

### FEATURES

- SURFACE MOUNTABLE 0402 ~ 2512 CASE SIZE
- PRECISION TOLERANCE ( $\pm 1\%$  &  $\pm 5\%$ )
- POWER RATINGS UP TO 2 WATTS
- STANDARD & **HIGH POWER OPTION (PAGE 4)** AVAILABLE
- Pb-FREE REFLOW COMPATIBLE

**RoHS Compliant**  
includes all homogeneous materials



\*See Part Number System for Details

### CHARACTERISTICS FOR STANDARD POWER RATINGS

Type	EIA Size	Power Rating at 70°C	Resistance Tolerance	Temperature Coefficient (°C)	Resistance Range	Resistance Range (Codes)	Operating Temp. Range (°C)
NCST-C04	0402	1/16W	1% (F) 5% (J)	$\pm 800$ ppm (K)	50m $\Omega$ ~ 91m $\Omega$	R050 ~ R091	-55°C ~ +155°C
				$\pm 500$ ppm (H)	100m $\Omega$ ~ 976m $\Omega$	R100 ~ R976	
NCST-C06	0603	1/10W	1% (F) 5% (J)	$\pm 1200$ ppm (S)	20m $\Omega$ ~ 47m $\Omega$	R020 ~ R047	
				$\pm 800$ ppm (K)	50m $\Omega$ ~ 91m $\Omega$	R050 ~ R091	
NCST-C10	0805	1/8W	1% (F) 5% (J)	$\pm 500$ ppm (H)	100m $\Omega$ ~ 976m $\Omega$	R100 ~ R976	
				$\pm 1500$ ppm (T)	10m $\Omega$ ~ 18m $\Omega$	R010 ~ R018	
				$\pm 1200$ ppm (S)	20m $\Omega$ ~ 47m $\Omega$	R020 ~ R047	
				$\pm 800$ ppm (K)	50m $\Omega$ ~ 91m $\Omega$	R050 ~ R091	
NCST-C12	1206	1/4W	1% (F) 5% (J)	$\pm 500$ ppm (H)	100m $\Omega$ ~ 976m $\Omega$	R100 ~ R976	
				$\pm 1500$ ppm (T)	10m $\Omega$ ~ 18m $\Omega$	R010 ~ R018	
				$\pm 1200$ ppm (S)	20m $\Omega$ ~ 47m $\Omega$	R020 ~ R047	
				$\pm 800$ ppm (K)	50m $\Omega$ ~ 91m $\Omega$	R050 ~ R091	
NCST-C25	1210	1/3W	1% (F) 5% (J)	$\pm 500$ ppm (H)	100m $\Omega$ ~ 976m $\Omega$	R100 ~ R976	
				$\pm 800$ ppm (K)	20m $\Omega$ ~ 91m $\Omega$	R020 ~ R091	
				$\pm 1500$ ppm (T)	10m $\Omega$ ~ 18m $\Omega$	R010 ~ R018	
NCST-C50	2010	3/4W	1% (F) 5% (J)	$\pm 500$ ppm (H)	100m $\Omega$ ~ 976m $\Omega$	R100 ~ R976	
				$\pm 800$ ppm (K)	20m $\Omega$ ~ 91m $\Omega$	R020 ~ R091	
				$\pm 1500$ ppm (T)	10m $\Omega$ ~ 18m $\Omega$	R010 ~ R018	
NCST-C100	2512	1W	1% (F) 5% (J)	$\pm 500$ ppm (H)	100m $\Omega$ ~ 976m $\Omega$	R100 ~ R976	
				$\pm 800$ ppm (K)	20m $\Omega$ ~ 91m $\Omega$	R020 ~ R091	
				$\pm 1500$ ppm (T)	10m $\Omega$ ~ 18m $\Omega$	R010 ~ R018	

