

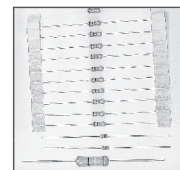
## FEATURES

- ECONOMICALLY PRICED FOR COMMERCIAL AND INDUSTRIAL APPLICATIONS
- WIDE SELECTION OF POWER RATINGS AND RESISTANCE VALUES
- EIA COLOR CODING RESISTANT TO INDUSTRIAL SOLVENTS
- AVAILABLE ON TAPE AND REEL FOR AUTOMATIC INSERTION AND BULK PACK FOR SMALLER PRODUCTION RUNS
- NEW REDUCED SIZES AT HIGHER POWER RATINGS
- ±5% TOLERANCE STANDARD

**RoHS  
Compliant**

includes all homogeneous materials

\*See Part Number System for Details



## STANDARD TYPES, RATINGS AND AVAILABILITY

Type	NCF25R	NCF25	NCF50	NCF50R	NCF100	NCF200
Power Rating at 70°C	0.25W	0.25W	0.50W	0.50W	1.0W	2.0W
Max. Working Voltage at 70°C	250V	250V	350V	350V	500V	750V
Max. Overload Voltage at 70°C	500V	500V	700V	700V	1000V	1500V
Resistance Range   ±5% (J) Tol.	1.0Ω~10MegΩ	0.5Ω~10MegΩ	1.0Ω~10MegΩ	1.0Ω~10MegΩ	1.0Ω~10MegΩ	1.0Ω~10MegΩ
Resistance Value Availability	E-24	E-24	E-24	E-24	E-24	E-24

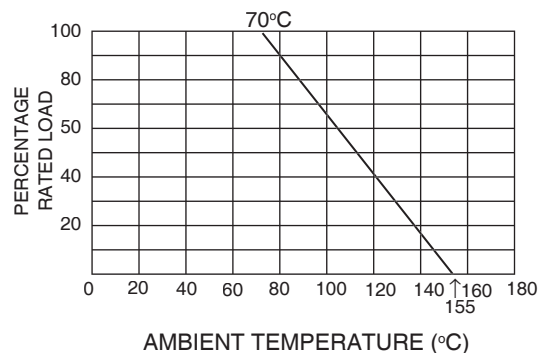
## PERFORMANCE CHARACTERISTICS

Requirements		Performance		Test Method & Conditions	
Operating Temperature Range		-55 ~ +155°C (derated above +70°C - see chart)		JIS C5202	MIL-R-10509F
Temperature Coefficient (ppm/°C)	(ppm/°C)	0.25W & Over	NCF25R	5.2 1- to = 80°C	4.6.12
	0 ~ -450	≤100KΩ	≤22KΩ		
	0 ~ -700	110KΩ ~ 1megΩ	24KΩ ~ 470KΩ		
	0 ~ -1000	1.1megΩ ~ 2.2megΩ	510KΩ ~ 2.2megΩ		
Noise (μV/V)	0 ~ -1300	2.4megΩ ~ 10megΩ	2.2megΩ ~ 10megΩ	JIS C5202 5.9 Method II	
	(μV/V)	(NCF25R)	0.25W & Over		
	0.1	-	0.5Ω ~ 10KΩ		
	0.3	1.0Ω ~ 10KΩ	11Ω ~ 91KΩ		
Short Time Overload	0.5	11Ω ~ 91KΩ	100KΩ ~ 1megΩ	5.5 Cond. A	4.6.6
	1.0	100KΩ ~ 10megΩ	1.1megΩ ~ 10megΩ		
Temperature Cycling		ΔR ≤ ±(1%+0.05Ω)		7.4-55°C/+85°C	4.6.4
Soldering Effect		ΔR ≤ ±(0.5%+0.05Ω)		6.4 350°C 3 sec.	4.6.10
Vibration		ΔR ≤ ±(1%+0.05Ω)		6.3 Cond. A	4.6.16
Moisture Resistance	R > 100K	ΔR ≤ ±5%		7.9 40°C	4.6.11
	R ≤ 100K	ΔR ≤ ±(3%+0.05Ω)		90-95%RH 1000hrs	
Load Life	R > 100K	ΔR ≤ ±3%		7.10	4.6.13
	R ≤ 100k	ΔR ≤ ±(3%+0.05Ω)		70°C 1000hrs	

\* Maximum allowable continuous voltage (Vdc or rms) for all resistors is the lower of the two values: "MAXIMUM WORKING VOLTAGE" as specified, or

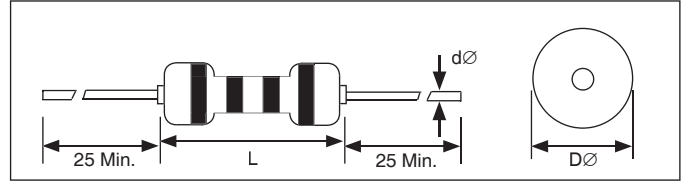
$$\sqrt{\text{Power rating (WATTS) x Resistance (OHMS)}}$$

