

## FEATURES

- SURFACE MOUNT IN SIZES 0204 (1406), 0207 (2410) AND 0309 (3414)
- AVAILABLE IN PRECISION TOLERANCE AND TC (TO ±1% TOL. AND ±25PPM TC)
- ALL SIZES ARE AVAILABLE IN TAPE/REEL FOR AUTOMATIC MOUNTING
- SAC REFLOW SOLDERABLE (+260°C FOR 3 SECONDS)



## SPECIFICATIONS

Type	Size	Power Rating at 70°C	Max. *1 Working Voltage	Max. *2 Overload Voltage	Resistance Tolerance Code	Temperature Coefficient (ppm/°C)	Resistance Range (Ω)*3	Resistance Values	Operating Temperature Range
NFR0204Q	0204 (1406)	0.25W	200V	400V	±1% (F)	±25 (C)	100 ~ 560K	E-24 & E-96	-55°C ~ +155°C
					±1% (F)	±50 (D)	1.0 ~ 5.1M	E-24 & E-96	
					±2% (G)	±50 (D)	1.0 ~ 5.1M	E-24	
					±1% (F)	±100 (E)	5.11M ~ 10M	E-24 & E-96	
					±5% (J)	±100 (E)	0.1 ~ 0.99	E-24	
NFR0207Q	0207 (2410)	0.25W	250V	500V	±1% (F)	±25 (C)	100 ~ 560K	E-24 & E-96	
					±1% (F)	±50 (D)	1.0 ~ 5.1M	E-24 & E-96	
					±2% (G)	±50 (D)	1.0 ~ 5.1M	E-24	
					±1% (F)	±100 (E)	5.11M ~ 10M	E-24 & E-96	
					±5% (J)	±100 (E)	0.1 ~ 0.99	E-24	
NFR0207H	0207 (2410)	0.5W	250V	500V	±1% (F)	±25 (C)	100 ~ 560K	E-24 & E-96	
					±1% (F)	±50 (D)	1.0 ~ 5.1M	E-24 & E-96	
					±2% (G)	±50 (D)	1.0 ~ 5.1M	E-24 & E-96	
					±1% (F)	±100 (E)	5.11M ~ 10M	E-24 & E-96	
					±5% (J)	±100 (E)	0.1 ~ 0.99	E-24	
NFR0207J	0207 (2410)	1.0W	350V	700V	±1% (F)	±25 (C)	100 ~ 560K	E-24 & E-96	
					±1% (F)	±50 (D)	1.0 ~ 5.1M	E-24 & E-96	
					±2% (G)	±50 (D)	1.0 ~ 5.1M	E-24 & E-96	
					±1% (F)	±100 (E)	5.11M ~ 10M	E-24 & E-96	
					±5% (J)	±100 (E)	0.1 ~ 0.99	E-24	
NFR0309H	0309 (3414)	0.5W	350V	700V	±1% (F)	±25 (C)	100 ~ 560K	E-24 & E-96	
					±1% (F)	±50 (D)	1.0 ~ 5.1M	E-24 & E-96	
					±2% (G)	±50 (D)	1.0 ~ 5.1M	E-24	
					±1% (F)	±100 (E)	5.11M ~ 10M	E-24 & E-96	
					±5% (J)	±100 (E)	0.1 ~ 0.99	E-24	
NFR0309J	0309 (3414)	1.0W	350V	700V	±1% (F)	±25 (C)	100 ~ 560K	E-24 & E-96	
					±1% (F)	±50 (D)	1.0 ~ 5.1M	E-24 & E-96	
					±2% (G)	±50 (D)	1.0 ~ 5.1M	E-24	
					±1% (F)	±100 (E)	5.11M ~ 10M	E-24 & E-96	
					±5% (J)	±100 (E)	0.1 ~ 0.99	E-24	
NFR0309K	0309 (3414)	2.0W	350V	700V	±1% (F)	±25 (C)	100 ~ 560K	E-24 & E-96	
					±1% (F)	±50 (D)	1.0 ~ 5.1M	E-24 & E-96	
					±2% (G)	±50 (D)	1.0 ~ 5.1M	E-24	
					±1% (F)	±100 (E)	5.11M ~ 10M	E-24 & E-96	
					±5% (J)	±100 (E)	0.1 ~ 0.99	E-24	