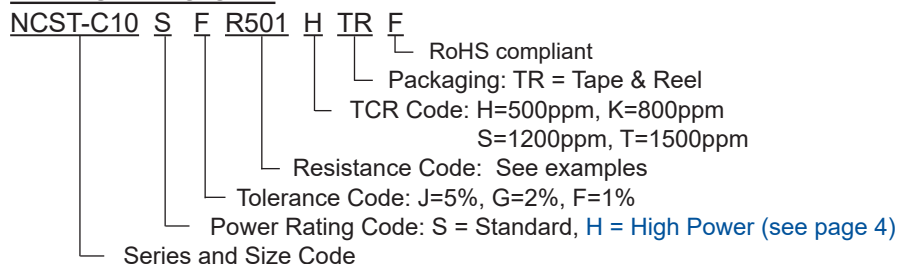
Operating Voltage:  $\sqrt{\text{Power rating (Watts)} \times \text{Resistance (Ohms)}}$

High Power Specifications Beginning on Page 4

Overload Voltage:  $2.5 \times \sqrt{\text{Power rating (Watts)} \times \text{Resistance (Ohms)}}$

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

### PART NUMBER SYSTEM



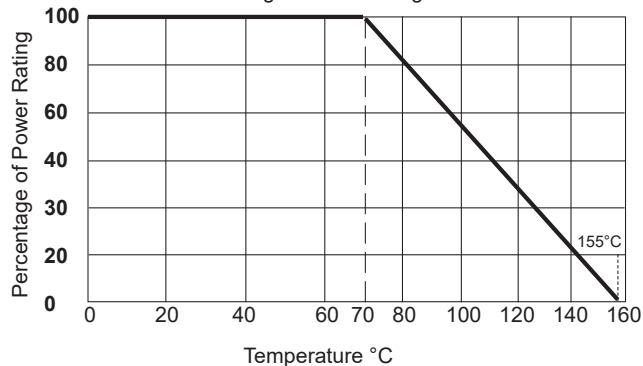
## AVAILABLE STANDARD POWER VALUES AND PART NUMBERS

	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
0402 Size 1/16W	50mΩ ~ 91mΩ	NCST-C04S ± R050KTRF	50	±800ppm (K)
		↓	↓	
		NCST-C04S ± R091KTRF	91	
	100mΩ ~ 976mΩ	NCST-C04S ± R100HTRF	100	±500ppm (H)
		↓	↓	
NCST-C04S ± R976HTRF	976			
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
0603 Size 1/10W	20mΩ ~ 47mΩ	NCST-C06S ± R020STRF	20	±1200ppm (S)
		↓	↓	
		NCST-C06S ± R047STRF	47	
	50mΩ ~ 91mΩ	NCST-C06S ± R050KTRF	50	±800ppm (K)
		↓	↓	
	NCST-C06S ± R091KTRF	91		
	100mΩ ~ 976mΩ	NCST-C06S ± R100HTRF	100	±500ppm (H)
↓		↓		
NCST-C06S ± R976HTRF	976			
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
0805 Size 1/8W	10mΩ ~ 18mΩ	NCST-C10S ± R010TTRF	10	±1500ppm (T)
		↓	↓	
	20mΩ ~ 47mΩ	NCST-C10S ± R018TTRF	18	±1200ppm (S)
		↓	↓	
	50mΩ ~ 91mΩ	NCST-C10S ± R020STRF	20	±800ppm (K)
		↓	↓	
	NCST-C10S ± R047STRF	47		
		NCST-C10S ± R050KTRF	50	
	100mΩ ~ 976mΩ	NCST-C10S ± R091KTRF	91	±500ppm (H)
		↓	↓	
NCST-C10S ± R100HTRF	100			
NCST-C10S ± R976HTRF	976			
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
1206 Size 1/4W	10mΩ ~ 18mΩ	NCST-C12S ± R010TTRF	10	±1500ppm (T)
		↓	↓	
	20mΩ ~ 47mΩ	NCST-C12S ± R018TTRF	18	±1200ppm (S)
		↓	↓	
	50mΩ ~ 91mΩ	NCST-C12S ± R020STRF	20	±800ppm (K)
		↓	↓	
	NCST-C12S ± R047STRF	47		
		NCST-C12S ± R050KTRF	50	
	100mΩ ~ 976mΩ	NCST-C12S ± R091KTRF	91	±500ppm (H)
		↓	↓	
NCST-C12S ± R100HTRF	100			
NCST-C12S ± R976HTRF	976			
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
1210 Size 1/3W	10mΩ ~ 18mΩ	NCST-C25S ± R010TTRF	10	±1500ppm (T)
		↓	↓	
	20mΩ ~ 91mΩ	NCST-C25S ± R018TTRF	18	±800ppm (K)
		↓	↓	
	NCST-C25S ± R020KTRF	20		
		NCST-C25S ± R091KTRF	91	
	100mΩ ~ 976mΩ	NCST-C25S ± R100HTRF	100	±500ppm (H)
↓		↓		
NCST-C25S ± R976HTRF	976			

