermistors are intended for surface mounting applications. The terminations are solder plated with nickel barrier.

## Options

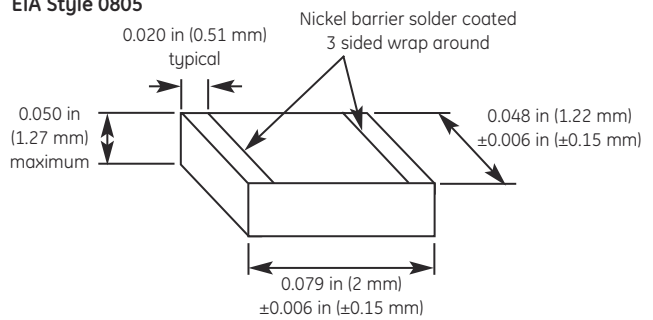
- For reel taping replace suffix "B" with "R" in type number
- Other resistance values in the range 2 K $\Omega$  to 200 K $\Omega$  available
- Other tolerances (K)  $\pm 10\%$  and (H)  $\pm 3\%$  available
- Tolerances at temperatures other than 77°F (25°C) available

Type Number (Bulk Pack)	R@77°F (25°C) ( $\Omega$ )	Material System	TC @ 77°F (25°C) (%/°C)	Beta (25/85) K
NB1206SA103JB	10K	2	-3.89	3540
NB1206SA503JB	50K	5	-4.13	3740
NB1206SB104JB	100K	1	-4.39	3977
NB0805SA103JB	10K	2	-3.89	3540
NB0805SD223JB	22K	2A	-3.99	3627
NB0805SC303JB	30K	5A	-4.11	3730
NB0805SE503JB	50K	5	-4.13	3740
NB0805SB104JB	100K	1	-4.39	3977
NB0603SA103JB	10K	2	-3.89	3540
NB0603SE503JB	50K	5	-4.13	3740
NB0603SB104JB	100K	1	-4.39	3977

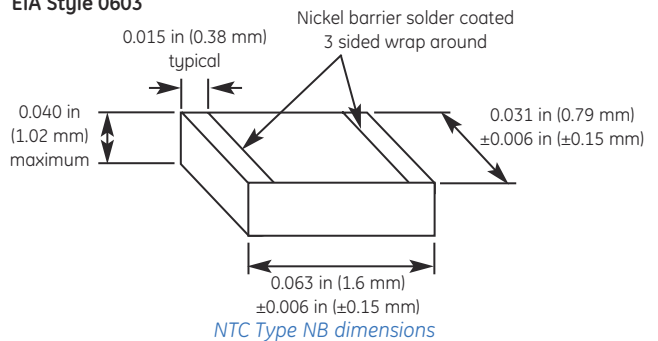
EIA Style 1206



EIA Style 0805



EIA Style 0603



TEMP °F (°C)	RATIO Rt/R25 Nominal Material System				
	1	2	2A	5	5A
-67(-55)	94.57	56.63	61.82	73.35	70.47
-49(-45)	46.67	30.22	32.64	37.53	36.35
-31(-35)	24.11	16.81	17.96	20.08	19.59
-13(-25)	12.99	9.72	10.26	11.20	10.99
5(-15)	7.281	5.816	6.069	6.485	6.398
23(-5)	4.229	3.593	3.708	3.886	3.851
41(5)	2.539	2.286	2.333	2.403	2.390
59(15)	1.571	1.493	1.508	1.530	1.526
77(25)	1.0000	1.0000	1.0000	1.0000	1.0000
95(35)	0.6530	0.6849	0.6785	0.6698	0.6710
113(45)	0.4367	0.4789	0.4702	0.4587	0.4603
131(55)	0.2985	0.3414	0.3324	0.3208	0.3222
149(65)	0.2082	0.2477	0.2393	0.2286	0.2298
167(75)	0.1480	0.1827	0.1752	0.1658	0.1667
185(85)	0.10700	0.13682	0.13029	0.12228	0.12297
203(95)	0.07864	0.10392	0.09832	0.09154	0.09204
221(105)	0.05868	0.07998	0.07521	0.06950	0.06986
239(115)	0.04439	0.06231	0.05826	0.05346	0.05371
257(125)	0.03403	0.04911	0.04567	0.04163	0.04180

# Type NC08 Specification

SMD chip thermistor 0805 size.

