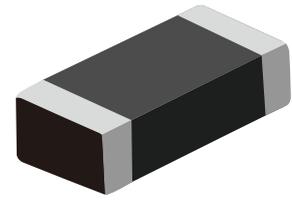


FEATURES

- | Small size, large power, strong capacity of suppression of inrush current
- | Fast response
- | Large material constant(B value), small residual resistance
- | Long service life and high reliability
- | Complete series, wide applications



0603

APPLICATIONS

- | Switching power-supply,switch power, ups power
- | Monitor, Sps, Fax, Telecom, Adaptor etc.
- | All kinds of RT, display
- | Bulb and other lighting lamps

APPROVALS

RoHS	Compliance with 2011/65/EU
HF	Compliance with IEC61249-2-21:2003

PRODUCT IDENTIFICATION(PART NUMBER)

SND	—	CMFA	474	F	4050	F	B
①	②	③	④	⑤	⑥	⑦	⑧

①Code		②Type		③External Dimensions (L×W×T)(mm)		④Nominal Zero-Power Resistance	
SND	Logo	-	Delimiter	0402[CMFD]	1.00×0.50×0.50	472	4.7kΩ
				0603[CMFA]	1.60×0.80×0.80	103	10kΩ
				0805[CMFB]	2.00×1.25×0.85	154	150kΩ
				1206[CMFC]	3.20×1.60×0.85	474	470kΩ

⑤Tolerance of Resistance		⑥B Constant		⑦Tolerance of B Constant		⑧B constant calculation method	
F	±1%	3380	3380K	F	±1%	A	25°C&85°C
G	±2%	3950	3950K	H	±3%	B	25°C&50°C
H	±3%	4050	4050K				
J	±5%	4500	4500K				

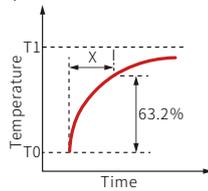
ELECTRICAL CHARACTERISTICS

Part Number	Resistance (25°C) (kΩ)	B Constant (25/50°C) (K)	Permissible Operating Current (25°C) (mA)	Dissipation Factor (mW/°C)	Thermal Time Constant (s)	Rated Electric Power(25°C) (mW)	Operating ambient temperature (°C)
SND-CMFA474F4050FB	470±1%	4050±1%	0.04	1.0	<5	100	-40~+125

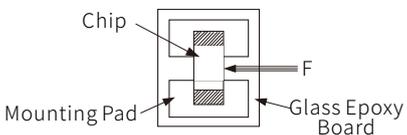
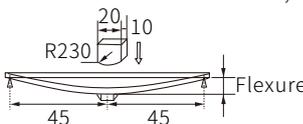
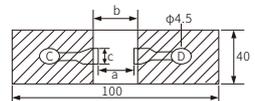
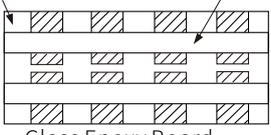
TEST AND MEASUREMENT PROCEDURES

Test Conditions	Inspection Equipment
Unless otherwise specified, the standard atmospheric conditions for measurement/test as: a. Ambient Temperature: 20±15°C b. Relative Humidity: 65±20% c. Air Pressure: 86kPa to 106kPa	Visual Examination: 20× magnifier Resistance value test: Thermistor resistance tester
If any doubt on the results, measurements/tests should be made within the following limits: a. Ambient Temperature: 25±2°C b. Relative Humidity: 65±5% c. Air Pressure: 86kPa to 106kPa	