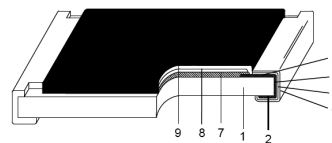
## AVAILABLE STANDARD POWER VALUES AND PART NUMBERS

	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
2010 Size 3/4W	10mΩ ~ 18mΩ	NCST-C50S * R010TTRF	10	±1500ppm (T)
		↓	↓	
		NCST-C50S * R018TTRF	18	
	20mΩ ~ 91mΩ	NCST-C50S * R020KTRF	20	±800ppm (K)
		↓	↓	
		NCST-C50S * R091KTRF	91	
100mΩ ~ 976mΩ	NCST-C50S * R100HTRF	100	±500ppm (H)	
	↓	↓		
	NCST-C50S * R976HTRF	976		
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
2512 Size 1W	10mΩ ~ 18mΩ	NCST-C100S * R010TTRF	10	±1500ppm (T)
		↓	↓	
		NCST-C100S * R018TTRF	18	
	20mΩ ~ 91mΩ	NCST-C100S * R020KTRF	20	±800ppm (K)
		↓	↓	
		NCST-C100S * R091KTRF	91	
100mΩ ~ 976mΩ	NCST-C100S * R100HTRF	100	±500ppm (H)	
	↓	↓		
	NCST-C100S * R976HTRF	976		

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



## CONSTRUCTION



1 Alumina Substrate	4 Edge Electrode	7 Resistor Layer
2 Bottom Electrode	5 Barrier Layer	8 Primary Overcoat
3 Top Electrode	6 External Electrode	9 Secondary Overcoat

## CHARACTERISTICS FOR HIGHER POWER RATINGS

Type	EIA Size	Power Rating at 70°C	Resistance Tolerance	Temperature Coefficient (°C)	Resistance Range	Resistance Range (Codes)	Operating Temp. Range (°C)
NCST-C04H	0402	1/10W	1% (F) 5% (J)	±800ppm (K)	50mΩ ~ 91mΩ	R050 ~ R091	-55°C ~ +155°C
				±500ppm (H)	100mΩ ~ 976mΩ	R100 ~ R976	
NCST-C06H	0603	1/8W	1% (F) 5% (J)	±1200ppm (S)	20mΩ ~ 47mΩ	R020 ~ R047	
				±800ppm (K)	50mΩ ~ 91mΩ	R050 ~ R091	
				±500ppm (H)	100mΩ ~ 976mΩ	R100 ~ R976	
NCST-C10H	0805	1/4W	1% (F) 5% (J)	±1500ppm (T)	10mΩ ~ 18mΩ	R010 ~ R018	
				±1200ppm (S)	20mΩ ~ 47mΩ	R020 ~ R047	
				±800ppm (K)	50mΩ ~ 91mΩ	R050 ~ R091	
				±500ppm (H)	100mΩ ~ 976mΩ	R100 ~ R976	
NCST-C12H	1206	1/2W	1% (F) 5% (J)	±1500ppm (T)	10mΩ ~ 18mΩ	R010 ~ R018	
				±1200ppm (S)	20mΩ ~ 47mΩ	R020 ~ R047	
				±800ppm (K)	50mΩ ~ 91mΩ	R050 ~ R091	
				±500ppm (H)	100mΩ ~ 976mΩ	R100 ~ R976	
NCST-C25H	1210	1/2W	1% (F) 5% (J)	±1500ppm (T)	10mΩ ~ 18mΩ	R010 ~ R018	
				±800ppm (K)	20mΩ ~ 91mΩ	R020 ~ R091	
				±500ppm (H)	100mΩ ~ 976mΩ	R100 ~ R976	
NCST-C50H	2010	1W	1% (F) 5% (J)	±1500ppm (T)	10mΩ ~ 18mΩ	R010 ~ R018	
				±800ppm (K)	20mΩ ~ 91mΩ	R020 ~ R091	
				±500ppm (H)	100mΩ ~ 976mΩ	R100 ~ R976	
NCST-C100H	2512	2W	1% (F) 5% (J)	±1500ppm (T)	10mΩ ~ 18mΩ	R010 ~ R018	
				±800ppm (K)	20mΩ ~ 91mΩ	R020 ~ R091	
				±500ppm (H)	100mΩ ~ 976mΩ	R100 ~ R976	

