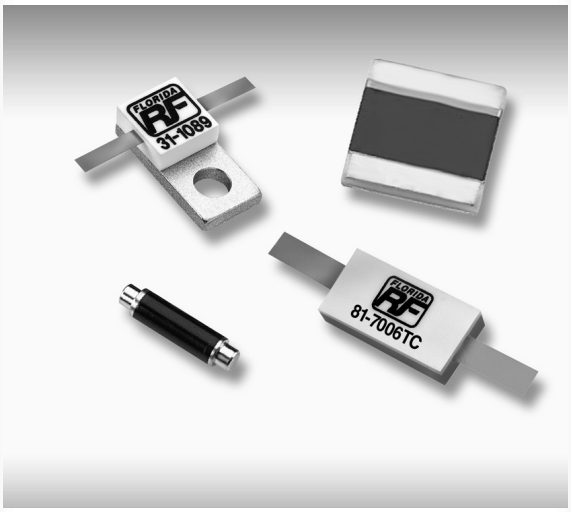
Features

- *Lead Free, RoHS Compliant Option Available*
- *Low Capacitance*
- *Mounting - Surface Mount, Tab & Cover, Flange, and Rod*
- *Power Levels: 0.05 to 800 watts*
- *50 & 100 Ohms standard*
- *Tuned Circuit*
- *Available in AlN, BeO, or Alumina*
- *Substrate Thicknesses of .015" to .120" Available*
- *Rod Diameters of .020" to .375"*
- *Custom Tab Forming Available*
- *S-Parameter Files Available*
- *Resistance Ranges from 3 to 400 Ohms*
- *Small Size*

Applications

- *Base Stations*
- *Broadcast (TV and Radio)*
- *High Power Amplifier*
- *Instrumentation*
- *Military*
- *Radar System*
- *Satellite Communications*
- *Splitters/Combiners*
- *Voltage Dropping Resistor*
- *Wilkinson Dividers*



Florida RF Labs® provides a full array of resistor packages that includes surface mount, tab & cover, flange, rod, and film cards. These devices use a tuned circuit design to minimize parasitic capacitance and achieve low VSWR performance. The devices are available for delivery in tray or tape & reel.

Table of Contents

Surface Mount and Tab & Cover

Standard Resistance ..... *50 & 100 Ohms ±5%*
Resistance Range ..... *3 to 400 Ohms*
Operating Temperature ..... *-55 to 150˚C*
Power Rating ..... *100% @ 100˚C Derates to 0% @ 150˚C*
Peak Power ..... *Typically 10 Times the Max Power Rating with 1% Duty Cycle and 100 Microsecond Pulse Width*
Resistor ..... *Nichrome*
Substrates ..... *BeO, AlN, or Alumina*
Environment ..... *Meets Applicable Sections of MIL-PRF-55342*

Flange

Standard Resistance ..... *50 & 100 Ohms ±5%*
Resistance Range ..... *3 to 400 Ohms*
Operating Temperature ..... *-55 to 150˚C*
Power Rating ..... *100% @ 100˚C Derates to 0% @ 150˚C*
Peak Power ..... *Typically 10 Times the Max Power Rating with 1% Duty Cycle and 100 Microsecond Pulse Width*
Resistor ..... *Nichrome*
Substrates ..... *BeO, AlN, or Alumina*
Environment ..... *Meets Applicable Sections of MIL-PRF-55342*

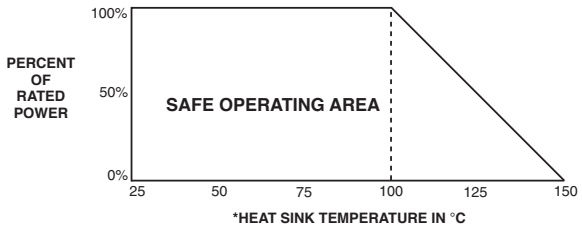
Standard Rod

Standard Resistance ..... *50 & 100 Ohms ±5%*
Resistance Range ..... *5 to 300 Ohms*
Operating Temperature ..... *-55 to 150˚C*
Power Rating ..... *100% @ 100˚C Derates to 0% @ 150˚C*
Peak Power ..... *Typically 10 Times the Max Power Rating with 1% Duty Cycle and 100 Microsecond Pulse Width*
Terminals ..... *Soft Solder Tinned Terminals*
Resistor ..... *Nichrome*
Substrates ..... *BeO or Alumina*
Environment ..... *Meets Applicable Sections of MIL-PRF-55342*

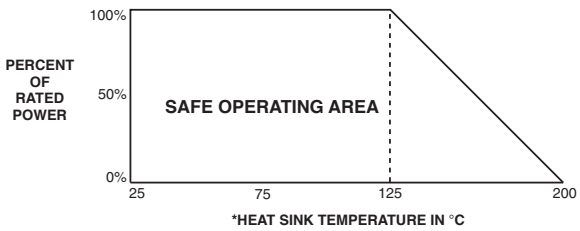
Film Cards

Resistance Range ..... *25 to 1,000 Ohms/square*
Standard Tolerance ..... *±10%*
Max. Surface Temperature ..... *150˚C*
Resistor ..... *Nichrome*
Substrates ..... *Fiberglass, Mylar®, Kapton®, or Mica*

Power Rating and Derating



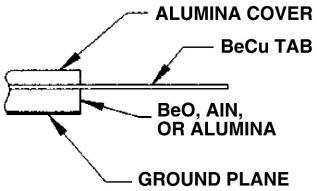
Alternative Derating Available Upon Request



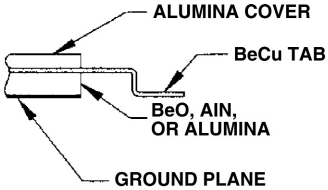
*The heat sink is defined as the surface that the component is attached to, *ie*. chassis or printed circuit board.