ELECTRICAL TEST

No.	Items	Test Methods and Remarks
1	Nominal Zero-Power Resistance at 25°C(R25)	Ambient temperature: 25±0.05°C Measuring electric power: ≤0.1mW
2	Nominal B Constant	Measure the resistance at the ambient temperature of 25±0.05°C, 50±0.05°C or, 85±0.05°C. $B(25-50^{\circ}\text{C}) = \frac{\ln R_{25} - \ln R_{50}}{1/T_{25} - 1/T_{50}} \quad B(25-85^{\circ}\text{C}) = \frac{\ln R_{25} - \ln R_{85}}{1/T_{25} - 1/T_{85}}$ T: Absolute temperature (K)
3	Thermal Time Constant	The total time for the temperature of the thermistor to change by 63.2% of the difference from ambient temperature T0 (°C) to T1 (°C) by the drastic change of the power applied to thermistor from Non-zero Power to Zero-Power state, normally expressed in second(S). 
4	Dissipation Factor	The required power which makes the NTC thermistor body temperature raise 1°C through self-heated, normally expressed in milliwatts per degree Celsius (mW/°C). It can be calculated by the following formula: $\delta = \frac{W}{T - T_0}$
5	Rated Power	The necessary electric power makes thermistor's temperature rise 100°C by self-heating at ambient temperature 25°C
6	Permissible operating current	The current that keep body temperature of chip NTC on the PC board in still air rising 1°C by self-heating.

RELIABILITY TEST

Items	Standard	Test Methods and Remarks	Requirements																														
Terminal Strength	IEC 60068-2-21	Solder the chip to the testing jig (glass epoxy board shown in the right) using eutectic solder. Then apply a force in the direction of the arrow. <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Size</th> <th>F</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>0201,0402,0603</td> <td>5N</td> <td rowspan="2">10±1s</td> </tr> <tr> <td>0805</td> <td>10N</td> </tr> </tbody> </table>	Size	F	Duration	0201,0402,0603	5N	10±1s	0805	10N	No removal or split of the termination or other defects shall occur. 																						
Size	F	Duration																															
0201,0402,0603	5N	10±1s																															
0805	10N																																
Resistance to Flexure	IEC 60068-2-21	Solder the chip to the test jig (glass epoxy board shown in the right) using a eutectic solder. Then apply a force in the direction shown as follow;  <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Size</th> <th>Flexure</th> <th>Pressurizing Speed</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>0201</td> <td>1mm</td> <td rowspan="2"><0.5mm/s</td> <td rowspan="2">10±1s</td> </tr> <tr> <td>0402,0603,0805</td> <td>2mm</td> </tr> </tbody> </table>	Size	Flexure	Pressurizing Speed	Duration	0201	1mm	<0.5mm/s	10±1s	0402,0603,0805	2mm	① No visible damage ② $ \Delta R_{25}/R_{25} \leq 5\%$ <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Type</th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>0201</td> <td>0.25</td> <td>0.3</td> <td>0.3</td> </tr> <tr> <td>0402</td> <td>0.4</td> <td>1.5</td> <td>0.5</td> </tr> <tr> <td>0603</td> <td>1.0</td> <td>3.0</td> <td>1.2</td> </tr> <tr> <td>0805</td> <td>1.2</td> <td>4.0</td> <td>1.65</td> </tr> </tbody> </table> 	Type	a	b	c	0201	0.25	0.3	0.3	0402	0.4	1.5	0.5	0603	1.0	3.0	1.2	0805	1.2	4.0	1.65
Size	Flexure	Pressurizing Speed	Duration																														
0201	1mm	<0.5mm/s	10±1s																														
0402,0603,0805	2mm																																
Type	a	b	c																														
0201	0.25	0.3	0.3																														
0402	0.4	1.5	0.5																														
0603	1.0	3.0	1.2																														
0805	1.2	4.0	1.65																														
Vibration	IEC 60068-2-80	① Solder the chip to the testing jig (glass epoxy board shown in the left) using eutectic solder ② The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz ③ The frequency ranges from 10 to 55 Hz and return to 10 Hz shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total of 6 hours).	No visible damage 																														
Dropping	IEC 60068-2-32	Drop a chip 10 times on a concrete floor from a height of 1 meter	No visible damage.																														
Solderability	IEC 60068-2-58	① Solder temperature: 245±5°C ② Duration: 3±0.3s ③ Solder: Sn/3.0Ag/0.5Cu. ④ 25% Resin and 75% ethanol in weight	① No visible damage. ② Wetting shall exceed 95% coverage.																														
Resistance to Soldering Heat	IEC 60068-2-58	① Solder temperature: 260±5°C ② Duration: 10±1s ③ Solder: Sn/3.0Ag/0.5Cu. ④ 25% Resin and 75% ethanol in weight ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.	① No visible damage ② $ \Delta R_{25}/R_{25} \leq 5\%$ ③ $ \Delta B/B \leq 2\%$																														
Temperature cycling	IEC 60068-2-14	5 cycles of following sequence without loading <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±5°C</td> <td>30±3min</td> </tr> <tr> <td>2</td> <td>25±2°C</td> <td>5±3min</td> </tr> <tr> <td>3</td> <td>125±2°C</td> <td>30±3min</td> </tr> <tr> <td>4</td> <td>25±2°C</td> <td>5±3min</td> </tr> </tbody> </table> The chip shall be stabilized at normal condition for 1~2 hours before measuring	Step	Temperature	Time	1	-40±5°C	30±3min	2	25±2°C	5±3min	3	125±2°C	30±3min	4	25±2°C	5±3min	① No visible damage ② $ \Delta R_{25}/R_{25} \leq 3\%$ ③ $ \Delta B/B \leq 2\%$															
Step	Temperature	Time																															
1	-40±5°C	30±3min																															
2	25±2°C	5±3min																															
3	125±2°C	30±3min																															
4	25±2°C	5±3min																															
Resistance to dry heat	IEC 60068-2-2	① 125±5°C in air, for 1000±24 hours without loading. ② The chip shall be stabilized at normal condition for 1~2 hours before measuring	① No visible damage ② $ \Delta R_{25}/R_{25} \leq 5\%$ ③ $ \Delta B/B \leq 2\%$																														

