

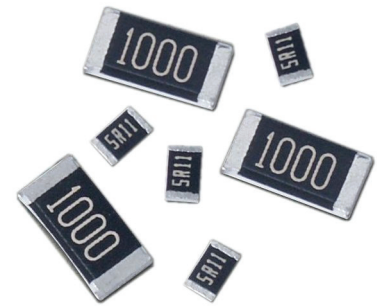
NTRF Series

High Frequency (up to 40 GHz)
Thin Film Precision Chip Resistor



FEATURES

- SMALL STANDARD SIZE 0402 CASE SIZE
- HIGH PURITY ALUMINA SUBSTRATE
- OHMIC RANGE (10 Ω ~ 1K Ω)
- SMALL INTERNAL REACTANCE (< 10 mΩ)
- RESISTOR TOLERANCE TO ±0.1%
- LOW TCR(DOWN TO ±25 PPM/°C



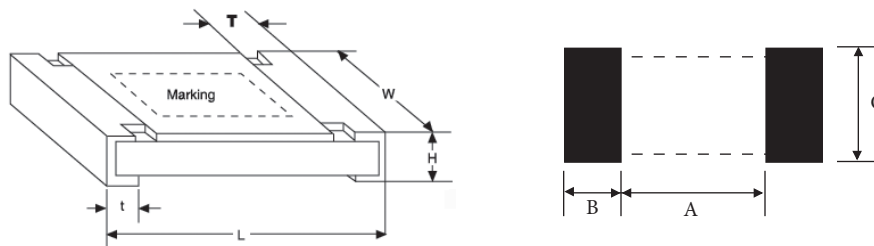
SPECIFICATIONS

Type	EIA Size	Power Rating At 70°C	Max.*1 Working Voltage	Max.*2 Overload Voltage	Resistance Tolerance (Code)	Temperature Coefficient (ppm/°C)	Resistance Range (Ω)
NTRF04	0402	1/20 (0.05)W	30V	60V	±0.1% (B) ±0.25 (C) ±0.5%(D) ±1% (F)	±25(C) ±50(D)	10Ω ~ 1KΩ
NTRF06	0603	1/8 (0.125)W	50V	100V			
NTRF10	0805	1/5 (0.20)W	50V	100V			
NTRF12	1206	1/3 (0.33)W	75V	150V			

*Please refer to page 3 for information regarding max working and overload voltage ratings

DIMENSIONS (mm) & LAND PATTERNS (mm)

Type	L	W	H	T	t	A	B	C	Weight (1000 pcs)
NTRF04	1.00 ± 0.07	0.50 ± 0.07	0.38 ± 0.15	0.20 ± 0.15	0.20 ± 0.15	0.50	0.50	0.60 ± 0.2	0.73g
NTRF06	1.55 ± 0.10	0.80 ± 0.10	0.45 ± 0.15	0.30 ± 0.20	0.50 ± 0.20	0.80	1.00	0.90 ± 0.2	2.08 g
NTRF10	2.00 ± 0.15	1.25 ± 0.15	0.45 ± 0.15	0.30 ± 0.20	0.35 ± 0.20	1.00	1.00	1.35 ± 0.2	4.15 g
NTRF12	3.05 ± 0.20	1.55 ± 0.20	0.45 ± 0.15	0.45 ± 0.20	0.35 ± 0.25	2.00	1.15	1.70 ± 0.2	7.59 g



