Wirewound Resistors, Industrial Power, Flat



FEATURES

- High temperature silicon coating
- Mounting accommodations ideally suited to high density packaging
- Self-stacking hardware for horizontal or vertical placement
- Withstands high vibrations without loosening
- Mounting hardware functions as a heat sink allowing greater heat dissipation and less derating of stacked units
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

LINKS TO ADDITIONAL RESOURCES

3D Models

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	HISTORICAL MODEL	POWER RATING $P_{25\,°C}$ W	RESISTANCE RANGE Ω ± 5 %	RESISTANCE RANGE Ω ± 10 %	WEIGHT (typical) g
FSOT10	FSOT-10	10	1.0 to 15K	0.10 to 15K	0.41
FSOT10-NI	FSOT-10-NI		1.0 to 1.8K	1.0 to 1.8K	
FSOT15	FSOT-15	15	1.0 to 26K	0.10 to 26K	0.47
FSOT15-NI	FSOT-15-NI		1.0 to 3.6K	1.0 to 3.6K	
FSOT20	FSOT-20	20	1.0 to 71K	0.10 to 71K	0.74
FSOT20-NI	FSOT-20-NI		1.0 to 9.8K	1.0 to 9.8K	
FSOT30...14 / FSOT30...16	HL-24-09 / HL-24-16	30	1.0 to 11K	0.10 to 11K	20.14
FSOT30...15 / FSOT30...17	NHL-24-09 / NHL-24-16		1.0 to 1.2K	1.0 to 1.2K	
FSOT40...14 / FSOT40...16	HL-40-09 / HL-40-16	40	1.0 to 26K	0.10 to 26K	30.07
FSOT40...15 / FSOT40...17	NHL-40-09 / NHL-40-16		1.0 to 3K	1.0 to 3K	
FSOT55...14 / FSOT55...16	HL-55-09 / HL-55-16	55	1.0 to 54K	0.10 to 54K	51.25
FSOT55...15 / FSOT55...17	NHL-55-09 / NHL-55-16		1.0 to 6.8K	1.0 to 6.8K	
FSOT70...14 / FSOT70...16	HL-70-09 / HL-70-16	70	1.0 to 77K	0.10 to 77K	60.48
FSOT70...15 / FSOT70...17	NHL-70-09 / NHL-70-16		1.0 to 9.4K	1.0 to 9.4K	
FSOT95...14 / FSOT95...16	HL-95-09 / HL-95-16	95	1.0 to 99.9K	0.10 to 99.9K	76.51
FSOT95...15 / FSOT95...17	NHL-95-09 / NHL-95-16		1.0 to12.4K	1.0 to 12.4K	

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	FSOT, FSOT...XX FLAT RESISTOR CHARACTERISTICS
Temperature coefficient	ppm/°C	± 90 for 0.1 Ω to 0.99 Ω; ± 50 for 1 Ω to 9.9 Ω; ± 30 for 10 Ω and above
Dielectric withstanding voltage	V_{AC}	1000, from terminal to mounting hardware
Short time overload	-	10 x rated power for 5 s
Maximum working voltage	V	$(P \times R)^{1/2}$
Insulation resistance	Ω	1000 MΩ minimum dry, 100 MΩ minimum after moisture test
Operating temperature range	°C	-55 to +350

For technical questions, contact: ww2dresistors@vishay.com

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GLOBAL PART NUMBER INFORMATION

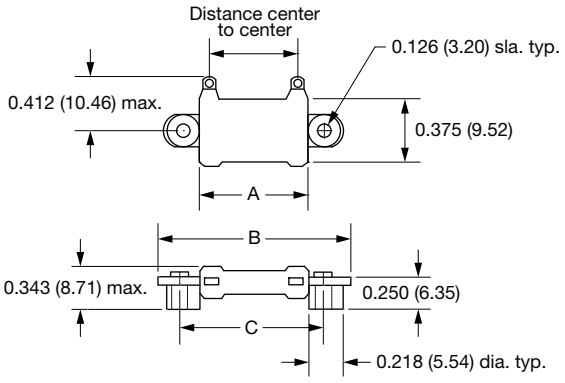
Global Part Numbering Example: FSOT3009E10R00JE14

