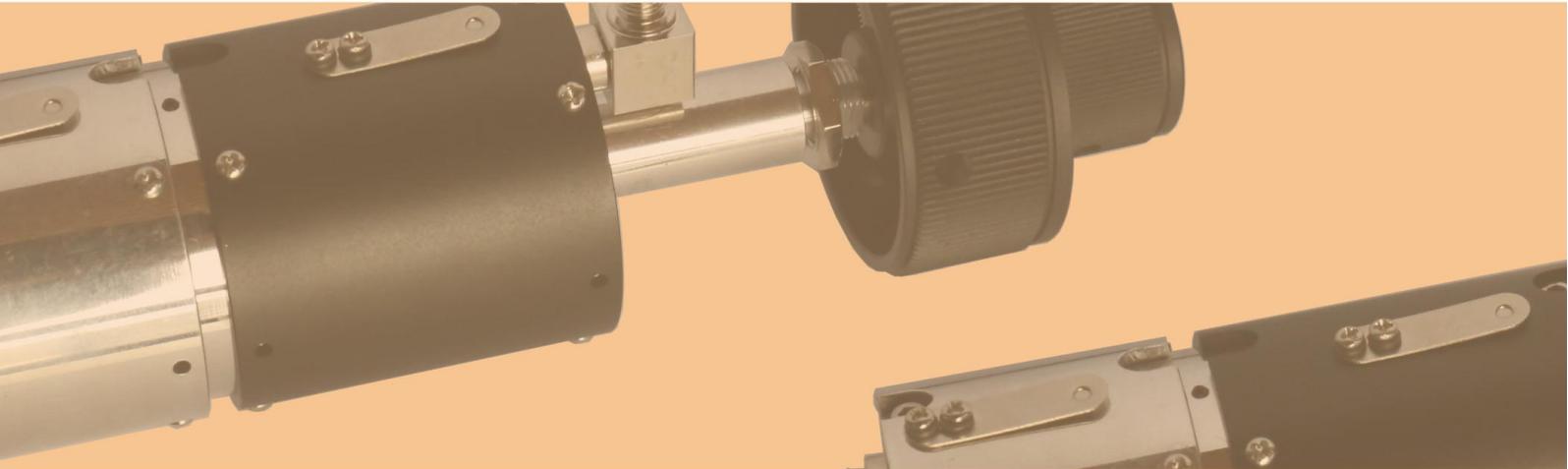


Manually Variable Attenuators



2019



Qualwave Inc.

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Rotary Stepped Attenuators

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QSA06A

DC~6GHz, 0~90dB, 10W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	DC~6GHz
Attenuation Range/Step:	0~1dB/0.1dB 0~10dB/1dB 0~60dB/10dB 0~90dB/10dB
Impedance:	50Ω
Average Power:	2, 10W@25°C max.

Attenuation Accuracy vs. Attenuation

Attenuation (dB)	Attenuation Accuracy (±dB)
0~1	0.3
1~50	0.5
50~90	3.2

VSWR & Insertion Loss

Frequency (GHz)	VSWR (max.)	Insertion Loss (dB, max.)
DC~2.5	1.25	0.4 (0.5 for 0~1dB atten.)
DC~3	1.3	0.5
DC~4.3	1.35	0.75
DC~6	1.4	1

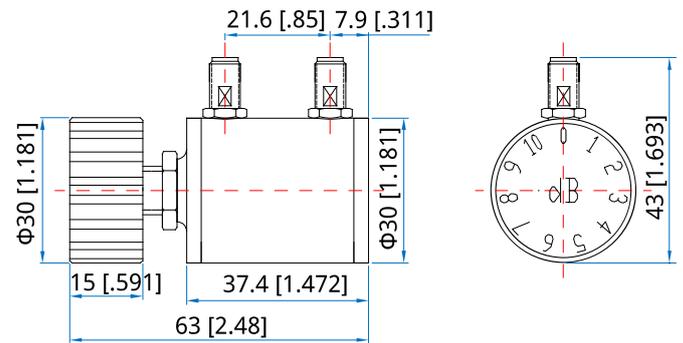
Mechanical

Size:	Φ30*63mm Φ1.181*2.48in
Weight:	250g
RF Connectors:	SMA Female N Female
Housing Materials:	Aluminum

Environmental

Temperature: -20~+85°C

Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QSA06A-W-X-Y-Z

W: Frequency in GHz

X: Maximum attenuation in dB

Y: Power in Watts

Z: Connector type

Connector naming rules:

N - N

S - SMA

Examples:

To order an attenuator, DC-6GHz, 0~60dB attenuation, 2W, SMA female, specify QSA06A-6-60-2-S.