PART NUMBER SYSTEM

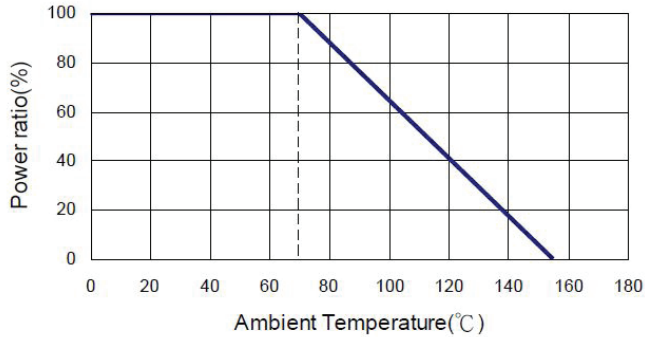
NTRF 10 B 1003 C TR 1K E
 |
 | Series
 |
 | Size Code: 02=0201, 04=0402, 06=0603, 10=0805, 12=1206
 |
 | Tolerance Code: B = ± 0.1%, C = ± 0.25%, D = ± 0.5%, F = ± 1%
 |
 | Resistance Code: First 3 digits are significant figures (both E-24 and E-96 values), 4th digit is the multiplier, "R" indicates a decimal point.
 |
 | Temperature Coefficient Code:
 | C = ±25ppm, D = ±50ppm
 |
 | Tape & Reel Packaging
 |
 | Optional 1,000 piece reel quantity
 |
 | RoHS compliant

NTRF Series

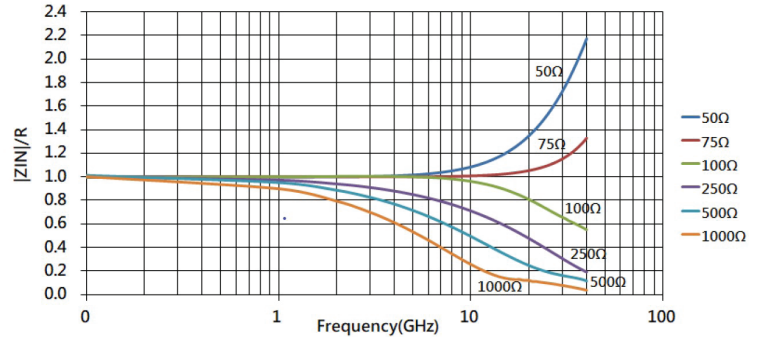
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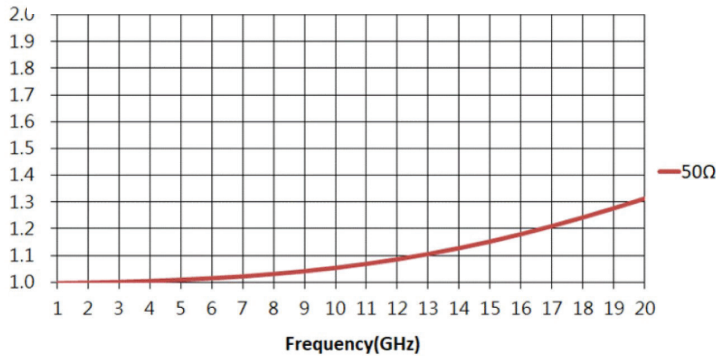
Power Derating Curve: For operation above 70°C, power rating must be derated according to the following chart:



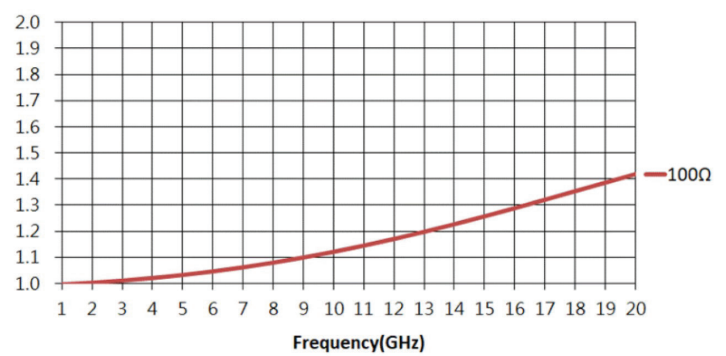
Internal Impedance NTRF04



VSWR NTRF04 50Ω



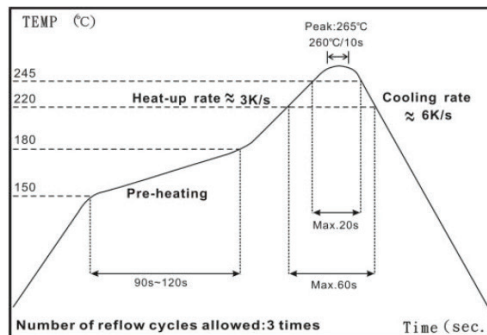
VSWR NTRF04 100Ω



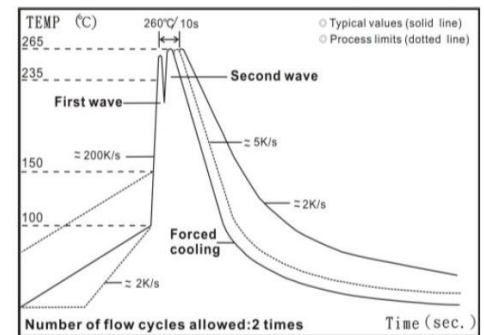
SOLDERING CONDITIONS

- (1) Time of IR reflow soldering at max. temperature point 260C: 10s
- (2) Time of wave soldering at maximum temperature point 260C: 10s
- (3) Time of soldering iron at maximum temperature point 410C: 5s

IR Reflow Soldering Profile



Wave (Flow) Soldering Profile



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ENVIRONMENTAL CHARACTERISTICS

Item	Requirement	Test Method*
Standard Temperature Range: -55°C ~ +155°C (power derating above +70°C)		
Temperature Coefficient of Resistance	As specified	MIL-STD-202 Method 304 +25/-55/+25/+125/+25
Short Time Overload	$\Delta R \pm 0.2\%$	JIS-C-5201-1 4:13 RCWV x 2.5 or Max Overloading Voltage for 5 Seconds
Dielectric Withstanding Voltage	By Type	MIL-STD-202 Method 301 Apply Max. Overload Voltage for 1 minute
Insulation Resistance	> 9999 M Ω	MIL-STD-202 Method 302 Apply 100Vdc for 1 minute
Endurance	$\Delta R \pm 0.5\%$	MIL-STD-202 Method 108 70 \pm 2°C, RCWV for 1000 hrs with 1.5 hours "ON" and 0.5 hours OFF
Damp Heat with Load	$\Delta R \pm 0.5\%$	MIL-STD-202 Method 103 40 \pm 2°C, 90~95% R.H. RCWV for 1000 hrs with 1.5 hours "ON" and 0.5 hours OFF
Bending Strength	$\Delta R \pm 0.1\%$	JIS-C-5201-1 4.33 Bending Amplitude 3mm for 60 seconds
Solderability	95% Minimum Coverage	MIL-STD-202 Method 208 245°C \pm 5°C, for 3 seconds
Resistance to Soldering Heat	$\Delta R \pm 0.1\%$	MIL-STD-202 Method 210 260°C \pm 5°C for 10 seconds
Low Temperature Operation	$\Delta R \pm 0.2\%$	JIS-C-5201-1 4.36 1 hour @ -65°C followed by 45 minutes of RCWV
High Temperature Exposure	$\Delta R \pm 0.5\%$	MIL-STD-202 Method 108 @ +155°C for 1000 hrs

RCWV (Rated Continuous Working Voltage) = $\sqrt{P \cdot R}$ or Max. Operating voltage whichever is lower

Storage Temperature: 15 ~28 °C; Humidity < 80%RH

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

Maximum Working Voltage" as specified above or:

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

Note *2 - Maximum Overload Voltage for all resistors is the lower of the two values:

Maximum Overload Voltage" as specified above or

$$2 \times \sqrt{\text{Power rating (Watts)} \times \text{Resistance (Ohms)}}$$

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STANDARD E-24 AND E-96 VALUES AND RESISTANCE CODES

E-24		E-96								
Value & Code	Value	Code	Value	Code	Value	Code	Value	Code	Value	Code
10	100	01	102	02	105	03	107	04	110	05
11	110	05	113	06	115	07	118	08	121	09
12	121	09	124	10	127	11	130	12	133	13
13	133	13	137	14	140	15	143	16	147	17
15	147	17	150	18	154	19	158	20	162	21
16	162	21	165	22	169	23	174	24	178	25
18	178	25	182	26	187	27	191	28	196	29
20	196	29	200	30	205	31	210	32	215	33
22	215	33	221	34	226	35	232	36	237	37
24	237	37	243	38	249	39	255	40	261	41
27	261	41	267	42	274	43	280	44	287	45
30	287	45	294	46	301	47	309	48	316	49
33	316	49	324	50	332	51	340	52	348	53
36	348	53	357	54	365	55	374	56	383	57
39	383	57	392	58	402	59	412	60	422	61
43	422	61	432	62	442	63	453	64	464	65
47	464	65	475	66	487	67	499	68	511	69
51	511	69	523	70	536	71	549	72	562	73
56	562	73	576	74	590	75	604	76	619	77
62	619	77	634	78	649	79	665	80	681	81
68	681	81	698	82	715	83	732	84	750	85
75	750	85	768	86	787	87	806	88	825	89
82	825	89	845	90	866	91	887	92	909	93
91	909	93	931	94	953	95	976	96		

MULTIPLIER CODE

Code	A	B, b	C	D, d	E	F	G	H	X	Y	Z
Multiplier	10 ⁰	10 ¹	10 ²	10 ³	10 ⁴	10 ⁵	10 ⁶	10 ⁷	10 ⁻¹	10 ⁻²	10 ⁻³

MARKING IDENTIFIERS

0402 Size	0603 Size	0805 and 1206 Size
No marking on 0402 sizes	<p>3 Digit Marking System: 2 digit value code + 1 digit multiplier code</p> <div style="text-align: center;"> $\begin{array}{c} \underline{XX} \quad \underline{X} \\ \qquad \\ \text{Resistance Code} \quad \text{Multiplier Code} \end{array}$ </div> <p>E24 0603 Multiplier Code: 10e multiplier E96 0603 Multiplier Code: Per table</p> <p>0603 Marking Examples: 101 = 100 Ω (E24) 13C = 13.3 KΩ (E96) 68B = 4.99 KΩ (E96) 103 = 10 KΩ (E24)</p>	<p>4 Digit Marking System: 3 digit value code + 1 digit multiplier code where "R" denotes a decimal</p> <div style="text-align: center;"> $\begin{array}{c} \underline{XXX} \quad \underline{X} \\ \qquad \\ \text{Resistance Code} \quad \text{Multiplier Code} \end{array}$ </div> <p>Value Multiplier Code: 10e multiplier</p> <p>Marking Examples: 10R0 = 10 Ω 1332 = 13.3 KΩ 4992 = 49.9 KΩ 1003 = 100 KΩ</p>

NTRF Series

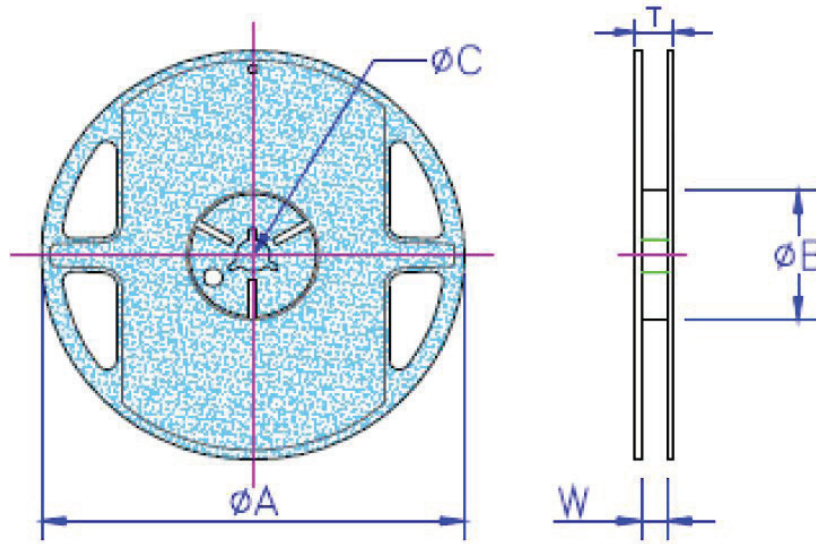
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TAPING SPECIFICATIONS

