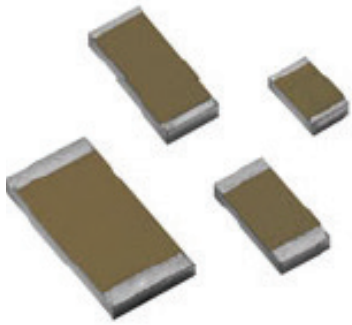
FRST Series (Z1 Foil Technology) (0603, 0805, 1206, 1506, 2010, 2512)

Ultra High-Precision Foil Wraparound Surface Mount Chip Resistor

for High Temperature Applications up to +200°C, Humidity Proof (85°C/85% RH) to 0.005%, Stability Under Load of 0.02%

FEATURES

- Humidity test: 85°C/85% RH, 1000 hrs to ΔR 0.005%, typical
- Temperature coefficient of resistance (TCR): 2.5 ppm/°C typical (–55°C to +175°C, +25°C ref.)
- Resistance range: 5 Ω to 125 kΩ
- Resistance tolerance: to ±0.01%
- Power coefficient "ΔR due to self heating": 5 ppm at rated power
- Power rating: to 750 mW at +70°C
  to 150 mW at +175°C
- Load life stability: ±0.005% typical at 70°C (2000 h, rated power)
- Stability under load: 0.02% at +175 °C (2000 h, derated power)



Pb-free Available

RoHS* COMPLIANT

Tolerance and TCR vs. Resistance Value(1)
(–55°C to +175°C, +25°C Ref.)

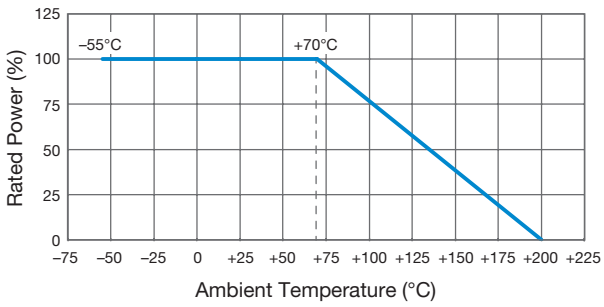
Resistance Value (Ω)	Tolerance (%)	Typical TCR (ppm/°C)
250 to 125k	±0.01%	±2.5
100 to <250	±0.02%	
50 to <100	±0.05%	
25 to <50	±0.1%	
10 to <25	±0.25%	
5 to <10(2)	±0.5%	

Notes
(1) For tighter performances and non-standard values lower than 5 Ω and above 125 kΩ, please contact VFR application engineering using the e-mail address in the footer below.
(2) TCR of these low value range : ±10 ppm/°C max

Specifications

Chip Size	Rated Power at +70°C (mW)	Derated Power at +175°C (mW)	Max. Working Voltage ($\leq\sqrt{P \times R}$)	Resistance Range (Ω)	Max. Weight (mg)
0603	100	20	22 V	100 to 4k	4
0805	200	40	40 V	5 to 8k	6
1206	300	60	87 V	5 to 25k	11
1506	300	60	95 V	5 to 30k	12
2010	500	100	187 V	5 to 70k	27
2512	750	150	220 V	5 to 125k	40

Power Derating Curve



Performances (Based on MIL-PRF-55342)

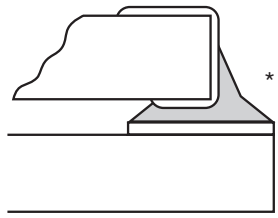
Test	Conditions	Typical Limit % (ppm)	Max Limit %[1] (ppm)
Short Time Overload	6.25 x P_{nom}	±0.005% (50)	±0.01% (100)
High Temperature Exposure	+200°C, 1,000 h	±0.02% (200)	±0.05% (500)[2]
Resistance to Soldering Heat	Per MIL-PRF-55342 (p.4.8.8.1)	±0.005% (50)	±0.01% (100)
Moisture Resistance	Per MIL-PRF-55342 (p. 4.8.9)	±0.005% (50)	±0.01% (100)
Humidity Test	85°C/85% RH, 1000 h	±0.005% (50)	±0.01% (100)[3]
Stability Under Load, 175°C, 2,000 h	Derated power	±0.02% (200)	±0.03% (300)
Load-Life Test, 70°C, 2,000 h	@ rated power	±0.005% (50)	±0.01% (100)
Thermal Shock	5 x (–65°C to +175°C)	±0.005% (50)	±0.01% (100)