## AVAILABLE HIGH POWER VALUES AND PART NUMBERS

	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
0402 Size 1/10W	50mΩ ~ 91mΩ	NCST-C04H * R050KTRF	50	±800ppm (K)
		↓	↓	
		NCST-C04H * R091KTRF	91	
	100mΩ ~ 976mΩ	NCST-C04H * R100HTRF	100	±500ppm (H)
		↓	↓	
		NCST-C04H * R976HTRF	976	
0603 Size 1/8W	20mΩ ~ 47mΩ	NCST-C06H * R020STRF	20	±1200ppm (S)
		↓	↓	
		NCST-C06H * R047STRF	47	
	50mΩ ~ 91mΩ	NCST-C06H * R050KTRF	50	±800ppm (K)
		↓	↓	
		NCST-C06H * R091KTRF	91	
	100mΩ ~ 976mΩ	NCST-C06H * R100HTRF	100	±500ppm (H)
		↓	↓	
		NCST-C06H * R976HTRF	976	

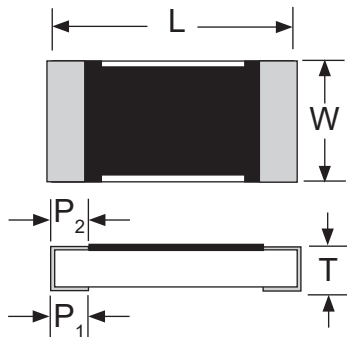
## AVAILABLE HIGH POWER VALUES AND PART NUMBERS

	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
0805 Size 1/4W	10mΩ ~ 18mΩ	NCST-C10H * R010TTRF	10	±1500ppm (T)
		↓	↓	
		NCST-C10H * R018TTRF	18	
	20mΩ ~ 47mΩ	NCST-C10H * R020STRF	20	±1200ppm (S)
		↓	↓	
		NCST-C10H * R047STRF	47	
	50mΩ ~ 91mΩ	NCST-C10H * R050KTRF	50	±800ppm (K)
		↓	↓	
		NCST-C10H * R091KTRF	91	
	100mΩ ~ 976mΩ	NCST-C10H * R100HTRF	100	±500ppm (H)
↓		↓		
NCST-C10H * R976HTRF		976		
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
1206 Size 1/2W	10mΩ ~ 18mΩ	NCST-C12H * R010TTRF	10	±1500ppm (T)
		↓	↓	
		NCST-C12H * R018TTRF	18	
	20mΩ ~ 47mΩ	NCST-C12H * R020STRF	20	±1200ppm (S)
		↓	↓	
		NCST-C12H * R047STRF	47	
	50mΩ ~ 91mΩ	NCST-C12H * R050KTRF	50	±800ppm (K)
		↓	↓	
		NCST-C12H * R091KTRF	91	
	100mΩ ~ 976mΩ	NCST-C12H * R100HTRF	100	±500ppm (H)
↓		↓		
NCST-C12H * R976HTRF		976		
	Available Value Range	Part Number	Resistance Value (mΩ)	Available TCR
1210 Size 1/2W	10mΩ ~ 18mΩ	NCST-C25H * R010TTRF	10	±1500ppm (T)
		↓	↓	