F	S	O	T	3	0	0	9	E	1	0	R	0	0	J	E	1	4

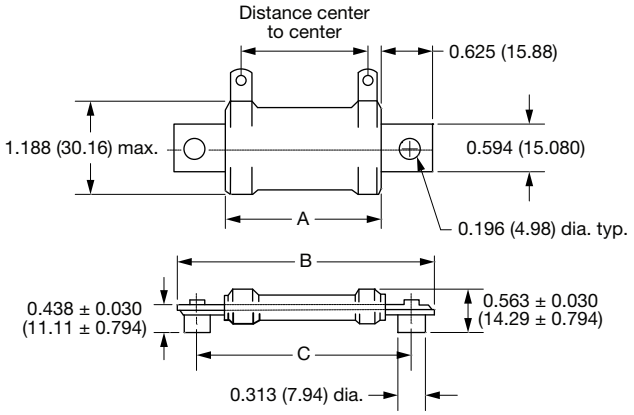
GLOBAL MODEL (6 digits)	TERMINAL DESIGNATION (2 digits)	TERMINAL FINISH (1 digit)	RESISTANCE VALUE (5 digits)	TOLERANCE	PACKAGING CODE	SPECIAL
FSOT30 (see "Standard Electrical Specifications" table above for additional P/N's)	**09** **16** **11 (only FSOT10, FSOT15, FSOT20)**	**E** = lead (Pb)-free	**R** = decimal **K** = thousand **10R00** = 10.0 Ω **1K500** = 1.5 kΩ	**J** = ± 5.0 % **K** = ± 10.0 %	**E** = lead (Pb)-free cell and bulk pack	(dash number) (up to 2 digits) From **1 to 99** as applicable; leave empty if 11 terminal **NI** = non-inductive (11 terminal only) **14** = standard, 09 terminal **15** = non-inductive, 09 terminal **16** = standard, 16 terminal **17** = non-inductive, 16 terminal

DIMENSIONS in inches [millimeters]

FSOT10 / FSOT15 / FSOT20



FSOT...XX FLAT 30 / 40 / 55 / 70 / 95



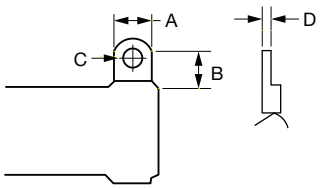
MODEL	A ± 0.063 [1.59]	B ± 0.063 [1.59]	C ± 0.031 [0.79]	DISTANCE CENTER TO CENTER (ref.)	TERMINAL DESIGNATION	
					STANDARD	OPTIONAL
FSOT10	0.750 [19.05]	1.3125 [33.34]	1.000 [25.40]	0.531 [13.49]	11E	-
FSOT15	1.000 [25.40]	1.5625 [39.69]	1.250 [31.75]	0.781 [19.84]	11E	-
FSOT20	2.062 [52.37]	2.625 [66.68]	2.313 [58.75]	1.843 [46.81]	11E	-
FSOT30...XX	1.250 [31.75]	2.500 [63.50]	2.000 [50.80]	0.718 [18.24]	09E	16E
FSOT40...XX	2.000 [50.80]	3.250 [82.55]	2.750 [69.85]	1.468 [37.29]	09E	16E
FSOT55...XX	3.500 [88.90]	4.750 [120.65]	4.250 [107.95]	2.968 [75.39]	09E	16E
FSOT70...XX	4.750 [120.65]	6.000 [152.40]	5.500 [139.70]	4.218 [107.14]	09E	16E
FSOT95...XX	6.000 [152.40]	7.250 [184.15]	6.750 [171.45]	5.468 [138.89]	09E	16E