## Derating Curve



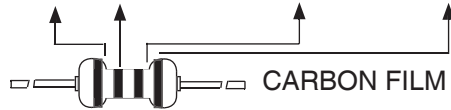
## DIMENSIONS (mm)

Type	Dφ	L	dφ ± 0.05
NCF25R	1.8 ± 0.2	3.3 ± 0.4	0.45
NCF25	2.5 ± 0.5	6.3 ± 0.5	0.56
NCF50	3.5 ± 0.5	9.0 ± 0.5	0.65
NCF50R	2.3 ± 0.5	6.5 ± 0.5	0.56
NCF100	4.5 ± 0.5	11.0 ± 0.5	0.80
NCF200	5.5 ± 0.5	15.0 ± 0.5	0.80



## COLOR CODING

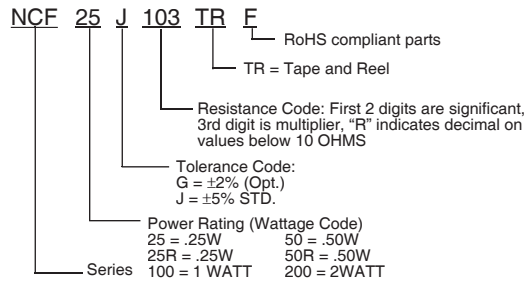
Color	Significant Figure			Multiplier	Tolerance
	1st	2nd	3rd		
Black	0	0	0	1	-
Brown	1	1	1	10	F (±1%)
Red	2	2	2	100	G (±2%)
Orange	3	3	3	1,000	-
Yellow	4	4	4	10,000	-
Green	5	5	5	100,00	D (±0.5%)
Blue	6	6	6	1,000,000	C (±0.25%)
Violet	7	7	7	10,000,000	B (±0.1%)
Grey	8	8	8	-	-
White	9	9	9	-	-
Gold	-	-	-	0.1	J (±5%)
Silver	-	-	-	0.01	K (±10%)



## SIGNIFICANT VALUES OF NOMINAL RESISTANCE E-24 5% (J)

1.0	2.2	4.7
1.1	2.4	5.1
1.2	2.7	5.6
1.3	3.0	6.2
1.5	3.3	6.8
1.6	3.6	7.5
1.8	3.9	8.2
2.0	4.3	9.1

## PART NUMBER SYSTEM



## PACKAGING & REEL QUANTITIES

Tape and Reel - 5K NCF25R, 25 and 50R  
 2.5K NCF50  
 2K NCF100  
 1K for NCF200

# Zero-Ohm Resistors

## FEATURES

- STANDARD 1/8 WATT AND 1/4 WATT SIZES
- FOR JUMPERS OR CROSSOVERS ON PCB'S
- TAPE AND REEL FOR AUTOMATIC INSERTION
- SINGLE BLACK BAND INDICATES ZERO RESISTANCE

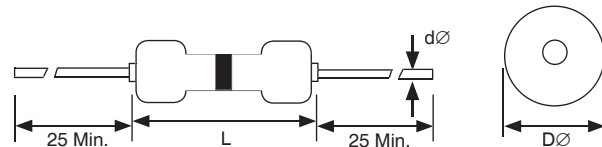
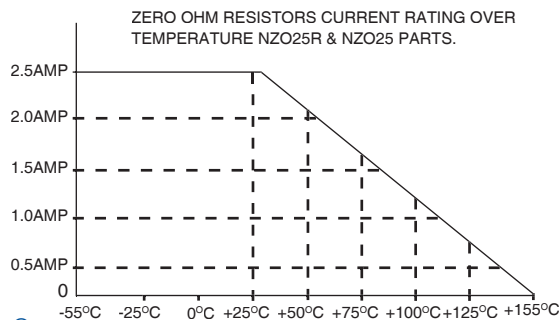
## SPECIFICATIONS

OPERATING TEMPERATURE RANGE: -55°C to +155°C

RESISTANCE: 0.01 OHM or less

CURRENT RATING: 2.5 AMPS (-55°C to +70°C)

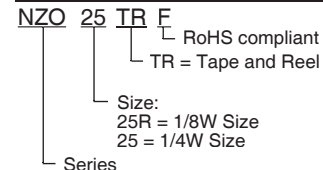
DERATED GRAPH BELOW



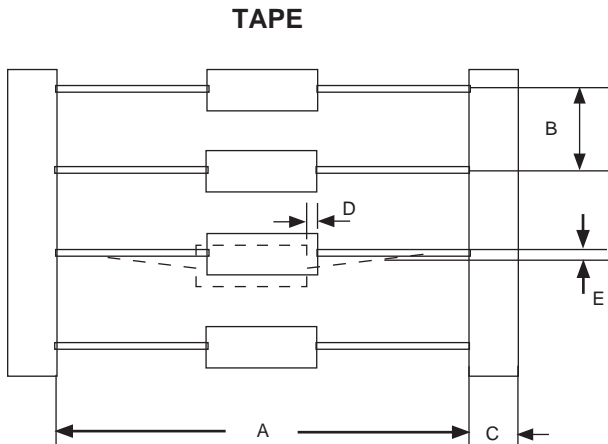
## DIMENSIONS (mm)

