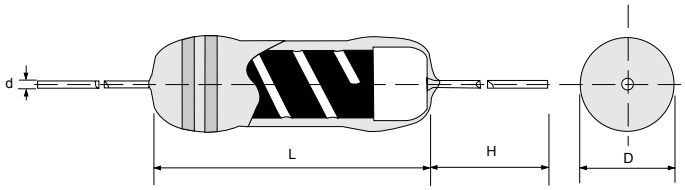
NFR - Non Flammable Carbon Film Resistor

Quality • Reliability
Cost-Down via Technology



Specifications Per

- IEC 60115-1, IEC 60115-4
- MIL-R-10509

Features

- Conformal multi-layer non-flammable coating
- Color code per MIL & EIA standards
- Special tin-plated electrolytic copper lead wire
- Products meet RoHS requirements and do not contain substances of very high concern identified by European Chemicals Agency

DIMENSIONS

Type	Body Length (L, mm)	Body Diameter (D, mm)	Lead Wire Length (H, mm)	Lead Wire Diameter (d, mm)	Net Weight Per 1000Pcs
NFR16	3.20 ± 1.0	1.9 ± 0.2	28 ± 3.0	0.45 ± 0.02	145 Grams
NFR20	3.20 ± 1.0	1.9 ± 0.2	28 ± 3.0	0.45 ± 0.02	145 Grams
NFR25	6.50 ± 1.0	2.4 ± 0.2	26 ± 3.0	0.55 ± 0.03	220 Grams
NFR51	8.80 ± 1.0	3.2 ± 0.2	26 ± 3.0	0.60 ± 0.03	340 Grams
NFR52	6.50 ± 1.0	2.6 ± 0.3	26 ± 3.0	0.55 ± 0.03	300 Grams
NFR100	11.0 ± 1.0	4.5 ± 0.5	26 ± 3.0	0.70 ± 0.03	600 Grams
NFR200	15.5 ± 1.0	5.5 ± 0.5	26 ± 3.0	0.80 ± 0.03	1200 Grams

GENERAL SPECIFICATIONS

Type	Power Rating (at 70°C)	Maximum Working Voltage	Maximum Overload Voltage	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Available Resistance Values
NFR16	1/6W	200V	400V	1Ω	1MΩ	±5%	E-24
NFR20	1/4W	250V	500V	1Ω	1MΩ	±5%	E-24
NFR25	1/3W	250V	500V	1Ω	10MΩ	±5%	E-24
NFR51	1/2W	350V	650V	1Ω	10MΩ	±5%	E-24
NFR52	1/2W	350V	500V	1Ω	4.7MΩ	±5%	E-24
NFR100	1W	500V	1000V	1Ω	1MΩ	±5%	E-24
NFR200	2W	500V	1000V	1Ω	1MΩ	±5%	E-24

Special sizes, values, and specifications not listed available on special order.

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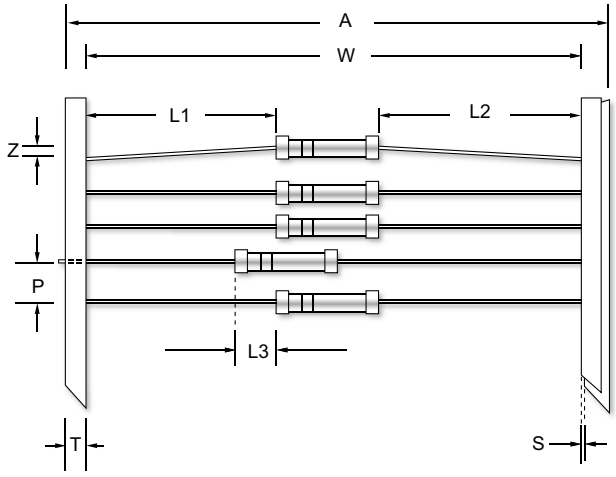
TAPING/PACKING SPECIFICATIONS



