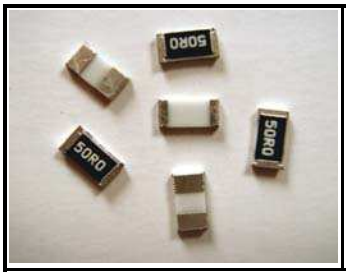
Thin Film Technology Corp.

Product Family: 7 Watt RF Chip Power Resistor

Part Number: CFA1206E50R0FS-T50



Construction:

- High purity alumina substrate
- Nickel alloy thin-film resistive element
- Epoxy-resin overcoat
- Pre-tinned (Sn100, matte) terminations over Ni barrier is standard (RoHS compliant and Pb Free)

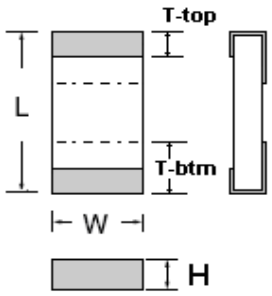
Features:

- TCR = ±25 ppm/°C
- High volume production suitable for commercial and special applications
- Competitive pricing

Description:

These power resistors are designed to tolerate high current and establish a low thermal resistance interface with the circuit board. A lower thermal resistance more efficiently sinks heat to the board, enabling a larger effective area for heat dissipation. As a result, much lower surface temperatures are achievable in comparison to standard chip resistors for the same chip size and applied power.

Product Dimensions and Product Marking:



Dimension	L	W	H	T-top	T-btm
1206 English (3216 Metric)	0.120 ±0.008	0.060 ±0.008	0.016 ±0.004	0.016 ±0.008	1.000 ±0.008

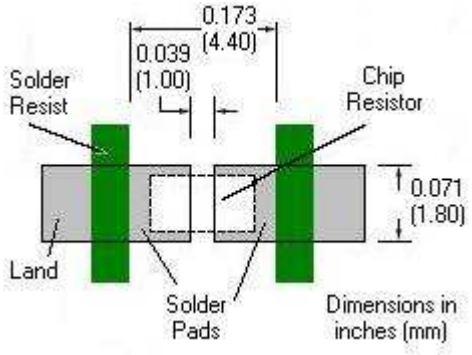
Note: Dimensions are shown in inches. Metric case size is shown in parenthesis.

Product Marking:

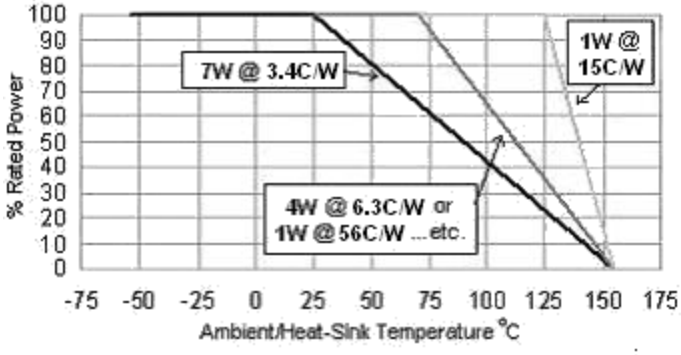
Product marking will be on the top side of the component (black side) and will contain the characters “50R0” which stands for 50.0Ω

Land Pattern and Derating Curve:

Recommended Land Pattern:



Derating Curve [5]:



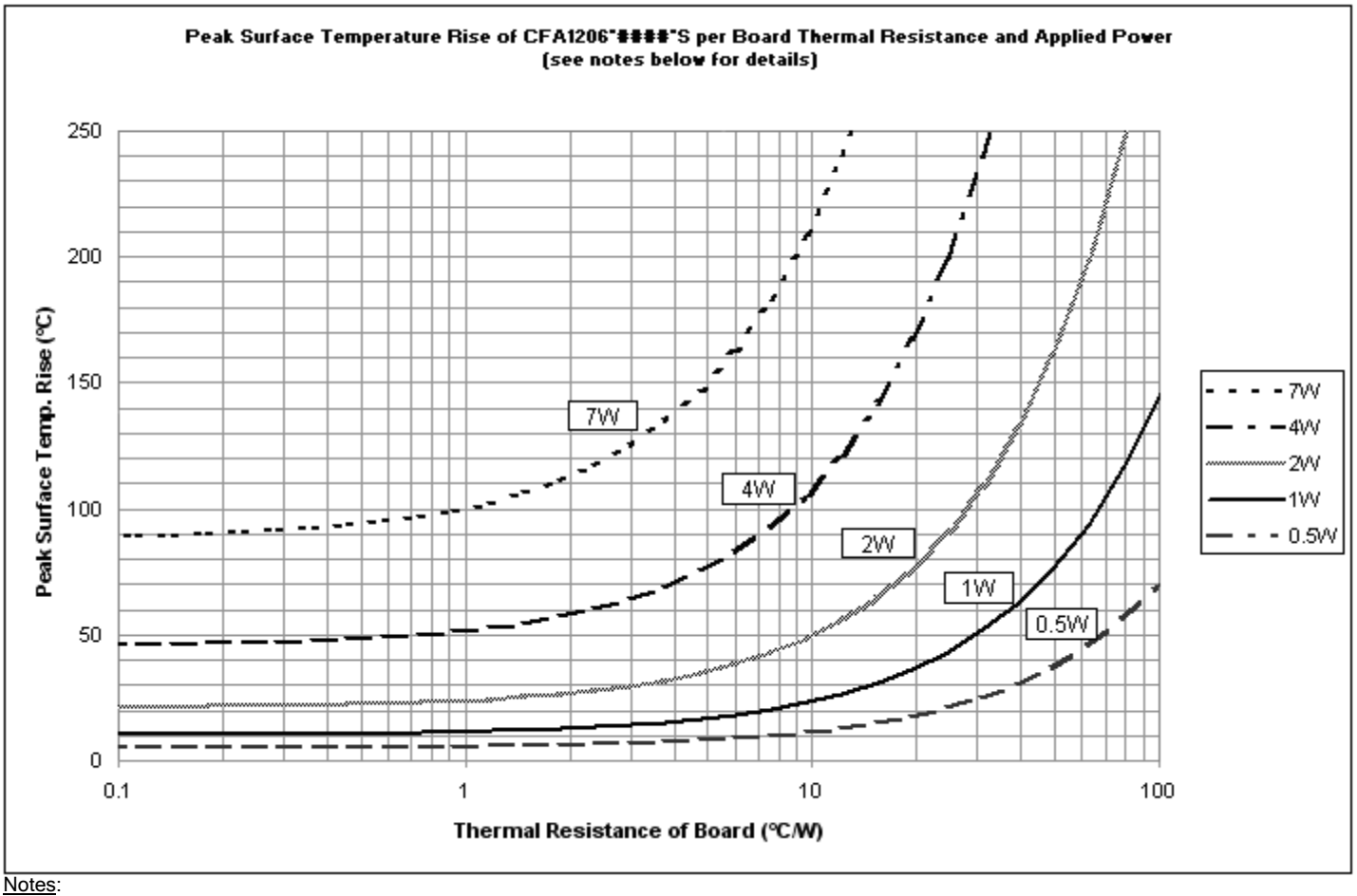
Part Numbering: CFA1206E50R0FS-T50

Product Designator	Ceramic Type	English Size (Metric Size)	Temp. Coefficient of Resistance (TCR)	Resistance Value	Tolerance	Custom Code	Qty Indicator
CF	**A** = Alumina	**1206** (3216)	**E** = ±25ppm/°C	**50R0** = 50.0Ω	**F** = ±1%	Standard = **S** Custom = TBD	**-T50** (5k/reel)

Electrical Specifications:

Type	CFA1206E50R0FS-T50
English Size	1206
Metric Size	3216
Power	7 Watts [1,2]
Rated Voltage	√Power x Resistance
Frequency Performance	Return Loss < 23dB to 3.0GHz Max VSWR = 1.15 to 3.0GHz
Resistance	50Ω
Tolerance% (code)	±1.0% (F)
TCR ppm/°C (code)	±25ppm/°C (E) [3]
Operating Temperature	-55°C ~ +155°C [4]
Packaging	5,000 pcs/reel

Notes:
1. Dependent on effective thermal conductivity/resistance of board construction/land design and size of board - greater power capability for board/land with lower thermal resistance. For relatively high thermal resistance mountings, the power resistors are capable of generating sufficient heat to reflow solder bonds without device damage.
2. Refer to Thermal Performance Plot below.
3. Per MIL-PRF-55342 (-55/25/125ºC).
4. Per MIL-PRF-55342.
5. Derating curves are derived from the thermal performance plots.
6. Please consult the factory for any desired variations to the above specifications



Notes:
1. Plots produced by characterization of thermal coefficients determined from experimental measurements (by thermal imaging camera) at thermal equilibrium with parts mounted to various boards (with homogeneous thermal conductivity to minimize uncertainty) per recommended solder pad dimensions and with boards pressed against a Cu carrier/heat-sink (not ideal) with a thermal compound interface in a static environment (no air flow).
2. Heat flow primarily through thickness of board with virtually zero lateral heat transfer in board.
3. Thermal resistance of test boards were calculated based on material manufacturer specified thermal conductivity (20ºC) via the following: Thermal Resistance (°C/W) = L / (k A), where Thermal Conductivity, k (W/mK) = (L / (A ΔT)) ΔQ/Δt, L = Thickness of board in meters and A = area of chip resistor in meters.
4. The relationships between peak surface temperature rise, power, and board thermal resistance are linear, but the x-axis is plotted in log-scale to offer greater resolution at lower board thermal resistances.

