NCSQ Series

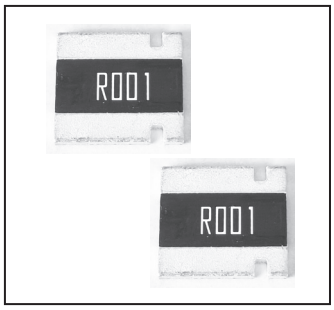
Automotive Current Sensing Chip Resistor

AEC-Q200 QUALIFIED | 9001:2015 CERTIFIED | ROHS/REACH COMPLIANT HALOGEN FREE

NIC Components Corp.

FEATURES

- LOW INDUCTANCE (≤5nH)
- 0.5mΩ ~ 8.0mΩ RESISTANCE RANGE
- RESISTOR TOLERANCES DOWN TO ±0.5%
- LOW TCR OPTIONS DOWN TO ≤±50 PPM/°C
- HIGH POWER CAPABILITY
- AEC-Q200 QUALIFIED AVAILABLE
- OPERATING TEMPERATURE UP TO 170°C
- POWER RATINGS UP TO 5.0 WATT
- LOW EMF (< 3 mV/°C)



SPECIFICATIONS

Type	EIA Size	Power Rating & Code At 70°C	TCR (PPM/°C) See Note #1	Element TCR (PPM/°C) See Note #2	Max.*1 Current Rating	Max.*2 Overload Current	Resistance Range 0.5% (D), 1% (F) 2% (G), 5% (J)	Temperature Range
NCSQ3637	3637	3W	≤±50ppm	0.5mΩ ≤±10ppm 0.75mΩ ~ 8.0mΩ ≤±30ppm	77.46	173.21	0.5mΩ ~ 8.0mΩ	-55 °C ~ +170 °C
		4W (H)			89.44	200	0.5mΩ ~ 1.0mΩ	
		5W (U)			100	223.61		

1. Component TCR - Total TCR that includes the TCR effects of the resistor element and the copper terminal and soldering.
2. Element TCR - Only applies to the alloy used for the resistor element; refer to note1 for component temperature coefficient (including copper terminal).

PART NUMBER SYSTEM

NCSQ 3637 H G 0M75 TR Q Y F

- F — RoHS compliant
- Y — Optional: "QY" denotes suitable for automotive equipment, sourced to special production and inspection at IATF-16949 certified production site
- Q — AEC-Q200 Qualified
- TR — Tape & Reel Packaging: TR = Standard Tape & Reel
- 0M75 — Resistance Code: Four characters. The letter "M" indicates milli-ohms for 0M50 = 0.5mΩ and 0M75 = 0.75mΩ , R001 = 1mΩ, R002 = 2mΩ, etc.
- G — Tolerance Code: D = 0.5%, F = 1.0%, G = ±2%, J = ±5%
- H — Power Rating: Blank = 3 watt, H = 4 watt, U = 5 watt
- 3637 — Size Code
- NCSQ — Series

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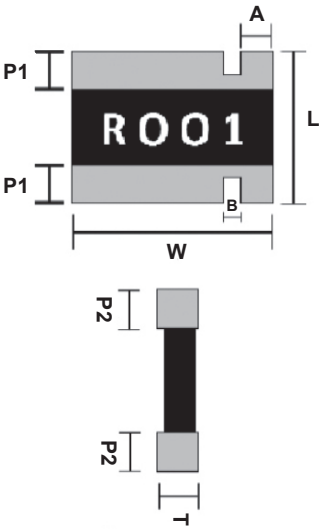
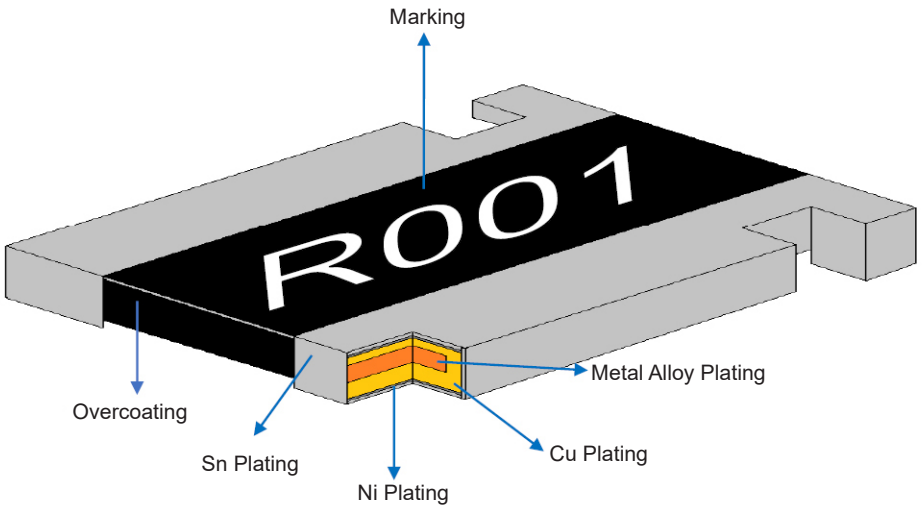
COMPONENT DIMENSIONS (mm)