QSA06B

DC~6GHz, 0~100dB, 10W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency: DC~6GHz
 Attenuation Range/Step: 0~11dB/0.1dB
 0~50dB/1dB
 0~70dB/1dB
 0~100dB/1dB
 Impedance: 50Ω
 Average Power: 2, 10W@25°C max.

Attenuation Accuracy vs. Attenuation

Attenuation (dB)	Attenuation Accuracy (±dB)
0~1	0.3
1~10	0.5
10~50	0.8
50~70	1.5
70~100	3.5

VSWR & Insertion Loss

Frequency (GHz)	VSWR ^{*1} (max.)	VSWR ^{*2} (max.)	Insertion Loss (dB, max.)
DC~2.5	1.3	1.45	1
DC~3	1.35	1.45	1.2
DC~4.3	1.4	1.55	1.5
DC~6	1.55	1.6	1.8

[2] SMA

[3] N

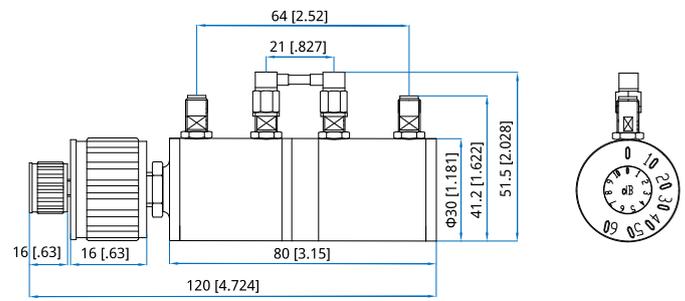
Mechanical

Size: Φ30*120mm
 1.181*4.724in
 Weight: 435g
 RF Connectors: SMA Female
 N Female
 Housing Materials: Aluminum

Environmental

Temperature: -20~+85°C

Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QSA06B-W-X-Y-Z

W: Frequency in GHz

X: Maximum attenuation in dB

Y: Power in Watts

Z: Connector type

Connector naming rules:

N - N

S - SMA

Examples:

To order an attenuator, DC-4.3GHz, 0~70dB attenuation, 2W, SMA female, specify QSA06B-4.3-70-2-S.

QSA06C

DC~6GHz, 0~100dB, 10W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	DC~6GHz
Attenuation Range/Step:	0~11dB/0.1dB 0~70dB/1dB 0~100dB/1dB
Impedance:	50Ω
Average Power:	2, 10W@25°C max.

Attenuation Accuracy vs. Attenuation

Attenuation (dB)	Attenuation Accuracy (±dB)
0~1	0.3
1~11	0.5
11~50	0.8
50~70	1.5
70~100	3.5

VSWR & Insertion Loss

Frequency (GHz)	VSWR (max.)	Insertion Loss (dB, max.)
DC~2.5	1.4	1.2
DC~3	1.45	1.2
DC~4.3	1.5	1.5
DC~6	1.65	1.8

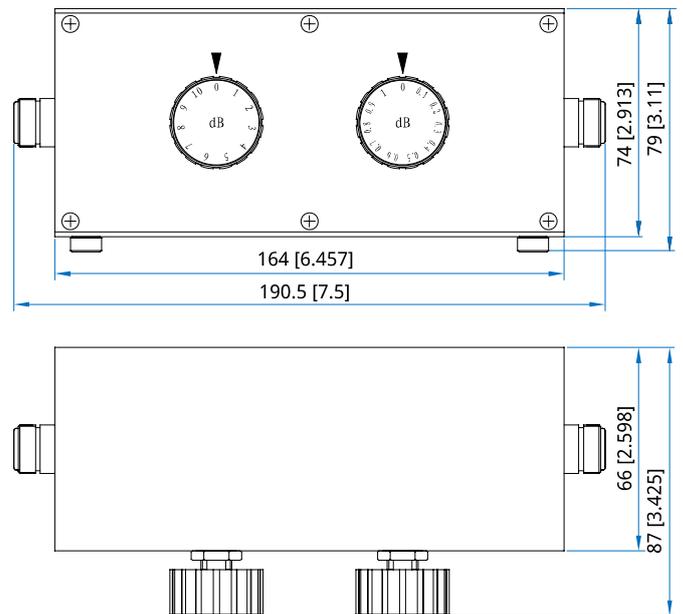
Mechanical

Size:	190.5*87*79mm 7.5*3.425*3.11in
Weight:	1Kg
RF Connectors:	N Female
Housing Materials:	Aluminum

Environmental

Temperature:	-20~+85°C
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Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QSA06C-X-Y-Z

X: Frequency in GHz

Y: Maximum attenuation in dB

Z: Power in Watts

Examples:

To order an attenuator, DC-4.3GHz, 0~70dB attenuation, 2W, specify QSA06C-4.3-70-2.