Tab Options

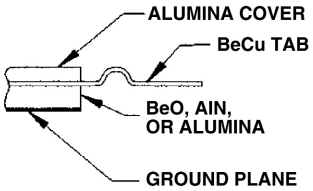
- Standard Straight Tab



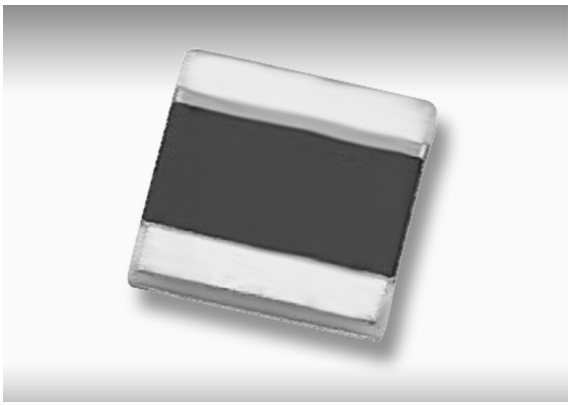
- Strain Relief



- Strain Relief



Note: For strain relief options, contact the factory.



High power chip resistors are available in three terminal styles for either RF or DC applications, such as bias voltage dropping or heaters. Terminal Style A has back side metallization for direct attachment to a heat sink or an item to be heated. Terminal Style B has wrap-around metallization for applications such as Wilkinson power divider balance resistors. Terminal Style C has a split ground that allows it to be mounted as a resistor or termination.

General Specifications

Standard Resistance . . . . . 50 & 100 Ohms ±5%
Resistance Range . . . . . 3 to 400 Ohms
Power . . . . . 5 to 150 W
*Power Rating . . . . . 100% @ 100˚C**
Derates to 0% @ 150˚C
Operating Temperature . . . . . -55 to 150˚C

Material Specifications

Substrates . . . . . BeO, AlN or Alumina
Resistive Element . . . . . Nichrome
Solderable Terminals . . . . . See Plating Option
Environment . . . . . Meets applicable sections of MIL-PRF-55342

** 100°C is referenced at the heat sink*

Ordering Information

8 1 A 7 042 – 100 – 5

TYPE
1 = Resistor

PLATING OPTION
– = Tin Lead
A = Silver Nickel**
B = Silver Copper**

DESCRIPTIONS
Random Numbers

RESISTANCE
Value in ohms

STYLE
8 = Chip/Power Pak

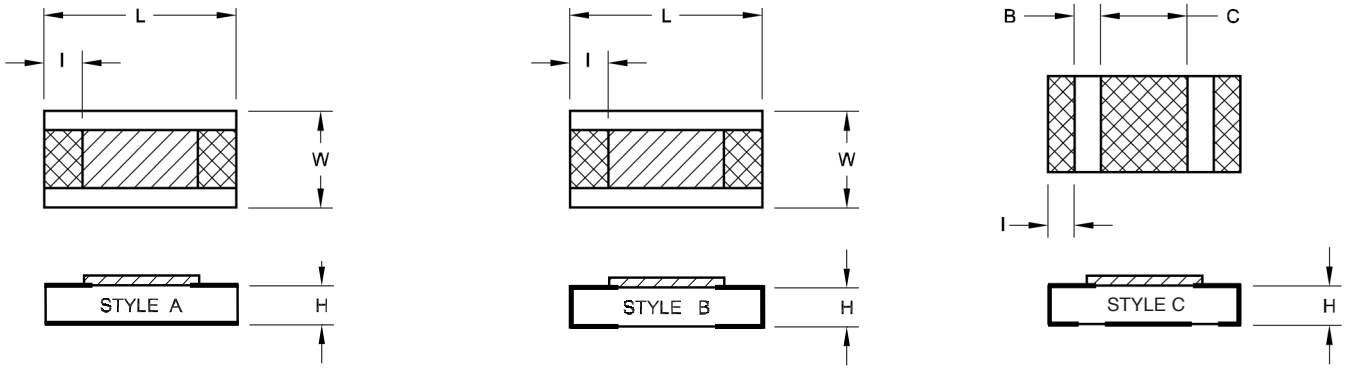
SUBSTRATE MATERIAL
7 = AlN (Aluminum Nitride)
8 = Alumina
3 = BeO (Beryllium Oxide)

