

# Current Sensing Chip Resistors

NCST Series

## FEATURES

- SURFACE MOUNTABLE 0402 ~ 7520 CASE SIZE
- PRECISION TOLERANCE ( $\pm 1\%$ )
- POWER RATINGS UP TO 3 WATTS
- Pb-FREE REFLOW COMPATIBLE

**RoHS Compliant**  
includes all homogeneous materials



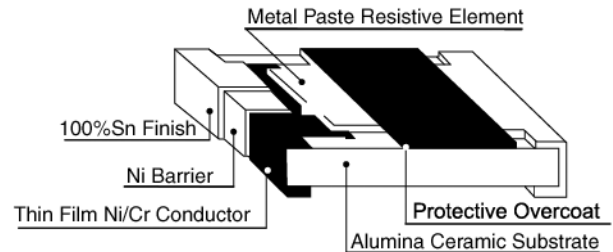
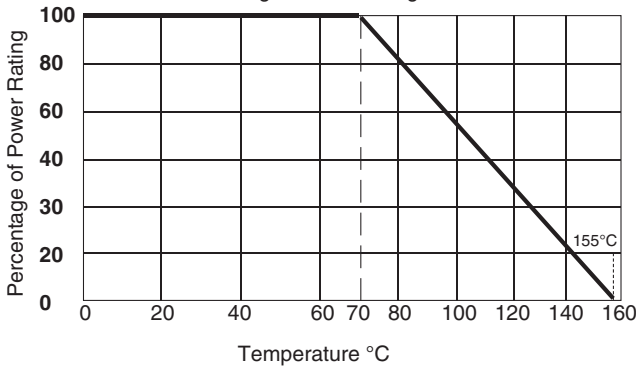
\*See Part Number System for Details

## CHARACTERISTICS

Type	EIA Size	Power Rating at 70°C	Resistance Tolerance	Temperature Coefficient (°C)	Resistance Range	Resistance Range (Codes)	Operating Temp. Range (°C)
NCST04	0402	1/16W	1% (F) 2% (G) 5% (J)	$\pm 200$ ppm (F)	501m $\Omega$ ~ 1 $\Omega$	R501 ~ 1R00	-55°C ~ +155°C
				$\pm 300$ ppm (G)	101m $\Omega$ ~ 500m $\Omega$	R101 ~ R500	
				$\pm 400$ ppm (H)	50m $\Omega$ ~ 100m $\Omega$	R050 ~ R100	
NCST06	0603	1/10W	1% (F) 2% (G) 5% (J)	$\pm 200$ ppm (F)	501m $\Omega$ ~ 1 $\Omega$	R501 ~ 1R00	
				$\pm 300$ ppm (G)	101m $\Omega$ ~ 500m $\Omega$	R101 ~ R500	
				$\pm 400$ ppm (H)	51m $\Omega$ ~ 100m $\Omega$	R051 ~ R100	
NCST10	0805	1/8W	1% (F) 2% (G) 5% (J)	$\pm 600$ ppm (J)	20m $\Omega$ ~ 50m $\Omega$	R020 ~ R050	
NCST12*	1206	1/4W		$\pm 200$ ppm (F)	501m $\Omega$ ~ 1 $\Omega$	R501 ~ 1R00	
				$\pm 300$ ppm (G)	51m $\Omega$ ~ 500m $\Omega$	R051 ~ R500	
			$\pm 400$ ppm (H)	21m $\Omega$ ~ 50m $\Omega$	R021 ~ R050		
NCST50*	2010	3/4W	1% (F) 2% (G) 5% (J)	$\pm 600$ ppm (J)	10m $\Omega$ ~ 20m $\Omega$	R010 ~ R020	
NCST100*	2512	1W		$\pm 300$ ppm (G)	1m $\Omega$ ~ 4m $\Omega$	R001 ~ R004	
			$\pm 150$ ppm (X)	11m $\Omega$ ~ 350m $\Omega$	R011 ~ R350		
			$\pm 200$ ppm (F)	5m $\Omega$ ~ 10m $\Omega$	R005 ~ R010		
NCST200	0830	2W	2% (G) 5% (J) 1% (F) 2% (G) 5% (J)	$\pm 100$ ppm (E)	31m $\Omega$ ~ 3.0 $\Omega$	R031 ~ 1R00	
				$\pm 150$ ppm (X)	21m $\Omega$ ~ 30m $\Omega$	R021 ~ R030	
				$\pm 200$ ppm (F)	6m $\Omega$ ~ 20m $\Omega$	R006 ~ R020	
NCST300	1225	3W	1% (F) 2% (G) 5% (J)	$\pm 300$ ppm (G)	3m $\Omega$ ~ 5m $\Omega$	R003 ~ R005	

