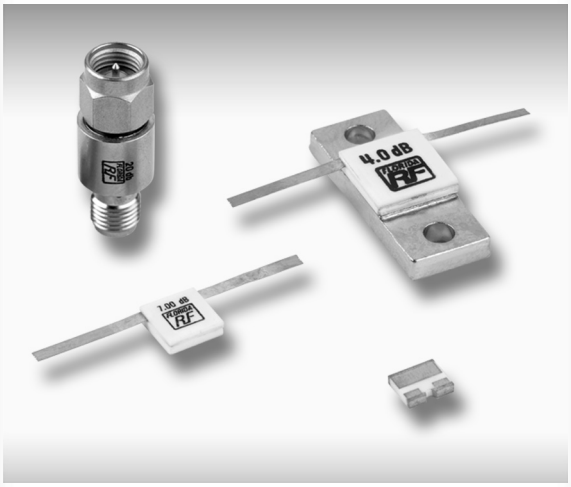
Features

- *Lead Free, RoHS Compliant Option Available*
- *Substrates - BeO, AlN or Alumina*
- *Power Rating - .05 to 400 Watts*
- *Frequency Range DC to 6 GHz*
- *Package styles: chip, tab & cover, flange and coaxial*
- *Tuned Internal Circuit*
- *Good VSWR*
- *Variety of Chip Sizes*
- *Attenuation Values from 0 to 30 dB*
- *S-Parameter Files Available*

Applications

- *Circulators*
- *Coaxial Attenuator Components*
- *Filters*
- *High Power Amplifiers*
- *Instrumentation*
- *Isolators*
- *Military*
- *Signal Sampling*



Florida RF Labs® attenuators are available in several package styles for use in high power applications: chip, tab & cover and flange models. The power ratings range from .05 to 400 watts. The attenuation values range from 0 dB to 30 dB. The devices are available for delivery in tray or tape & reel packages.

Table of Contents

Surface Mount

Impedance ..... *50 Ohms*
Operating Temperature ..... *-55 to 150˚C*
Power Rating ..... *100% @ 85˚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-E-5400 and MIL-PRF-55342*

Tab & Cover

Impedance ..... *50 Ohms*
Operating Temperature ..... *-55 to 150˚C*
Power Rating ..... *100% @ 85˚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 or AlN*
Environment ..... *Meets Applicable Sections of MIL-E-5400 and MIL-PRF-55342*

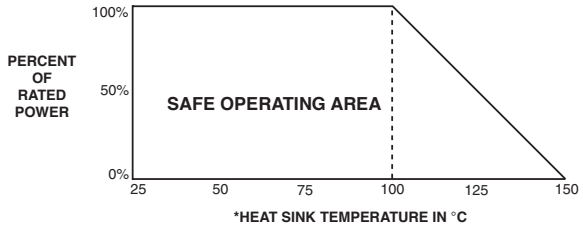
Flange

Impedance ..... *50 Ohms*
Operating Temperature ..... *-55 to 150˚C*
Power Rating ..... *100% @ 85˚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 or AlN*
Environment ..... *Meets Applicable Sections of MIL-E-5400 and MIL-PRF-55342*

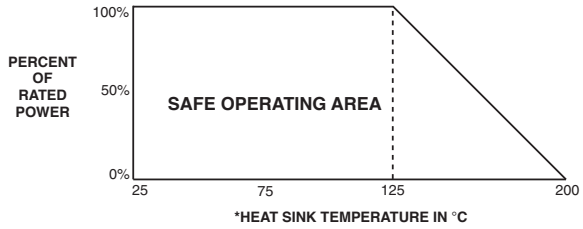
Coaxial

Impedance ..... *50 Ohms ± 5%*
Operating Temperature ..... *-55 to 125˚C*
Power Rating ..... *100% @ 25˚C Derates to 0.5% @ 125˚C*
Peak Power ..... *Typically 10 Times the Max Power Rating with 1% Duty Cycle and 100 Microsecond Pulse Width*
Resistor ..... *Nichrome*
Substrates ..... *BeO or Alumina*
Environment ..... *Meets Applicable Sections of MIL-PTL-3933 and MIL-PRF-39012*

Power Rating and Derating



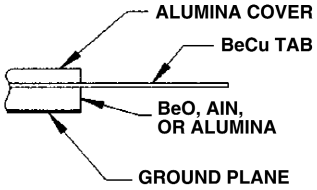
Alternative Derating Available Upon Request



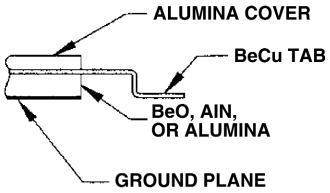
*The heat sink is defined as the surface that the Component is attached to, *ie*. chassis or printed circuit board.

