

■ General

- This specification is available for High power thick Film Resistors manufactured by ELLON Electro-Mechanics Co., Ltd.
- The resistor is manufactured by highly quality-controlled process and guaranteed high reliability,
- it meets RoHS & Halogen-Free requirement.
- Temperature $20 \pm 2^{\circ}\text{C}$, Humidity $65 \pm 5\%$. Being no doubt about the judgment, measurements can
- be made within the following Temperature $5 \sim 35^{\circ}\text{C}$, Humidity $45 \sim 85\%$.

■ Application

- Consumer electronics
- Computer & relative products
- Communication devices
- Measuring instrument
- Industrial/Power supply
- Battery management system

■ Features

- Thick film on alumina substrate, RuO₂/Ag Resistive layer
- High Power capability
- Low Resistance/TCR/inductance
- High precision current sensing
- Halogen free and lead free
- Glass and epoxy overcoat

■ PART NUMBER SYSTEM

<u>EHP</u>	<u>06</u>	<u>F</u>	<u>P</u>	<u>100K</u>	<u>V</u>	<u>E</u>	<u>H</u>
Product Type	Size (Inch)	Resistor Tolerance	Rated Power	Resistor Value	TCR (PPM/°C)	Quantity (Pcs)	Remarks
EHP	02=0201 04=0402 06=0603 08=0805 16=1206 12=1210 20=2010 25=2512	B=±0.1% D=±0.5% F = ±1% G=± 2% J=± 5%	X=1/10W W=1/8W P=1/5W V=1/4W O=1/3W Z=2/3W G=2/5W U=1/2W Q=3/4W T=1W A=1.5W S=2W R=3W		D=±50PPM E=±100PPM K=±150PPM F=±200PPM H=±400PPM J=±600PPM Q=±800PPM R=±1000PPM V=±1800PPM	D=4000 E=5000 C=10000 A=15000	S=High Power U=Ultra High Power L=Low Ohm H=High Ohm J=Jumper

(1): EHP Series

(2): Size Code: 02=0201, 04=0402, 06=0603, 08=0805, 16=1206, 12=1210, 20=2010, 25=2512

(3): Tolerance Code: B=±0.1%; D=±0.5%; F = ±1%; G=± 2%; J=± 5%

(4): Power Rating

(5): Resistance Value: First 3 digits are significant figures (both E-24 and E-96 values), 4th digit is the multiplier, “R” indicates a decimal point.

(6): Temperature Coefficient (ppm/°C)

(7): reel quantity

(8): Remarks: H=High Power; U=Ultra High Power; L=Low Ohm; H=High Ohm; J=Jumper

■ High Power Electrical Specifications

Type	EIA Size	Power Rating at 70°C	Max.*1 Working Voltage	Max.*2 Overload Voltage	T.C.R (ppm/°C)	Resistance Range (Ω)		Resistance Value	Operating Temperature Range (°C)
						±0. 1% (B) ±0.5% (D)	±1% (F) ±5% (J)		
EHP04	0402	1/8W (0.125W)	50V	100V	±400	-	1Ω≤R<10Ω	E-24,E-96	-55 ~ +155
					±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP06	0603	1/8W (0.125W)	50V	100V	±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP08	0805	1/4W (0.25W)	150V	300V	±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP16	1206	1/2W (0.50W)	200V	400V	±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP12	1210	2/3W (0.66W)			±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP20	2010	1W			±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP25	2512	2W	300V	500V	±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		

■ For non-standard parts, please contact our sales

■ High Power Jumper Electrical Specifications

Type	EHP04	EHP06	EHP08	EHP16	EHP12	EHP20	EHP25
Jumper Resistance Value	20mΩMax						
Jumper Rated Current	2A	2.5A	3.5A	5A	6A	7A	10A
Max. Over Load Current <1 second and 1 times	6A	9A	13A	16A	19A	22A	30A

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■ High Power Low Ohm Electrical Specifications