QSA06D

DC~6GHz, 0~101dB, 10W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency: DC~6GHz
 Attenuation Range: 0~71, 0~101dB
 Step: 0.1dB
 Impedance: 50Ω
 Average Power: 2, 10W@25°C max.

Attenuation Accuracy vs. Attenuation

Attenuation (dB)	Attenuation Accuracy (±dB)
0.1~0.9	0.3
1~9.9	0.4
10~59.9	0.8
60~69.9	1.5
70~101	3.5

VSWR & Insertion Loss

Frequency (GHz)	VSWR (max.)	Insertion Loss (dB, max.)
DC~2.5	1.5	1.5
DC~3	1.6	1.7
DC~4.3	1.7	2.0
DC~6	1.75	2.5

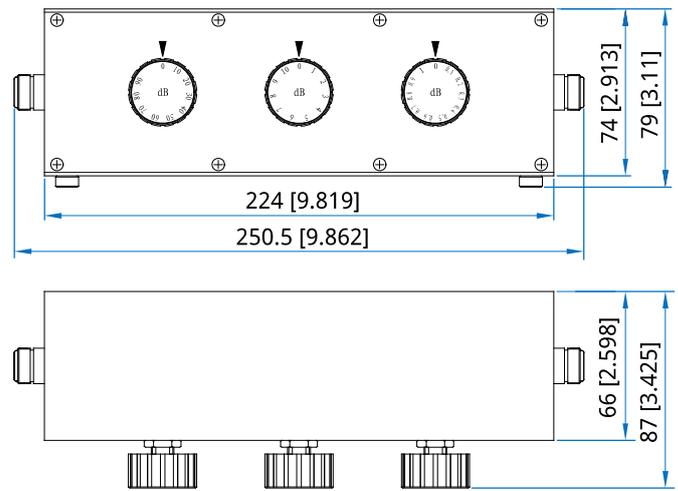
Mechanical

Size: 250.5*87*79mm
 9.862*3.425*3.11in
 Weight: 1.25Kg
 RF Connectors: N Female
 Housing Materials: Aluminum

Environmental

Temperature: -20~+85°C

Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QSA06D-X-Y-Z

X: Frequency in GHz

Y: Maximum attenuation in dB

Z: Power in Watts

Examples:

To order an attenuator, DC-4.3GHz, 0~71dB attenuation, 2W, specify QSA06D-4.3-71-2.

QSA18A

DC~18GHz, 0~80dB, 10W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	DC~18GHz
Attenuation Range/Step:	0~9dB/1dB, 0~80dB/10dB
Impedance:	50Ω
Average Power:	2, 10W@25°C max.

Attenuation Accuracy vs. Attenuation

Attenuation (dB)	Attenuation Accuracy (±dB)
0~9	1
10~60	1.5
70	2.5
80	2.8

VSWR & Insertion Loss

Frequency (GHz)	VSWR (max.)	Insertion Loss (dB, max.)
DC~8	1.4	1
DC~12.4	1.5	1.2
DC~18	1.6	1.5

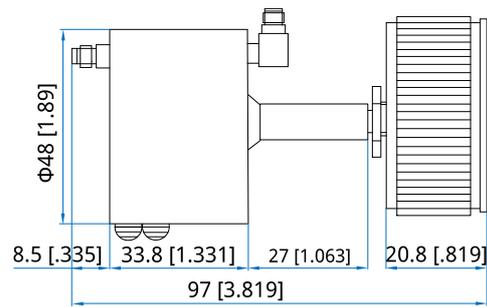
Mechanical

Weight:	300g max.
RF Connectors:	SMA Female
Housing Materials:	Aluminum

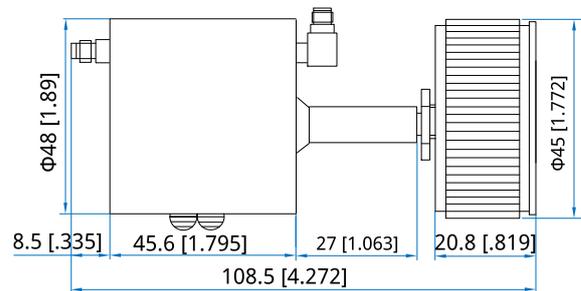
Environmental

Temperature:	0~+54°C
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Outline Drawings



