

High Precision Bulk Metal® Foil Burden Resistor

FEATURES AND BENEFITS

- **Temperature coefficient of resistance (TCR):**
–55°C to +125°C, 25°C ref.
 - Burden (C): ±2 ppm/°C typical (Table 1)
 - Burden (K): ±1 ppm/°C typical (Table 1)
 - Burden (Z): ±0.2 ppm/°C typical (Table 2)
- Resistance tolerance: to ±0.005% (50 ppm)
- Load-life stability: ±0.005% after 2,000 hrs of 0.1 W at 70°C
- Power rating: to 0.6 W at +70°C
- Resistance range: 1 Ω to 500 Ω (for higher or lower values, please contact us)
- VFR resistors are not restricted to standard values; specific “as required” values can be supplied at no extra cost or delivery (e.g., 80R0123 vs. 80 Ω)
- **Electrostatic discharge (ESD): at least to 25 kV**
- Thermal stabilization time: <1 s (within 10 ppm of steady state value)
- Non-inductive, non-capacitive design
- Rise time: 1 ns effectively no ringing
- Current noise: 0.010 μV_{RMS}/V of applied voltage (<-40 dB)
- Thermal EMF: <0.05 μV/°C
- Low harmonic distortion, linear behavior
- Voltage coefficient: <0.1 ppm/V
- Low inductance: <0.08 μH
- Terminal finishes available: lead (Pb)-free, tin/lead alloy
- **For higher power and lower resistance values, please check the VCSXXX Series:**
<http://www.vishaypg.com/doc?63240>



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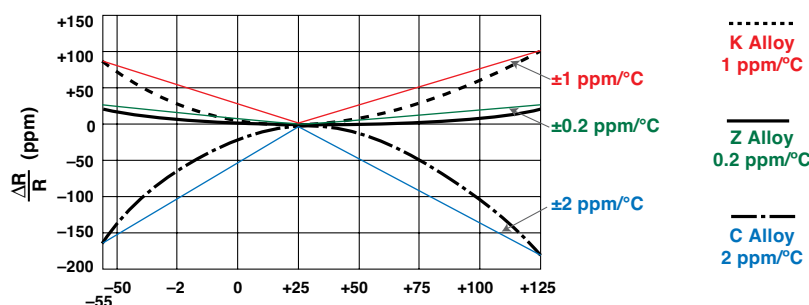
INTRODUCTION

The Vishay Foil Resistors (VFR) Burden resistor is usually connected to the output of the power device for the discharging of the bulk output filter capacitor when it is charged and connected to a large power source, like an accumulator or airplane battery. The Burden resistor offers resistance of a few ohms and prevents the influence of inrush current to the device that the power unit (power converter) connects to. Inrush current usually happens when the battery or accumulators are very large and their capacity is too high. The Burden resistor is placed across the output of the current transformer.

THE BURDEN RESISTOR

Current sensing transformers act as current sources and need a load. A current source is the dual of a voltage source, and just like you shouldn't short-circuit a voltage source because it would cause infinite current, you shouldn't leave a current source open, as it would cause an infinite voltage. The precision Burden resistor converts the current to a limited voltage. Typically it is used to discharge a capacitor when the circuit isn't powered anymore.

Figure 1 – Nominal Resistance vs. Temperature Curves and Chord Slopes (TCR) of Foil Alloy Types in Military Range



Note

* This datasheet provides information about parts that are RoHS-compliant and/or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS compliant. Please see the information/tables in this datasheet for details.