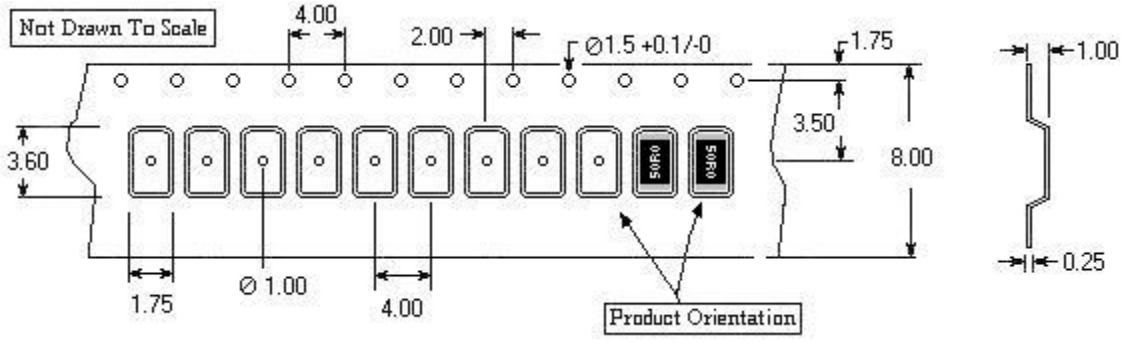
Environmental Performance Specifications:

Test	Reference	Conditions of Test	Requirement
Life [4]	MIL-PRF-55342, MIL-STD-202 Method 108A	25ºC, 2000h, rated power [3], 1.5h on, 0.5h off	± 0.5% + 0.01Ω
Thermal Shock	MIL-PRF-55342, MIL-STD-202 Method 107G	Condition F-3, -65ºC/0.25h to 125ºC/0.25h, 125 cycles	± 0.1% + 0.01Ω
High Temperature Exposure	MIL-PRF-55342	125ºC, 2000h	± 0.1% + 0.01Ω
Short Time Overload [4]	MIL-PRF-55342	6.25x rated power [3], 5 sec.	± 0.1% + 0.01Ω
Moisture Resistance	MIL-PRF-55342, MIL-STD-202 Method 106G	85°C / 85%RH 1.5h on, 0.5h off @ 1/10th rated power [3]	± 0.1% + 0.01Ω
Resistance to Soldering Heat [1]	MIL-PRF-55342, MIL-STD-202 Method 210F	260ºC for 15 sec., over 220ºC for 60 sec., 3 cycles	± 0.1% + 0.01Ω
Solderability [2]	MIL-PRF-55342, MIL-STD-202 Method 208H	Precondition E: 150ºC dry bake for 16h, Method 1 “Dip and Look Test”, 245ºC, 5 sec., Pb-free (SnAgCu) Solder	Min 95% coverage of critical area

Notes:
1. Test conditions modified to represent the high temperature Pb-free reflow conditions and an extra cycle is added.
2. JESD22-B102D adds test conditions for Pb-free and is aligned with J-STD-002B referenced in MIL-STD-202 Method 208H. JESD22-B102D procedure comes from EIA-638, “Surface Mount Solderability Test”.
3. Parts mounted to boards in accordance with NEMA grade FR-4 of IPC-4101 (62mils thick) with Cu carrier/heat-sink at a rated power of 1W (Board Thermal Resistance ~ 72C/W).
4. Due to the complexity of managing the heat load of hundreds of pieces during qualification, long-term reliability testing for the 7W power rating had been conducted in terms of the equivalent current density via much thinner/narrower resistor patterns to limit the heat load.

Tape and Reel Packaging:

Packaging Specifications	General Guidelines & Recommendations
Packaging Requirements	• All taping done in accordance with EIA 481 standards. • Pieces taped with the marking up and showing through the cover tape (as shown in the drawing below).
Labeling Requirements	Labels will contain the TFT part number and quantity of pieces taped.



Note: All dimensions in mm