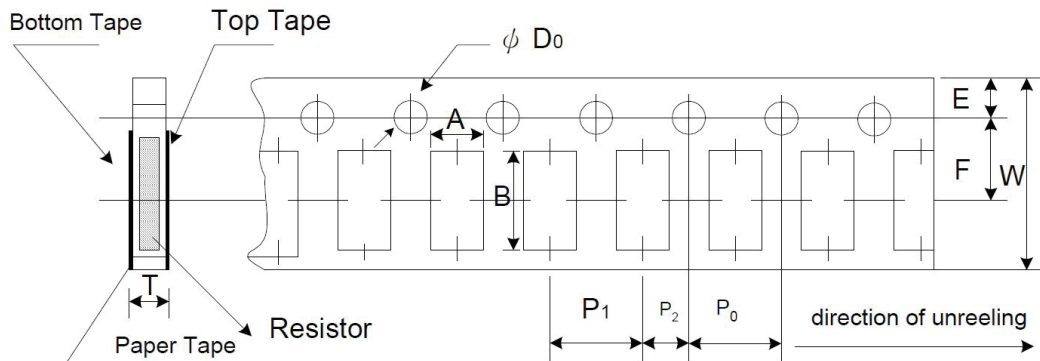
Type	EIA Size	A	B	C	W	T	Paper Tape (EA)
NTRF04	0402	1.78 ±1.0	60.0±1.0	13.5 ±0.7	9.5 ± 1.0	11.5 ±1.0	10,000
NTRF06	0603	1.78 ±1.0	60.0 ±1.0	13.5 ±0.7	9.5 ± 1.0	11.5 ±1.0	5,000
NTRF10	0805	1.78 ±1.0	60.0±1.0	13.5 ±0.7	9.5 ± 1.0	11.5 ±1.0	5,000
NTRF12	1206	1.78 ±1.0	60.0 ±1.0	13.5 ±0.7	9.5 ± 1.0	11.5 ±1.0	5,000

REEL DIMENSIONS (mm)



PAPER TAPE DIMENSIONS (mm)

Type	EIA Size	A	B	D	E	F	P ₀	P ₁	P ₂	W	T
NTRF04	0402	0.66 ± 0.06	1.18 ± 0.06	1.55 ±0.05	1.75 ±0.10	3.5 ±0.05	4.00 ± 0.10	2.00 ±0.05	2.00 ±0.05	8.00 ± 0.20	0.60 ± 0.03
NTRF06	0603	1.10 ± 0.05	1.90 ± 0.05	1.55 ±0.05	1.75 ± 0.05	3.5 ±0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ±0.05	8.00 ± 0.10	0.60 ± 0.03
NTRF10	0805	1.60 ± 0.05	2.37 ± 0.05	1.55 ±0.05	1.75 ± 0.05	3.5 ±0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ±0.05	8.00 ± 0.10	0.75 ± 0.05
NTRF12	1206	2.00 ± 0.05	3.55 ± 0.05	1.55 ±0.05	1.75 ± 0.05	3.5 ±0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	8.00 ± 0.10	0.75 ± 0.05



Unit: mm

Performance Passives By Design

NIC Components Corp.
100 Baylis Road. Melville, NY 11747

Last Updated 2/8/2023. Specification subject to change without notice. Please check web site for latest information.