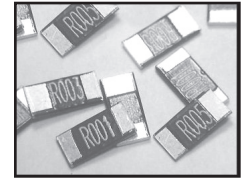


FEATURES

- SURFACE MOUNTABLE 1206, 2010 AND 2512 CASE SIZE
- LOW RESISTANCE & LOW INDUCTANCE METAL STRIP CONSTRUCTION
- PRECISION TOLERANCE ($\pm 1\%$) AND TCR ($\pm 50\text{PPM}$) TO $+170^\circ\text{C}$
- TAPED & REEL PACKAGING FOR EASY PICK AND PLACE
- REFLOW COMPATIBLE

RoHS Compliant
includes all homogeneous materials



See Part Number System for Details

SPECIFICATIONS

Type	EIA Size	Power Rating at 80°C	Case Type**	Resistance Tolerance (Code)	Temperature Coefficient (ppm/°C)	Resistance Range	Operating Temperature Range (°C)
NCSR100S	1206	1 Watt	3	±1% (F) ±3% (H) ±5% (J)	±50 (D)* ±75 (W)* ±100 (E)* ±150 (K)* ±200 (F)*	0.5mΩ ~ 10mΩ	-55°C ~ +170°C
NCSR150	2010	1.5 Watt	3			0.5mΩ ~ 10mΩ	
NCSR100	2512	1 Watt	1 & 2			0.5mΩ ~ 15mΩ	
NCSR200		2 Watt	1 & 2			0.5mΩ ~ 10mΩ	
NCSR250		2.5 Watt	2			4.0mΩ ~ 6.0mΩ	
NCSR300		3 Watt	2			0.5mΩ ~ 3.0mΩ	

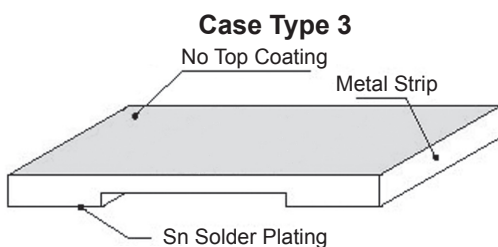
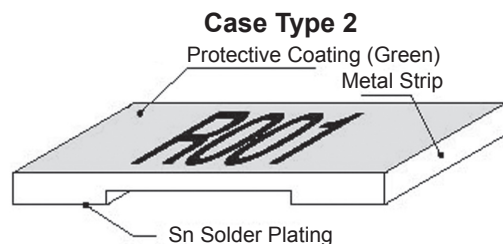
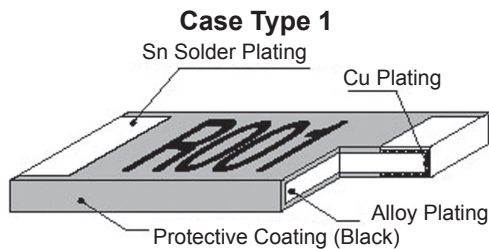
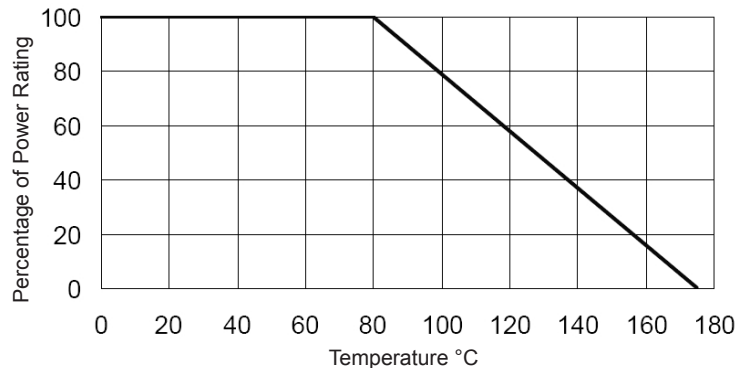
*See Part Number Tables for Available Value/ TCR, ** See Part Number Tables for Case Type

ENVIRONMENTAL CHARACTERISTICS

Item	Specification			Test Method
	Type 1	Type 2	Type 3	
Temperature Coefficient of Resistance	As Specified			MIL-STD-202, Method 304 +25/-55/+25/+125/+25°C
Thermal Shock	±0.5%	±1%	±1%	MIL-STD-202, Method 107G -55°C ~ +150°C, 100 cycles
Short Time Overload	±0.5%	±1%	±1%	JIS-C-5202-5.5 5x rated power for 5 seconds
Resistance to dry heat	±1%	±1%	±1%	JIS-C-5202-7.2 96 hrs @ 155°C without load
Load Life	±1%	±1%	±1%	MIL-STD-202 Method 108 RCWV @ 70°C, cycles of 1.5 hours on, 0.5 hrs off for 1,000 ~ 1,048 hrs
Resistance to Soldering Heat	±0.5%	±1%	±1%	MIL-STD-202F Method 210E 260°C ±5°C for 10 sec. ±1 sec.
Solderability	95% min. coverage			MIL-STD-202F Method 208H 245°C ±5°C for 5 sec. ±0.5 sec.