\*Available with a  $\pm 100$ ppm (E) TCR (100m $\Omega$  ~ 1 $\Omega$ )

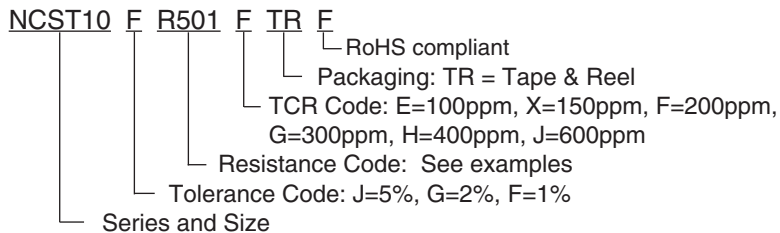
**Power Derating Curve:** For operation above 70°C, power rating must be derated according to the following chart:



## ENVIRONMENTAL CHARACTERISTICS

Item	Specification	Test Method
Temperature Coefficient of Resistance	As Specified	MIL-STD-202, Method 304 +25/-55/+25/+125/+25°C
Thermal Shock	±0.5%	MIL-STD-202, Method 107G -55°C ~ +150°C, 100 cycles
Short Time Overload	±0.5%	JIS-C-5202-5.5 RCWV x 2.5 or Max. Overloading Voltage for 5 sec.
Dielectric Withstanding Voltage	by Type	MIL-STD-202F Method 301 Apply Max. Overload Voltage for 1 minute
Insulation Resistance	>1000MΩ	MIL-STD-202F Method 302 Apply 100Vdc for 1 minute
Resistance to dry heat	±0.5%	JIS-C-5202-7.2 96 hrs @ 155°C without load
Load Life	±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%	MIL-STD-202F Method 210E 260°C ±5°C for 10 sec. ±1 sec.
Humidity (Steady State)	±0.5%	MIL-STD-202 Method 103B 40°C, 90 ~ 95% RH, RCWV 1.5 hours ON, 0.5 hours OFF, total 1000 ~ 1048 hours
Low Temperature Operation	±0.5%	JIS-C-5202-7.1 1 hour -65°C followed by 45 minutes of RCWV
Solderability	95% min. coverage	MIL-STD-202F Method 208H 245°C ±5°C for 5 sec. ±0.5 sec.
Bending Strength	As Specified	JIS-C-5202-6.1.4 Bending Amplitude 3mm for 10 seconds