Outline A - 0~9dB



Outline B - 0~80dB

Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QSA18A-X-Y-Z

X: Frequency in GHz

Y: Maximum attenuation in dB

Z: Power in Watts

Examples:

To order an attenuator, DC-8GHz, 0~9dB attenuation, 2W, specify QSA18A-8-9-2.

QSA18B

DC~18GHz, 0~99dB, 5W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency*1:	DC~18GHz
Attenuation Range:	0~69dB, 0~99dB
Step:	1dB
Impedance:	50Ω
Average Power:	2W, 5W

[1] 0.1~18GHz for 0~99dB attenuators.

Attenuation Accuracy vs. Attenuation

Attenuation (dB)	Attenuation Accuracy (±dB)
0~9	0.8
10~19	1
20~49	1.5
50~69	2
70~99	3.5

VSWR & Insertion Loss

Frequency (GHz)	VSWR (max.)	Insertion Loss (dB, max.)
DC~18	1.75	1.5

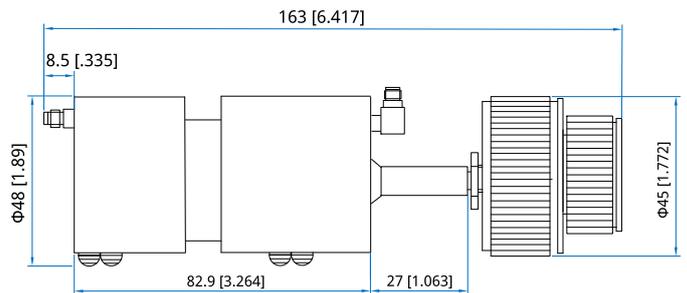
Mechanical

Size:	Φ48*163mm Φ1.89*6.417in
Weight:	480g
Outer Conductor:	SUS303 Stainless Steel
RF Connectors:	SMA Female
Inner Conductor:	Gold Plated Beryllium Copper
Housing Materials:	Aluminum

Environmental

Temperature:	0~+50°C
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Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QSA18B-X-Y-Z

X: Frequency in GHz

Y: Maximum attenuation in dB

Z: Power in Watts

Examples:

To order an attenuator, DC~12.4GHz, 0~69dB attenuation, 2W, specify QSA18B-12.4-69-2.

QSA26

DC~26.5GHz, 0~90dB, 10W

Features:

- * Low VSWR
- * High Attenuation Flatness

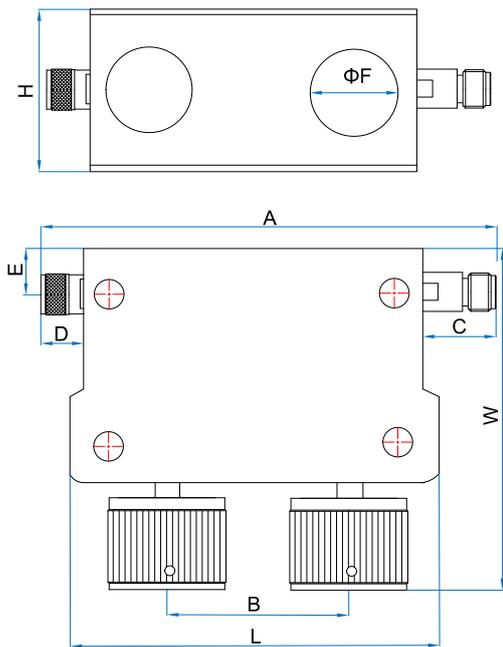
Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency: DC~26.5GHz
 Attenuation Range: 0~69dB, 0~99dB
 Step: 1dB
 Insertion Loss: 2dB max.
 VSWR: 1.85 max.
 Impedance: 50Ω
 Average Power: 2, 10W@25°C max.