Tab Options

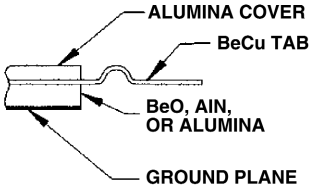
- Standard Straight Tab



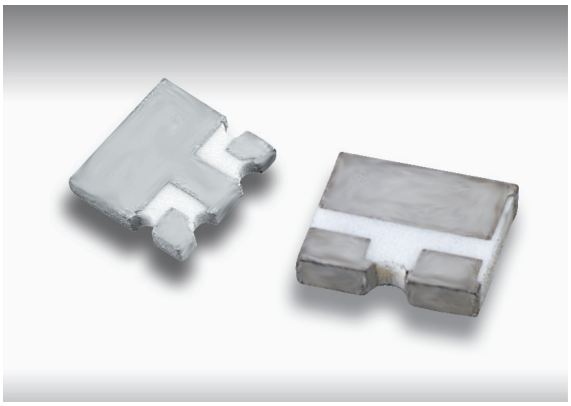
- Strain Relief



- Strain Relief



Note: For strain relief options, contact the factory.



Duo Wrap Surface Mount Chip Attenuators are designed for installation directly on printed circuit boards. Edge metallization on two sides forms solder fillets for stronger attachment, easier inspection, and increased heat transfer area.

General Specifications

Impedance . . . . . 50 Ohms
Attenuation Stability . . . . . 0.0001 dB/C˚
Attenuation Tolerance . . . . . 1-10 dB ± 1.0 dB
11-20 dB ± 1.0 dB
Power . . . . . 5 to 120 Watts
Frequency . . . . . .DC to 3 GHz
*Power Rating . . . . . 100% @ 85˚C**
Derates to 0% @ 150˚C
Operating Temperature . . . . . -55 to 150˚C

Material Specifications

Solderable Ground Plane . . . . . See Plating Option
Substrates . . . . . BeO, AlN or Alumina
Resistive Elements . . . . . Nichrome
Environment . . . . . Meets applicable portions of MIL-E-5400 and MIL-PRF-55342

** 85°C referenced from heat sink.*

Ordering Information

8 3 – 7 027 – 10.00

STYLE
8 = Chip/Power Pak

TYPE
3 = Attenuator

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

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

DESCRIPTION
Random Numbers

ATTENUATION
Value in dB

*** Lead free options*

Figure 1

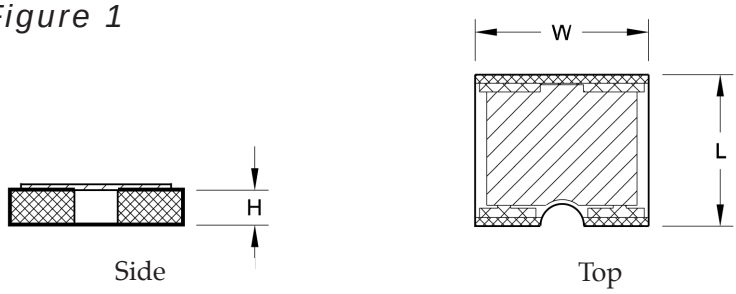


Figure 2

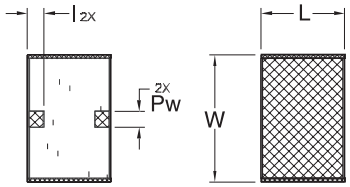
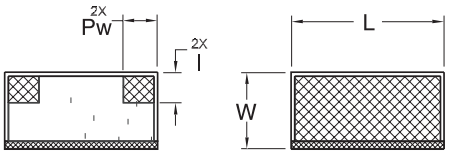
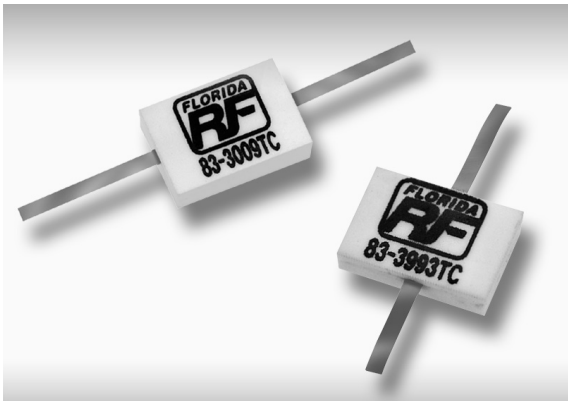


Figure 3



Power (W)[1] Max	Substrate Type	Frequency (GHz)	VSWR (Max)	Dimensions: inches (mm) L	W	H	I	Pw	Part Number*	Figure
5	BeO	3.0	1.50	.175 (4.44)	.200 (5.08)	.040 (1.00)	.049 (1.24)	.071 (1.80)	83-3995-*	1
5	AlN	3.0	1.50	.250 (6.35)	.250 (6.35)	.040 (1.00)	.065 (1.65)	.055 (1.40)	83-7999-*	1
5	Alumina	3.0	1.50	.250 (6.35)	.250 (6.35)	.025 (.635)	.065 (1.65)	.055 (1.40)	83-8999-*	1
10	AlN	2.0	1.35	.200 (5.08)	.100 (2.54)	.040 (1.00)	.045 (1.14)	.040 (1.00)	83-7014-*	3
10	BeO	3.0	1.50	.250 (6.35)	.250 (6.35)	.040 (1.00)	.065 (1.65)	.055 (1.40)	83-3999-*	1
20	AlN	3.0	1.50	.375 (9.52)	.375 (9.52)	.040 (1.00)	.065 (1.65)	.125 (3.17)	83-7027-*	1
25	BeO	2.0	1.40	.375 (9.52)	.375 (9.52)	.040 (1.00)	.065 (1.65)	.125 (3.17)	83-3998-*	1
75	AlN	2.4	1.25	.300 (7.62)	.250 (6.35)	.040 (1.00)	.840 (21.33)	.050 (1.27)	83-7012-*	3
100	AlN	2.5	1.43	.230 (5.84)	.350 (8.89)	.040 (1.00)	.095 (2.41)	.050 (1.27)	83-7033-*	2
120	AlN	2.4	1.20	.230 (5.84)	.350 (8.89)	.040 (1.00)	.045 (1.14)	.045 (1.14)	83-7026-*	2