Burden Resistor (Through-Hole Version)

Model Number	Resistance Value (Ω)	Typical TCR and Max. Spread (ppm/°C)
Burden-K	80 to <500	±1 ±2.5
Burden-C		±2 ±2.5
Burden-K	50 to <80	±1 ±3.5
Burden-C		±2 ±3.5
Burden-K	1 to <50	±1 ±4.5
Burden-C		±2 ±4.5

Model Number	Resistance Value (Ω)	Typical TCR and Max. Spread (ppm/°C)
Burden-Z	100 to 500	±0.2 ±0.6
	80 to <100	±0.2 ±0.8
	50 to <80	±0.2 ±1.0
	25 to <50	±0.2 ±1.3
	10 to <25	±0.2 ±1.6
	5 to <10	±0.2 ±2.3
	1 to <5	±0.2 ±3.2

Model Number	Resistance Range (Ω)	Ambient Power Rating		Average Weight in Grams	Dimensions		Tightest Tolerance vs. Lowest Resistance Value
		at +70°C	at +125°C		Inches	mm	
Burden-C (Burden-J) ⁽¹⁾	1 to 500	0.6 W	0.3 W	0.6	W: 0.105 ±0.010 L: 0.300 ±0.010 H: 0.326 ±0.010 ST: 0.010 min. SW: 0.040 ±0.005 LL: 1.000 ±0.125 LS: 0.150 ±0.005	2.67 ±0.25 7.62 ±0.25 8.28 ±0.25 0.254 min. 1.02 ±0.13 25.4 ±3.18 3.81 ±0.13	0.005% / 50 Ω 0.01% / 25 Ω 0.02% / 12 Ω 0.05% / 5 Ω 0.1% / 2 Ω 0.50% / 1 Ω
Burden-K (Burden-L) ⁽¹⁾							
Burden-Z (Burden-A) ⁽¹⁾							

⁽¹⁾ 0.200" (5.08 mm) lead spacing available—specify **Burden-J** for Burden-C, **Burden-L** for Burden-K, and **Burden-A** for Burden-Z.

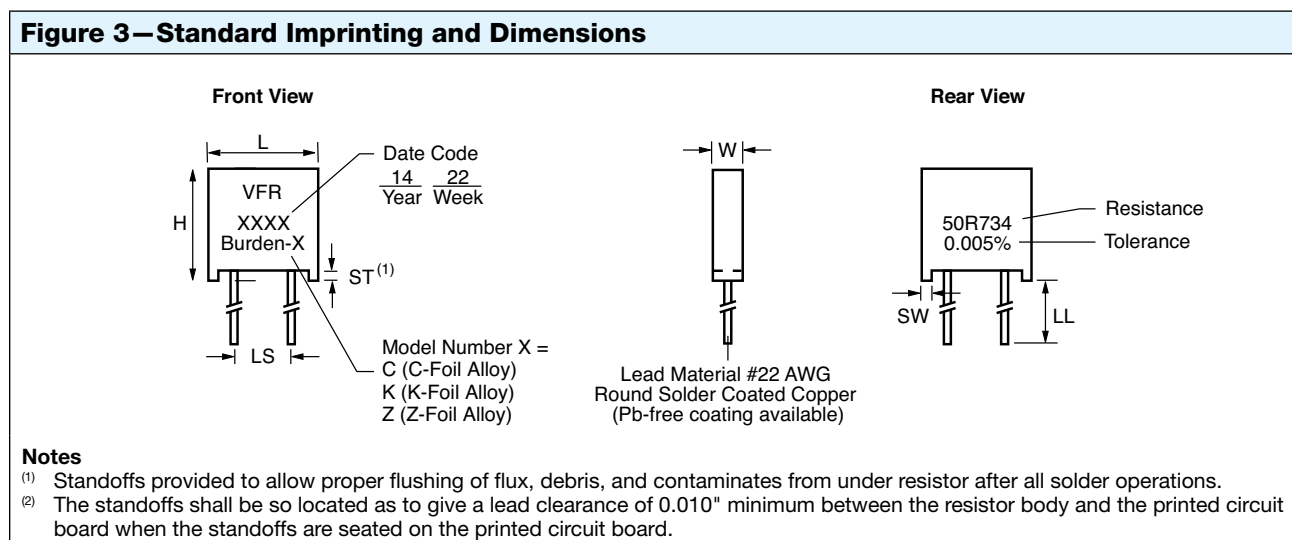


Figure 2 – Trimming to Values (conceptual illustration)