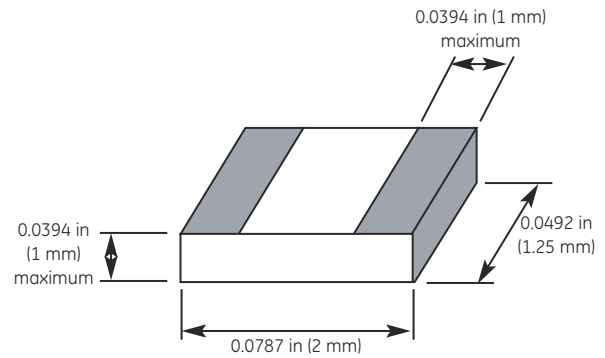
## Description

0805 size surface mount ceramic thermistor with palladium silver terminations.

## Options

- Other resistances in the range 1 k $\Omega$  to 750 k $\Omega$
- Tolerances at other temperatures
- For reel taping replace 'B' with 'R'
- Other tolerances, 5% (J) and 3% (H) available

Type Number	R@77°F 25°C ( $\Omega$ )	Material System	TC (%/C)	Beta (25/85) K
NC0805KA502KB	5K	D8.5	-4.23	3770K
NC0805KH103KB	10K	C9.7	-4.61	4040K
NC0805KB223KB	22K	D9.5	-4.43	3970K
NC0805KB303KB	30K	D9.5	-4.43	3970K
NC0805KC503KB	50K	D9.7A	-4.39	3970K
NC0805KD104KB	100K	D10.3	-4.49	4070K
NC0805KE154KB	150K	D12.2	-4.78	4350K
NC0805KE204KB	200K	D12.2	-4.78	4350K
NC0805KS304KB	300K	GE9.7B	-4.32	3950K



NTC Type NC08 dimensions

## Data

- Standard resistance tolerance:  $\pm 10\%$  @ 77°F (25°C)
- Dissipation constant: 3.5 mW/°C
- Time constant: 10 seconds
- Operating range: -58°F to 302°F (-50°C to 150°C)

# Type NHQ Specification

Surface mount chip 1206 size

## Description

A range of 1206 size surface mount NTC chip thermistors. The terminations are nickel barrier with solder plating.

## General

### Soldering Recommendations

- Maximum storage time in closed package: One year
- Maximum storage time exposed to ambient conditions of 59°F to 86°F (15°C to 30°C), 15% to 70% RH: 30 days
- Drying prior to soldering: Not to exceed 48h at 176°F (80°C) or 16h at 212°F (100°C) or 8h at 257°F (125°C)
- Flux type: R or RMA

### Flow Soldering Conditions

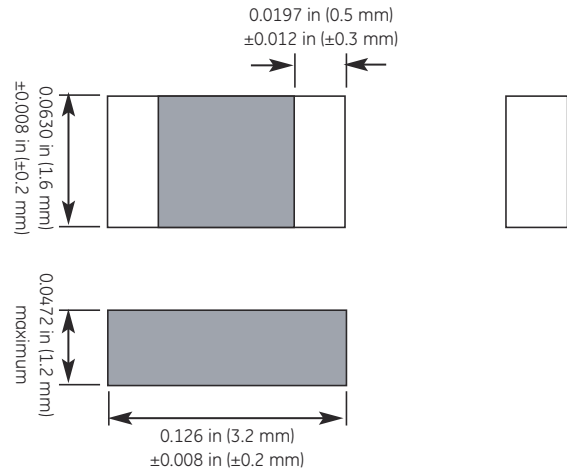
- Preheat temperature: 176°F to 302°F (80°C to 150°C)
- Maximum rate of temperature change: 4.5°F/s or 2.5°C/s
- Maximum solder temperature: 509°F (265°C)
- Maximum dwell time: 10 seconds
- Cooling in ambient or air flow of 5m/s

### Reflow Soldering Conditions

- Method infrared, hot gas, vapor
- Maximum rate of preheat temperature change: 4.5°F/s or 2.5°C/s
- Maximum temperature: 437°F (225°C)
- Maximum time above: 392°F (200°C) 30 seconds
- Maximum radiant flux: (0.1 to 100 W/μ) 5 W/cm<sup>2</sup>
- Maximum hot air temperature: 527°F (275°C) at 4 m/s
- Maximum vapor temperature: 419°F (215°C)
- Maximum rate of cooling: 4.5°F/s or 2.5°C/s

### Cleaning

Ultrasonic cleaning in methanol or isopropanol not exceeding 40 kHz for 5 minutes, or aqueous cleaning not exceeding 158°F (70°C) for 7 minutes (recommended).