[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.
* Complete the part number by adding the desired attenuation value. For example, a 20dB low BeO tab and cover attenuator is 83-3995-20.00.



Tab & Cover components are flangeless devices with protective ceramic covers and tab contacts, offering the highest performance available of any package style component. They are designed for direct solder attachment to a heat sink for excellent heat transfer. Tab & Cover attenuators have an attenuator range from 1 dB to 30 dB. The attenuation tolerance for values between 1-10 dB is ± 0.5 dB and 11-30 dB ± 1.0 dB. Optional lead forming is available on request.

General Specifications

Impedance . . . . . 50 Ohms
Attenuation Stability . . . . . 0.0001 dB/C°
Attenuation Tolerance . . . . . 1-10 dB ± 0.5 dB
11-30 dB ± 1.0 dB
Power . . . . . 10 to 250 Watts
Frequency . . . . . .DC to 4 GHz
*Power Rating . . . . . 100% @ 85°C**
Derates to 0% @ 150°C
Operating Temperature . . . . . -55 to 150°C

Material Specifications

Substrates . . . . . BeO, AlN or Alumina
Resistors . . . . . Nichrome
Tab Contact . . . . . .Beryllium Copper, Tin Plated per ASTM B545
Cover . . . . . .Alumina
Solderable Ground Plane . . . . . See Plating Option

** 85°C referenced from heat sink*

Ordering Information

8 3 – 7 006 TC – 20.00

STYLE
8 = Chip/Power Pak

TYPE
3 = Attenuator

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

SUBSTRATE MATERIAL
7 = AlN (Aluminum Nitride)
8 = Alumina
1, 3 = BeO (Beryllium Oxide)

DESCRIPTION
Random Numbers

MOUNTING
TC = Tab & Cover

ATTENUATION
Value in dB

*** Lead free option*

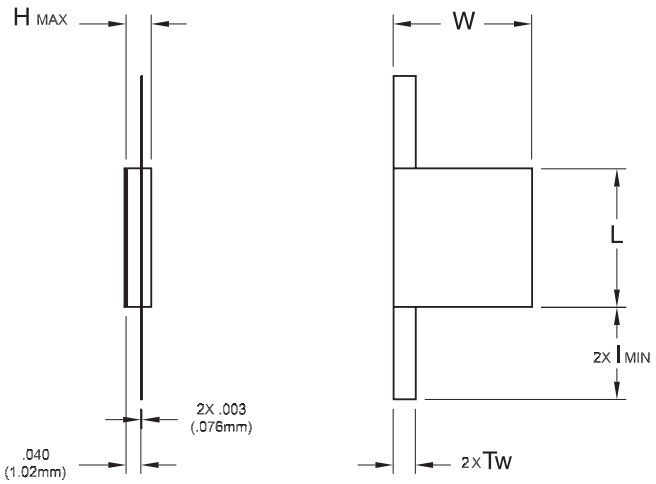
Power (W)[1] Max	Substrate Type	Freq. (GHz)	VSWR (Max)	Dimensions: inches (mm) L	W	H	I	Tw	Part Number*	Figure
10	BeO	4.00	1.35	.200 (5.08)	.100 (2.54)	.085 (2.16)	.250 (6.35)	.040 (1.00)	83-3005TC-*	1
20	BeO	4.00	1.50	.250 (6.35)	.250 (6.35)	.085 (2.16)	.250 (6.35)	.060 (1.52)	83-1001TC-*	1
50	BeO	2.00	1.25	.250 (6.35)	.375 (9.52)	.085 (2.16)	.250 (6.35)	.040 (1.00)	83-1996TC-*	3
50	BeO	2.50	1.40	.375 (9.52)	.375 (9.52)	.085 (2.16)	.250 (6.35)	.060 (1.52)	83-3021TC-*	1
50	AlN	2.00	1.25	.250 (6.35)	.375 (9.52)	.085 (2.16)	.250 (6.35)	.040 (1.00)	83-7013TC-*	5
60	AlN	2.20	1.12	.250 (6.35)	.375 (9.52)	.085 (2.16)	.250 (6.35)	.040 (1.00)	83-7003TC-*	4
70	AlN	2.75	1.25	.250 (6.35)	.375 (9.52)	.085 (2.16)	.250 (6.35)	.040 (1.00)	83-7009TC-*	1
75	AlN	2.00	1.20	.250 (6.35)	.375 (9.52)	.085 (2.16)	.250 (6.35)	.040 (1.00)	83-7011TC-*	2
100	AlN	2.30	1.20	.230 (5.84)	.350 (8.89)	.085 (2.16)	.250 (6.35)	.040 (1.00)	83-7023TC-*	5
100	AlN	2.30	1.15	.230 (5.84)	.350 (8.89)	.085 (2.16)	.250 (6.35)	.040 (1.00)	83-7017TC-*	6
100	BeO	0.75	1.25	.500 (12.70)	.500 (12.70)	.085 (2.16)	.250 (6.35)	.060 (1.52)	83-3003TC-*	1
100	AlN	3.00	1.30	.250 (6.35)	.375 (9.52)	.085 (2.16)	.250 (6.35)	.040 (1.00)	83-7006TC-*	5
150	BeO	1.00	1.50	.375 (9.52)	.375 (9.52)	.085 (2.16)	.250 (6.35)	.060 (1.52)	83-3006TC-*	1
150	AlN	DC-1.0 1.0-2.0 2.0-2.5	1.15 1.25 1.35	.250 (6.35)	.375 (9.52)	.085 (2.16)	.250 (6.35)	.040 (1.00)	83A7034TC-*	6
250	BeO	1.00	1.25	.500 (12.70)	.500 (12.70)	.085 (2.16)	.250 (6.35)	.060 (1.52)	83-3994TC-*	4