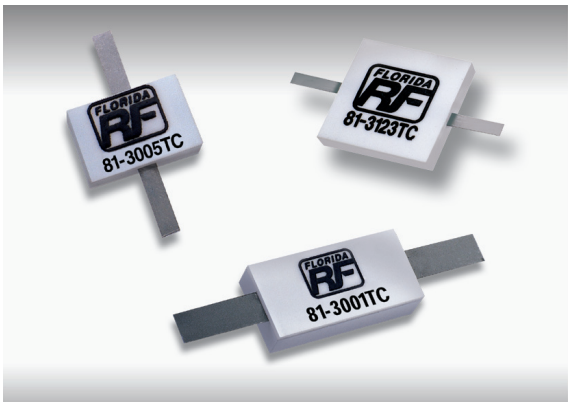
TOLERANCE
1 = 1%
2 = 2%
5 = 5%
10 = 10%

*** Lead free options*

Power (W)[1] Max	Capacitance[2] Max (pF)	Style	Substrate Type	Dimensions (in.) L	W	H	I	B	C	Part Number
2	0.10	B	Alumina	.120	.060	.015	.020	N/A	N/A	81-8004B-[3]
5	0.27	B	AlN	.200	.100	.040	.045	N/A	N/A	81-7001B-[3]
5	0.10	B	Alumina	.200	.100	.040	.045	N/A	N/A	81-8002B-[3]
5	0.80	B	BeO	.200	.100	.040	.045	N/A	N/A	81-3001B-[3]
8	1.00	B	BeO	.250	.250	.040	.060	N/A	N/A	81-3003B-[3]
8	0.85	B	BeO	.230	.350	.040	.060	N/A	N/A	81-3005B-[3]
8	0.66	B	BeO	.250	.250	.062	.060	N/A	N/A	81-3012B-[3]
10	0.10	C	AlN	.200	.100	.040	.030	0.023	0.094	81-7031-[3]
10	0.24	C	BeO	.200	.100	.040	.030	0.023	0.094	81-3031-[3]
10	0.80	A	BeO	.200	.100	.040	.045	N/A	N/A	81-3001A-[3]
20	1.50	C	AlN	.375	.250	.040	.060	0.04	0.195	81-7042-[3]
20	0.66	A	BeO	.250	.250	.062	.060	N/A	N/A	81-3012A-[3]
20	1.50	C	BeO	.375	.250	.040	.060	0.04	0.195	81-3032-[3]
30	0.50	A	BeO	.250	.250	.040	.045	N/A	N/A	81-3034A-[3]
30	0.85	A	BeO	.230	.350	.040	.060	N/A	N/A	81-3005A-[3]
50	1.00	A	BeO	.250	.250	.040	.060	N/A	N/A	81-3003A[3]
50	1.35	C	BeO	.700	.350	.060	.080	0.102	0.265	81-3036-[3]
150	1.25	A	BeO	.350	.230	.040	.048	N/A	N/A	81-3037A-[3]
150	1.33	A	BeO	.375	.250	.040	.060	N/A	N/A	81-3006A-[3]
250	1.64	A	BeO	.375	.375	.040	.060	N/A	N/A	81-3008A-[3]
800	4.48	A	BeO	1.00	1.00	.060	.090	N/A	N/A	81-3011A-[3]

For lead free options, replace the initial dash (-) with either "A" or "B" (see page 44).
[1] Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width.
[2] Capacitance is parallel and measures to 2.7 GHz.
[3] For a complete part number, include resistance and tolerance as described above in ordering information.
Please call the factory for your specific application.





Florida RF Labs® Tab & Cover resistors are ideal for mounting directly to a heatsink or on a circuit board. Tab & Cover resistors are available with BeO, AlN, or Alumina substrates. The devices have standard resistance values of 50 & 100 ohms. The power rating ranges from 10 to 500 watts. Applications include Wilkinson divider/combiners that require low capacitance to ground. Packaging options are tray and tape & reel. Optional lead forming is available on request.

General Specifications

Standard Resistance . . . . . 50 & 100 Ohms ±5%
Resistance Range . . . . . 5 to 400 Ohms
Power . . . . . 10 to 500 W
*Power Rating . . . . . 100% @ 100˚C**
Derates to 0% @ 150˚C
Operating Temperature . . . . . -55 to 150˚C

Material Specifications

Substrates . . . . . BeO, AlN, or Alumina
Resistor . . . . . Thin Film
Tab Contact . . . . . Beryllium Copper, Tin Plated per ASTM AS45
Cover . . . . . Alumina
Ground Plane . . . . . .See Plating Option

** 100°C is referenced at the heat sink*

Ordering Information

8 1 – 7 008TC – 100 – 5

STYLE
8 = Chip/Power Pak

TYPE
1 = Resistor

PLATING OPTION
– = Tin Lead
A = Silver Nickel**
B = Silver Copper**

SUBSTRATE MATERIAL
7 = AlN (Aluminum Nitride)
8 = Alumina
3 = BeO (Beryllium Oxide)