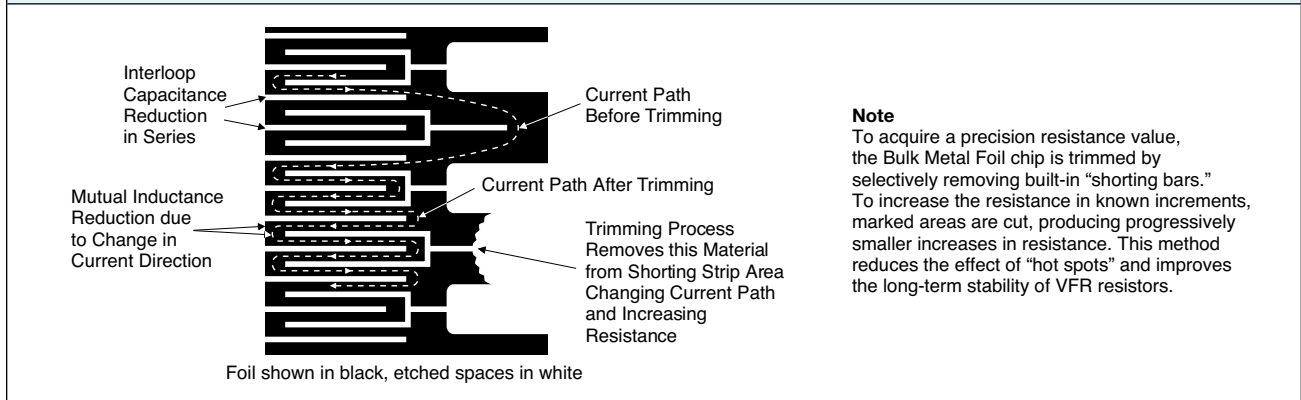
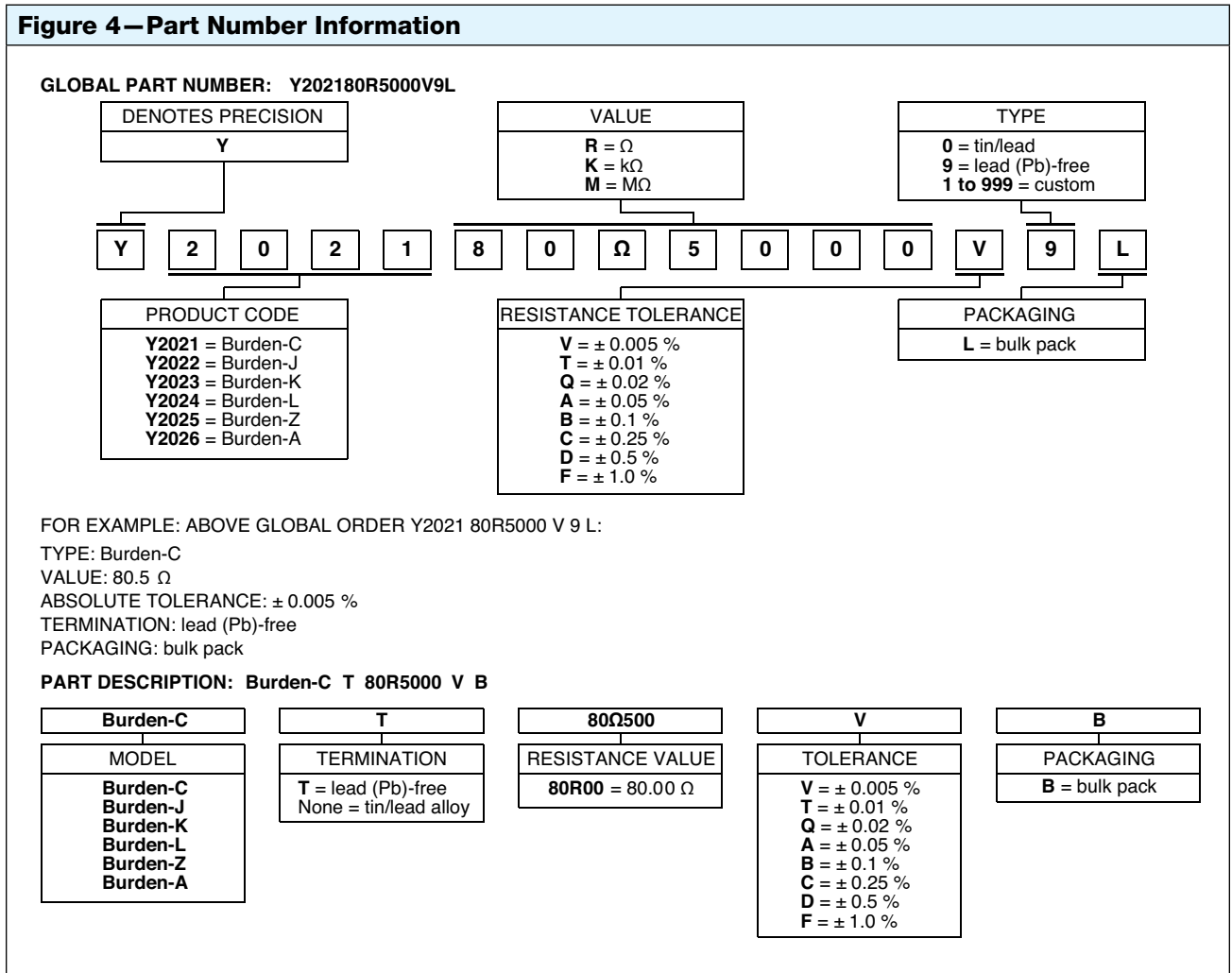


