



# THIN FILM RESISTORS

## TNPW e3 - Lead (Pb)-Free Solder Contacts

### High-Stability Thin Film Flat Chip Resistor



#### KEY BENEFITS

- Tolerances down to  $\pm 0.1$  %
- Temperature coefficient from  $\pm 10$  ppm/K to  $\pm 50$  ppm/K
- Superior moisture resistivity (85 °C; 56 days; 85 % RH)
- Excellent overall stability at different environmental conditions  $\leq 0.05$  % (1000 h rated power at 70 °C)
- AEC-Q200-qualified (sizes 0402 to 1206)
- Sulfur resistance verified according to ASTM B 809
- Industry standard sizes: 0402, 0603, 0805, 1206, and 1210

#### APPLICATIONS

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

#### RESOURCES

- Datasheet: TNPW e3 - <http://www.vishay.com/doc?28758>
- For technical questions contact [thinfilmchip@vishay.com](mailto:thinfilmchip@vishay.com)

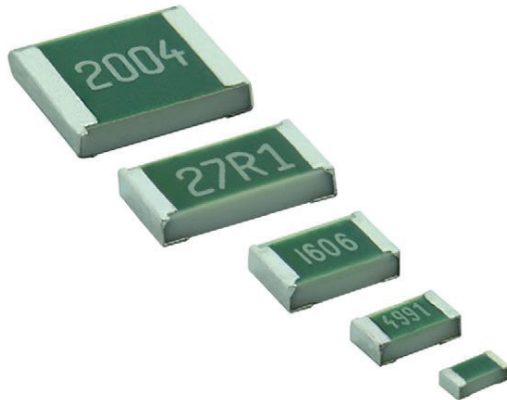




# THIN FILM RESISTORS

## TNPW e3 - Lead (Pb)-Free Solder Contacts

### High-Stability Thin Film Flat Chip Resistor



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 test and measuring equipment, medical equipment, industrial, and automotive.

#### FEATURES

- Superior moisture resistivity (85 °C; 85 % RH)
- Excellent overall stability at different environmental conditions  $\leq 0.05\%$  (1000 h rated power at 70 °C)
- AEC-Q200 qualified (sizes 0402 to 1206)
- Single lot date code (optional)
- Sulfur resistance verified according to ASTM B 809
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



#### APPLICATIONS

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

TECHNICAL SPECIFICATIONS					
DESCRIPTION	TNPW0402 e3	TNPW0603 e3	TNPW0805 e3	TNPW1206 e3	TNPW1210 e3 <sup>(1)</sup>
Imperial size	0402	0603	0805	1206	1210
Metric size code	RR1005M	RR1608M	RR2012M	RR3216M	RR3225M
Resistance range	10 $\Omega$ to 100 k $\Omega$	4.7 $\Omega$ to 332 k $\Omega$	4.7 $\Omega$ to 1 M $\Omega$	4.7 $\Omega$ to 2 M $\Omega$	10 $\Omega$ to 3.01 M $\Omega$
Resistance tolerance	$\pm 1\%$ ; $\pm 0.5\%$ ; $\pm 0.1\%$				
Temperature coefficient	$\pm 50$ ppm/K; $\pm 25$ ppm/K; $\pm 15$ ppm/K; $\pm 10$ ppm/K				
Rated dissipation, $P_{70}$ <sup>(2)</sup>	0.100 W	0.125 W	0.200 W	0.400 W	0.500 W
Operating voltage, $U_{max}$ , AC <sub>RMS</sub> or DC	50 V	75 V	150 V	200 V	200 V
Permissible film temperature, $\vartheta_{Fmax}$ <sup>(2)</sup>	155 °C				
Operating temperature range	-55 °C to 155 °C				
Permissible voltage against ambient (insulation):  1 min; $U_{ins}$	75 V	100 V	200 V	300 V	300 V
Failure rate: FIT <sub>observed</sub>	$\leq 0.1 \times 10^{-9}/h$				

#### Notes

- (1) The detail specification EN 140401-801 does not cover this product size.  
 (2) Please refer to APPLICATION INFORMATION, see next page.

#### APPLICATION INFORMATION

When the resistor dissipates power, a temperature rise above the ambient temperature occurs, dependent on the thermal resistance of the assembled resistor together with the printed circuit board. The rated dissipation applies only if the permitted film temperature is not exceeded.

These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.