NTC Type NHQ outline drawing

Code	R25 Ω	B (25/85) K
NHQ101B280R5	100	2800
NHQ501B325R5	500	3250
NHQ801B325R5	800	3250
NHQ102B325R5	1000	3250
NHQ152B345R5	1500	3450
NHQ202B410R5	2000	4100
NHQ222B410R5	2200	4100
NHQ252B410R5	2500	4100
NHQ272B410R5	2700	4100
NHQ302B410R5	3000	4100
NHQ472B355R5	4700	3550
NHQ502B355R5	5000	3550
NHQ103B375R5	10000	3750
NHQ153B400R5	15000	4000
NHQ203B400R5	20000	4000
NHQ223B400R5	22000	4000
NHQ303B400R5	30000	4000
NHQ333B400R5	33000	4000
NHQ473B400R5	47000	4000
NHQ503B400R5	50000	4000
NHQ104B425R5	100000	4250
NHQ154B425R5	150000	4250
NHQ304B435R5	300000	4350
NHQ474B435R5	470000	4350
NHQ504B435R5	500000	4350

## Data

- Resistance tolerance at 77°F (25°C) ±5%; for ±10% replace R5 by R10 in code.
- Tolerance on B value ±200 K
- Minimum temperature: -40°F (-40°C)
- Maximum temperature: 257°F (125°C)
- Dissipation factor: 3 mW/K
- Time constant: 8 seconds maximum

# Type NHQM Specification

Surface mount chip 0805 size

## Description

A range of 0805 size surface mount NTC chip thermistors. The terminations are nickel barrier with solder plating.

## General

### Soldering Recommendations

- Maximum storage time in closed package: One year
- Maximum storage time exposed to ambient conditions of 59°F to 86°F (15°C to 30°C), 15% to 70% RH: 30 days
- Drying prior to soldering: Not to exceed 48h at 176°F (80°C) or 16h at 212°F (100°C) or 8h at 257°F (125°C)
- Flux type: R or RMA

### Flow Soldering Conditions

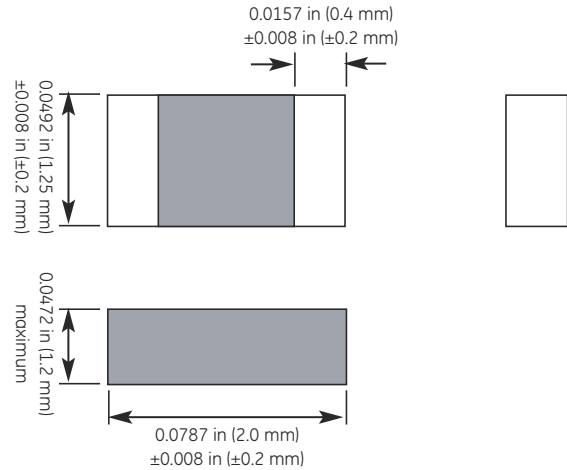
- Preheat temperature: 176°F to 302°F (80°C to 150°C)
- Maximum rate of temperature change: 4.5°F/s or 2.5°C/s
- Maximum solder temperature: 509°F (265°C)
- Maximum dwell time: 10 seconds
- Cooling in ambient or air flow of 5m/s

### Reflow Soldering Conditions

- Method infrared, hot gas, vapor
- Maximum rate of preheat temperature change: 4.5°F/s or 2.5°C/s
- Maximum temperature: 437°F (225°C)
- Maximum time above: 392°F (200°C) 30 seconds
- Maximum radiant flux: (0.1 to 100 W $\mu$ ) 5 W/cm<sup>2</sup>
- Maximum hot air temperature: 527°F (275°C) at 4 m/s
- Maximum vapor temperature: 419°F (215°C)
- Maximum rate of cooling: 4.5°F/s or 2.5°C/s

### Cleaning

Ultrasonic cleaning in methanol or isopropanol not exceeding 40 kHz for 5 minutes, or aqueous cleaning not exceeding 158°F (70°C) for 7 minutes (recommended).



