

**Ultra High Precision Z1 Foil Technology Flip Chip Resistor for Load Life Stability of 0.005% (50 ppm) with TCR of  $\pm 0.2$ , 35% Space Saving vs. Wraparound Design, Power to 750mW**

**FEATURES**

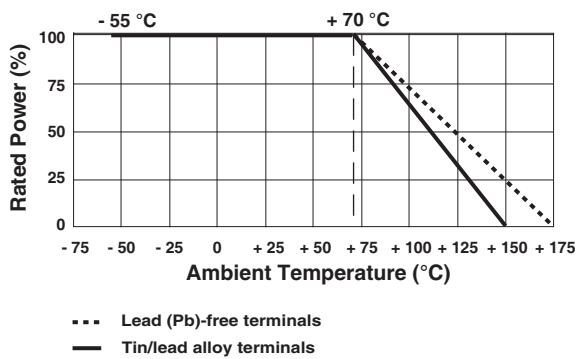
- Temperature coefficient of resistance (TCR):  $\pm 0.2$  ppm/ $^{\circ}\text{C}$  typical ( $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $+25^{\circ}\text{C}$  ref.)
- Resistance range: 5  $\Omega$  to 125 k $\Omega$
- Tolerance: to  $\pm 0.01\%$  (100 ppm)
- Power coefficient “ $\Delta R$  due to self heating” 5 ppm at rated power
- Power rating: 750 mW at  $+70^{\circ}\text{C}$
- Load life stability:  $\pm 0.005\%$  typical at  $70^{\circ}\text{C}$ , 2000 h (rated power)
- Foil resistors are not restricted to standard values; specific “as required”(e.g. 1K2345 vs. 1K)



**SPECIFICATIONS**

CHIP SIZE	RATED POWER (mW) at $+70^{\circ}\text{C}$	MAXIMUM VOLTAGE RATING ( $\sqrt{P \times R}$ )	RESISTANCE RANGE ( $\Omega$ )	MAXIMUM WEIGHT (mg)
0805	200	40	5 to 8K	5.2
1206	300	86	5 to 25K	10.3
1506	400	109	5 to 30K	12
2010	500	187	5 to 70K	25
2512	750	306	5 to 125K	35

**POWER DERATING CURVE**



**TOLERANCE AND TCR VS.  
RESISTANCE VALUE<sup>(1)</sup>**

RESISTANCE VALUE ( $\Omega$ )	TOLERANCE (%)	TYPICAL TCR AND MAX. SPREAD ( $-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$ , $+25^{\circ}\text{C}$ ref.)
250 to 125K	$\pm 0.01$	$\pm 0.2 \pm 1.6$
100 to <250	$\pm 0.02$	$\pm 0.2 \pm 1.6$
50 to <100	$\pm 0.05$	$\pm 0.2 \pm 1.8$
25 to <50	$\pm 0.1$	$\pm 0.2 \pm 2.8$
10 to <25	$\pm 0.25$	$\pm 0.2 \pm 2.8$
5 to <10	$\pm 0.5$	$\pm 0.2 \pm 7.8$

**Note**

<sup>(1)</sup> For tighter performances and non-standard values, please contact VFR's application engineering at [foil@vpgsensors.com](mailto:foil@vpgsensors.com)

\* 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.

**FRFC PERFORMANCE LIMITS (MIL-PRF-55342)**

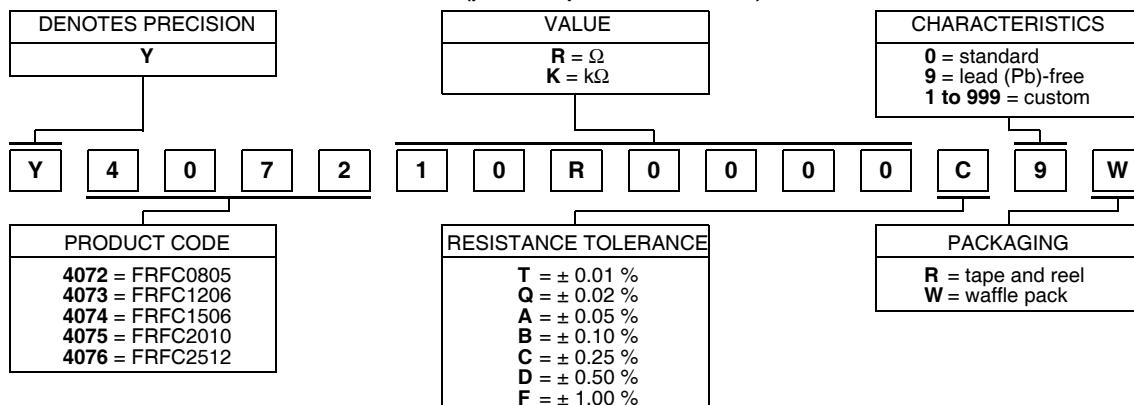
TEST	CONDITIONS	TYPICAL LIMIT % (ppm)	MAX LIMIT % (ppm) <sup>(1)</sup>
Short Time Overload	$6.25 \times P_{nom}$	$\pm 0.005\% (50)$	$\pm 0.01\% (100)$
High Temperature Exposure	$+150^\circ\text{C}$ , 100 h	$\pm 0.005\% (50)$	$\pm 0.01\% (100)$
Low Temperature Operation	$-65^\circ\text{C}$ , 45 min @ rated power	$\pm 0.005\% (50)$	$\pm 0.01\% (100)$
Moisture Resistance	Per MIL-PRF-55342 (p. 4.8.9)	$\pm 0.005\% (50)$	$\pm 0.03\% (300)$
Load Life Test, $70^\circ\text{C}$ , 2,000 h	@ rated power	$\pm 0.005\% (50)$	$\pm 0.01\% (100)$
Resistance to Soldering Heat	P.4.8.8.1	$\pm 0.005\% (50)^{(2)}$	$\pm 0.01\% (100)^{(2)}$
Thermal Shock	$5 \times (-65^\circ\text{C} \text{ to } +150^\circ\text{C})$	$\pm 0.001\% (10)$	$\pm 0.005\% (50)$
Thermal Shock	$100 \times (-65^\circ\text{C} \text{ to } +150^\circ\text{C})$	$\pm 0.003\% (30)$	$\pm 0.01\% (100)$