For lead free options, replace the initial dash (-) with either "A" or "B" (see page 30).

[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.

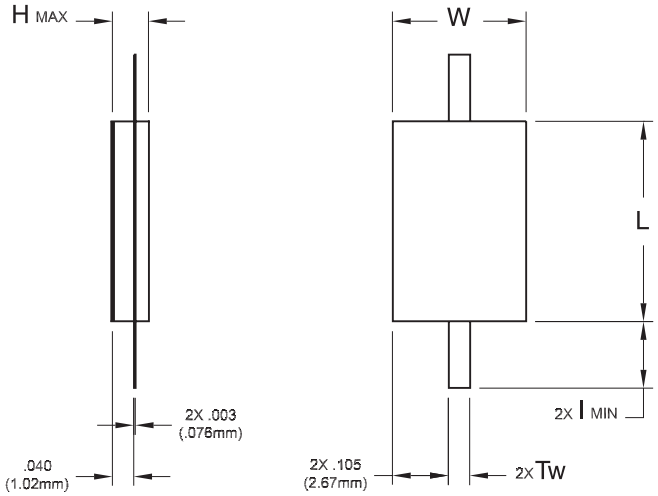
* Complete the part number by adding the desired attenuation value. For example, a 20dB BeO tab and cover attenuator is 83-3005TC-20.00.

Outline Drawings for Flangeless Attenuators Table (see page 31)



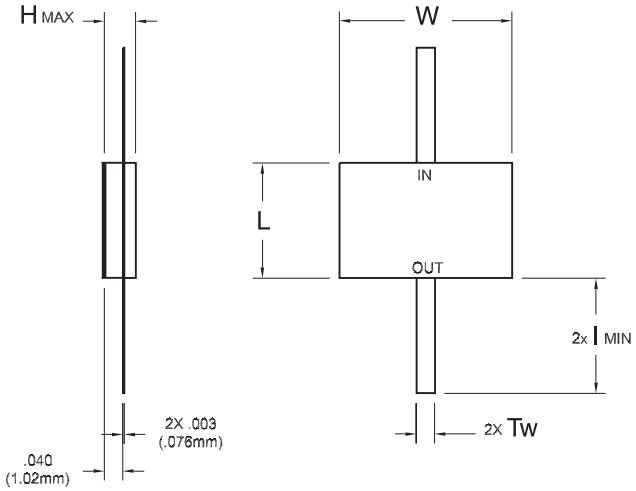
- 83-3005TC
- 83-1001TC
- 83-3021TC
- 83-7009TC
- 83-3003TC
- 83-3006TC