Type	EIA Size	Power Rating @ 70°C	Resistance Values	Temp. Range	L	W	A	B	T	P1	P2
NCSQ3637	3637	3W	0.5mΩ	-55 °C ~ +170 °C	9.140 ±0.254	9.600 ±0.254	1.50 ±0.254	1.20 ±0.254	0.73 ±0.254	2.35 ±0.254	2.20 ±0.254
			0.75mΩ								
			1mΩ								
			2mΩ								2.15 ±0.254
			3mΩ								
			5mΩ								
			6mΩ								
			8mΩ								
		4W/ 5W	0.5mΩ								2.20 ±0.254
			0.75mΩ								
			1mΩ								



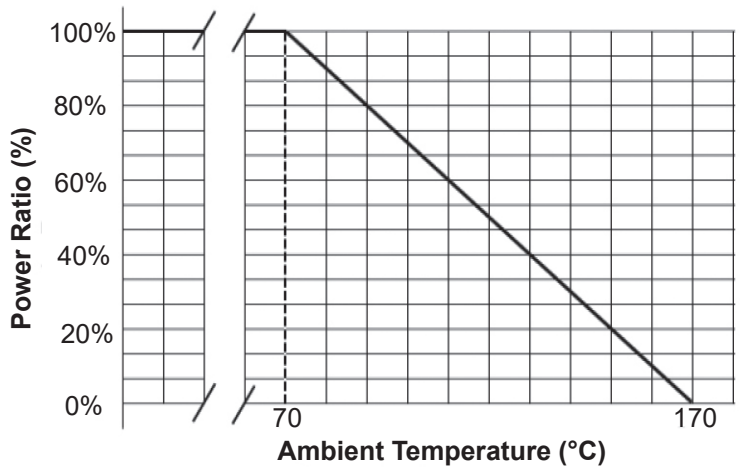
CONSTRUCTION

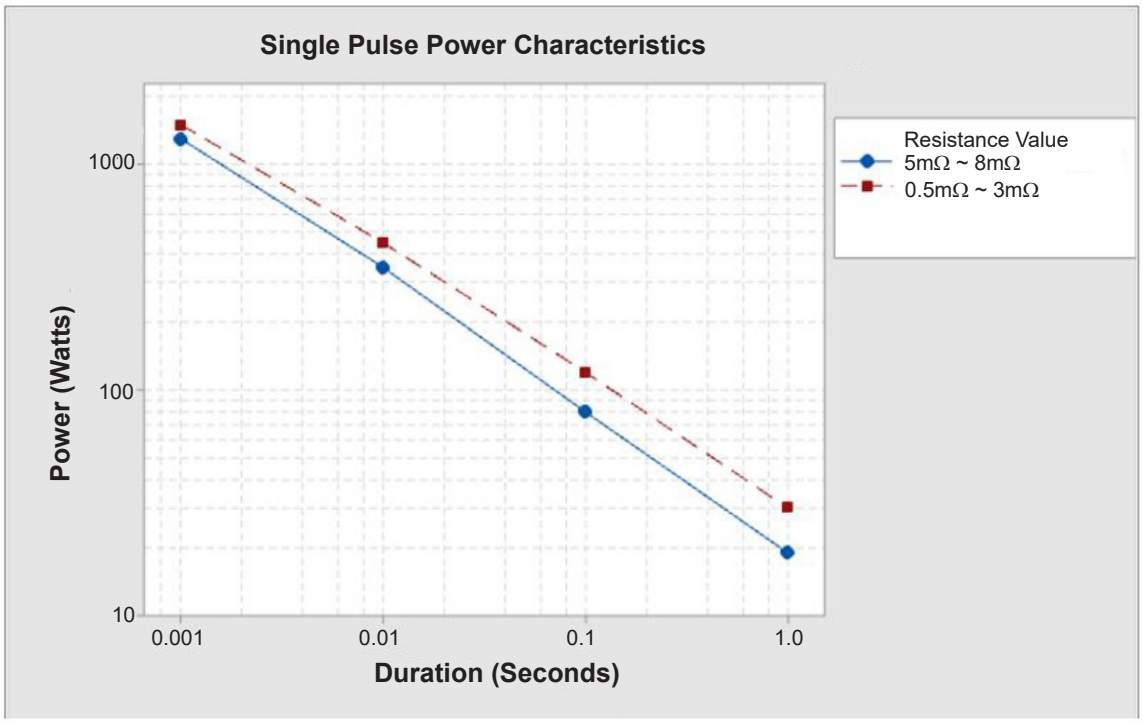


Rated Current: The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the max. current rating, the highest normal rated power is to be used.

$$\text{Rated Current (Amps)}: \sqrt{\text{Power rating (Watts)} / \text{Resistance (Ohms)}}$$

Power Derating Curve: Operating Temperature Range -55°C ~+170°C)
For operation at ambient temperature in excess of 70°C, the load should be derated in accordance with the power derating curve below.