### PART NUMBER SYSTEM



### AVAILABLE VALUES AND PART NUMBERS

	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
0402 Size 1/16W	50mΩ ~ 100mΩ	NCST04 * R050HTRF	50	±400ppm (H)
		↓	↓	
		NCST04 * R050HTRF	100	
	101mΩ ~ 500mΩ	NCST04 * R101GTRF	101	±300ppm (G)
		↓	↓	
		NCST04 * R501FTRF	500	
501mΩ ~ 1.0Ω	NCST04 * R501FTRF	501	±200ppm (F)	
	↓	↓		
	NCST04 * 1R00FTRF	1,000		
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
0603 Size 1/10W	20mΩ ~ 50mΩ	NCST06 * R020JTRF	20	±600ppm (J)
		↓	↓	
		NCST06 * R050JTRF	50	
	51mΩ ~ 100mΩ	NCST06 * R051HTRF	51	±400ppm (H)
		↓	↓	
		NCST06 * R100HTRF	100	
	101mΩ ~ 500mΩ	NCST06 * R101GTRF	101	±300ppm (G)
		↓	↓	
		NCST06 * R500GTRF	500	
	501mΩ ~ 1.0Ω	NCST06 * R501FTRF	501	±200ppm (F)
↓		↓		
NCST06 * 1R00FTRF		1,000		
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
0805 Size 1/8W	20mΩ ~ 50mΩ	NCST10 * R020JTRF	20	±600ppm (J)
		↓	↓	
		NCST10 * R050JTRF	50	
	51mΩ ~ 100mΩ	NCST10 * R051HTRF	51	±400ppm (H)
		↓	↓	
		NCST10 * R100HTRF	100	
	101mΩ ~ 500mΩ	NCST10 * R101GTRF	101	±300ppm (G)
		↓	↓	
		NCST10 * R500GTRF	500	
	501mΩ ~ 1.0Ω	NCST10 * R501FTRF	501	±200ppm (F)
↓		↓		
NCST10 * 1R00FTRF		1,000		
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
1206 Size 1/4W	10mΩ ~ 20mΩ	NCST12 * R010JTRF	10	±600ppm (J)
		↓	↓	
		NCST12 * R020JTRF	20	
	21mΩ ~ 50mΩ	NCST12 * R021HTRF	21	±400ppm (H)
		↓	↓	
		NCST12 * R050HTRF	50	
	51mΩ ~ 500mΩ	NCST12 * R051GTRF	51	±300ppm (G)
		↓	↓	
		NCST12 * R500GTRF	500	
	501mΩ ~ 1.0Ω	NCST12 * R501FTRF	501	±200ppm (F)
		↓	↓	
		NCST12 * 1R00FTRF	1,000	
	100mΩ ~ 1.0Ω	NCST12 * R100ETRF	100	±100ppm (E)
↓		↓		
NCST12 * 1R00ETRF		1,000		

\*Tolerance Codes: 1% (F), 2% (G) or 5% (J)

## AVAILABLE VALUES AND PART NUMBERS

	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
2010 Size 3/4W	10mΩ ~ 20mΩ	NCST50 * R010JTRF	10	±600ppm (J)
		↓	↓	
		NCST50 * R020JTRF	20	
	21mΩ ~ 50mΩ	NCST50 * R021HTRF	21	±400ppm (H)
		↓	↓	
		NCST50 * R050HTRF	50	
	51mΩ ~ 500mΩ	NCST50 * R051GTRF	51	±300ppm (G)
		↓	↓	
		NCST50 * R500GTRF	500	
	501mΩ ~ 1.0Ω	NCST50 * R501FTRF	501	±200ppm (F)
		↓	↓	
		NCST50 * 1R00FTRF	1,000	
100mΩ ~ 1.0Ω	NCST50 * R100ETRF	100	±100ppm (E)	
	↓	↓		
	NCST50 * 1R00ETRF	1,000		
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
2512 Size 1W	10mΩ ~ 20mΩ	NCST100 * R010JTRF	10	±600ppm (J)
		↓	↓	
		NCST100 * R020JTRF	20	
	21mΩ ~ 50mΩ	NCST100 * R021HTRF	21	±400ppm (H)
		↓	↓	
		NCST100 * R050HTRF	50	
	51mΩ ~ 500mΩ	NCST100 * R051GTRF	51	±300ppm (G)
		↓	↓	
		NCST100 * R500GTRF	500	
	501mΩ ~ 1.0Ω	NCST100 * R501FTRF	501	±200ppm (F)
		↓	↓	
		NCST100 * 1R00FTRF	1,000	
100mΩ ~ 1.0Ω	NCST100 * R100ETRF	100	±100ppm (E)	
	↓	↓		
	NCST100 * 1R00ETRF	1,000		
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
0830 Size 2W	1mΩ ~ 4mΩ	NCST200 * R001GTRF	1	±300ppm (G)
		NCST200 * R004GTRF	4	
	5mΩ ~ 10mΩ	NCST200 * R005FTRF	5	±200ppm (F)
		NCST200 * R010FTRF	10	
	11mΩ ~ 350mΩ	NCST200 * R011XTRF	51	±150ppm (X)
		NCST200 * R350XTRF	500	
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
1225 Size 3W	3mΩ ~ 5mΩ	NCST300 * R003GTRF	3	±300ppm (G)
		NCST300 * R005GTRF	5	
	6mΩ ~ 20mΩ	NCST300 * R006FTRF	6	±200ppm (F)
		NCST300 * R020FTRF	20	
	21mΩ ~ 30mΩ	NCST300 * R021XTRF	21	±150ppm (X)
		NCST300 * R030XTRF	30	
	31mΩ ~ 3.0Ω	NCST300 * R031ETRF	31	±100ppm (E)
		NCST300 * 3R00ETRF	3,000	