Figure 1



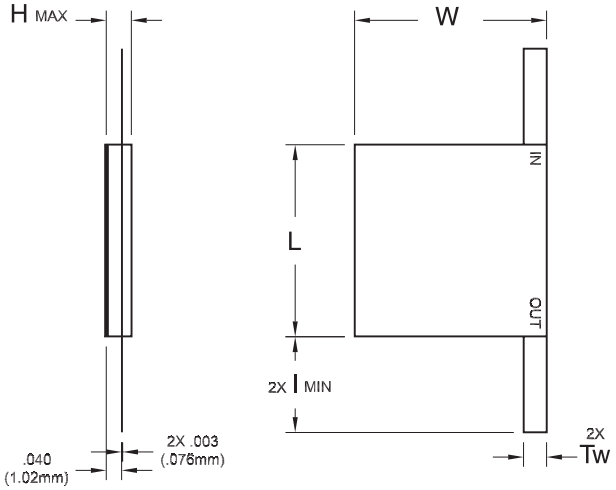
- 83-7011TC

Figure 2



- 83-1996TC

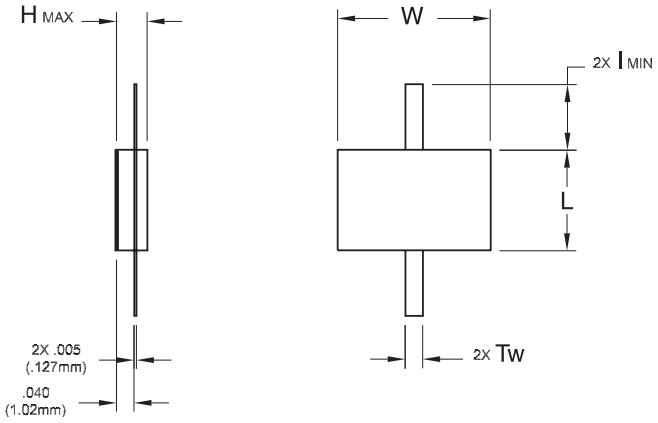
Figure 3



- 83-7003TC
- 83-3994TC

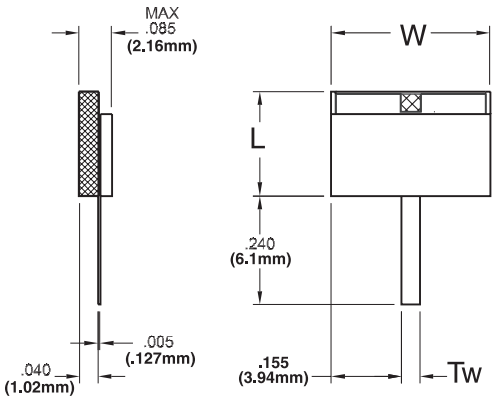
Figure 4

Outline Drawings for Flangeless Attenuators Table (see page 31)



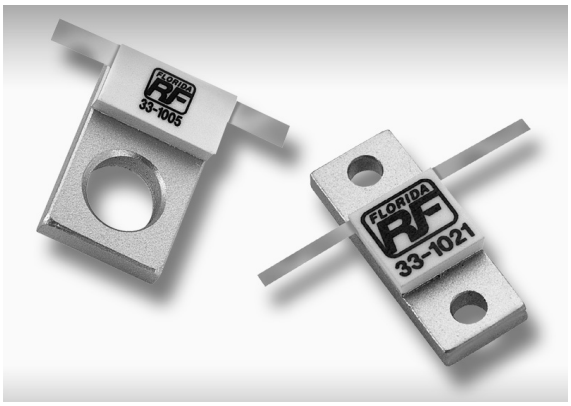
- 83-7013TC
- 83-7023TC
- 83-7006TC

Figure 5



- 83-7017TC
- 83A7034TC

Figure 6



High Power Flange Mount components offer high performance and the convenience of bolt-in installation. Flanged attenuators have an attenuation range from 1 to 30 dB. The attenuation tolerance for values between 1-10 dB is ± 0.5 dB and between 11-30 dB is ± 1.0 dB. Optional lead forming is available on request.

General Specifications

Impedance . . . . . 50 Ohms
Attenuation Stability . . . . . 0.0001 dB/C˚
Attenuation Tolerance . . . . . 1-10 dB ± 0.5 dB
11-30 dB ± 1.0 dB
Power . . . . . 10 to 400 Watts
Frequency . . . . . .DC to 4 GHz
*Power Rating . . . . . 100% @ 100˚C**
Derates to 0% @ 150˚C
Operating Temperature . . . . . -55 to 150˚C

Material Specifications

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

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

Ordering Information

3 3 – 7 XXX – XX.XX

TYPE
3 = Attenuator

DESCRIPTION
Random Numbers

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

ATTENUATION
Value in dB

STYLE
3 = High Power Flange

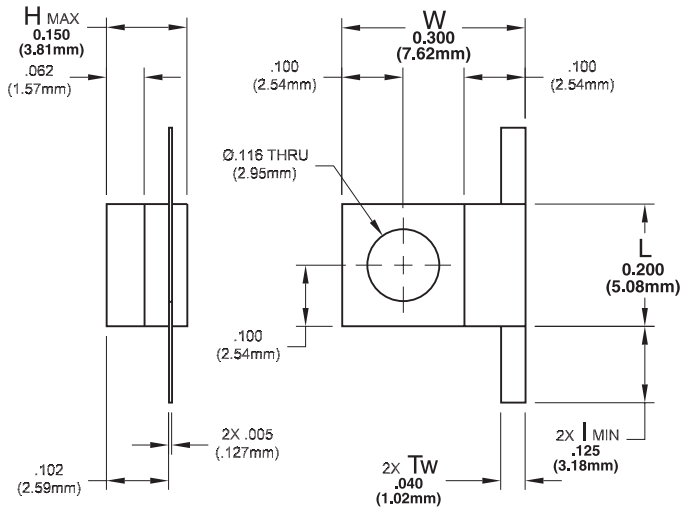
SUBSTRATE MATERIAL
7 = AlN (Aluminum Nitride)
1 = BeO (Beryllium Oxide)