Items	Standard	Test Methods and Remarks	Requirements
Resistance to cold	IEC 60068-2-1	① $-40 \pm 3^{\circ}\text{C}$ in air, for 1000 ± 24 hours without loading. ② The chip shall be stabilized at normal condition for 1~2 hours before measuring.	① No visible damage ② $ \Delta R25/R25 \leq 5\%$ ③ $ \Delta B/B \leq 2\%$
Resistance to damp heat	IEC 60068-2-78	① $40 \pm 2^{\circ}\text{C}$, 90~95%RH in air, for 1000 ± 24 hours without loading. ② The chip shall be stabilized at normal condition for 1~2 hours before measuring	① No visible damage ② $ \Delta R25/R25 \leq 3\%$ ③ $ \Delta B/B \leq 2\%$
Resistance to high temperature load	IEC 60539-1 5.25.4	① $85 \pm 2^{\circ}\text{C}$ in air with permissive operating current for 1000 ± 48 hours ② The chip shall be stabilized at normal condition for 1~2 hours before measuring	① No visible damage ② $ \Delta R25/R25 \leq 5\%$ ③ $ \Delta B/B \leq 2\%$

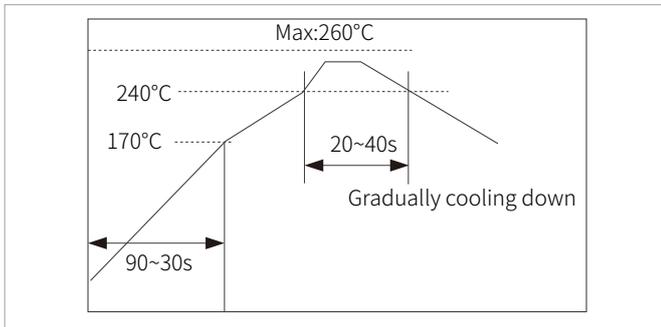
STORAGE

Storage Conditions	
a. Storage Temperature: $-10^{\circ}\text{C} \sim 40^{\circ}\text{C}$	b. Relative Humidity: $\leq 75\% \text{RH}$
c. Keep away from corrosive atmosphere and sunlight	
Period of Storage: 6 Months after delivery	