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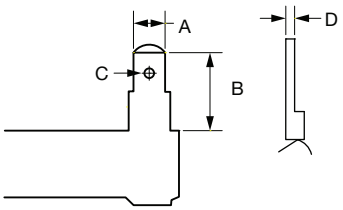
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TERMINAL DIMENSIONS in inches [millimeters]

STYLE 09, STYLE 11



STYLE 16



DIMENSION	STYLE 09	STYLE 11	STYLE 16
A	0.188 [4.78]	0.125 [3.18]	0.188 [4.76]
B	0.458 [11.63]	0.255 [6.48]	0.563 [14.29]
C	0.104 [2.64]	0.081 [2.06]	0.050 [1.27]
D	0.020 [0.51]	0.020 [0.51]	0.020 [0.51]

POWER RATING

Vishay FSOT flat resistor wattage ratings are based on mounting horizontally to 10" x 10" x 0.04" [254.0 mm x 254.0 mm x 1.02 mm] steel plate in 25 °C ambient with no air flow.

EXCLUSIVE BRACKET DESIGN

Mounting strap fits snugly through resistor core and is bound against unit by two eccentric spacers. The bracket eliminates expensive cements and improves heat transfer and power handling capabilities.

MATERIAL SPECIFICATIONS

Element: copper-nickel alloy of nickel-chrome alloy, depending on resistance value

Core: ceramic, steatite

Coating: special high temperature silicone

Standard Terminals: model “E” terminals are tinned steel

Terminal Bands: steel

Part Marking: HEI, model, wattage, value, tolerance, date code

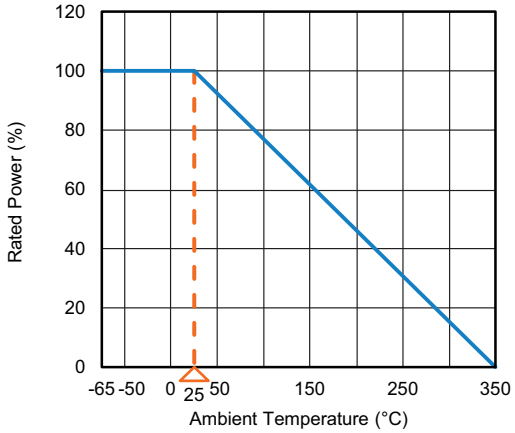
TERMINAL FINISH

“E” finish - 100 % Sn coated steel.

NON-INDUCTIVE

Models of equivalent physical and electrical specifications are available with non-inductive (Aryton-Perry) winding. For non-inductive models, maximum resistance values are lower, see Standard Electrical Specifications table.

DERATING



Derating is required for ambient temperatures above 25 °C per the above graph.

PERFORMANCE

TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal shock	Rated power applied until thermally stable, then a minimum of 15 min at -55 °C	± (2.0 % + 0.05 Ω) Δ*R*
Short time overload	10 x rated power for 5 s	± (2.0 % + 0.05 Ω) Δ*R*
Dielectric withstanding voltage	1000 V_{RMS}, 1 min	± (0.1 % + 0.05 Ω) Δ*R*
Low temperature storage	-55 °C for 24 h	± (2.0 % + 0.05 Ω) Δ*R*
High temperature exposure	250 h at +350 °C	± (2.0 % + 0.05 Ω) Δ*R*
Moisture resistance	MIL-STD-202 method 106, 7b not applicable	± (2.0 % + 0.05 Ω) Δ*R*
Shock, specified pulse	MIL-STD-202 method 213, 100 *g*'s for 6 ms, 10 shocks	± (0.2 % + 0.05 Ω) Δ*R*
Vibration, high frequency	Frequency varied 10 Hz to 2000 Hz, 20 *g* peak, 2 directions 6 h each	± (0.2 % + 0.05 Ω) Δ*R*
Load life	1000 h at rated power, +25 °C, 1.5 h “ON”, 0.5 h “OFF”	± (3.0 % + 0.05 Ω) Δ*R*

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