*** Lead free option*

Power (W)[1] Max	Freq. (GHz)	VSWR (Max)	Substrate Type	Dimensions: inches (mm) L	W	H	I	Tw	Part Number*	Figure
10	2.7	1.15	AlN	.200 (5.08)	.300 (7.62)	.150 (3.81)	.125 (3.18)	.040 (1.02)	33-7003-*	1
10	DC-2.0 2.0-4.0	1.15 1.35	BeO	.200 (5.08)	.300 (7.62)	.150 (3.81)	.125 (3.18)	.040 (1.02)	33-1005-*	1
10	4.0	1.35	BeO	.200 (5.08)	.500 (12.70)	.150 (3.81)	.125 (3.18)	.040 (1.02)	33-1017-*	2
20	DC-2.0 2.0-4.0	1.15 1.50	BeO	.250 (6.35)	.515 (13.08)	.150 (3.81)	.250 (6.35)	.060 (1.52)	33-1001-*	3
50	2.0	1.40	AlN	.375 (9.52)	.975 (24.76)	.210 (5.33)	.250 (6.35)	.060 (1.52)	33-7001-*	4
50	2.5	1.40	BeO	.375 (9.52)	.975 (24.76)	.210 (5.33)	.250 (6.35)	.060 (1.52)	33-1021-*	4
75	2.2	1.20	AlN	.375 (9.52)	.870 (22.10)	.150 (3.81)	.250 (6.35)	.040 (1.02)	33-7005-*	5
75	1.0	1.30	BeO	.375 (9.52)	.870 (22.10)	.150 (3.81)	.125 (3.18)	.040 (1.02)	33-1009-*	5
100	2.5	1.20	AlN	.230 (5.84)	.800 (20.32)	.125 (3.18)	.240 (6.09)	.040 (1.02)	33-7023-*	7
100	DC-2.0 2.0-3.0	1.25 1.30	AlN	.255 (6.47)	.820 (20.83)	.150 (3.81)	.250 (6.35)	.040 (1.02)	33-7004-*	8
100	0.75	1.25	BeO	.500 (12.70)	1.250 (31.75)	.210 (5.33)	.250 (6.35)	.060 (1.52)	33-1003-*	6
150	1.0	1.50	BeO	.375 (9.52)	.975 (24.76)	.210 (5.33)	.250 (6.35)	.060 (1.52)	33-1006-*	4
200	0.5	1.50	BeO	1.04 (26.41)	1.90 (48.26)	.245 (6.22)	.125 (3.18)	.250 (6.35)	33-1004-*	9
250	1.0	1.25	BeO	.500 (12.70)	1.250 (31.75)	.210 (5.33)	.250 (6.35)	.060 (1.62)	33-1042-*	6
400	1.0	1.30	BeO	.500 (12.70)	1.250 (31.75)	.210 (5.33)	.250 (6.35)	.060 (1.62)	33-1050-*	10

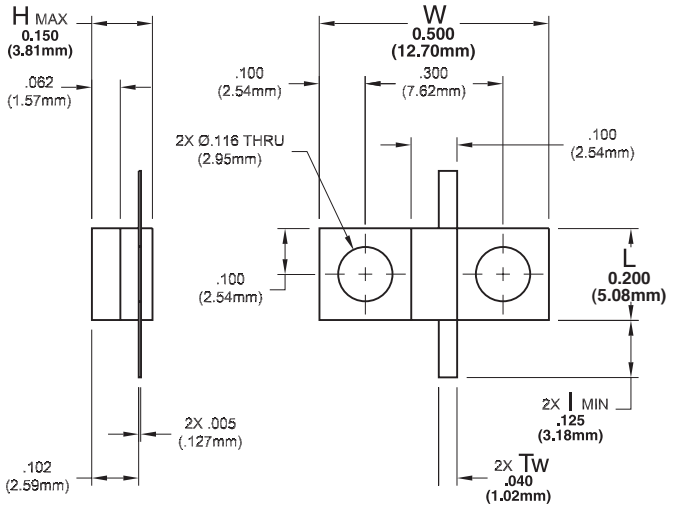
For lead free options, replace the initial dash (-) with either "A" or "B" (see page 34).
All parts are bi-directional except for 33-7001, 33-1042, and 33-1050, which are uni-directional.
[1] Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width. Please call the factory for your specific application.
* Complete the part number by adding the desired attenuation value. For example, a 20dB BeO flanged attenuator is 33-1005-20.00.

Outline Drawings for Flange Mount Attenuators Table (see page 35)