Note \*1 - Maximum allowable continuous Working Voltage for all resistors is the lower of the two values:

“Maximum Working Voltage” as specified above or the result of the following formula

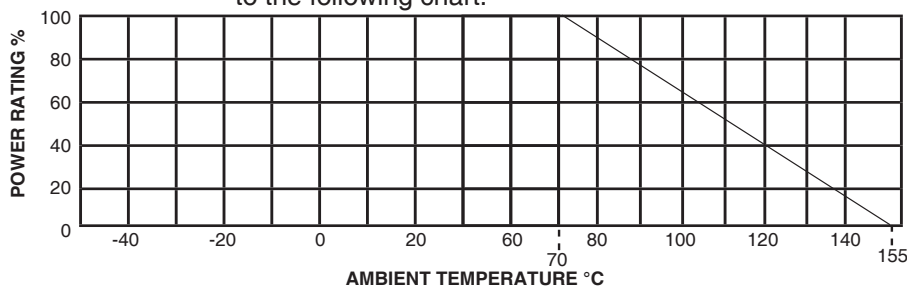
$$\sqrt{\text{Power rating (Watts)} \times \text{Resistance (Ohms)}}$$

Note \* - Maximum Overload Voltage for all resistors is the lower of the two values:

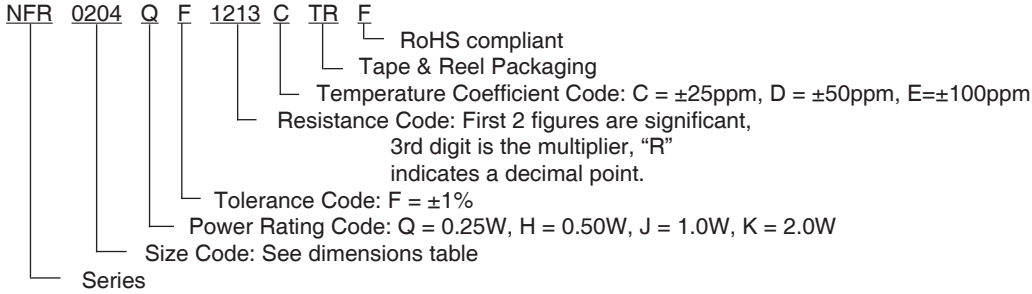
“Maximum Overload Voltage” as specified above or the result of the following formula

$$2.5 \times \sqrt{\text{Power rating (Watts)} \times \text{Resistance (Ohms) for 5 sec.}}$$

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



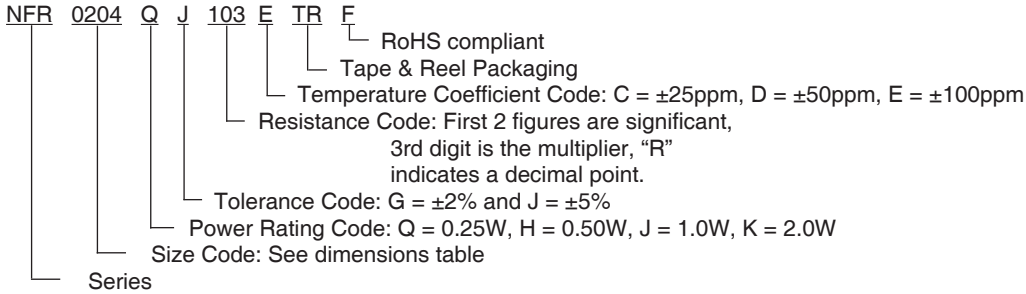
### PART NUMBER SYSTEM (1% E-24 & E-96 VALUES)



