



THIN FILM RESISTORS

TNPW e3 – Lead (Pb)-Free Solder Contacts



**Excellent Stability
in Extreme
Environmental
Conditions**

High-Stability Thin Film Flat Chip Resistor

KEY BENEFITS

- High stability: $\leq 0.05\%$ (1000 h rated power at 70 °C)
- Superior moisture resistivity: $\leq 0.25\%$ (85 °C; 56 days; 85 % RH)
- AEC-Q200 compliant (sizes 0402 to 1206)
- Lead (Pb)-free solder contacts and RoHS-compliant
- Low temperature coefficient and tight tolerances ($\pm 0.1\%$; ± 10 ppm/K)
- Waste gas resistant
- Industry standard sizes: 0402, 0603, 0805, 1206, 1210, 2010, and 2512

APPLICATIONS

- Automotive
- Telecommunications
- Medical equipment
- Industrial equipment
- Instrumentation
- Test and measuring equipment

Datasheet is available on our web site at www.vishay.com
for TNPW e3 - <http://www.vishay.com/doc?28758>

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FEATURES

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TNPW e3 Precision Thin Film Flat Chip Resistors are the perfect choice for most fields of modern electronics where highest reliability and stability is of major concern. Typical applications include automotive, telecommunication, industrial, medical equipment, precision test and measuring equipment.

STANDARD ELECTRICAL SPECIFICATIONS

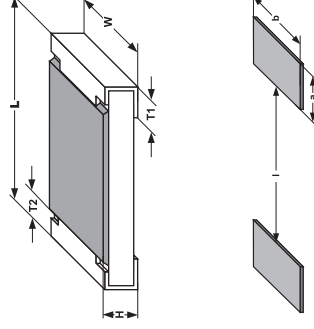
	TNPW0402	TNPW0603	TNPW0805	TNPW1206	TNPW1210 ¹⁾	TNPW2010	TNPW2512 ¹⁾
Metric Size	RR 1005M	RR 1608M	RR 2012M	RR 3216M	RR 3225M	RR 5025M	RR 6332M
Resistance range	10 Ω to 100 kΩ	10 Ω to 332 kΩ	10 Ω to 1 MΩ	10 Ω to 2 MΩ	10 Ω to 3.01 MΩ	10 Ω to 4.99 MΩ	10 Ω to 8.87 MΩ
Resistance tolerance	± 1 %; ± 0.5 %; ± 0.1 %						
Temperature Coefficient	± 50 ppm/K; ± 25 ppm/K; ± 15 ppm/K; ± 10 ppm/K						
Climatic category (LCT/LCT/days)	55/125/56	55/125/56	55/125/56	55/125/56	55/125/56	55/125/56	55/125/56
Rated dissipation, P ₇₀ ²⁾	0.063 W	0.1 W	0.125 W	0.25 W	0.33 W	0.4 W	0.5 W
Operating voltage, U _{max} AC/DC	50 V	75 V	150 V	200 V	200 V	300 V	300 V
Maximum permissible film temperature	155 °C	155 °C	155 °C	155 °C	155 °C	155 °C	155 °C
Thermal resistance ³⁾	870 K/W	550 K/W	440 K/W	220 K/W	170 K/W	140 K/W	110 K/W
Max. resistance change at P ₇₀ , ΔR/R	10 Ω to 100 kΩ	10 Ω to 332 kΩ	10 Ω to 1 MΩ	10 Ω to 2 MΩ	10 Ω to 3.01 MΩ	10 Ω to 4.99 MΩ	10 Ω to 8.87 MΩ
Insulation voltage: U _{iso} 1 min continuous	≤ 0.05 %	≤ 0.05 %	≤ 0.05 %	≤ 0.05 %	≤ 0.05 %	≤ 0.05 %	≤ 0.05 %
	≤ 0.10 %	≤ 0.10 %	≤ 0.10 %	≤ 0.10 %	≤ 0.10 %	≤ 0.10 %	≤ 0.10 %
	≤ 0.30 %	≤ 0.30 %	≤ 0.30 %	≤ 0.30 %	≤ 0.30 %	≤ 0.30 %	≤ 0.30 %
Failure rate	75 V	100 V	200 V	300 V	300 V	300 V	300 V
Weight/1000 pcs.	0.65 g	2 g	5.5 g	10 g	16 g	28 g	39 g

¹⁾ Size not specified in EN 140401-801

²⁾ Rated voltage ΔP × R. The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature is not exceeded

³⁾ Measuring conditions in accordance with EN 140401-801

• TNPW 0402 without marking
 • Extended values, tighter tolerances and temperature coefficient available on request

DIMENSIONS


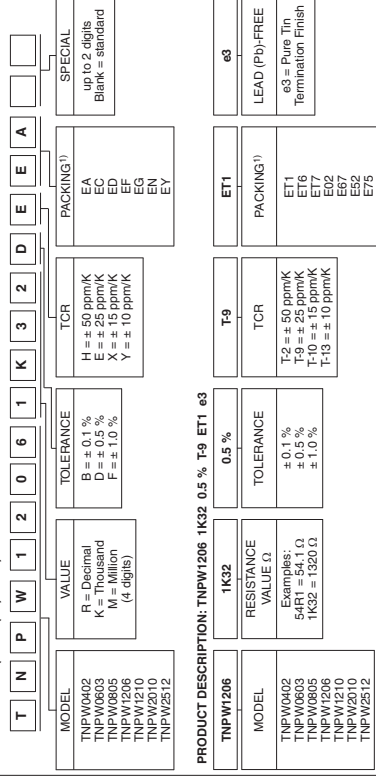
SIZE	DIMENSIONS in millimeters						
	INCH	METRIC	L	W	H	T1	T2
0402	1005	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.2 ± 0.10	0.3	0.20
0603	1608	1.6 ± 0.10	0.85 ± 0.10	0.45 ± 0.10	0.3 ± 0.20	0.4	0.20
0805	2012	2.0 ± 0.15	1.25 ± 0.15	0.45 ± 0.10	0.4 ± 0.20	0.4	0.20
1206	3216	3.2 ± 0.15	1.6 ± 0.15	0.55 ± 0.10	0.5 ± 0.25	0.5	0.25
1210	3225	3.2 ± 0.15	2.45 ± 0.15	0.60 ± 0.15	0.5 ± 0.25	0.5	0.25
2010	5025	5.0 ± 0.15	2.5 ± 0.15	0.60 ± 0.15	0.6 ± 0.25	0.6	0.25
2512	6332	6.3 ± 0.20	3.1 ± 0.15	0.60 ± 0.15	0.6 ± 0.25	0.6	0.25

SIZE	SOLDER PAD DIMENSIONS in millimeters						
	INCH	METRIC	a	b	i	a	b
0402	1005	0.4	0.6	0.5	-	-	-
0603	1608	0.5	0.9	1.0	0.9	0.9	1.0
0805	2012	0.7	1.3	1.2	0.9	1.3	1.3
1206	3216	0.9	1.7	2.0	1.1	1.7	2.3
1210	3225	0.9	2.5	2.0	1.1	2.5	2.3
2010	5025	1.0	2.5	3.9	1.2	2.5	3.9
2512	6332	1.0	3.2	5.2	1.2	3.2	5.2

PART NUMBER AND PRODUCT DESCRIPTION

Products can be ordered using either the Product Description or the Part Number.
 For ordering TNPW with SnPb contacts please refer to latest edition of data sheet TNPW lead bearing.

PART NUMBER: (LEAD (Pb)-FREE) TNPW12061K3205E9 ET1 e3



¹⁾ Please refer to PACKING table