Type	EIA Size	Power Rating at 70°C	Max.*1 Working Voltage	Max.*2 Overload Voltage	T.C.R (ppm/°C)	Resistance Range (Ω)	Operating Temperature Range (°C)
						±1% (F);±5% (J)	
EHP04	0402	1/10W (0.1W)	0.15V~0.32V	0.79V	±1000	220mΩ≤R≤450mΩ	-55 ~ +155
					±800	220mΩ<R<450mΩ	
EHP06	0603	1/8W (0.125W)	0.1V~0.35V	0.88V	±1000	75mΩ≤R<100mΩ	
					±800	100mΩ≤R<330mΩ	
					±600	330mΩ≤R<1Ω	
EHP08	0805	1/4W (0.25W)	0.05V~0.5V	1.25V	±1800	10mΩ≤R<50mΩ	
					±800	50mΩ≤R<100mΩ	
					±600	100mΩ≤R<1Ω	
EHP16	1206	1/2W (0.50W)	0.07V~0.71V	1.77V	±1800	10mΩ≤R<50mΩ	
					±800	50mΩ≤R<100mΩ	
					±600	100mΩ≤R<1Ω	
EHP12	1210	2/3W (0.66W)	0.08V~0.81V	2.03V	±1800	10mΩ≤R<50mΩ	
					±800	50mΩ≤R<100mΩ	
					±600	100mΩ≤R<1Ω	
EHP20	2010	1W	0.1V~1V	2.5V	±1800	10mΩ≤R<50mΩ	
					±800	50mΩ≤R<100mΩ	
					±600	100mΩ≤R<1Ω	
EHP25	2512	2W	0.14V~1.41V	3.54	±1800	10mΩ≤R<50mΩ	
					±800	50mΩ≤R<100mΩ	
					±600	100mΩ≤R<1Ω	

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■ High Power High Ohm Electrical Specifications

Type	EIA Size	Power Rating at 70℃	Max.*1 Working Voltage	Max.*2 Overload Voltage	T.C.R (ppm/℃)	Resistance Range (Ω)	Operating Temperature Range (℃)
						±1% (F) ±5% (J)	
EHP04	0402	1/8W (0.125W)	50V	100V	±200	10.1MΩ~30MΩ	-55 ~ +155
EHP06	0603	1/8W (0.125W)	50V	100V			
EHP08	0805	1/4W (0.25W)	150V	300V			
EHP16	1206	1/2W (0.50W)	200V	400V			
EHP12	1210	2/3W (0.66W)					
EHP20	2010	1W					
EHP25	2512	2W					

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■ Ultra High Power Electrical Specifications

Type	EIA Size	Power Rating at 70°C	Max.*1 Working Voltage	Max.*2 Overload Voltage	T.C.R (ppm/°C)	Resistance Range(Ω)		Resistance Value	Operating Temperature Range (°C)
						±0. 1% (B) ±0.5% (D)	±1% (F) ±5% (J)		
EHP04	0402	1/5W (0.2W)	50V	100V	±400	-	1Ω≤R<10Ω	E-24,E-96	-55 ~ +155
					±100 ±200	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP06	0603	1/3W (0.33W)	75V	125V	±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100 ±200	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP08	0805	1/2W (0.5W)	200V	300V	±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100 ±200	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP16	1206	3/4W (0.75W)	200V	400V	±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100 ±200	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP12	1210	1W			±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100 ±200	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP20	2010	1.5W			±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100 ±200	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		
EHP25	2512	3W	250V	500V	±400	-	1Ω≤R<10Ω	E-24,E-96	
					±100 ±200	10Ω≤R≤1MΩ	10Ω≤R≤10MΩ		

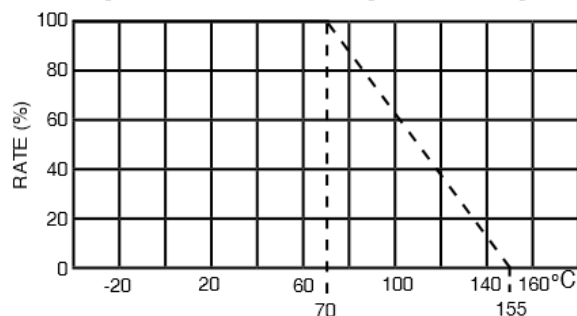
■ For non-standard parts, please contact our sales

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 allowable Overload voltage is two times the Maximum Working Voltage (see Note *1 above).