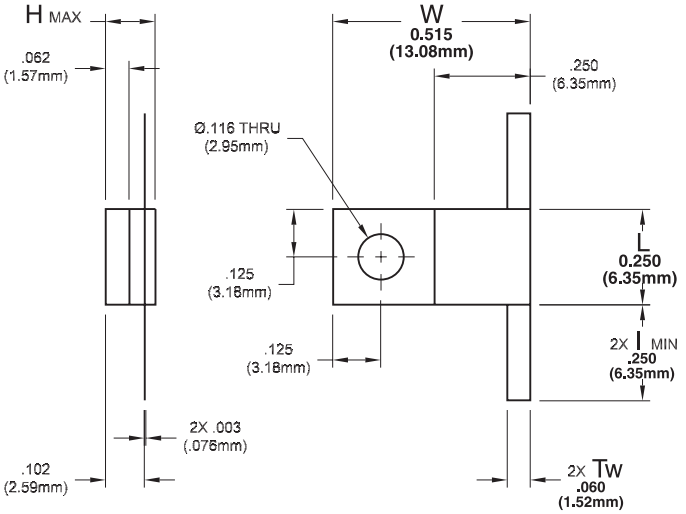
- 33-7002-*
- 33-1005-*

Figure 1



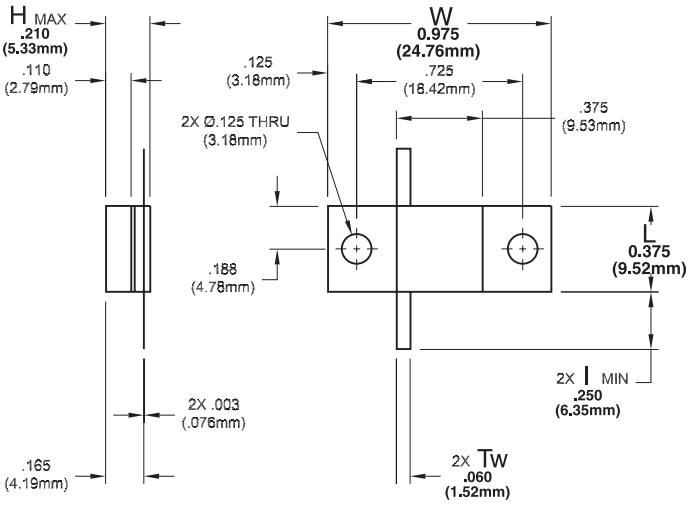
- 33-1017-*

Figure 2



- 33-1001-*

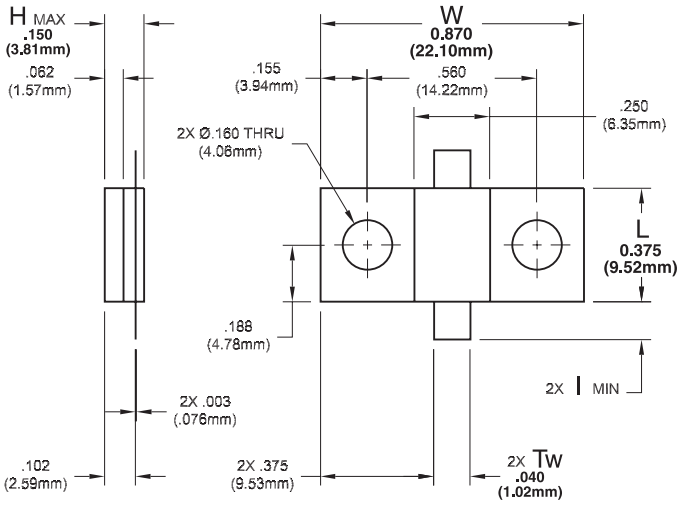
Figure 3



- 33-1021-*
- 33-7001-*
- 33-1006-*

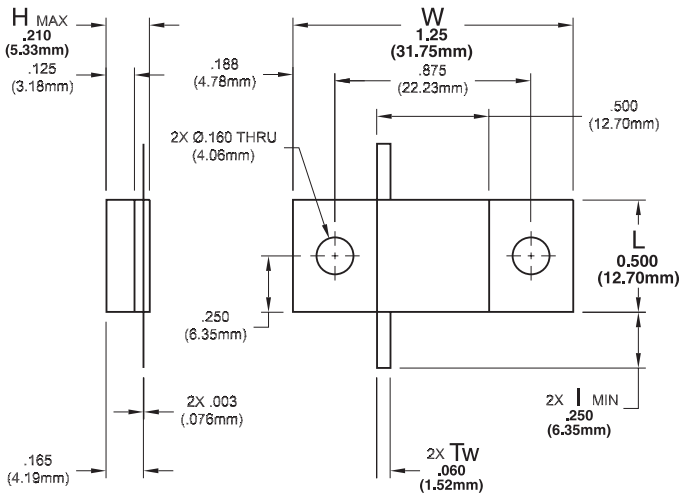
Figure 4

Outline Drawings for Flange Mount Attenuators Table (see page 35)