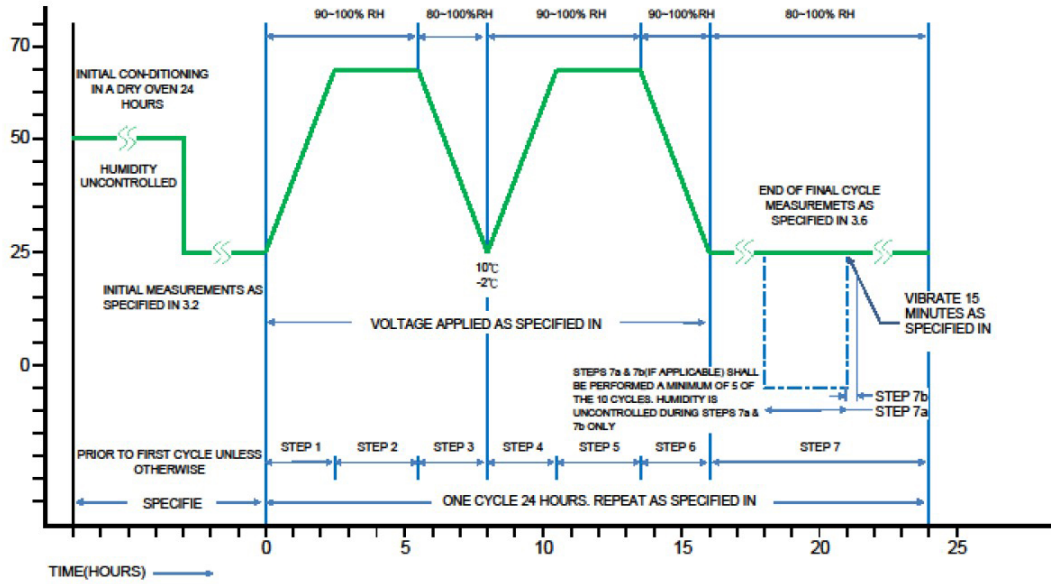




ENVIRONMENTAL CHARACTERISTICS

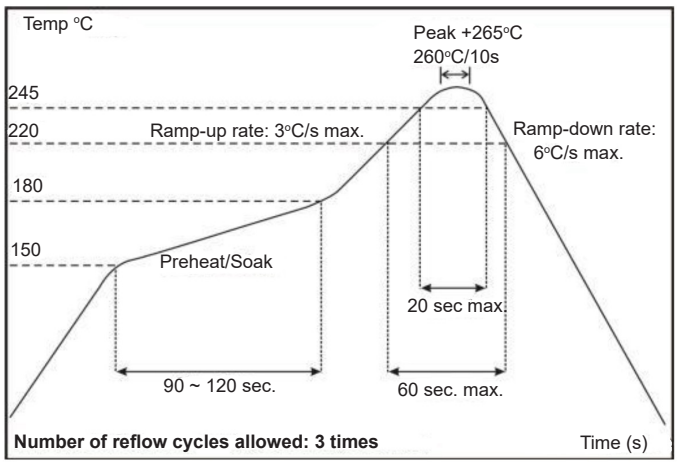
Item	Requirement	Test Method*
Temperature Coefficient of Resistance	As specified	JIS-C-5201-1 4.8 IEC-60115-1 4.8 +25/+150°C +25°C is the reference temperature
Short Time Overload	ΔR/R1 ≤ ± (0.5% +0.0005Ω)	JIS-C-5201-1 4.13 IEC-60115-1 4.13 3W: 5 times of rated power for 5 second 4W: 5 times of rated power for 5 second 5W: 5 times of rated power for 5 second
High Temperature Exposure	ΔR/R1 ≤ ± (1.0% +0.0005Ω)	JIS-C-5201-1 4.25, IEC-60068-2-2 At 170±5°C for 1000 hours.
Resistance to Soldering Heat	ΔR/R1 ≤ ± (0.5% +0.0005Ω). No visual damage	JIS-C-5201-1 4.18 IEC-60115-1 4.18 260±5°C for 10 seconds.
Temperature Cycling	ΔR/R1 ≤ ± (0.5% +0.0005Ω)	JESD22 Method JA-104 1000 Cycles (-55°C to +155°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme.
Biased Humidity	ΔR/R1 ≤ ± (0.5% +0.0005Ω)	MIL-STD-202 Method 103 1,000 hours; 85°C/85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.