Outline Drawings



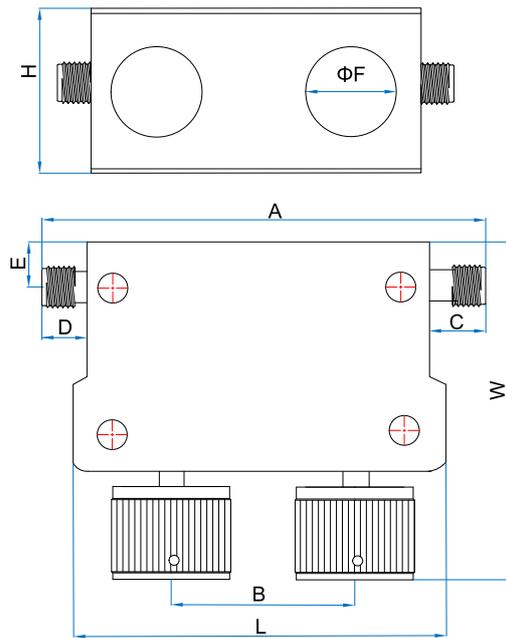
Outline A

2W

Size	L	W	H	A	B	C	D	E	F
mm	115	106	83	163	57.4	27	24	14	45
in	4.528	4.173	3.268	6.417	1.063	0.945	0.000	0.551	1.772

10W

Size	L	W	H	A	B	C	D	E	F
mm	126	106	83	174	74.1	27	24	14	45
in	4.961	4.173	3.268	6.850	2.917	1.063	0.945	0.551	1.772



Outline B

2W

Size	L	W	H	A	B	C	D	E	F
mm	115	106	83	126	57.4	7	7	14	45
in	4.528	4.173	3.268	4.961	2.260	0.276	0.276	0.551	1.772

10W

Size	L	W	H	A	B	C	D	E	F
mm	126	106	83	137	74.1	77	7	14	45
in	4.961	4.173	3.268	5.394	2.917	3.031	0.276	0.551	1.772

Unit: mm [in]

Tolerance: ±1mm [±0.04in]

Mechanical

RF Connectors: N Male & Female
 SMA Female
 3.5mm Female

Housing Materials: Aluminum

Environmental

Temperature: 0~+54°C

Attenuation Accuracy vs. Attenuation

Attenuation (dB)	Attenuation Accuracy (±dB)	
	DC~18GHz	DC~26.5GHz
0~9	0.8	1.5
10~19	1	1.75
20~49	1.5	2
50~69	2	2.5
70~99	3.5	-

How To Order

QSA26-W-X-Y-Z

W: Frequency in GHz

X: Maximum attenuation in dB

Y: Power in Watts

Z: Connector type

Connector naming rules:

N - N male & female

S - SMA female

3 - 3.5mm female

Examples:

To order an attenuator, DC-26.5GHz, 0~69dB attenuation, 2W, SMA female, specify QSA26-26.5-69-2-S.

QSA28

DC~28GHz, 0~90dB, 25W

Features:

- * Low VSWR
- * High Attenuation Flatness

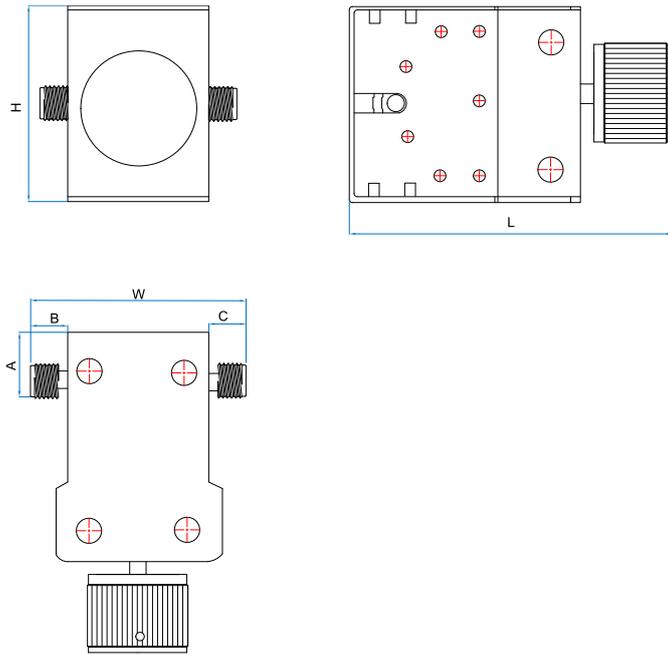
Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	DC~28GHz
Attenuation Range/Step:	0~9dB/1dB 0~90dB/10dB
Attenuation Accuracy:	±0.8~±2.5dB
Impedance:	50Ω
Average Power:	2, 10W, 25W@25°C max.