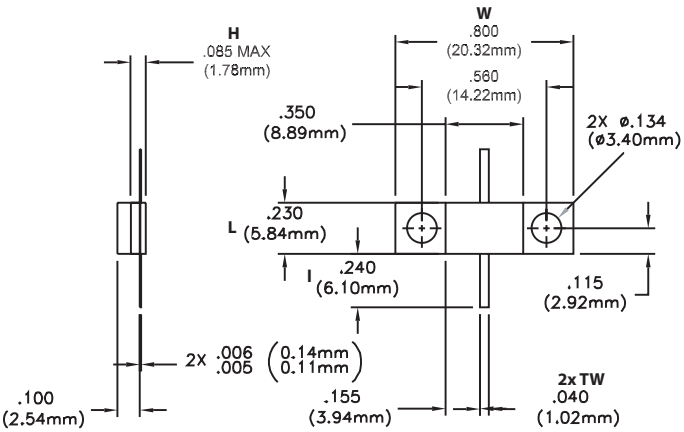
- 33-1009-*
- 33-7005-*

Figure 5



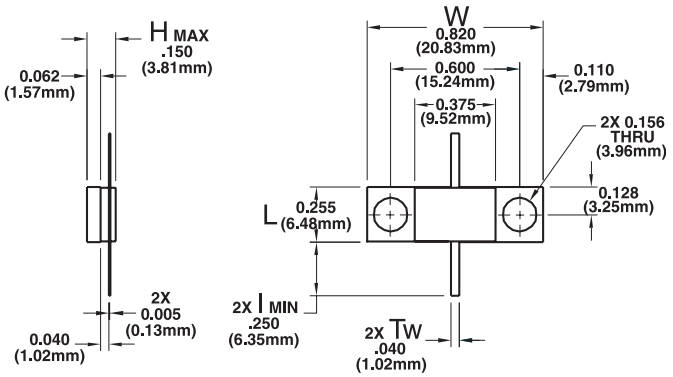
- 33-1003-*
- 33-1042-*

Figure 6



- 33-7023-*

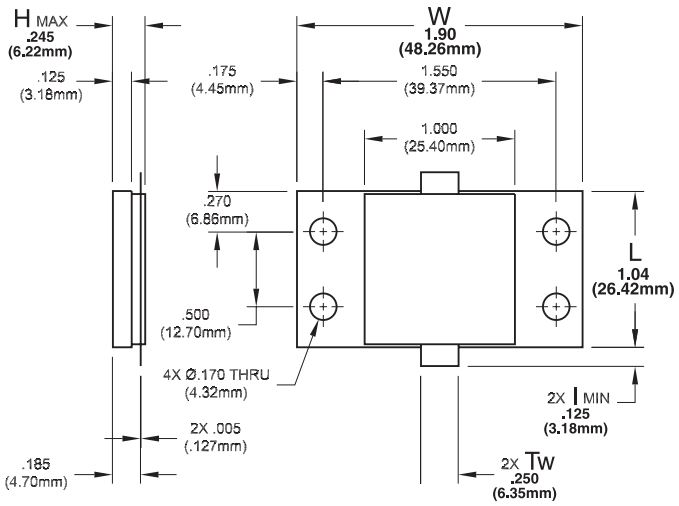
Figure 7



- 33-7004-*

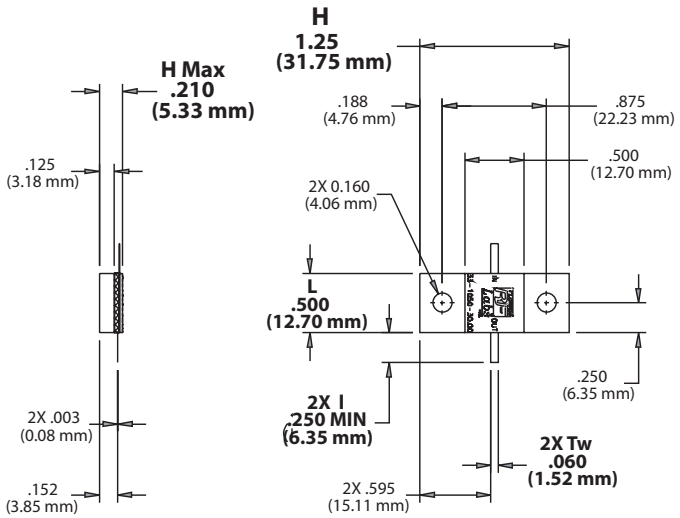
Figure 8

Outline Drawings for Flange Mount Attenuators Table (see page 35)



• 33-1004-*

Figure 9



• 33-1050-*

Figure 10

Florida RF Labs line of precision coaxial attenuators is useable for power applications up to 2 watts. The rugged construction of the device ensures reliability and continuous performance. The standard connector is SMA with others available upon request.

General Specifications

Impedance . . . . . 50 Ohms ± 5%
Attenuation Stability . . . . . 0.0001 dB/db/C˚
Attenuation Tolerance . . . . . 1-10 dB ± 0.3 dB
11-20 dB ± 0.5 dB
Power . . . . . 2 Watts
Frequency . . . . . .DC to 18 GHz
*Power Rating . . . . . 100% @ 25˚C**
Derates to .5% @ 125˚C
Operating Temperature . . . . . -55 to 125˚C

Material Specifications

Substrates . . . . . BeO or Alumina
Resistive Elements . . . . . Nichrome
Environment . . . . . Meets applicable portions of MIL-PTL-3933 and MIL-PRF-39012
*Connector . . . . . SMA**
Body . . . . . .Stainless Steel

** Other connector types available upon request.*

Ordering Information

1 3 – 0003 – 10.00

STYLE
1 = Coaxial Attenuator

TYPE
3 = Attenuator

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

DESCRIPTION
Random Numbers

ATTENUATION
Value in dB

*** Lead free option*

Power (W)[1] Max	Frequency (GHz)	VSWR	Attenuation (dB)	Tolerance (dB)	Connector	Part Number*
2	2.7 18.0	1.15 1.40	7-20 2-6	± 0.5 ± 0.5	SMA	13-0003-*

[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.
* Complete the part number by adding the desired attenuation value after the "-".

Dimensions (Long Body SMA)