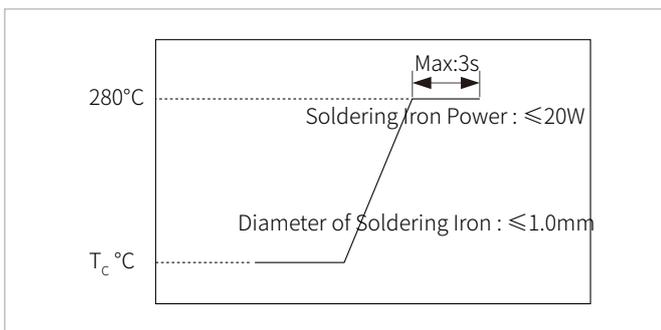
NOTES & WARNINGS

The SND series thermistors shall not be operated and stored under the following environmental condition:	
(1) Corrosive or deoxidized atmospheres (such as chlorine, sulfurated hydrogen, ammonia, sulfuric acid, nitric oxide and so on)	(2) Volatile or inflammable atmospheres
(3) Dusty condition	(4) Excessively high or low pressure condition
(5) Humid site	(6) Places with brine, oil, chemical liquid or organic solvent
(7) Intense vibration	(8) Places with analogously deleterious conditions
The ceramic body of the SND series thermistors is fragile, no excessive pressure or impact shall be exerted on it.	
The SND series thermistors shall not be operated beyond the specified "Operating Temperature Range" in the catalog.	

RECOMMENDED SOLDERING TECHNOLOGIES



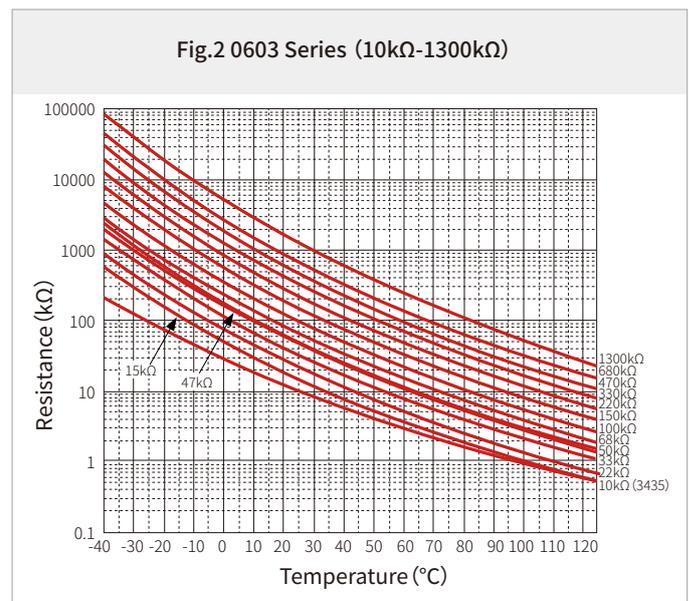
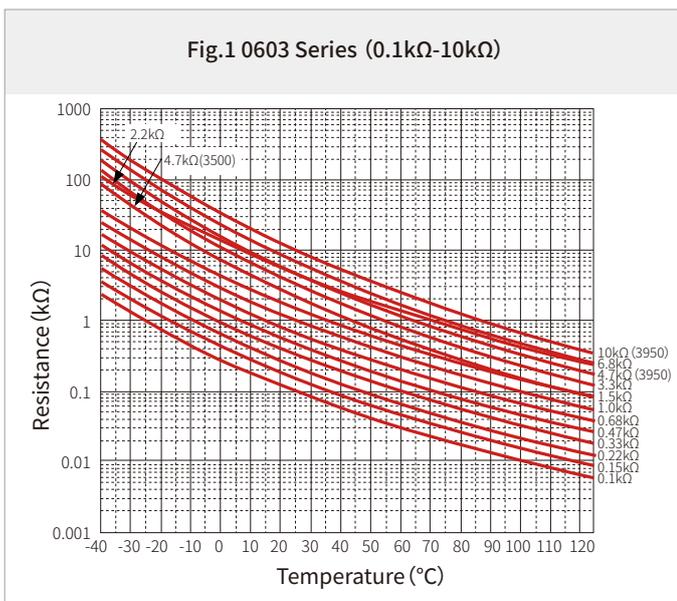
Re-flowing Profile
1~2°C/sec. Ramp
Pre-heating: 150~170°C/90±30 sec.
Time above 240°C: 20~40 sec.
Peak temperature: 260°CMax./10 sec.
Solder paste: Sn/3.0Ag/0.5Cu
Max.2 times for re-flowing