DESCRIPTIONS
Random Numbers

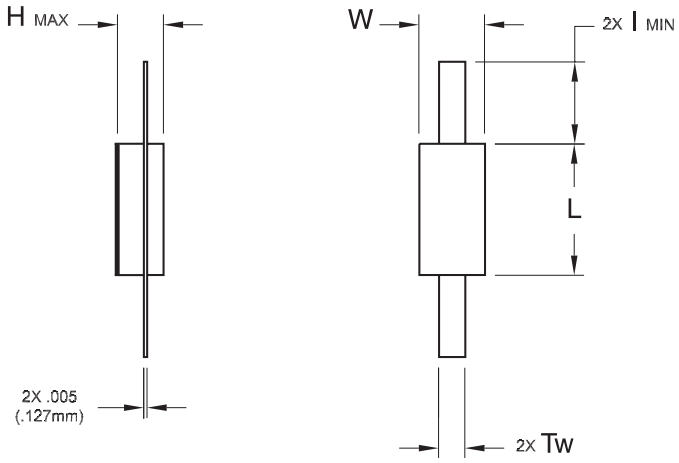
RESISTANCE
Value in ohms

TOLERANCE
1 = 1%
2 = 2%
5 = 5%
10 = 10%

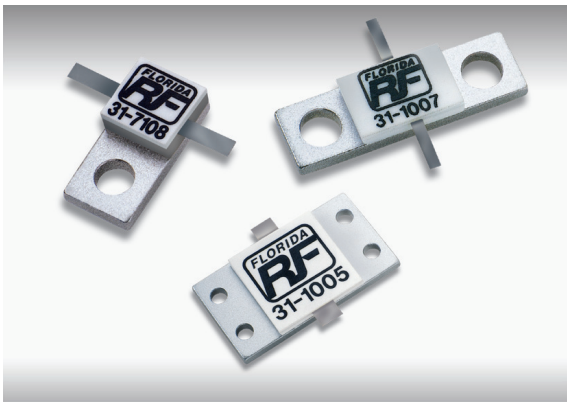
*** Lead free option*

Power (W)[1] Max	Substrate Type	Capacitance Max (pf)	Dimensions (in.) L	W	H	l	Tw	Part Number*
10	BeO	0.80	.200	.100	.090	.250	.040	81-3001TC-*
20	AIN	0.57	.200	.100	.085	.125	.040	81-7008TC-*
30	BeO	0.50	.250	.250	.085	.250	.060	81-3034TC-*
40	AIN	0.25	.230	.350	.040	.150	.040	81-7107TC-*
40	AIN	0.52	.250	.250	.085	.250	.060	81-7108TC-*
40	BeO	0.50	.250	.350	.085	.250	.040	81-3035TC-*
50	AIN	0.45	.250	.375	.085	.250	.060	81-7109TC-*
50	BeO	1.00	.250	.250	.085	.250	.060	81-3003TC-*
60	BeO	0.70	.250	.375	.040	.250	.060	81-3033TC-*
100	AIN	1.50	.375	.250	.085	.125	.040	81-7043TC-*
150	AIN	1.38	.375	.250	.085	.125	.120	81-7021TC-*
150	BeO	1.33	.375	.250	.085	.125	.120	81-3006TC-*
150	BeO	0.50	.375	.250	.105	.250	.120	81-3075TC-*
200	AIN	1.40	.375	.375	.085	.125	.120	81-7110TC-*
250	BeO	1.64	.375	.375	.085	.250	.120	81-3008TC-*
250	BeO	1.00	.375	.375	.105	.250	.120	81-3076TC-*
400	BeO	3.25	.500	.500	.085	.125	.250	81-3074TC-*
500	BeO	1.50	.500	.500	.085	.250	.060	81-3123TC-*

For lead free options, replace the initial dash (-) with either "A" or "B" (see page 48).
[1] Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width. Please call the factory for your specific application.
* For a complete part number, include resistance and tolerance as described in ordering information.



Flangeless Resistor



Florida RF Labs® flanged resistors are excellent for mounting directly to heatsinks for improved heat dissipation. The devices have standard resistance values of 50 & 100 ohms. The flanged resistors are available with power ratings ranging from 10 to 800 watts. The products are available with both BeO and AlN substrates. Optional lead forming is available on request.

General Specifications

Standard Resistance . . . . . 50 & 100 Ohms ±5%
Resistance Range . . . . . 4 to 400 Ohms
Power . . . . . 10 to 800 W
*Power Rating . . . . . 100% @ 100˚C**
Derates to 0% @ 150˚C
Operating Temperature . . . . . -55 to 150˚C

Material Specifications

Substrates . . . . . BeO or AlN
Resistor . . . . . Thin Film
Tab Contact . . . . . Beryllium Copper, Tin Plated per ASTM B545
Cover . . . . . Alumina
Mounting Flange . . . . . Copper, Nickel Plated per SAE AMS-QQ-N-290

** 100°C is referenced at the heat sink*

Ordering Information

3 1 A 7 021 – 050 – 5

STYLE
3 = High Power Flange

TYPE
1 = Resistor

PLATING OPTION
– = Tin Lead
A = Silver Nickel**
B = Silver Copper**

SUBSTRATE MATERIAL
7 = AlN (Aluminum Nitride)
1 = BeO (Beryllium Oxide)

DESCRIPTIONS
Random Numbers

RESISTANCE
Value in ohms

TOLERANCE
1 = 1%
2 = 2%
5 = 5%
10 = 10%

*** Lead free options*

Power (W)[1] Max	Substrate Type	Capacitance Max (pf)	Dimensions: inches (mm) L	W	H	I	Tw	Part Number*	Figure
10	BeO	0.8	.200 (5.08)	.300 (7.62)	.150 (3.81)	.125 (3.17)	.040 (1.00)	31-1006-*	1
10	BeO	0.8	.200 (5.08)	.500 (12.70)	.150 (3.81)	.125 (3.17)	.040 (1.00)	31-1008-*	2
20	AlN	0.57	.200 (5.08)	.300 (7.62)	.150 (3.81)	.125 (3.17)	.040 (1.00)	31-7006-*	1
20	BeO	0.2	.250 (6.35)	.515 (13.81)	.170 (4.32)	.250 (6.35)	.040 (1.00)	31-1094-*	3
20	BeO	0.6	.250 (6.35)	.515 (13.81)	.160 (4.06)	.250 (6.35)	.060 (1.52)	31-1001-*	3
20	BeO	0.6	.250 (6.35)	.515 (13.81)	.160 (4.06)	.250 (6.35)	.100 (2.54)	31-1009-*	3
30	BeO	0.5	.250 (6.35)	.515 (13.81)	.140 (3.56)	.276 (7.01)	.060 (1.52)	31-1034-*	5
40	AlN	0.25	.230 (5.84)	.800 (20.32)	.150 (3.81)	.150 (3.81)	.040 (1.00)	31-7107-*	6
40	AlN	0.8	.250 (6.35)	.515 (13.81)	.150 (3.81)	.250 (6.35)	.060 (1.52)	31-7108-*	3
40	BeO	0.5	.230 (5.84)	.800 (20.32)	.150 (3.81)	.150 (3.81)	.040 (1.00)	31-1035-*	6
40	BeO	0.5	.250 (6.35)	.515 (13.81)	.140 (3.56)	.250 (6.35)	.060 (1.52)	31-1089-*	3
50	AlN	0.45	.255 (6.48)	.787 (19.99)	.140 (3.56)	.250 (6.35)	.060 (1.52)	31-7109-*	7
60	BeO	0.7	.255 (6.48)	.787 (19.99)	.140 (3.56)	.250 (6.35)	.060 (1.52)	31-1033-*	7
75	BeO	0.5	.255 (6.48)	.820 (20.83)	.235 (5.97)	.125 (3.17)	.250 (6.35)	31-1002-*	4
80	BeO	-	.375 (9.52)	.870 (22.10)	.235 (5.97)	.125 (3.17)	.120 (3.05)	31-1029-*	9
150	AlN	2.25	.375 (9.52)	.870 (22.10)	.170 (4.32)	.125 (3.17)	.120 (3.05)	31-7021-*	9
150	BeO	1.33	.375 (9.52)	.870 (22.10)	.150 (3.81)	.125 (3.17)	.120 (3.05)	31-1003-*	9
150	BeO	0.8	.375 (9.52)	.870 (22.10)	.170 (4.32)	.125 (3.17)	.120 (3.05)	31-1021-*	9
150	BeO	0.5	.375 (9.52)	.870 (22.10)	.170 (4.32)	.125 (3.17)	.120 (3.05)	31-1075-*	9