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



■ Voltage Rating or Current Rating

Resistance Range: $\geq 1\Omega$

Rated Voltage: The resistor shall have a DC continuous working voltage or a RMS AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined formula as following:

$$E(RCWV) = \sqrt{P \times R}$$

E=Rated voltage(V)

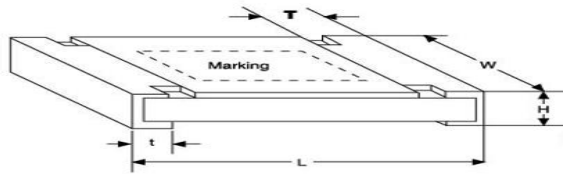
P=Power rating(W)

R=Nominal resistance(Ω)

■ Environmental Characteristics

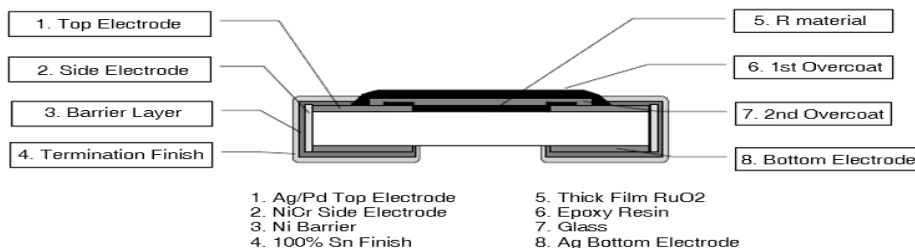
Item	Specification			Test Method
	Tol. 1%	Tol. 5%	0Ω	
Short Time Overload	$\Delta R \pm(1\% + 0.05W)$	$\Delta R \pm(2\% + 0.05W)$	20mWmax. (0402 30mWmax.)	JIS-C-5201-1 4.13 5x rated power or max overloading voltage whichever is less for 5 Seconds
Insulation Resistance	>10,000MΩ			JIS-C-5201-1 4.6 Maximum overload voltage for 1 minute
Endurance (Load Life)	$\Delta R \pm(1\% + 0.05W)$	$\Delta R \pm(3\% + 0.1W)$	20mWmax. (0402 30mWmax.)	JIS-C-5201-1 4.25 RCWV +70°C, 1.5 hours "ON", 0.5 hours "OFF" Total time 1,000 hours
Damp Heat with Load	$\Delta R \pm(1\% + 0.05W)$	$\Delta R \pm(3\% + 0.1W)$	20mWmax. (0402 30mWmax.)	JIS-C-5201-1 4.24 RCWV +40°C, 90~95% RH, 1.5 hour "ON", 0.5 hours "OFF" Total time 1,000 hours
Bending Strength	$\Delta R \pm(0.5\% + 0.05W)$	$\Delta R \pm(1\% + 0.1W)$	20mWmax. (0402 30mWmax.)	JIS-C-5201-1 4.33 Bend once for 10 seconds (0603 ~ 1206: 3mm, 2010, 2512: 2mm)
Solderability	>95% minimum coverage			JIS-C-5201-1 4.17 235°C ± 5°C for 2 ± 0.5 seconds
Resistance to Soldering Heat	$\Delta R \pm(0.5\% + 0.05W)$	$\Delta R \pm(1\% + 0.1W)$	20mWmax. (0402 30mWmax.)	JIS-C-5201-1 4.18 260°C ± 5°C for 10 seconds
Withstanding Voltage	No breakdown or flashover			JIS-C-5201-1 4.7 maximum overload voltage (AC) for 1 minute
Temperature Cycling	$\Delta R \pm(0.5\% + 0.05W)$	$\Delta R \pm(1\% + 0.1W)$	20mWmax. (0402 30mWmax.)	JIS-C-5201-1 4.19 30 minutes -55°C, 2 ~ 3 minutes +20°C, 30 minutes @155°C, 2 ~ 3 minutes +20°C (5 cycles)

■ Component Dimensions (mm)*



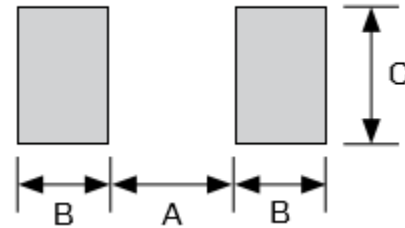
Type	EIA Size	L	W	H	T	t
EHP04	0402	1.00 ± 0.05	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.10
EHP06	0603	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.15	0.30 ± 0.15	0.30 ± 0.10
EHP08	0805	2.00 ± 0.10	1.25 ± 0.10	0.50 ± 0.15	0.40 ± 0.20	0.40 ± 0.20
EHP16	1206	3.10 ± 0.15	1.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.25
EHP12	1210	3.10 ± 0.10	2.60 ± 0.10	0.55 ± 0.10	0.50 ± 0.20	0.50 ± 0.20
EHP20	2010	5.00 ± 0.20	2.50 ± 0.20	0.60 ± 0.10	0.60 ± 0.25	0.60 ± 0.25
EHP25	2512	6.30 ± 0.20	3.10 ± 0.20	0.60 ± 0.15	0.60 ± 0.25	0.60 ± 0.25

