

HIGH OHMIC CHIP RESISTORS HHR SERIES

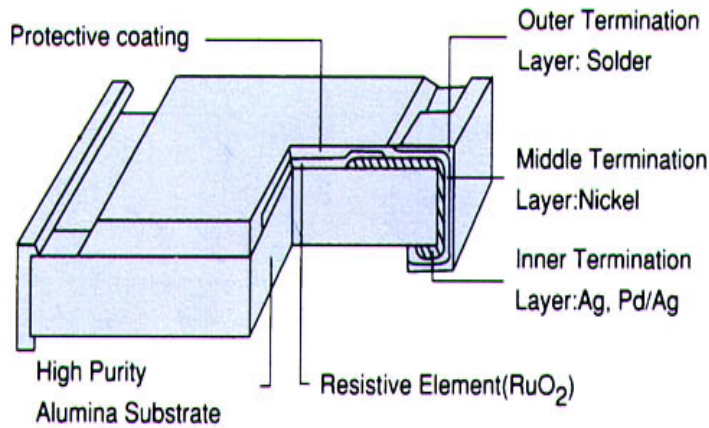
■ Features

- Small size and lightweight with size range per int'l standard
- Highly stable in auto-placement surface mounting application
- Compatible with flow and reflow soldering.

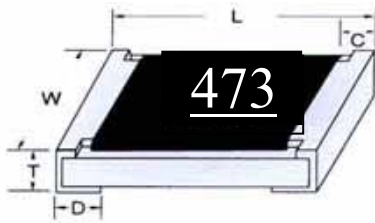
■ Applications

- Medical or Military equipment
- Printer
- Automotive industry
- Converter
- Power supply in small size

■ Configuration



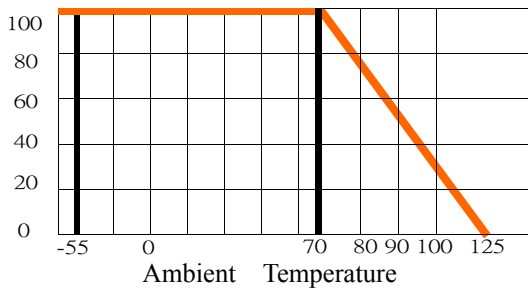
■ Dimensions



Size	L	W	C	D	T
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.15
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.15
1206	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.60±0.15
1210	3.10±0.10	2.50±0.15	0.50±0.25	0.50±0.25	0.60±0.15
2010	5.00±0.15	2.50±0.15	0.60±0.25	0.60±0.25	0.55±0.10
2512	6.40±0.15	3.20±0.15	0.60±0.25	0.60±0.25	0.55±0.10

Unit(mm)

■ Power Derating Curve



Maximum dissipation in percentage of rated power as a function of the ambient temperature for 0603,0805,1206,1210, 2010,2512

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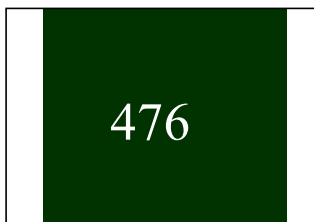
■ Rating

Type	Size	Power Rating at 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/°C)	Resistance Range		Standard Resistance Values
							Min.	Max.	
HHR0603	0603	1/10W	75V	150V	±5%(J)	±400	20.1MΩ	100MΩ	E-24
HHR0805	0805	1/8W	150V	300V					
HHR1206	1206	1/4W	200V	400V					
HHR1210	1210	1/3W	200V	400V					
HHR2010	2010	3/4W	200V	400V					
HHR2512	2512	1W	250V	500V					

■ Part Number

HHR	0805	J	R	-	47MR
Type	Size	Tolerance	Packing		Resistance
	0603	F: ± 1%	R : Paper tape- 5Kpcs		47MR= 47MΩ
	0805	J: ± 5%	K : Plastic tape- 4Kpcs		100MR=100MΩ
	1206				
	1210				
	2010				
	2512				

■ Resistance Marking E-24 series



3 digits marking for ±5% E-24 Series

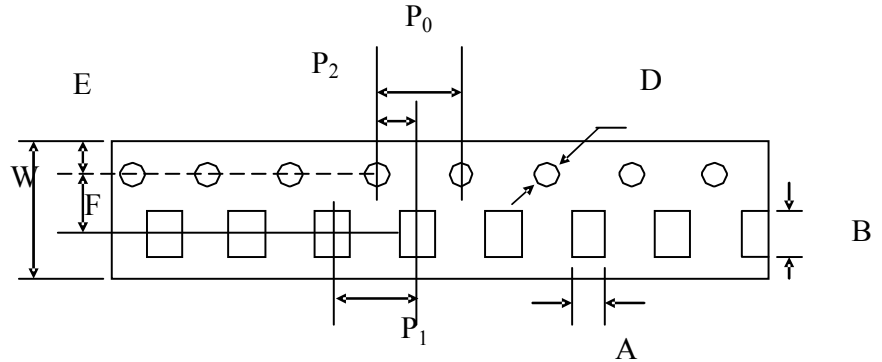
examples: **476** $47 \times 10^6 = 47M\Omega$