MAXIMUM OPERATING CURRENT: $I \text{ (Amps)} = \sqrt{P \text{ (Watts)} / R \text{ (Ohms)}}$

Power Derating Curve: For operation above 80°C, power rating must be derated according to the following chart:



THERMAL EMF

Type	EIA Size	Power Rating	Case Type	Resistance Value	Thermal EMF
NCSR100S	1206	1 Watt	3	0.5mΩ ~ 3mΩ	-1 μV/°C
				3.5mΩ ~ 10mΩ	-6 μV/°C
NCSR150	2010	1.5 Watt	3	0.5mΩ ~ 3mΩ	-1 μV/°C
				3.5mΩ ~ 10mΩ	-6 μV/°C
NCSR100	2512	1 Watt	1	0.5mΩ ~ 2mΩ	-1 μV/°C
			2	2.5mΩ ~ 7mΩ	+4 μV/°C
NCSR200		1	0.5mΩ ~ 2mΩ	-1 μV/°C	
		2	6.5mΩ ~ 10mΩ	-6 μV/°C	
NCSR250		2.5 Watt	2	4mΩ ~ 6mΩ	-6 μV/°C
NCSR300		3 Watt	2	0.5mΩ ~ 3mΩ	-1 μV/°C
			2	3.5mΩ ~ 10mΩ	-6 μV/°C



NCSR100S (1 WATT, 1206 CASE SIZE) AVAILABLE VALUES

Part Number	Resistance Value (mΩ)	Available Tolerance	Available TCR	Length (L)	Width (W)	Thickness (T)	Termination Width (P)	Case Type
NCSR100S*M50FTRT3F	0.5	±1% (F) ±3% (H) ±5% (J)	±200ppm (F)	3.20 ±0.25	1.60 ±0.10	0.60 ± 0.20	1.35 ±0.25	3
NCSR100S*M75KTRT3F	0.75		±150ppm (K)				1.23 ± 0.25	
NCSR100S*R001DTRT3F	1.0		±50ppm (D)				1.10 ±0.25	
NCSR100S*R002DTRT3F	2.0						0.60 ±0.25	
NCSR100S*R003DTRT3F	3.0						0.60 ±0.25	
NCSR100S*R004DTRT3F	4.0						1.10 ±0.25	
NCSR100S*R005DTRT3F	5.0						1.10 ±0.25	
NCSR100S*R006DTRT3F	6.0						1.10 ±0.25	
NCSR100S*R007DTRT3F	7.0						0.90 ±0.25	
NCSR100S*R008DTRT3F	8.0						0.90 ±0.25	
NCSR100S*R009DTRT3F	9.0						0.90 ±0.25	
NCSR100S*R010DTRT3F	10						0.60 ±0.25	

* Insert appropriate tolerance code, Contact NIC regarding availability of other values

NCSR100 (1 WATT, 2512 CASE SIZE) AVAILABLE VALUES

Part Number	Resistance Value (mΩ)	Available Tolerance	Available TCR	Length (L)	Width (W)	Thickness (T)	Termination Width (P)	Case Type				
NCSR100*M50DTRF	0.50	±1% (F) ±3% (H) ±5% (J)	±50ppm (D)	6.35±0.254	3.18 ±0.254	1.25 ± 0.20	1.30 ±0.38	1				
NCSR100*M75DTRF	0.75					0.75 ± 0.20						
NCSR100*R001DTRF	1.0					0.65 ± 0.20						
NCSR100*1M50DTRF	1.5					0.45 ± 0.20						
NCSR100*R002DTRF	2.0					0.35 ± 0.20						
NCSR100*2M50KTRF	2.5		±150ppm (K)			0.65 ± 0.20						
NCSR100*R003KTRF	3.0					0.55 ± 0.20						
NCSR100*R004ETRF	4.0		±100ppm (E)			0.45 ± 0.20						
NCSR100*R005ETRF	5.0					0.35 ± 0.20						
NCSR100*R006WTRF	6.0					0.32 ± 0.20						
NCSR100*6M50WTRF	6.5		±75ppm (W)			0.30 ± 0.20						
NCSR100*R007WTRF	7.0					0.27 ± 0.20						
NCSR100*R010KTRF	10		±150ppm (K)			0.25 ± 0.20						
NCSR100*R011DTRGF	11		±50ppm (D)			6.35 ± 0.25			3.00 ± 0.20	0.60 ± 0.20	1.18 ± 0.25	2
NCSR100*R012DTRGF	12											
NCSR100*R013DTRGF	13											
NCSR100*R014DTRGF	14											
NCSR100*R015DTRGF	15											