Power (W)[1] Max	Substrate Type	Capacitance Max (pF)	Dimensions: inches (mm) L	W	H	I	Tw	Part Number*	Figure
200	AlN	1.40	.375 (9.52)	.975 (24.75)	.215 (5.46)	.125 (3.17)	.120 (3.05)	31-7110-*	8
250	BeO	1.64	.375 (9.52)	.975 (24.76)	.215 (5.46)	.125 (3.17)	.120 (3.05)	31-1004-*	8
250	BeO	1.0	.375 (9.52)	.975 (24.76)	.215 (5.46)	.125 (3.17)	.120 (3.05)	31-1076-*	8
400	BeO	3.25	.500 (12.70)	1.100 (27.94)	.220 (5.58)	.125 (3.17)	.250 (6.35)	31-1074-*	10
500	BeO	1.5	.500 (12.70)	1.250 (31.75)	.215 (5.46)	.250 (6.35)	.060 (1.52)	31-1123-*	11
800	BeO	4.48	1.040 (26.41)	1.900 (48.26)	.245 (6.22)	.125 (3.17)	.250 (6.35)	31-1005-*	12
800	BeO	1.0	1.040 (26.41)	1.900 (48.26)	.245 (6.22)	.125 (3.17)	.250 (6.35)	31-1099-*	12

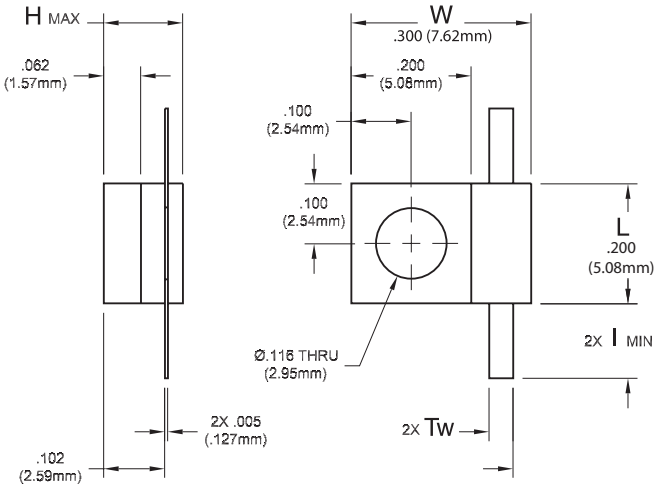
For lead free options, replace the initial dash (-) with either "A" or "B" (see page 48).
[1] Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width. Please call the factory for your specific application.
* For a complete part number, include resistance and tolerance as described above in ordering information.

High Voltage Flange Mount Resistors

Power (W)[1] Max	Substrate Type	Breakdown Voltage	Cap. Max (pF)	Dimensions: inches (mm) L	W	H	I	Tw	Part Number*	Figure
250	BeO	2.5kv	2.0	.375 (9.52)	.975 (24.76)	.280 (7.11)	.250 (6.35)	.120 (3.05)	31-1059-*	8
750	BeO	4kv	4.5	1.040 (26.41)	1.900 (48.26)	.250 (6.35)	.220 (5.58)	.250 (6.35)	31-1054-*	12

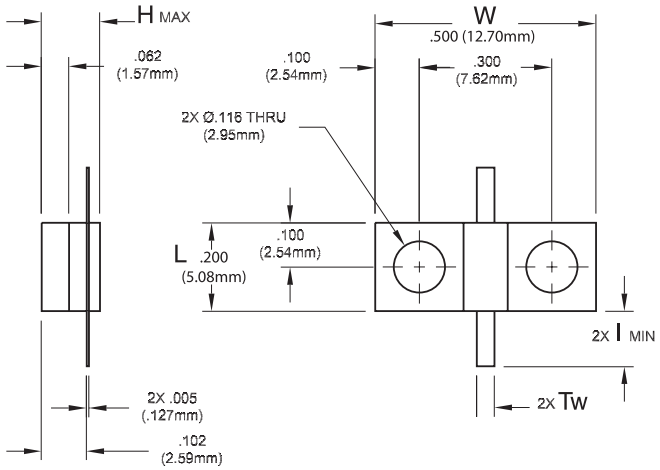
* For a complete part number, include resistance and tolerance as described above in ordering information.
Note: High voltage resistors use Formed Tabs. See Application Note on p. 94.