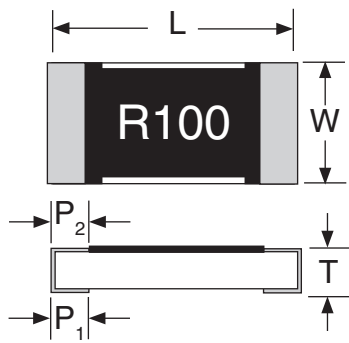
\*Tolerance Codes: 1% (F), 2% (G) or 5% (J)



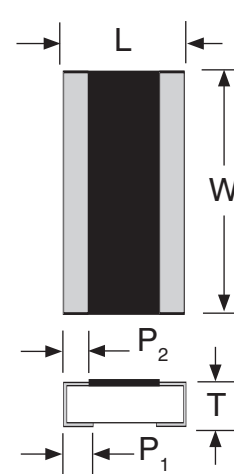
## DIMENSIONS (mm)

Type	Case Size	Length (L)	Width (W)	Thickness (T)	Termination Width (P <sub>1</sub> )	Termination Width (P <sub>2</sub> )
NCST04	0402	1.00 ±0.05	0.50 ±0.05	0.32 ±0.05	0.25 ±0.10	0.20 ±0.10
NCST06	0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.30 ±0.20	0.30 ±0.20
NCST10	0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.30 ±0.20	0.30 ±0.20
NCST12	1206	3.05 ±0.15	1.55 ±0.15	0.60 ±0.10	0.50 ±0.20	0.40 ±0.20
NCST50	2010	5.00 ±0.20	2.45 ±0.15	0.60 ±0.10	0.60 ±0.30	0.50 ±0.25
NCST100	2512	6.35 ±0.20	3.15 ±0.15	0.60 ±0.10	0.60 ±0.30	0.50 ±0.25
NCST200	0830	2.00 ±0.20	7.50 ±0.30	0.60 ±0.10	0.40 ±0.20	0.40 ±0.20
NCST300	1225	3.10 ±0.15	6.30 ±0.15	0.90 ±0.15	0.60 ±0.30	0.55 ±0.25