Load Life (Endurance)	For ≤3mΩ: ΔR/R1 ≤ ±(1.0%+0.0005Ω) For 5mΩ /6mΩ /8mΩ: ΔR/R1≤ ±(2.0%+0.0005Ω)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1 70±2°C, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON"and 0.5 hr "OFF"
Solderability	>95% Coverage. No visual damage	JIS-C-5201-1 4.17 IEC-60115-1 4.17 245±5°C for 3 seconds.
Dielectric Withstanding Voltage	No broken	JIS-C5201-1 4.7 Apply 500VAC for 1 minute.
Core Body Strength	ΔR/R1 ≤± (0.5% +0.0005Ω) No broken	JIS-C5201-1 4.15 Central part pressurizing force: 5N,10 seconds
Terminal Strength (SMD)	ΔR/R1 ≤± (0.5% +0.0005Ω)	AEC Q200-006 Pressurizing force 17.7N for 60 seconds
Bending Strength	ΔR/R1 ≤± (0.5% +0.0005Ω)	JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending once 2mm for 10 seconds
Moisture Resistance	ΔR/R1 ≤± (0.5% +0.0005Ω)	MIL-STD 202 Method 106 T=24 hours / Cycle ,10Cycles . Steps 7a& 7b not required. Unpowered. (Figure 1)

FIGURE 1

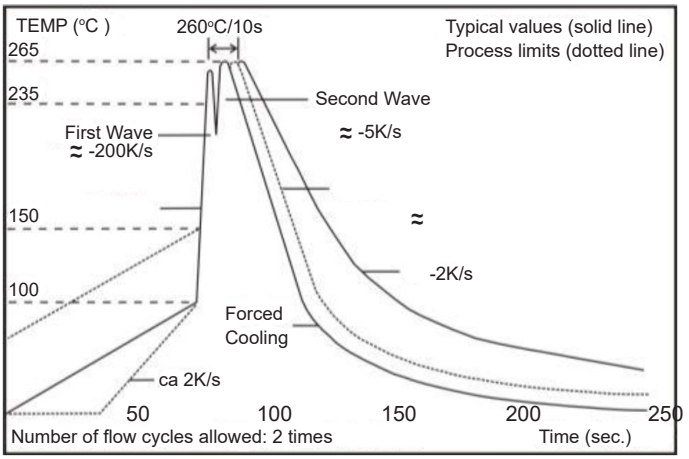


RECOMMENDED SOLDERING PROFILES

REFLOW SOLDERING PROFILE

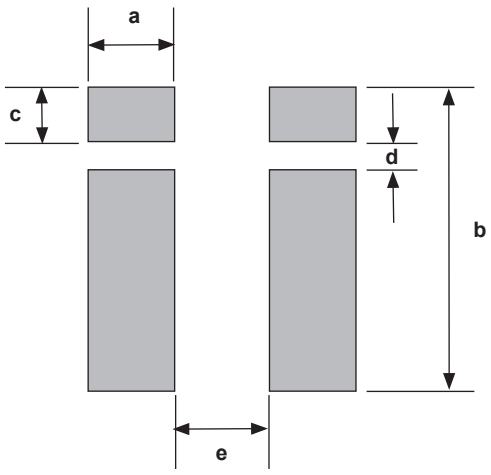


WAVE SOLDERING PROFILE



LAND PATTERN DIMENSIONS (mm)