Outline Drawings for Flange Mount Resistors Table *(see pages 49-50)*



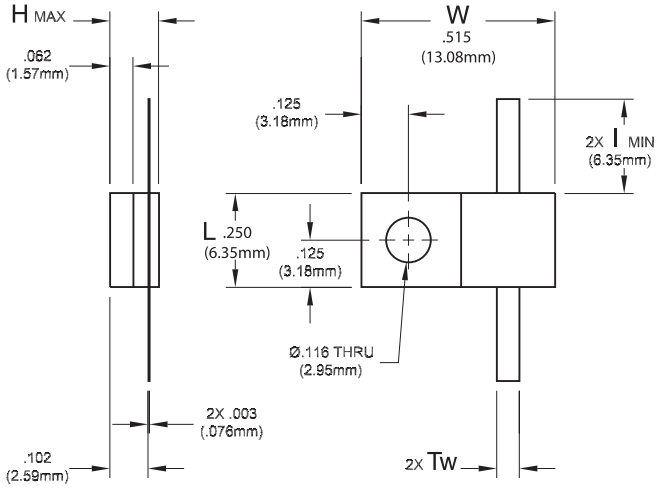
- 31-1006-*
- 31-7006-*

Figure 1



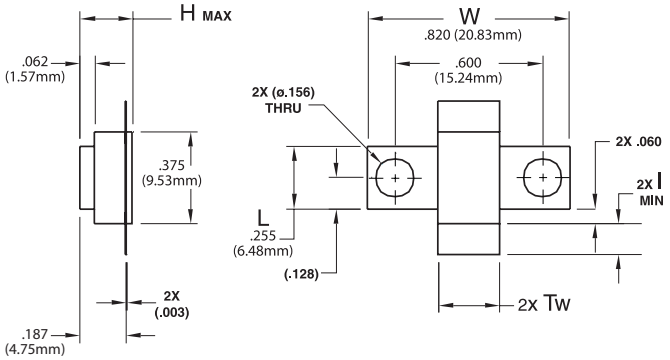
- 31-1008-*

Figure 2



- 31-1001-*
- 31-1009-*
- 31-1094-* (Consult web for height dimensions)
- 31-1089-*
- 31-7108-*

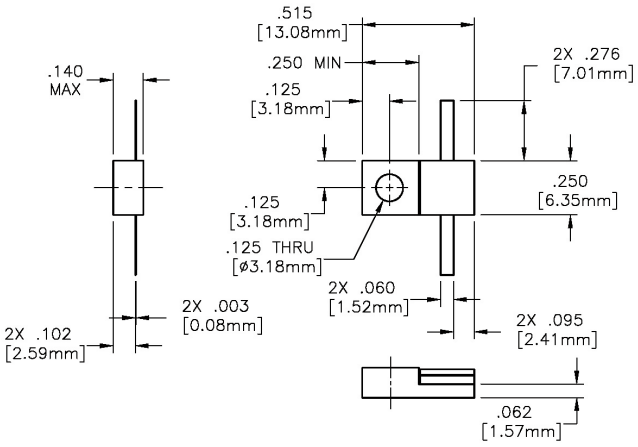
Figure 3



- 31-1010-*
- 31-1002-*

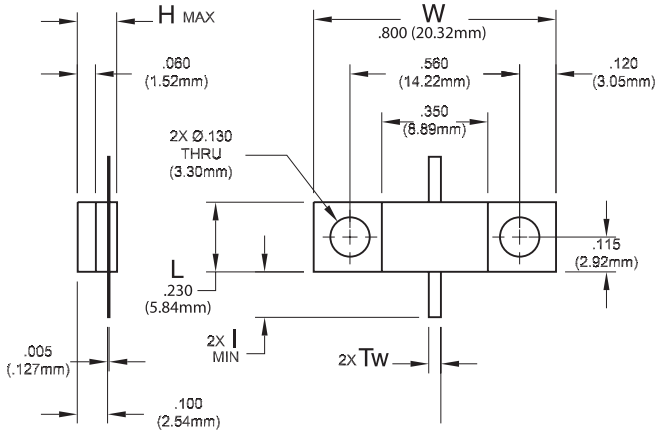
Figure 4

Outline Drawings for Flange Mount Resistors Table (see pages 49-50)