		NCST-C25H * R018TTRF	18	
	20mΩ ~ 91mΩ	NCST-C25H * R020KTRF	20	±800ppm (K)
		↓	↓	
		NCST-C25H * R091KTRF	91	
	100mΩ ~ 976mΩ	NCST-C25H * R100HTRF	100	±500ppm (H)
		↓	↓	
		NCST-C25H * R976HTRF	976	
		Available Value Range	Part Number	Resistance Value (mΩ)
2010 Size 1W	10mΩ ~ 18mΩ	NCST-C50H * R010TTRF	10	±1500ppm (T)
		↓	↓	
		NCST-C50H * R018TTRF	18	
	20mΩ ~ 91mΩ	NCST-C50H * R020KTRF	20	±800ppm (K)
		↓	↓	
		NCST-C50H * R091KTRF	91	
	100mΩ ~ 976mΩ	NCST-C50H * R100HTRF	100	±500ppm (H)
		↓	↓	
		NCST-C50H * R976HTRF	976	
		Available Value Range	Part Number	Resistance Value (mΩ)
2512 Size 2W	10mΩ ~ 18mΩ	NCST-C100H * R010TTRF	10	±1500ppm (T)
		↓	↓	
		NCST-C100H * R018TTRF	18	
	20mΩ ~ 91mΩ	NCST-C100H * R020KTRF	20	±800ppm (K)
		↓	↓	
		NCST-C100H * R091KTRF	91	
	100mΩ ~ 976mΩ	NCST-C100H * R100HTRF	100	±500ppm (H)
		↓	↓	
		NCST-C100H * R976HTRF	976	

### DIMENSIONS (mm)

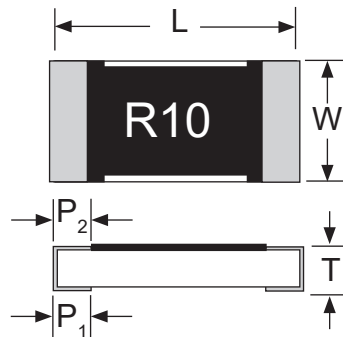
Type	Case Size	Length (L)	Width (W)	Thickness (T)	Termination Width (P <sub>1</sub> )	Termination Width (P <sub>2</sub> )
NCST-C04	0402	1.00 ± 0.05	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.20 ± 0.10
NCST-C06	0603	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
NCST-C10	0805	2.00 ± 0.10	1.25 ± 0.10	0.50 ± 0.10	0.35 ± 0.20	0.40 ± 0.20
NCST-C12	1206	3.10 ± 0.10	1.55 ± 0.10	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.20
NCST-C25	1210	3.10 ± 0.10	2.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.20
NCST-C50	2010	5.00 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20
NCST-C100	2512	6.35 ± 0.10	3.10 ± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20