* Insert appropriate tolerance code



NCSR150 (1.5 WATT, 2010 CASE SIZE) AVAILABLE VALUES

Part Number	Resistance Value (mΩ)	Available Tolerance	Available TCR	Length (L)	Width (W)	Thickness (T)	Termination Width (P)	Case Type
NCSR150*M50FTRT3F	0.50	±1% (F) ±3% (H) ±5% (J)	±200ppm (F)	5.08 ±0.25	2.54 ±0.15	0.6 ±0.20	2.17 ± 0.25	3
NCSR150*M75KTRT3F	0.75		±150ppm (K)				2.04 ± 0.25	
NCSR150*R001DTRT3F	1.0		±50ppm (D)				1.84 ± 0.25	
NCSR150*R002DTRT3F	2.0						1.54 ± 0.25	
NCSR150*R003DTRT3F	3.0						1.04 ± 0.25	
NCSR150*R004DTRT3F	4.0						1.84 ± 0.25	
NCSR150*R005DTRT3F	5.0						1.84 ± 0.25	
NCSR150*R006DTRT3F	6.0						1.54 ± 0.25	
NCSR150*R007DTRT3F	7.0						1.54 ± 0.25	
NCSR150*R008DTRT3F	8.0						1.54 ± 0.25	
NCSR150*R009DTRT3F	9.0						1.29 ± 0.25	
NCSR150*R010DTRT3F	10						1.29 ± 0.25	

* Insert appropriate tolerance code

NCSR200 (2 WATT, 2512 CASE SIZE) AVAILABLE VALUES

Part Number	Resistance Value (mΩ)	Available Tolerance	Available TCR	Length (L)	Width (W)	Thickness (T)	Termination Width (P)	Case Type		
NCSR200*M50DTRF	0.50	±1% (F) ±3% (H) ±5% (J)	±50ppm (D)	6.35 ±0.254	3.18 ±0.254	1.25 ± 0.20	1.30 ± 0.38	1		
NCSR200*M75DTRF	0.75					0.75 ± 0.20				
NCSR200*R001DTRF	1.0					0.65 ± 0.20				
NCSR200*1M50DTRF	1.5					0.45 ± 0.20				
NCSR200*R002DTRF	2.0					0.35 ± 0.20				
NCSR200*6M50DTRGF	6.5			6.35 ± 0.25	3.00 ± 0.20	0.60 ± 0.20	1.43 ± 0.25		1.18 ± 0.25	2
NCSR200*R007DTRGF	7.0									
NCSR200*R008DTRGF	8.0									
NCSR200*R009DTRGF	9.0									
NCSR200*R010DTRGF	10									