Unit (mm)

Type	A (Max.)	L1-L2 (Max.)	L3 (Max.)	P ±0.5	S (Max.)	T ±0.5	W ±1.5	Z (Max.)
NFR16	65	±1.0	0.5	5.0	0.8	6.0	52.5	1.2
NFR20	65	±1.0	0.5	5.0	0.8	6.0	52.5	1.2
NFR25	65	±1.0	0.5	5.0	0.8	6.0	52.5	1.2
NFR51	65	±1.0	0.5	5.0	0.8	6.0	52.5	1.2
NFR52	65	±1.0	0.5	5.0	0.8	6.0	52.5	1.2
NFR100	65	±1.0	0.5	5.0	0.8	6.0	52.5	1.2
NFR200	76	±1.5	1.0	10.0	0.8	6.0	63.5	1.2

Type	Packing Type	NFR16	NFR20	NFR25	NFR51	NFR52	NFR100	NFR200
Minimum Packing QTY (pcs)	Ammo pack	5000	5000	5000	2000	2000	1000	500

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PART NUMBER

Example: NFR16J10K0TKZTB5K0

NFR16	J	10K0	TKZ	TB5K0
Type	Tolerance	Resistance	TCR	Packaging
	J (5%)	10KΩ **4-character code** containing - 3 significant digits 1 letter multiplier MULTIPLIER R = 1 K = 10^3 M = 10^6 G = 10^9	**3-character code** TKZ = Default Product Temperature Coefficient. Information of typical product temperature coefficient can be found in the Technical Summary section of the datasheet.*	**5-character code** TB = Tape Box (pieces per box) NFR16/20/25 5K0 = 5,000 NFR51/52 2K0 = 2,000 NFR100 1K0 = 1,000 NFR200 500 = 500

*** For the availabilities of non-default temperature coefficient, please check with us. Reference for TCR letter codes can be found in section (4) of Part Number Construction in the Appendices.**

TECHNICAL SPECIFICATIONS

Characteristics	Limits			
Dielectric Withstanding Voltage VAC or DC	NFR16 / 20 NFR25 / 52 NFR51 NFR100 / 200		300 500 700 1000	
Temperature Coefficient	NFR16 /20	NFR25 /51 /52	NFR100 /200	PPM/°C
	≤ 33K	≤ 33K	≤ 56K	±300
	36K~330K	36K~330K	68K~470K	- 500
	130K~470K	360K~470K	510K~1M	- 700
	510K~910K	510K~1M	>1M	-1000
	>910K	>1M		-1500
Operating Temperature Range, °C	-55~+155			
Insulation Resistance, MΩ	10^4			
Power Derating, Linear	100% at 70°C, down to zero at 155°C			

PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits
Short Time Over Load	**IEC 60115-1 4.13** 5 seconds 2.5x rated voltage (not over max. overload voltage)	±2%
Load Life In Humidity	**IEC 60115-1 4.24** 56 days rated load at (40±2)°C and (93±3)% relative humidity	±5%
Load Life 1,000 hours	**IEC 60115-1 4.25.1** Rated load with 1.5 hours ON, 0.5 hours OFF, at (70±2)°C	±5%
Resistance To Soldering Heat	**IEC 60115-1 4.18.2** Leads immersed till 3mm from the body in (260±5)°C solder for 10±1 seconds	±1%
Solderability	**IEC 60115-1 4.17.2** Solder area covered after (235±3)°C/(2±0.2) seconds with flux applied	95% Min.
Vibration	**IEC 60115-1 4.22** Six hours in each parallel and axial direction with a simple harmonic motion having an amplitude of 0.75mm and 10 to 500 Hz.	±1%
Thermal Endurance	**IEC 60115-1 4.25.3** 1000 hours at 155°C without load	±1%
Thermal Shock	**IEC 60115-1 4.19** -55°C 30minutes, +155°C 30minutes, 5 cycles	±2%