Case Sizes  
0402  
No Marking



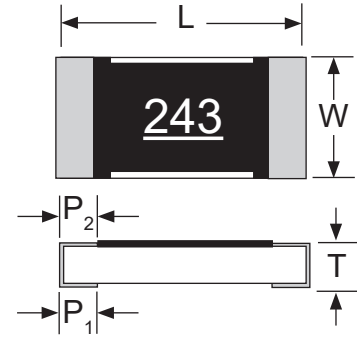
Case Sizes 0603  
3 Character Marking

Marking for E-24 values  
and E-96 values end with 0



R10 = 100 milli-ohm  
R28 = 280 milli-ohm

Marking for all other  
E-96 values



243 = 243 milli-ohm  
R28 = 280 milli-ohm

Case Sizes  
0805, 1206, 1210, 2010 & 2512  
4 Character Marking

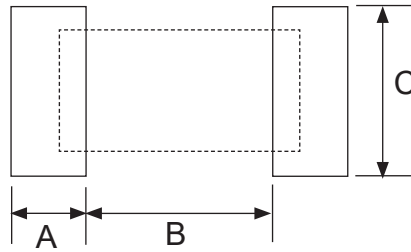
Resistance Value	47mΩ	75mΩ	15mΩ	750mΩ	820mΩ
Code	R047	R075	R015	R750	R820

## ENVIRONMENTAL CHARACTERISTICS

Item	Specification		Test Method
Temperature Coefficient of Resistance	As Specified		JIS-C-5201-1 4.8 IEC-60115-1 4.8 -55°C ~ +125°C, 25°C reference
Short Time Overload	1% tol.	5% tol.	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV * 2.5 or max. overload voltage whichever is less for 5 seconds (2 seconds for Higher Power parts)
	$\pm 1.0\% + 0.05\Omega$	$\pm 2.0\% + 0.05\Omega$	
Dielectric Withstanding Voltage	No breakdown or flashover		JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times max operating voltage for 1 minute
Insulation Resistance	>10000M $\Omega$		JIS-C-5201-1 4.6 IEC-60115-1 4.6 Maximum overload voltage for 1 minute
Resistance to dry heat	1% tol.	5% tol.	JIS-C-5201-1 4.23 IEC-60115-1 4.23.2 +155°C for 1,000 hours
	$\pm 1.0\% + 0.05\Omega$	$\pm 1.5\% + 0.1\Omega$	
Load Life	1% tol	5% tol	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1 RCWV @ 70°C, cycles of 1.5 hours ON, 0.5 hrs OFF for 1,000 hours
	$\pm 1\% + 0.10\Omega$	$\pm 2\% + 0.10\Omega$	
Resistance to Soldering Heat	1% tol	5% tol	JIS-C-5201-1 4.18 IEC-60115-1 4.18 +260°C $\pm 5^\circ\text{C}$ for 10 sec.
	$\pm 0.5\% + 0.05\Omega$	$\pm 1\% + 0.05\Omega$	
Humidity (Steady State)	1% tol	5% tol	JIS-C-5201-1 4.24 IEC-60115-1 4.24 +40°C, 90 ~ 95% RH, RCWV 1.5 hours ON, 0.5 hours OFF, total 1000 hours
	$\pm 1\% + 0.10\Omega$	$\pm 2\% + 0.10\Omega$	
Dry Heat	1% tol	5% tol	JIS-C-5201-1 4.23 IEC-60115-1 4.23.2 +155°C for 1000 hours
	$\pm 1\% + 0.05\Omega$	$\pm 1.5\% + 0.10\Omega$	
Solderability	95% min. coverage		JIS-C-5201-1 4.17 IEC-60115-1 4.17 +245°C $\pm 5^\circ\text{C}$ for 3 sec.
Leaching	Individual leaching area $\leq 5\%$ Total leaching area $\leq 10\%$		JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 +260°C $\pm 5^\circ\text{C}$ for 30 sec.
Rapid Change in Temperature	1% tol	5% tol	JIS-C-5201-1 4.19 IEC-60115-1 4.19 -55°C ~ $\pm 155^\circ\text{C}$ , 5 cycles
	$\pm 0.5\% + 0.05\Omega$	$\pm 1\% + 0.05\Omega$	
Bending Strength	$\pm 1\% + 0.05\Omega$		JIS-C-5201-1 4.33 IEC-60115-1 4.33 3mm for 5 seconds (2mm for 2010 & 2512)

### LAND PATTERN DIM. (mm)

Type	A	B	C
NCST-C04	0.45	0.50	0.60
NCST-C06	0.60	0.90	0.90
NCST-C10	0.70	1.20	1.30
NCST-C12	0.90	2.00	1.60
NCST-C25	0.90	2.00	2.80
NCST-C50	0.90	3.80	2.80
NCST-C100	1.60	3.80	3.50