Type	Dφ	L	dφ ± 0.05
NZO25R	1.8 ± 0.1	3.2 ± 0.2	0.5
NZO25	2.3 ± 0.2	6.5 ± 0.5	0.6

## PART NUMBER SYSTEM



# Resistor Taping Specifications & Mechanical Characteristics

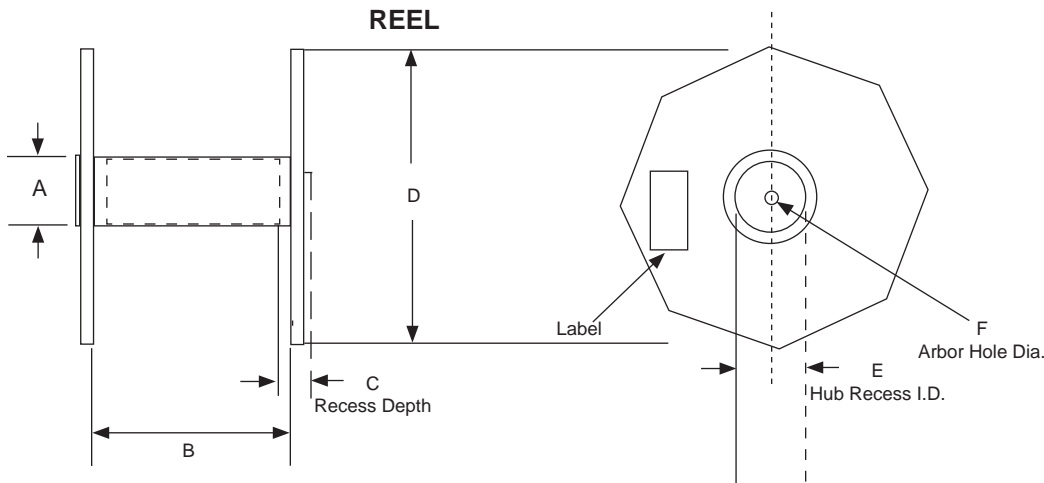


**TAPE DIMENSIONS (mm)**

Power Rating (Wattage)	A	B	C	D max.	E max.
1/8W	52 ± 1.0	5 ± 0.5	6 ± 0.3	0.6	1.2
1/4W	52 ± 1.0	5 ± 0.5	6 ± 0.3	0.6	1.2
1/2W	52 ± 1.0	5 ± 0.5	6 ± 0.3	0.6	1.2
1W	52.4 ± 1.5	5 ± 0.6	6 ± 0.3	0.6	1.2
	63.5 ± 1.5				
2W	52.4 ± 1.5	5 ± 0.6	6 ± 0.3	0.6	1.2
	63.5 ± 1.5				

**REEL DIMENSIONS (mm)**

Power Rating	A max.	B	C ref.	D max.	E max.	F ± 1.0
1/8W ~ 2W	60	40 ~ 100	16	312	53	15
3W		70 ± 10				14.5



## MECHANICAL CHARACTERISTICS

### LEAD PULL TEST

The lead wire shall withstand steady pull of the following weight axially to the lead wire for the minimum period of 10 seconds without any breakage or damage:

Nom. Lead Diameter	0.4φmm	0.5φmm	0.6φmm	0.7φmm	0.8φmm & over
Steady Weight	1.0Kgs.	1.0Kgs.	1.5Kgs	2.0Kgs.	2.5Kgs.

### LEAD BEND TEST

The lead wire shall withstand minimum 4 bends of 90° rotation without any breakage or damage, when the resistor is placed in a vertical position and is applied with a weight of 0.5Kgs for 0.4 - 0.5mm or 1.1Kgs for 0.6mm and over lead wire.

### SOLDERABILITY

The lead wire is immersed into 10% methanol or isopropyl alcohol of rosin by weight for a period of 2 ± 0.5 seconds. Then, it shall be dipped into molten solder melted at 230 ± 5°C for a period of 5 ± 1 seconds approximately 1.5mm from the body of the resistor. A new adhering coating of solder shall cover minimum 95% of the surface being dipped into solder.

### RESISTANCE TO CLEANING SOLVENTS

Color coating or marking shall remain legible after cleaning by solvents such as isopropyl alcohol, trichloroethylene, freon® TF/TAX, xylene etc., in form of liquid or gas.