Notes
(1) As shown +0.01 Ω to allow for measurement errors at low values.
(2) Applicable to all FRST series except for 0603 size. The limit for 0603 is ± 0.1% (1,000 ppm).
(3) Applicable to all FRST series except for 0603 size. The limit for 0603 is ± 0.03% (300 ppm).

Recommended Mounting

1. IR and vapor phase reflow are recommended.
2. Avoid the use of cleaning agents that attack epoxy resins, which form part of the resistor construction.
3. Vacuum pick up is recommended for handling.
4. If the use of a soldering iron becomes necessary, precautionary measures should be taken to avoid any possible damage/overheating of the resistor.

* Recommendation: The solder fillet profile should be such as to avoid running over the top metallization.



FRST Series (Z1 Foil Technology) (0603, 0805, 1206, 1506, 2010, 2512)

Global Part Number Information[1]

NEW GLOBAL PART NUMBER: Y401612K7560T9R (preferred part number format)

DENOTES PRECISION	VALUE	CHARACTERISTICS
Y	**R** = Ω **K** = kΩ	**9** = lead (Pb)-free **1 to 999** = custom

Y	4	0	1	6	1	2	K	7	5	6	0	T	9	R

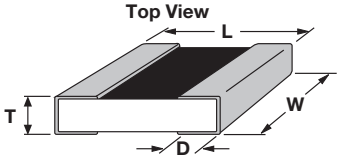
PRODUCT CODE	RESISTANCE TOLERANCE	PACKAGING
4013 = FRST0603 **4014** = FRST0805 **4015** = FRST1206 **4016** = FRST1506 **4017** = FRST2010 **4018** = FRST2512	**T** = ± 0.01 % **Q** = ± 0.02 % **A** = ± 0.05 % **B** = ± 0.10 % **C** = ± 0.25 % **D** = ± 0.5 % **F** = ± 1.0 %	**R** = tape and reel **W** = waffle pack

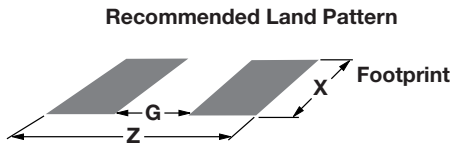
FOR EXAMPLE: ABOVE GLOBAL ORDER Y4016 12K7560 T 9 R:

TYPE: FRST1506
VALUES: 12.7560 kΩ
ABSOLUTE TOLERANCE: 0.01 %
TERMINATION: lead (Pb)-free
PACKAGING: tape and reel

Note
(1) For non-standard requests, please contact application engineering.

Dimensions 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 [1]	G [1]	X [1]
0603	0.063 (1.60)	0.032 (0.81)	0.025 (0.64)	0.011 (0.28)	0.102 (2.59)	0.031 (0.78)	0.031(0.78)
0805	0.080 (2.03)	0.050 (1.27)		0.015 (0.38)	0.122 (3.10)	0.028 (0.71)	0.050 (1.27)
1206	0.126 (3.20)	0.062 (1.57)		0.020 (0.51)	0.175 (4.45)	0.059 (1.50)	0.071 (1.80)
1506	0.150 (3.81)	0.062 (1.57)		0.020 (0.51)	0.199 (5.05)	0.083 (2.11)	0.071 (1.80)
2010	0.198 (5.03)	0.097 (2.46)		0.025 (0.64)	0.247 (6.27)	0.115 (2.92)	0.103 (2.62)
2512	0.249 (6.32)	0.127 (3.23)		0.032 (0.81)	0.291 (7.39)	0.150 (3.81)	0.127 (3.23)

Notes
(1) Land Pattern Dimensions are per IPC-7351A.