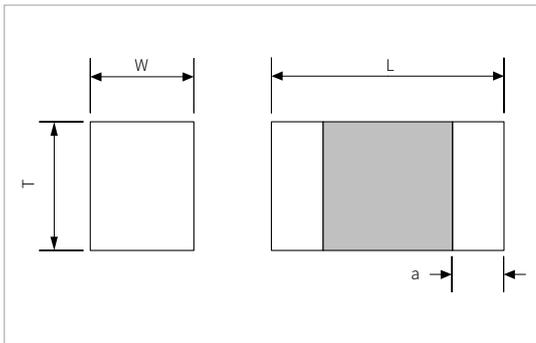
Iron Soldering Profile
Iron soldering power: Max.20W
Pre-heating: 150°C/60sec.
Soldering Tip temperature: 280°CMax.
Soldering time: 3 sec Max.
Solder paste: Sn/3.0Ag/0.5Cu
Max.1 times for iron soldering

Note: Take care not to apply the tip of the soldering iron to the terminal electrodes

CHARACTERISTIC CURVES

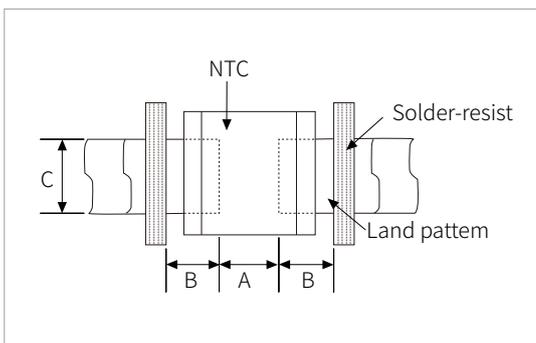


DIMENSION SPECIFICATION



Size	L(mm)	W(mm)	T(mm)	a(mm)
0603	0.063 ± 0.006	0.031 ± 0.006	0.031 ± 0.006	0.012 ± 0.008
[1608]	$[1.6 \pm 0.15]$	$[0.8 \pm 0.15]$	$[0.8 \pm 0.15]$	$[0.3 \pm 0.2]$

DIMENSION SPECIFICATION



A(mm)	B(mm)	C(mm)
$[0.6-0.8]$	$[0.6-0.7]$	$[0.6-0.8]$

TAPING

Type	0201	0402	0603	0805
Tape thickness(mm)	0.5 ± 0.15	0.5 ± 0.15	0.8 ± 0.15	0.85 ± 0.2
Tape material	Paper Tape			
Quantity per Reel	15K	10K	4K	4K

Headquarters

No.3387 Shendu Road
Pujiang I&E Park
Minhang Shanghai China
201000

Hotline

400-021-5756

Web

<https://www.semiware.com>

Sales Center

Tel: 86-21-3463-7458
Email: sales18@semiware.com

Customer Service

Tel: 86-21-5484-1001
Email: sales17@semiware.com

Technical Support

Tel: 86-21-3463-7654
Email: fae01@semiware.com

Complaint & Suggestions

Tel: 86-21-3463-7172
Ext: 8868
Email: cs03@semiware.com

By QR Code

Website



Wechat

To find your local partner within Semiware's global website: www.semiware.com

© 2022 Semiware Semiconductor Inc.

The content of this document has been carefully checked and understood. However, neither Semiware nor its subsidiaries assume any liability whatsoever for any errors or inaccuracies of this document and the consequences thereof. Published specifications are subject to change without notice. Product suitability for any area of application must ultimately be determined by the customer. In all cases, products must never be operated outside their published specifications. Semiware does not guarantee the availability of all published products. This disclaimer shall be governed by substantive Chinese law and resulting disputes shall be settled by the courts at the place of business of Semiware. Latest publications and a complete disclaimer can be downloaded from the Semiware website. All trademarks recognized.