**Notes**

<sup>(1)</sup> As shown  $+0.01\Omega$  to allow for measurement errors at low values.  
<sup>(2)</sup> For  $R < 100\Omega$ , the performance depends on PCB design and assembly.

**GLOBAL PART NUMBER INFORMATION<sup>(1)</sup>**

**NEW GLOBAL PART NUMBER: Y407210R0000C9W (preferred part number format)**



FOR EXAMPLE: ABOVE GLOBAL ORDER Y4072 10R0000 C 9 W:

TYPE: FRFC0805

VALUE: 10.0  $\Omega$

ABSOLUTE TOLERANCE:  $\pm 0.25\%$

TERMINATION: lead (Pb)-free

PACKAGING: waffle pack

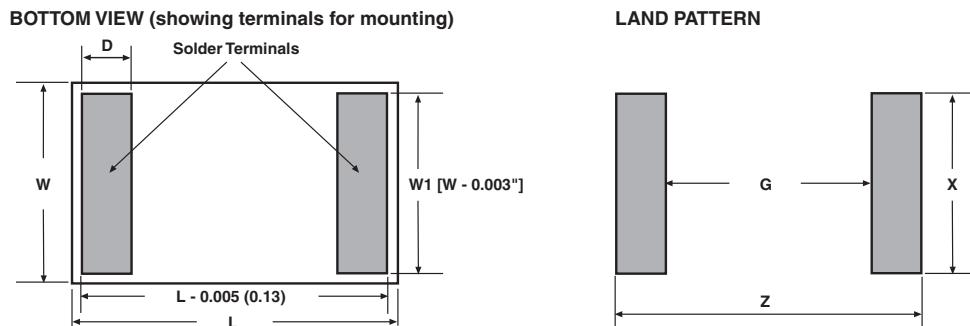
**HISTORICAL PART NUMBER: FRFC0805 10R000 TCR0.2 C S W (will continue to be used)**

FRFC0805	10R000	TCR0.2	C	S	W
MODEL	OHMIC VALUE	TCR	RESISTANCE TOLERANCE	TERMINATION	PACKAGING
FRFC0805 FRFC1206 FRFC1506 FRFC2010 FRFC2512	10.0 $\Omega$	Characteristic	T = $\pm 0.01\%$ Q = $\pm 0.02\%$ A = $\pm 0.05\%$ B = $\pm 0.10\%$ C = $\pm 0.25\%$ D = $\pm 0.50\%$ F = $\pm 1.00\%$	S = lead (Pb)-free B = tin/lead	T = tape and reel W = waffle pack

**Note**

<sup>(1)</sup> For non-standard requests, please contact application engineering.

## DIMENSIONS AND LAND PATTERN in Inches (Millimeters)



Note: Recommended stencil thickness 0.2 mm/0.00787 inch minimum

CHIP SIZE	L ±0.005 (0.13)	W ±0.005 (0.13)	THICKNESS MAXIMUM	D ±0.005 (0.13)	Z	G	X
0805	0.079 (2.01)	0.049 (1.24)	0.025 (0.64)	0.010 (0.25)	0.078 (1.98)	0.053 (1.35)	0.049 (1.24)
1206	0.126 (3.20)	0.062 (1.57)	0.025 (0.64)	0.015 (0.38)	0.125 (3.18)	0.090 (2.29)	0.062 (1.57)
1506	0.150 (3.81)	0.062 (1.57)	0.025 (0.64)	0.012 (0.30)	0.150 (3.81)	0.120 (3.05)	0.062 (1.57)
2010	0.200 (5.08)	0.100 (2.54)	0.025 (0.64)	0.020 (0.51)	0.199 (5.05)	0.153 (3.89)	0.100 (2.54)
2512	0.250 (6.35)	0.126 (3.20)	0.025 (0.64)	0.024 (0.61)	0.250 (6.35)	0.196 (4.98)	0.126 (3.20)

## Notes

- Avoid the use of cleaning agents which could attack epoxy resins, which form part of the resistor construction
- Vacuum pick up is recommended for handling
- Soldering iron is not recommended