* Insert appropriate tolerance code

NCSR250 (2.5 WATT, 2512 CASE SIZE) AVAILABLE VALUES

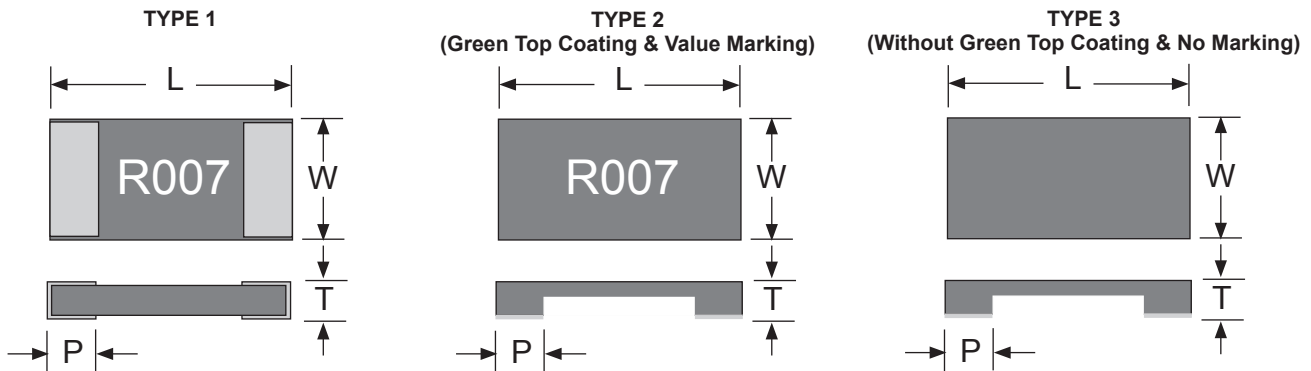
Part Number	Resistance Value (mΩ)	Available Tolerance	Available TCR	Length (L)	Width (W)	Thickness (T)	Termination Width (P)	Case Type
NCSR250*R004DTRGF	4.0	±1% (F) ±3% (H) ±5% (J)	±50ppm (D)	6.35 ±0.25	3.00 ±0.20	0.60 ±0.20	2.18 ±0.25	2
NCSR250*4M50DTRGF	4.5							
NCSR250*R005DTRGF	5.0						1.93 ±0.25	
NCSR250*R006DTRGF	6.0							

* Insert appropriate tolerance code

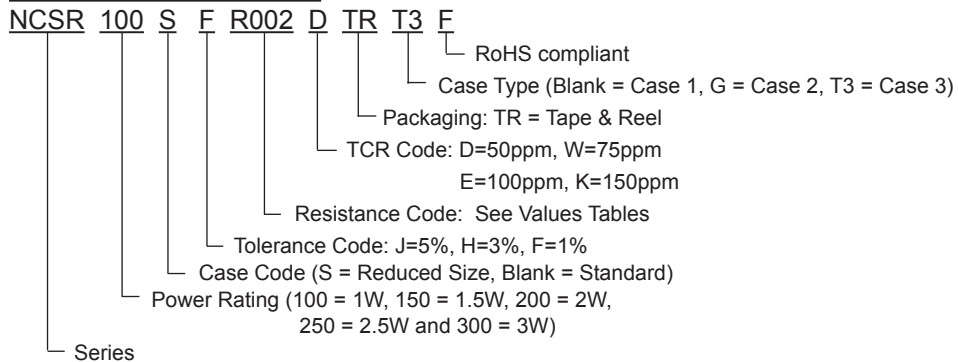
NCSR300 (3 WATT, 2512 CASE SIZE) AVAILABLE VALUES

Part Number	Resistance Value (mΩ)	Available Tolerance	Available TCR	Length (L)	Width (W)	Thickness (T)	Termination Width (P)	Case Type	
NCSR300*M50ETRGF	0.50	±1% (F) ±3% (H) ±5% (J)	±100ppm (E)	6.35 ±0.25	3.00 ±0.20	0.60 ±0.20	2.68 ±0.25	2	
NCSR300*M75ETRGF	0.75								
NCSR300*R001DTRGF	1.0								
NCSR300*1M50DTRGF	1.5		±50ppm (D)						1.93 ±0.25
NCSR300*R002DTRGF	2.0								
NCSR300*2M50DTRGF	2.5								
NCSR300*R003DTRGF	3.0								
				1.43 ±0.25					
				1.18 ±0.25					

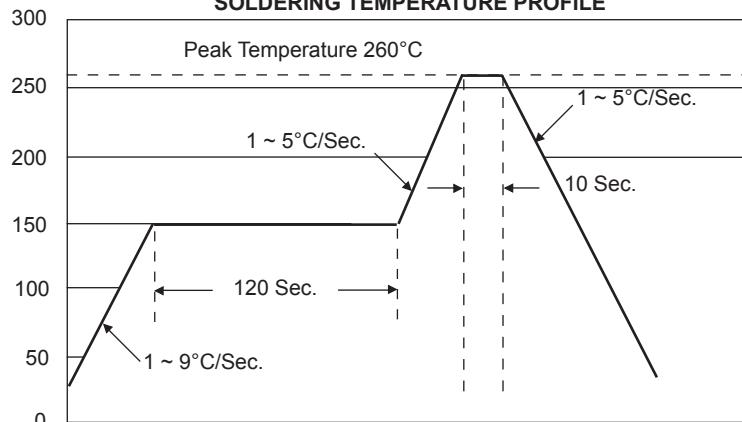
* Insert appropriate tolerance code



PART NUMBER SYSTEM



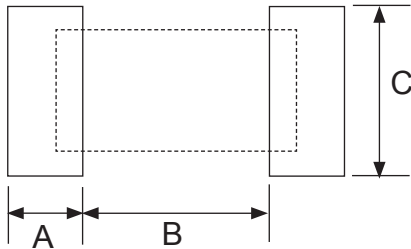
RECOMMENDED REFLOW SOLDERING TEMPERATURE PROFILE



2-WIRE LAND PATTERN DIM. (mm)