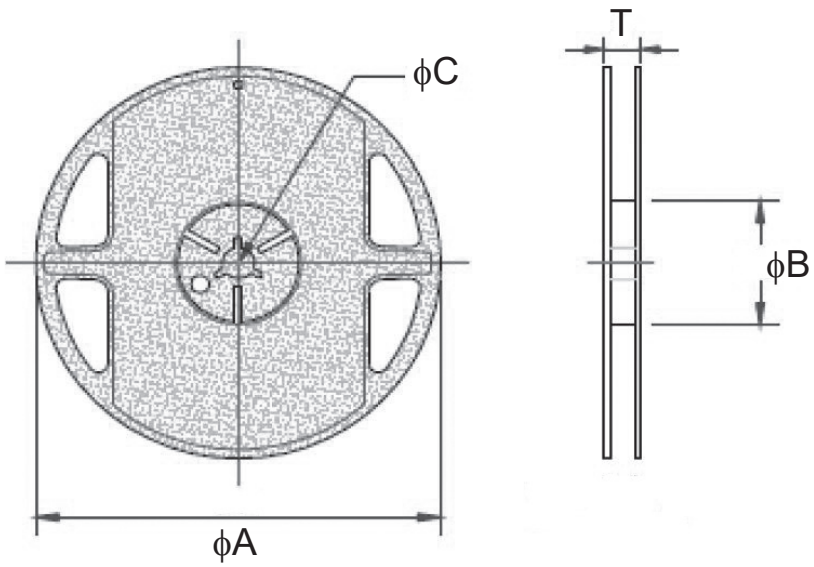
Power Rating	Resistance Range	a	b	c	d	e
3W	0.5mΩ ~ 8.0mΩ	3.30	10.5	1.98	0.60	4.00
4W & 5W	0.5mΩ ~ 1.0mΩ					



TAPING SPECIFICATIONS

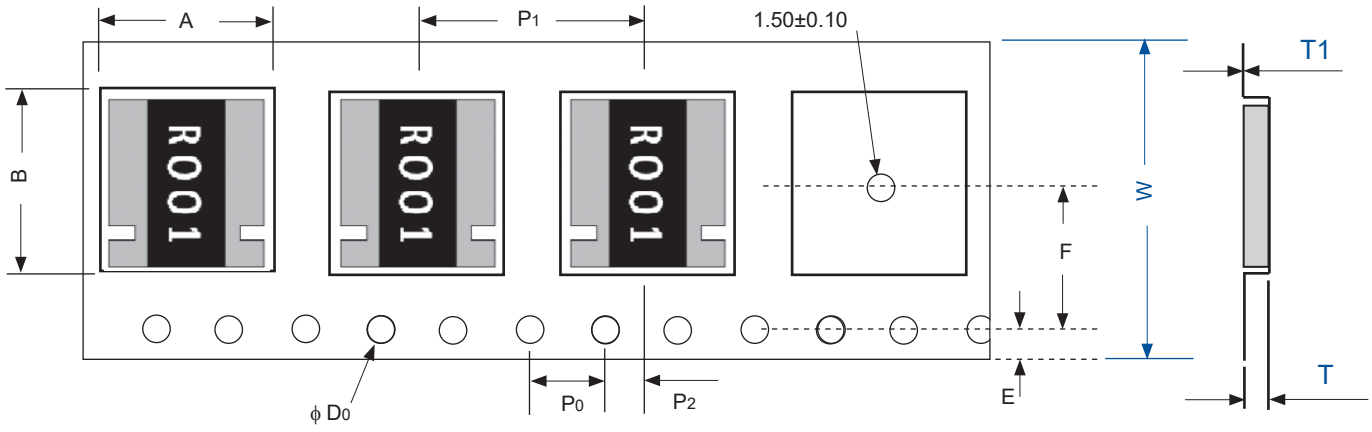
Type	EIA Size	A	B	C	T	Paper Tape (EA)
NCSQ3637	3637	178 ±1.0	60.0±1.0	13.5 ±0.5	17.4 ±1.0	1,000

REEL DIMENSIONS (mm)



EMBOSSED CARRIER DIMENSIONS (mm)

Type	EIA Size	A	B	ϕD_0	E	F	P_0	P_1	P_2	W	T	T_1
NCSQ3637	3637	9.6 ± 0.1	10.0 ± 0.1	1.50 +1/-0	1.75 ± 0.1	7.5 ±0.1	4.00 ± 0.1	12.00 ± 0.1	2.00 ±0.1	16.00 ± 0.20	1.3 ±0.1	0.25 ± 0.05



Direction of unreeling