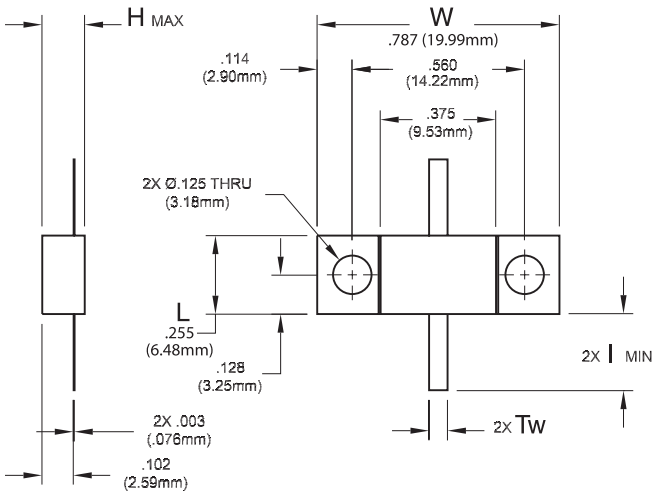
• 31-1034-*

Figure 5



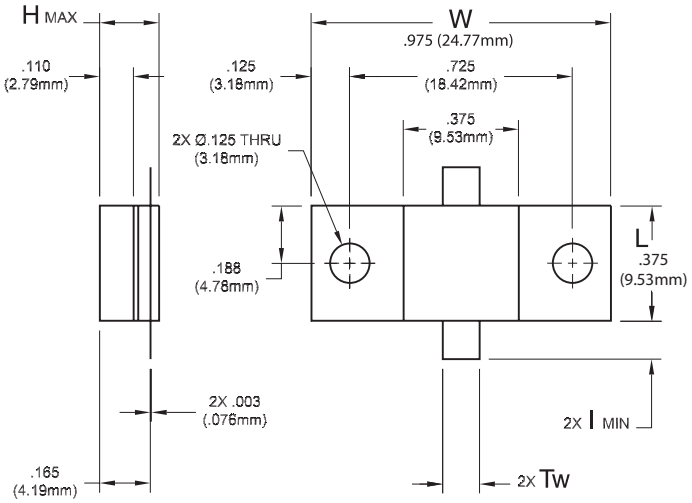
• 31-1035-*
• 31-7107-*

Figure 6



• 31-7109-*
• 31-1033-*

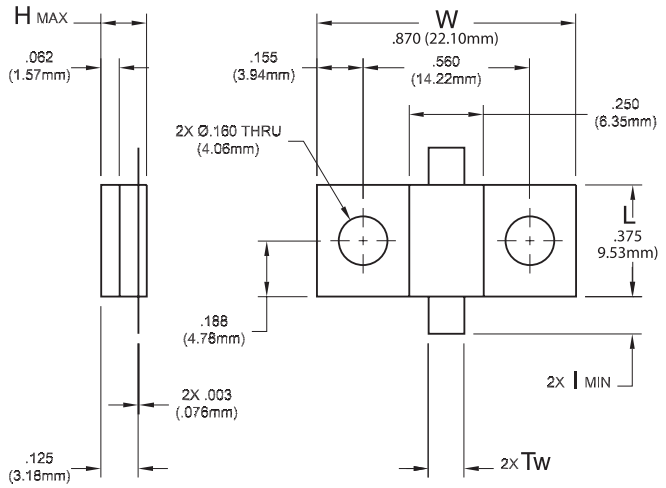
Figure 7



• 31-7110-*
• 31-1004-*
• 31-1076-*
• 31-1059-* (Formed Tab)

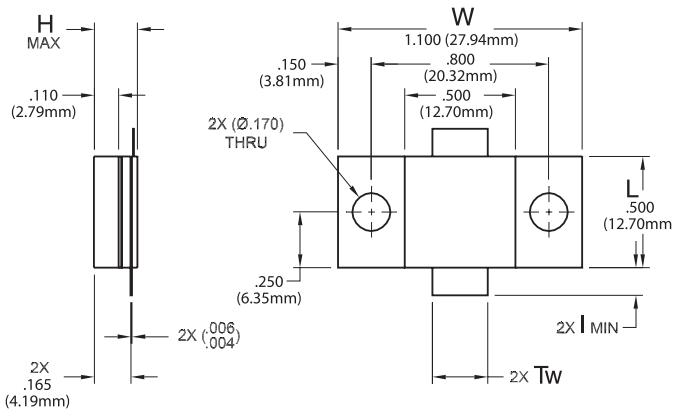
Figure 8

Outline Drawings for Flange Mount Resistors Table (see pages 49-50)



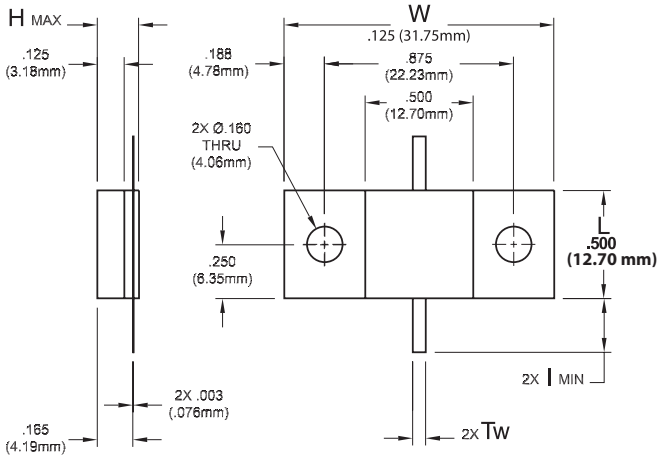
- 31-1003-*
- 31-1021-*
- 31-1029-* (Consult web for exact dimensions)
- 31-1075-*
- 31-7021-*

Figure 9



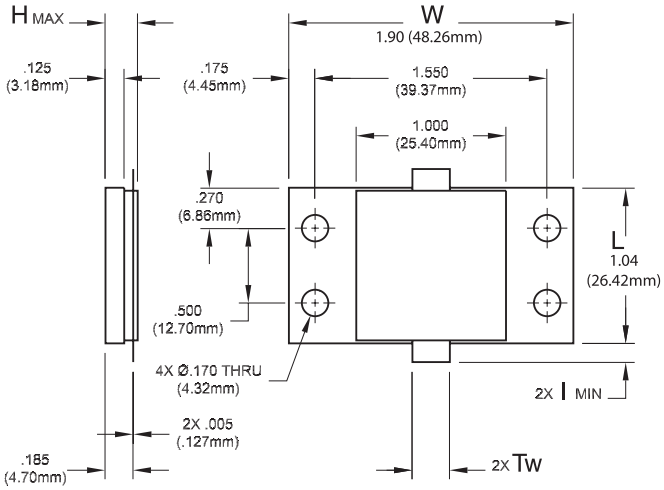
- 31-1074-*

Figure 10



- 31-1123-*

Figure 11



- 31-1005-*
- 31-1099-*
- 31-1054-* (Formed Tab)

Figure 12

Rod Resistors are typically used in wideband high performance coaxial terminations and attenuators. They feature thin film resistance elements trimmed without kerfs for stable high frequency characteristics. The high temperature protective coating shields the film during assembly operations. In applications where one end of the rod resistor is soldered directly to a heat sink, power handling as much as 10x rated power may be achieved.

General Specifications

Standard Resistance . . . . . 50 & 100 Ohms ±5%
Resistance Range . . . . . 5 to 300 Ohms
Power . . . . . 0.05 to 25 W
Power Derating . . . . . 100% @ 100˚C
Derates to 0% @ 150˚C
Operating Temperature . . . . . -55 to 150˚C

Material Specifications

Substrates . . . . . BeO or Alumina
Resistor . . . . . Nichrome
Terminals . . . .Solder Tinned (Sn96), Plated Silver, Nickel Plated or Gold Plated

Ordering Information

R 080 – 187 B 2 100 – 5

STYLE
R = Rod Resistor Solder Tinned
GR = Gold Terminal
SR = Silver Terminal
NR = Nickel Terminal

ROD DIAMETER
in mils

ROD LENGTH
in mils

SUBSTRATE MATERIAL
A = Alumina
B = BeO (Beryllium Oxide)