Case Sizes  
0402, 0603, 0805, 1206, 2010 & 2512

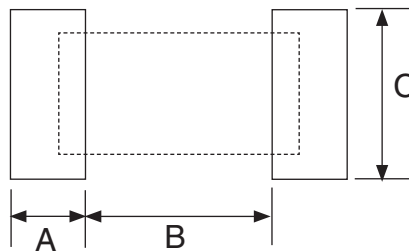


Case Sizes  
1225 & 7520



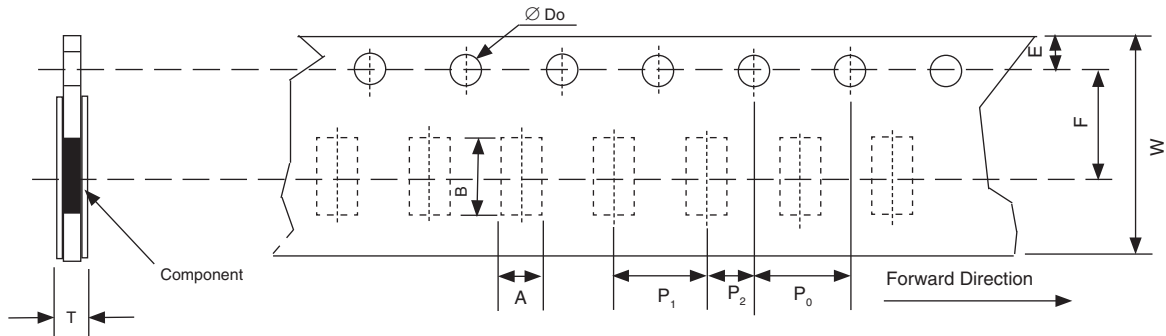
## LAND PATTERN DIM. (mm)

	A	B	C
NCST04	0.50	0.50	0.60 ±0.2
NCST06	0.70	0.80	0.90 ±0.2
NCST10	1.00	1.00	1.35 ±0.2
NCST12	1.15	2.00	1.70 ±0.2
NCST50	1.40	3.60	2.40 ±0.2
NCST100	1.60	4.90	3.00 ±0.2
NCST200	2.00	1.20	7.60 ±0.2
NCST300	2.00	2.00	7.60 ±0.2



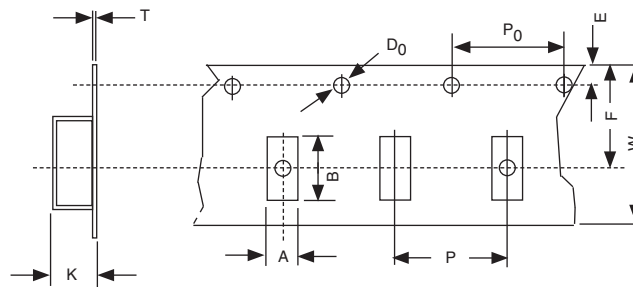
### PAPER CARRIER TAPE DIMENSIONS (mm)

Type	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	φD	T
NCST04	0.67 ±0.03	1.15 ±0.03	8.00 ±0.10	3.50 ±0.05	1.75 ±0.05	2.00 ±0.05	2.00 ±0.05	4.00 ±0.10	1.55 ±0.05	0.40 ±0.03
NCST06	1.10 ±0.05	1.90 ±0.05				0.60 ±0.03				
NCST10	1.60 ±0.05	2.37 ±0.05				0.75 ±0.05				
NCST12	2.00 ±0.05	3.55 ±0.05								



### EMBOSSED PLASTIC CARRIER DIMENSIONS (mm)

Type	A	B	W	F	K	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	φD <sub>o</sub>	T
NCST50	2.85 ±0.10	5.45 ±0.10	12.0 ±0.10	5.50 ±0.05	1.00 ±0.20	1.75 ±0.10	4.00 ±0.05	2.00 ±0.05	4.00 ±0.05	1.50 ±0.05	0.80 ±0.10
NCST100	3.40 ±0.20	6.65 ±0.10									
NCST200	2.50 ±0.20	8.30 ±0.20									
NCST300	3.38 ±0.10	6.68 ±0.10									



### REEL DIMENSIONS (mm) AND QUANTITY

Type	A	B	C	W	Quantity
NCST04	178 ±1.0	60 +0.5	13 ±0.20	9.0 ±0.50	10,000
NCST06					5,000
NCST10				13.2 ±1.50	4,000
NCST12					2,000
NCST50				17 ±0.50	2,000
NCST100					
NCST200				13.2 ±1.50	2,000
NCST300					