Table 4 – Environmental Performance

Group/Parameter	MIL-PRF-55182 CHAR J	Burden Resistor	
		Maximum ΔR	Typical ΔR
Test Group I Thermal shock, 5 x (-65°C to +150°C) Short time overload, 6.25 x rated power	$\pm 0.2\%$ $\pm 0.2\%$	$\pm 0.01\%$ (100 ppm) $\pm 0.01\%$ (100 ppm)	$\pm 0.002\%$ (20 ppm) $\pm 0.003\%$ (30 ppm)
Test Group II Low temperature storage (24 h at -65°C) Low temperature operation (45 min, rated power at -65°C) Terminal strength	$\pm 0.15\%$ $\pm 0.15\%$ $\pm 0.2\%$	$\pm 0.01\%$ (100 ppm) $\pm 0.01\%$ (100 ppm) $\pm 0.01\%$ (100 ppm)	$\pm 0.002\%$ (20 ppm) $\pm 0.002\%$ (20 ppm) $\pm 0.002\%$ (20 ppm)
Test Group III Dielectric Withstanding Voltage (DWV) Resistance to solder heat Moisture resistance	$\pm 0.15\%$ $\pm 0.1\%$ $\pm 0.4\%$	$\pm 0.01\%$ (100 ppm) $\pm 0.01\%$ (100 ppm) $\pm 0.05\%$ (500 ppm)	$\pm 0.002\%$ (20 ppm) $\pm 0.005\%$ (50 ppm) $\pm 0.01\%$ (100 ppm)
Test Group IV Shock Vibration	$\pm 0.2\%$ $\pm 0.2\%$	$\pm 0.01\%$ (100 ppm) $\pm 0.01\%$ (100 ppm)	$\pm 0.002\%$ (20 ppm) $\pm 0.002\%$ (20 ppm)
Test Group V Life test at 0.3 W/+125°C	2000 h 10 000 h	$\pm 0.5\%$ $\pm 2.0\%$	$\pm 0.015\%$ (150 ppm) $\pm 0.05\%$ (500 ppm)
Test Group Va Life test at 0.6 W/+70°C, 2000 h		$\pm 0.5\%$	$\pm 0.015\%$ (150 ppm)
Test Group VI High temperature exposure (2000 h at +175°C)		$\pm 2.0\%$	$\pm 0.1\%$ (1000 ppm)
Test Group VII Voltage coefficient		5 ppm/V	<0.1 ppm/V

Burden Resistor (Through-Hole Version)

Figure 4 – Part Number Information



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