(no traces between pads to avoid short circuit)

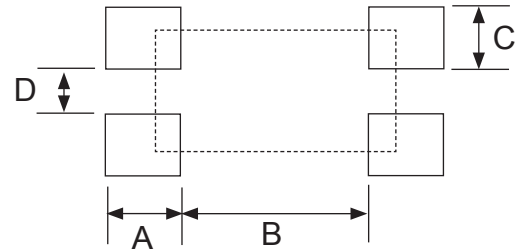
Case Size	A	B	C
1206	1.90	1.40	1.80
2010	1.44	3.80	3.12
2512	1.80	4.75	3.6



4-WIRE LAND PATTERN DIM. (mm)

Recommended for precision current sensing
(no traces between pads to avoid short circuit)

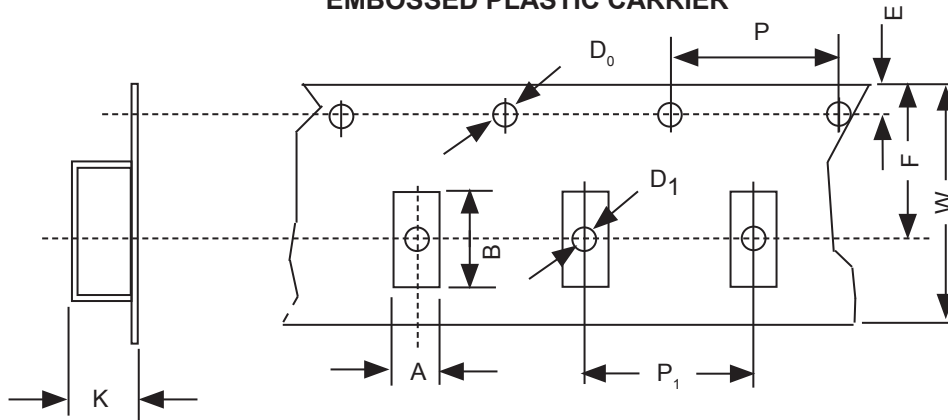
Case Size	A	B	C	D
2010	1.44	3.80	1.16	0.80
2512	1.80	4.75	1.45	1.00



TAPE DIMENSIONS (mm)

Case Size	Resistance Values	A	B	K		P	P ₁	E	F	D ₀	W	Quantity per Reel
				Case 1	Case 2							
1206	All	2.0 ±0.15	3.60 ±0.2	0.87 ±0.1	n/a	4.0 ±0.1	4.0 ±0.1	1.75 ±0.1	3.50 ±0.05	1.55 ^{+1/-0}	8.0 ±0.2	2,000
2010	All	2.85 ±0.1	5.55 ±0.1	n/a	0.85 ±0.2	4.0 ±0.1	4.0 ±0.1	1.75 ±0.1	5.50 ±0.05	1.55 ±0.05	12.0 ±0.3	
2512	0.50	3.40 ±0.1	6.70 ±0.1	1.45 ±0.2	0.87 ±0.2	4.0 ±0.1	4.0 ±0.1	1.75 ±0.1	5.50 ±0.05	1.55 ±0.05	12.0 ±0.3	
	0.75	3.50 ±0.1	6.80 ±0.1	0.87 ±0.2	0.87 ±0.2	4.0 ±0.1	4.0 ±0.1	1.75 ±0.1	5.50 ±0.05	1.55 ±0.05	12.0 ±0.3	
	1 ~ 22	3.40 ±0.1	6.70 ±0.1	0.87 ±0.2	0.87 ±0.2	4.0 ±0.1	4.0 ±0.1	1.75 ±0.1	5.50 ±0.05	1.55 ±0.05	12.0 ±0.3	

EMBOSSED PLASTIC CARRIER



Notice:

1. The cumulative tolerance of 10 sprocket hole pitch is ±0.2mm.
2. Carrier camber shall be not more than 1mm per 100mm through a length of 250mm.
3. A & B measured 0.3mm from the bottom of the packet
4. K measured at a point on the inside bottom of the packet to the top surface of the carrier.
5. Pocket position relative to sprocket hole is measured as the true position of the pocket and not the pocket hole.