### E-24 & E-96 VALUES

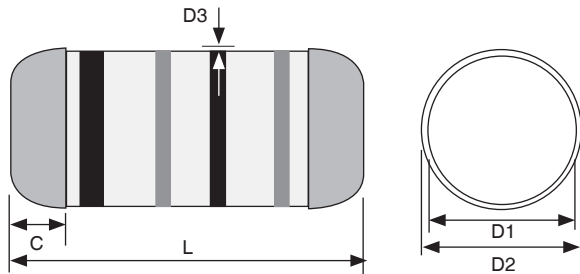
E-24 Values	E-96 Values			
100	100	102	105	107
110	110	113	115	118
120	121	124	127	130
130	133	137	140	143
150	147	150	154	158
160	162	165	169	174
180	178	182	187	191
200	196	200	205	210
220	215	221	226	232
240	237	243	249	255
270	261	267	274	280
300	287	294	301	309
330	316	324	332	340
360	348	357	365	374
390	383	392	402	412
430	422	432	442	453
470	464	475	487	499
510	511	523	536	549
560	562	576	590	604
620	619	634	649	665
680	681	698	715	732
750	750	768	787	806
820	825	845	866	887
910	909	931	953	976

### PART NUMBER SYSTEM (2% & 5% E-24 VALUES)



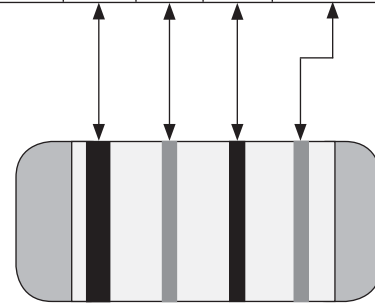
### DIMENSIONS (mm)

Type	Size	L	D1	D2	D3	C
NFR0204Q	0204	3.5 ± 0.2	1.40 ± 0.1	1.55 max.	0.10 max.	0.5 min.
NFR0207Q	0207	5.9 ± 0.2	2.20 ± 0.1	2.40 max.	0.15 max.	0.5 min.
NFR0207J						
NFR0309H	0309	8.5 ± 0.2	3.20 ± 0.2	3.40 max.	0.30 max.	0.5 min.
NFR0309J						
NFR0309K						



### COLOR CODING

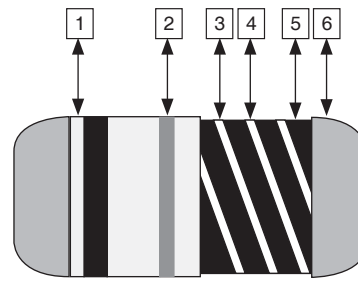
Color	Significant Figure			Multiplier
	1st	2nd	3rd*	
Black	0	0	0	1
Brown	1	1	1	10
Red	2	2	2	100
Orange	3	3	3	1,000
Yellow	4	4	4	10,000
Green	5	5	5	100,000
Blue	6	6	6	1,000,000
Violet	7	7	7	10,000,000
Grey	8	8	8	-
White	9	9	9	-
Gold	-	-	-	0.1
Silver	-	-	-	0.01



Note: 3 bands for 2%\* & 5% tolerance parts,  
4 bands for 1% tolerance parts.  
\*2% tolerance parts identified by reel label

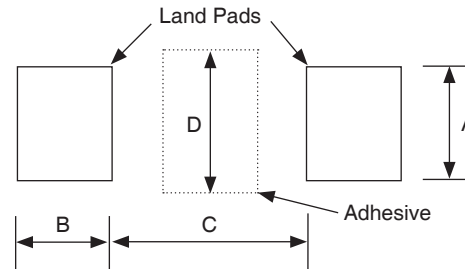
## CONSTRUCTION

Item	Material
1	Insulation Coating
2	Marking
3	Cutting Line
4	Ceramic Core
5	Resistive Film
6	Terminal