NTC Type NHQM outline drawing

Code	R25 $\Omega$	B (25/85) K
NHQM400B280R5	40	2800
NHQM800B280R5	80	2800
NHQM101B280R5	100	2800
NHQM221B310R5	220	3100
NHQM471B325R5	470	3250
NHQM501B325R5	500	3250
NHQM801B325R5	800	3250
NHQM102B325R5	1000	3250
NHQM152B345R5	1500	3450
NHQM202B410R5	2000	4100
NHQM252B410R5	2500	4100
NHQM272B410R5	2700	4100
NHQM302B410R5	3000	4100
NHQM472B355R5	4700	3550
NHQM502B355R5	5000	3550
NHQM682B375R5	6800	3750
NHQM103B375R5	10000	3750
NHQM153B400R5	15000	4000
NHQM203B400R5	20000	4000
NHQM223B400R5	22000	4000
NHQM273B400R5	27000	4000
NHQM303B400R5	30000	4000
NHQM333B400R5	33000	4000
NHQM473B415R5	47000	4150
NHQM503B415R5	50000	4150
NHQM104B425R5	100000	4250
NHQM154B425R5	150000	4250
NHQM304B425R5	300000	4250
NHQM474B435R5	470000	4350
NHQM504B435R5	500000	4350

## Data

- Resistance tolerance at 77°F (25°C)  $\pm 5\%$ ; for  $\pm 10\%$  replace R5 by R10 in code.
- Tolerance on B value  $\pm 200$  K
- Minimum temperature: -40°F (-40°C)
- Maximum temperature: 257°F (125°C)
- Dissipation factor: 1.5 mW/K
- Time constant: 5 seconds maximum

# Type NHQMM Specification

Surface mount chip 0603 size

## Description

A range of 0603 size surface mount NTC chip thermistors. The terminations are nickel barrier with solder plating.

## General

### Soldering Recommendations

- Maximum storage time in closed package: One year
- Maximum storage time exposed to ambient conditions of 59°F to 86°F (15°C to 30°C), 15% to 70% RH: 30 days
- Drying prior to soldering: Not to exceed 48h at 176°F (80°C) or 16h at 212°F (100°C) or 8h at 257°F (125°C)
- Flux type: R or RMA

### Flow Soldering Conditions

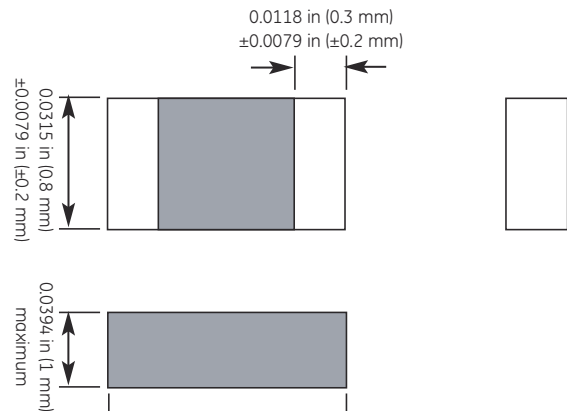
- Preheat temperature: 176°F to 302°F (80°C to 150°C)
- Maximum rate of temperature change: 4.5°F/s or 2.5°C/s
- Maximum solder temperature: 509°F (265°C)
- Maximum dwell time: 10 seconds
- Cooling in ambient or air flow of 5m/s

### Reflow Soldering Conditions

- Method infrared, hot gas, vapor
- Maximum rate of preheat temperature change: 4.5°F/s or 2.5°C/s
- Maximum temperature: 437°F (225°C)
- Maximum time above: 392°F (200°C) 30 seconds
- Maximum radiant flux: (0.1 to 100 W $\mu$ ) 5 W/cm<sup>2</sup>
- Maximum hot air temperature: 527°F (275°C) at 4 m/s
- Maximum vapor temperature: 419°F (215°C)
- Maximum rate of cooling: 4.5°F/s or 2.5°C/s

### Cleaning

Ultrasonic cleaning in methanol or isopropanol not exceeding 40 kHz for 5 minutes, or aqueous cleaning not exceeding 158°F (70°C) for 7 minutes (recommended).



*NTC Type NHQMM outline drawing*

Code	R25 $\Omega$	B (25/85) K
NHQMM300B275R5	30	2750
NHQMM400B280R5	40	2800
NHQMM680B280R5	68	2800
NHQMM800B280R5	80	2800
NHQMM101B280R5	100	2800
NHQMM471B320R5	470	3200
NHQMM501B320R5	500	3200
NHQMM102B325R5	1000	3250
NHQMM152B345R5	1500	3450
NHQMM202B410R5	2000	4100
NHQMM222B410R5	2200	4100
NHQMM252B410R5	2500	4100
NHQMM302B410R5	3000	4100
NHQMM332B410R5	3300	4100
NHQMM472B355R5	4700	3550
NHQMM502B355R5	5000	3550
NHQMM682B355R5	6800	3550
NHQMM103B375R5	10000	3750
NHQMM153B380R5	15000	3800
NHQMM203B380R5	20000	3800
NHQMM223B380R5	22000	3800
NHQMM303B400R5	30000	4000
NHQMM333B400R5	33000	4000
NHQMM473B400R5	47000	4000
NHQMM503B400R5	50000	4000
NHQMM683B400R5	68000	4000
NHQMM104B415R5	100000	4150
NHQMM154B425R5	150000	4250
NHQMM204B425R5	200000	4250