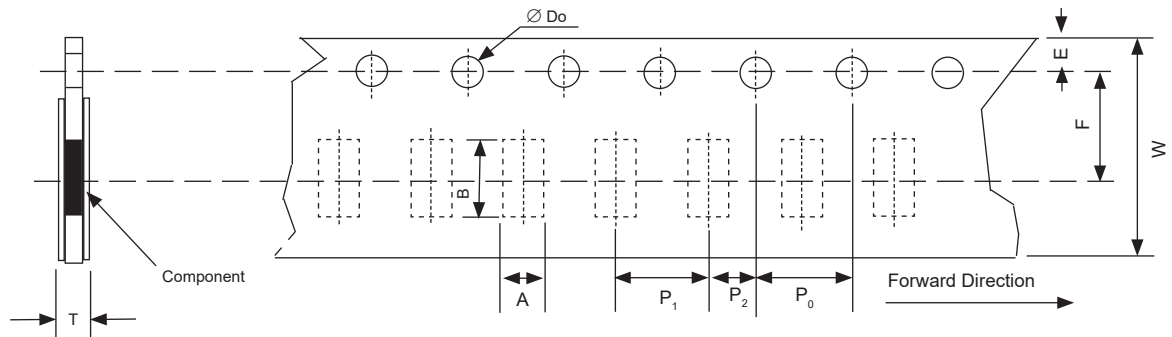


### Reflow Soldering Heat Profile and Limits

→ [www.nicomp.com/resource/files/resistive/NIC-ChipR-Reflow-Sept2020-Rev2.pdf](http://www.nicomp.com/resource/files/resistive/NIC-ChipR-Reflow-Sept2020-Rev2.pdf)  
 Wave soldering? – Please review your wave soldering process profile with NIC: [tpmg@nicomp.com](mailto:tpmg@nicomp.com)

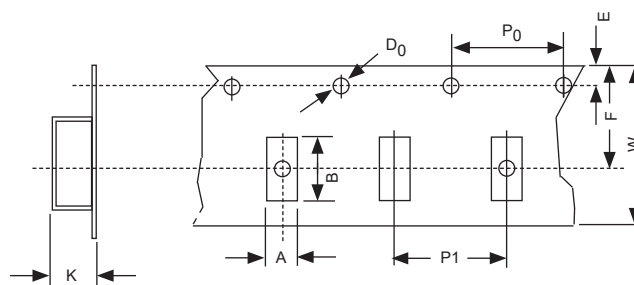
### PAPER CARRIER TAPE DIMENSIONS (mm)

Type	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	φD	T
NCST-C04	0.65 ± 0.10	1.15 ± 0.10	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	4.00 ± 0.10	1.50 +0.1/-0	0.45 ± 0.10
NCST-C06	1.10 ± 0.10	1.90 ± 0.10				0.70 ± 0.10				
NCST-C10	1.60 ± 0.10	2.40 ± 0.20				4.00 ± 0.05				0.85 ± 0.10
NCST-C12	1.90 ± 0.10	3.50 ± 0.20								
NCST-C25	2.90 ± 0.10	3.50 ± 0.20								



### 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>0</sub>
NCST-C50	2.80 ± 0.10	5.50 ± 0.10	12.0 ± 0.30	5.50 ± 0.05	1.00 ± 0.20	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.1	1.50 +0.1/-0
NCST-C100	3.50 ± 0.10	6.70 ± 0.10								





### REEL DIMENSIONS (mm) AND QUANTITY

Type	A	B	C	W	Quantity
NCST-C04	178.5 ±1.5	60 +1.0	13.0 ±0.2	9.5 ±0.5	10,000
NCST-C06					5,000
NCST-C10					
NCST-C12			4,000		
NCST-C25					
NCST-C50	13.0 ±0.5	13.0 ±0.5			
NCST-C100					