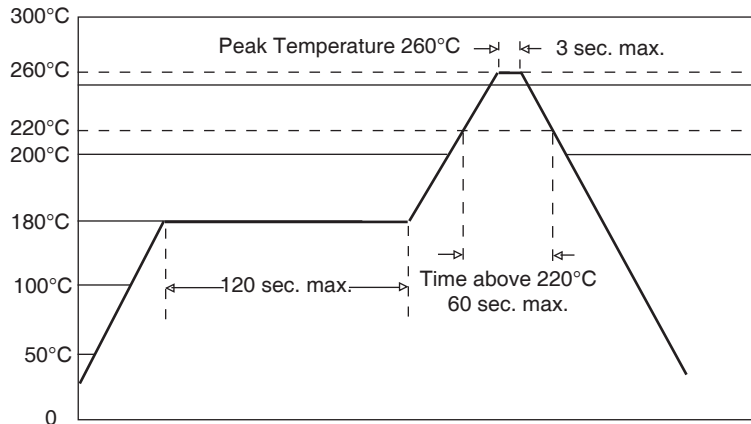


## LAND PATTERN DIMENSIONS (mm)

Type	Case Size	A	B	C	D
NFR0204Q	0204	1.5	1.5	2.0	2.2
NFR0207Q	0207	2.0	3.0	4.0	3.0
NFR0207H					
NFR0207J					
NFR0309H	0309	3.0	3.0	5.0	3.5
NFR0309J					
NFR0309K					



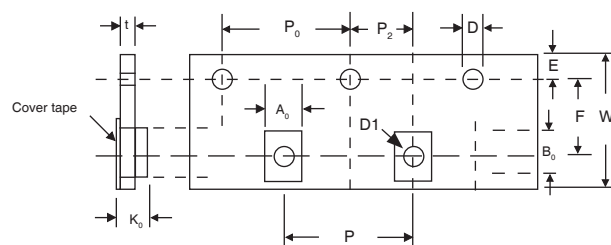
## REFLOW SOLDERING TEMPERATURE PROFILE



## CARRIER TAPE DIMENSIONS (mm)

Type	Case Size	A	B	W	F	E	D	D <sub>1</sub>	P <sub>0</sub>	P <sub>2</sub>	K <sub>0</sub>	t
NFR0204Q	0204 (1406)	1.6±0.1	3.7±0.1	8.0±0.1	3.5±0.05	1.75±0.1	1.5±0.1	1.0±0.1	4.0±0.1	2.0±0.1	1.65±0.1	0.22±0.05
NFR0207Q	0207 (2410)	2.4±0.1	6.05±0.1	12.0±0.1	5.5±0.05	1.75±0.1	1.5±0.1	1.5±0.1	4.0±0.1	2.0±0.1	2.50±0.1	0.30±0.05
NFR0207H												
NFR0207J												
NFR0309H	0309 (3414)	3.5±0.1	8.85±0.1	16.0±0.1	7.5±0.10	1.75±0.1	1.5±0.1	1.5±0.1	4.0±0.1	2.0±0.1	3.50±0.1	0.35±0.05
NFR0309J												
NFR0309K												

## EMBOSSED PLASTIC CARRIER



## REEL DIMENSIONS AND QUANTITY (mm)

Type	Case Size	A	B	C	W	T	Qty
NFR0204Q	0204	178 ± 1.0	60.0 ± 0.5	13.0 ± 0.2	9.0 ± 0.5	12.0 ± 0.15	3,000
NFR0207Q	0207	178 ± 1.0	60.0 ± 0.5	13.0 ± 0.5	13.2 ± 0.5	16.0 ± 0.20	2,000
NFR0207H							
NFR0207J							
NFR0309H	0309	330 ± 1.0	100.0 ± 1.0	13.0 ± 0.5	17.0 ± 0.5	21.5 ± 0.20	2,500
NFR0309J							
NFR0309K							