## Data

- Resistance tolerance at 77°F (25°C)  $\pm 5\%$ ; for  $\pm 10\%$  replace R5 by R10 in code.
- Tolerance on B value  $\pm 200$  K
- Minimum temperature: -40°F (-40°C)
- Maximum temperature: 257°F (125°C)
- Dissipation factor: 1.2 mW/K
- Time constant: 4 seconds maximum

# Type NHQT Specification

Surface mount chip 0402 size

## Description

A range of 0402 size surface mount NTC chip thermistors. The terminations are nickel barrier with solder plating.

## General

### Soldering Recommendations

- Maximum storage time in closed package: One year
- Maximum storage time exposed to ambient conditions of 59°F to 86°F (15°C to 30°C), 15% to 70% RH: 30 days
- Drying prior to soldering: Not to exceed 48h at 176°F (80°C) or 16h at 212°F (100°C) or 8h at 257°F (125°C)
- Flux type: R or RMA

### Flow Soldering Conditions

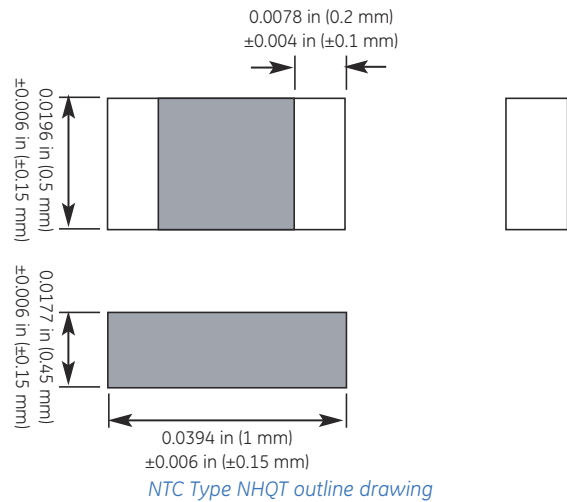
- Preheat temperature: 176°F to 302°F (80°C to 150°C)
- Maximum rate of temperature change: 4.5°F/s or 2.5°C/s
- Maximum solder temperature: 509°F (265°C)
- Maximum dwell time: 10 seconds
- Cooling in ambient or air flow of 5m/s

### Reflow Soldering Conditions

- Method infrared, hot gas, vapor
- Maximum rate of preheat temperature change: 4.5°F/s or 2.5°C/s
- Maximum temperature: 437°F (225°C)
- Maximum time above: 392°F (200°C) 30 seconds
- Maximum radiant flux: (0.1 to 100 W/μ) 5 W/cm<sup>2</sup>
- Maximum hot air temperature: 527°F (275°C) at 4 m/s
- Maximum vapor temperature: 419°F (215°C)
- Maximum rate of cooling: 4.5°F/s or 2.5°C/s

### Cleaning

Ultrasonic cleaning in methanol or isopropanol not exceeding 40 kHz for 5 minutes, or aqueous cleaning not exceeding 158°F (70°C) for 7 minutes (recommended).



Code	R25 Ω	B (25/85) K
NHQT400B285R5	40	2850
NHQT500B285R5	50	2850
NHQT600B285R5	60	2850
NHQT101B285R5	100	2850
NHQT151B285R5	150	2850
NHQT102B330R5	1000	3300
NHQT202B410R5	2000	4100
NHQT252B410R5	2500	4100
NHQT302B410R5	3000	4100
NHQT332B410R5	3300	4100
NHQT352B410R5	3500	4100
NHQT402B410R5	4000	4100
NHQT652B410R5	6500	4100
NHQT153B380R5	15000	3800
NHQT203B380R5	20000	3800
NHQT223B380R5	22000	3800
NHQT303B400R5	30000	4000
NHQT473B400R5	47000	4000
NHQT683B400R5	68000	4000
NHQT104B425R5	100000	4250
NHQT154B425R5	150000	4250
NHQT204B425R5	200000	4250

## Data

- Resistance tolerance at 77°F (25°C) ±5%; for ±10% replace R5 by R10 in code.
- Tolerance on B value ±200 K
- Minimum temperature: -40°F (-40°C)
- Maximum temperature: 257°F (125°C)
- Dissipation factor: 1.5 mW/K
- Time constant: 4 seconds maximum

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