CONSTRUCTION

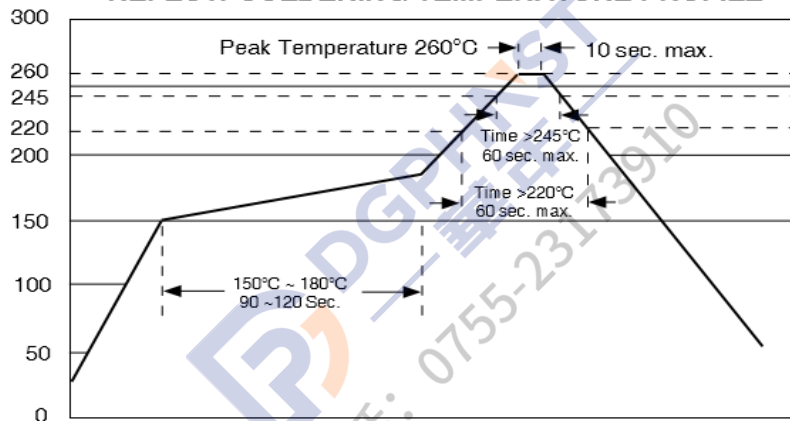


■ Land pattern dimensions (mm)

Type	EIA Size	A	B	C
EHP04	0402	0.50	0.50	0.60
EHP06	0603	0.90	0.60	0.90
EHP08	0805	1.20	0.70	1.30
EHP16	1206	2.00	0.90	1.60
EHP12	1210	2.00	0.90	2.80
EHP20	2010	3.80	0.90	2.80
EHP25	2512	3.80	1.60	3.50



REFLOW SOLDERING TEMPERATURE PROFILE



Component marking (h)

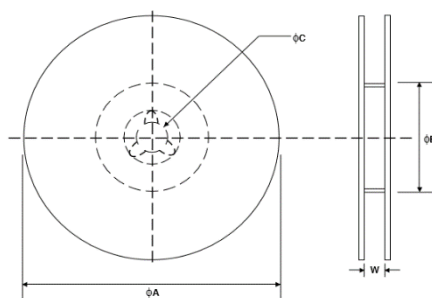
- For **E-24** Series J ($\pm 5\%$) Tolerance In 0603, 0805, 1206, 2010 and 2512 sizes: 3 DIGIT SYSTEM - First two digits are significant and third digit is multiplier
Examples: 100 = 10 ohms 101 = 100 ohms 102 = 1,000 ohms 103 = 10,000 ohms 104 = 100,000 ohms 105 = 1,000,000 ohms
- For **E-96** Series F ($\pm 1\%$) Tolerance in 0805, 1206 and 2010 and 2512 sizes: 4 DIGIT SYSTEM - First 3 digits are significant and fourth digit is multiplier, "R" represents decimal point
Examples: 10R0 = 10 ohms 1000 = 100 ohms 1001 = 1,000 ohms 1002 = 10,000 1003 = 100,000 ohms
- For **E-96** Series F ($\pm 1\%$) Tolerance in 0603 size (available from 1.0 ohm ~ 1.0Mohm)

Special 3 DIGIT SYSTEM below (Due to space restrictions)

0603 E-96 VALUES 1% TOLERANCE RESISTANCE CODE

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

■ Reel Specifications



Type	Reel Diameter		φ B (mm)	C (mm)	W (mm)	Reel Qty
	φ A					
EHP04	7"	φ178 ± 2.0	φ60 ± 1.0	13.0 ± 0.2	9.0 ± 0.5	10000
EHP06	10"	φ254 ± 2.0	φ100 ± 1.0			5000
EHP08	13"	φ330 ± 2.0				5000
EHP16	7"	φ178 ± 2.0				φ60 ± 1.0
EHP12	10"	φ254 ± 2.0	φ100 ± 1.0			5000
EHP20	13"	φ330 ± 2.0			12.4 ± 1.0	4000
EHP25	7"	φ178 ± 2.0	φ60 ± 1.0	4000		

■ Product Testing Method:

Our products are tested with our company's tapping & testing equipment by using four-feet probe to touch at the back of both electrodes.

Supposed different testing posting or methods are requested, please advise beforehand and customized-made production is available.