STYLE
(blank) = Figure 1
2 = Figure 2

RESISTANCE
Value in ohms

TOLERANCE
1 = 1%
2 = 2%
5 = 5%
10 = 10%

Power (W) Max	Substrate Type	Fig.	Dimensions (in.) D	L	A	Part Number*
0.05	Alumina	1	.020	.125	N/A	R020-125A-*
0.05	Alumina	1	.030	.125	N/A	R030-125A-*
0.10	Alumina	1	.040	.125	N/A	R040-125A-*
0.12	Alumina	1	.060	.125	N/A	R060-125A-*
0.15	Alumina	1	.060	.125	N/A	R060-187A-*
0.25	Alumina	2	.048	.250	.062	R062-250A2-*
0.5	Alumina	1	.125	.250	N/A	R125-250A-*
0.5	Alumina	2	.062	.500	.125	R125-500A2-*
0.5	Alumina	1	.125	.500	N/A	R125-500A-*
1.0	BeO	1	.060	.125	N/A	R060-125B-*
1.0	BeO	1	.060	.187	N/A	R060-187B-*
3.0	BeO	1	.080	.187	N/A	R080-187B-*
5.0	BeO	1	.125	.250	N/A	R125-250B-*
10.0	BeO	1	.125	.500	N/A	R125-500B-*
25.0	BeO	1	.375	.750	N/A	R375-750B-*

* For a complete part number, include resistance and tolerance as described in ordering information.

FIG. 1

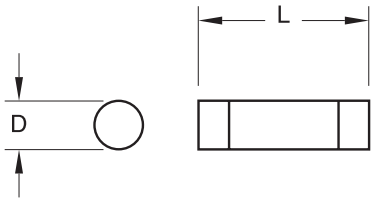
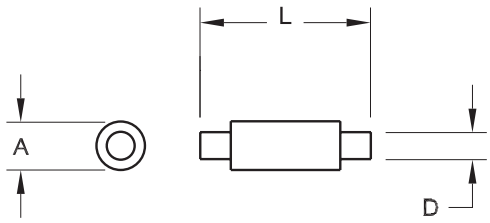
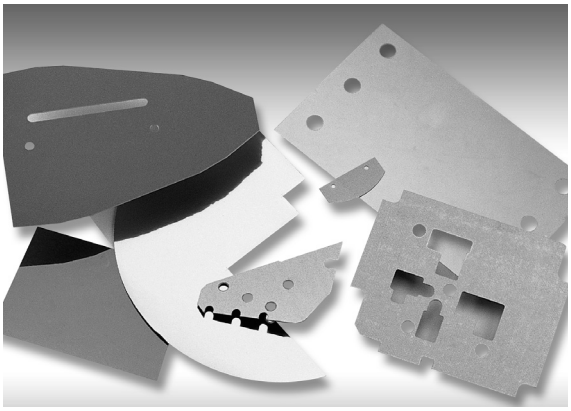


FIG. 2





Florida RF Labs offers a complete line of standard and custom waveguide attenuator elements. Deposition of thin film metallization on a glass substrate with optical grade finish produces an extremely stable resistive film. A protective coating is evaporated over the resistive film to prevent oxidation. Controlled processes throughout produce guaranteed repeatability. Contact factory for custom design requirements.

Film Cards are available in four materials: Fiberglass, Mylar®, Kapton® or Mica. They feature a surface resistance range of 25 to 1k ohm per square and power handling up to 8 watts. Applications include: Waveguide Elements, Crystal Detector Protection, Directional Coupler Termination, Mode Suppression in Cavity Filters.

General Specifications

Resistance Range . . . . . 25 to 1k Ohms/Square
Standard Tolerance 10%
Dielectric . . . . . 3.3 @ 60 Hz
Max Surface Temperature . . . . . 150˚C
(Fiberglass is 130˚C)

Material Specifications

Substrates . . . . . .Fiberglass, Mylar®, Kapton®, Mica
Resistor . . . . . .Nichrome
Dielectric
Fiberglass . . . . . .4.8 @ 1 MHz
Mylar® . . . . . .3.3 @ 60 MHz
Kapton® . . . . . .3.9 @ 1 Hz
Mica . . . . . .6.0 @ 1Hz
Thickness
Fiberglass . . . . . .0.010, .025, .032, or .062
Mylar® . . . . . .0.001, .002, .005, or .010
Kapton® . . . . . 0.002 or .005
Mica . . . . . 0.002, .003, or .005
Environment
Fiberglass . . . . . Meets applicable sections of MIL-I-24768-28 GEB-F
Mylar® . . . . . .n/a
Kapton® . . . . . .n/a
Mica . . . . . .ASTM-D351, Class V2

Ordering Information

73 0160 – 100

DESCRIPTIONS
Random Numbers

RESISTANCE
Value in ohms

STYLE
73 = Film Cards

Material	Size, WxL Inches (mm)	Thickness Inches (mm)	Part Number*
Fiberglass	5 x 12	.010 (.025)	73-0160-XXX*
	(127 x 305)	.025 (0.64)	73-0161-XXX*
		.032 (0.81)	73-0162-XXX*
		.062 (1.57)	73-0163-XXX*
Mylar®	5 x 12	.001 (0.02)	73-0157-XXX*
	(127 x 305)	.002 (0.05)	73-0166-XXX*
		.005 (0.13)	73-0158-XXX*
		.010 (0.25)	73-0159-XXX*
Kapton®	5 x 12	.002 (0.05)	73-0167-XXX*
	(127 x 305)	.005 (0.13)	73-0168-XXX*
Mica	2 x 5	.002 (0.05)	73-0154-XXX*
	(51 x 127)	.003 (0.08)	73-0155-XXX*
		.005 (0.13)	73-0156-XXX*

* Replace XXX with Resistance Value in Ohms. Example: 73-0157-100 is a 100 ohm/square resistive surface device.