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GENERAL SPECIFICATION

■ Tape And Reel Package

• Taping specs are according to EIA RS-481

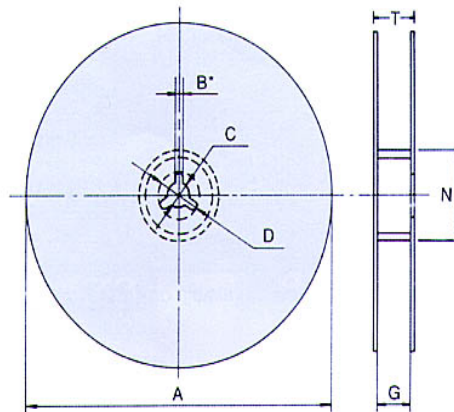


Accumulated dimensional tolerance $40 \pm 0.2 \text{mm}$

Size	A	B	W	F	E	P1	P2	P0	D
0603	1.10 ± 0.20	1.90 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / -0$
0805	1.65 ± 0.20	2.40 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / -0$
1206	2.00 ± 0.20	3.60 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / -0$
1210	2.80 ± 0.20	3.60 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / -0$
2010	2.80 ± 0.20	5.50 ± 0.20	12.00 ± 0.30	5.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / -0$
2512	3.50 ± 0.20	6.70 ± 0.20	12.00 ± 0.30	5.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / -0$

(unit: mm)

■ Reel Package



Size	Packaging Q'ty	A	N	C	D	B	G	T
0603, 0805, 1206, 1210	5Kpcs / Reel	178.0 ± 2.0	60.0 ± 0.5	13.0 ± 0.5	20min	2.0 ± 0.5	10.0 ± 1.5	14.9 max.
	10Kpcs / Reel	254.0 ± 2.0	100.0 ± 1.0	13.5 ± 0.5	20min	2.0 ± 0.5	10.0 ± 1.5	14.9 max.
	20Kpcs / Reel	330.0 ± 2.0	100.0 ± 1.0	13.5 ± 0.5	20min	2.0 ± 0.5	10.0 ± 1.5	14.9 max.
2010 2512	4Kpcs / Reel	178.0 ± 2.0	60.0 ± 0.5	13.0 ± 0.5	20min	2.0 ± 0.5	13.8 ± 1.5	16.7 max.
	8Kpcs / Reel	254.0 ± 2.0	100.0 ± 1.0	13.5 ± 0.5	20min	2.0 ± 0.5	13.8 ± 1.5	20.0 max.
	16Kpcs / Reel	330.0 ± 2.0	100.0 ± 1.0	13.5 ± 0.5	20min	2.0 ± 0.5	13.8 ± 1.5	20.0 max.

(unit: mm)

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■ Specification And Test Methods

ITEM	SPECIFICATION	TEST METHOD
DC Resistance	F: $\pm 1\%$, J: $\pm 5\%$	JIS C 5202 5.1 / IEC 115-1 4.5 Measure the resistance value.
Short time Overload	$\Delta R \leq \pm 2\%$	IEC 115-1 4.13 / JIS C 5202 5.5 2×Rated voltage or Max. Overload Voltage for 5 sec. measure resistance after 30 minutes
Solderability	Over 95% of termination must be covered with (Sn+Ag+Cu)	JIS C 5202 6.5/ IEC 115-1 4.17 After immersing flux, dip in the $245\pm 5^\circ\text{C}$ molten solder bath for 2 ± 0.5 sec.
Resistance to Solder Heat	J: $\Delta R \leq \pm 2\%$	JIS C 5202 6.4 / IEC 115-1 4.18 With $260\pm 5^\circ\text{C}$ for 10 ± 1 sec.
Temperature Coefficient of Resistance (TCR)	F, J: ± 400 ppm/ $^\circ\text{C}$	JIS C 5202 5.2 / IEC 115-1 4.8.4.2 T1 T2 Test temperature: $25^\circ\text{C} \rightarrow -55^\circ\text{C}$ $25^\circ\text{C} \rightarrow 125^\circ\text{C}$ $\text{TCR}(\text{ppm}/^\circ\text{C}) = \frac{R_2 - R_1}{R_1} \times \frac{1}{T_2 - T_1} \times 10^6$ T1: 25°C T2: Test temperature R1: Resistance at reference temperature (T1) R2: Resistance at test temperature (T2)
Load Life Humidity	$\Delta R \leq \pm 5\%$	JIS C 5202 7.9/ IEC 115-1 4.24.2 Maintain the temperature of the resistor at $40\pm 2^\circ\text{C}$ and 90~95% RH with the rated voltage applied. Cycle ON for 1.5 hours and OFF for 0.5 hour for $1000+48/-0$ hours. After 1~4 hour, measure the resistance value.
Load Life	$\Delta R \leq \pm 5\%$	JIS C 5202 7.10/ IEC 115-1 4.25.1 Permanent resistance change after $1000+48/-0$ hours (1.5 hours ON, 0.5 hour OFF) at RCWV or Max. Keep the resistor at $70\pm 2^\circ\text{C}$ ambient
Temperature Cycle	$\Delta R \leq \pm 5\%$	JIS C 5202 7.4 / IEC 115-1 4.19 Repeat 5 cycles as follows -55°C (30 min.) + 25°C (2~3 min.) $+155^\circ\text{C}$ (30 min.) + 25°C (2~3 min.)
Insulation Resistance	Between termination and coating must be over $1000\text{M}\Omega$	JIS C 5202 5.6 / IEC 115-1 4.6.1.1 Test voltage: $100\pm 15\text{V}$
Bending Strength	$\Delta R \leq \pm 2\%$ No mechanical damage	IEC 115-1 4.33 Resistance change after bended on the 90mm PCB. Bend: 2mm for 1206 ,2010,2512
Voltage Coefficient of Resistance (VCR)	$\leq \pm 300$ ppm/V	JIS C 5202 5.3 Measuring Voltage 10V/100V