Outline Drawings



Size	L	W	H	A	B	C
mm	106	62	83	14	7	7
in	4.173	2.441	3.268	0.551	0.276	0.276
mm	106	66	83	14	10.5	7
in	4.173	2.598	3.268	0.551	0.413	0.276

Unit: mm [in]

Tolerance: ±1mm [±0.04in]

VSWR & Insertion Loss

Frequency (GHz)	VSWR (max.)	Insertion Loss (dB, max.)
DC~18	1.6	1
DC~28	1.75	1.8

Mechanical

Size:	106*62/66*83mm 4.173*2.441/2.598*3.268in
Weight:	525g
RF Connectors:	3.5mm Female, SMA Female
Housing Materials:	Aluminum

Environmental

Temperature: 0~+54°C

How To Order

QSA28-X-Y-Z

W: Frequency in GHz

X: Maximum attenuation in dB

Y: Power in Watts

Z: Connector type

Connector naming rules:

S - SMA female

3 - 3.5mm female

Examples:

To order an attenuator, DC-28GHz, 0~70dB attenuation, 2W, 3.5mm female, specify QSA28-28-70-2-3.

QCA1

DC~2.5GHz, 0~16dB, 1W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	DC~2.5GHz
Attenuation Range:	10, 16dB
Impedance:	50Ω
Average Power:	1W

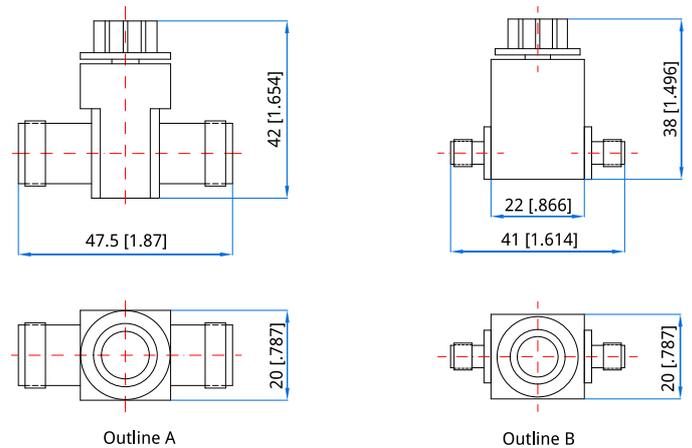
Mechanical

Weight:	65g
Outer Conductor:	Nickel plated brass
Female Inner Conductor:	Gold plated beryllium copper
Housing:	Aluminum

Environmental

Temperature:	-40~+65°C
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Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QCA1-0-2.5-10-N - 0~10dB, N Female, Outline A

QCA1-0-2.5-16-N - 0~16dB, N Female, Outline A

QCA1-0-2.5-10-S - 0~10dB, SMA Female, Outline B

QCA1-0-2.5-16-S - 0~16dB, SMA Female, Outline B

Customization is available upon request.

QCA10-0.5-4-15

0.5~4GHz, 0~15dB, 10W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	0.5~4GHz
VSWR:	1.5 max.
Attenuation Range:	15dB
Insertion Loss:	0.5dB max.
Impedance:	50Ω
Average Power:	10W

Mechanical

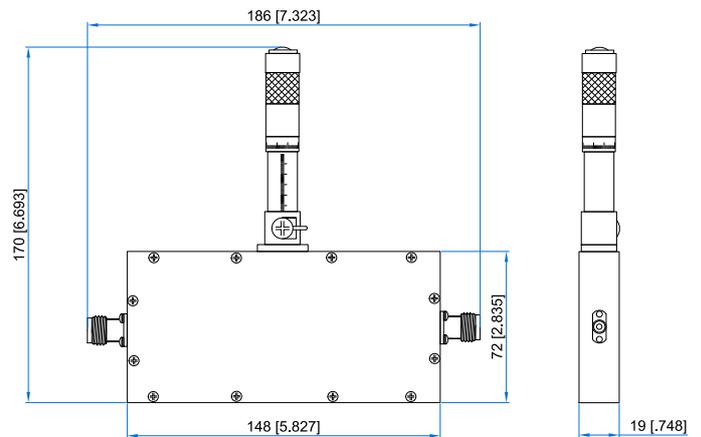
Size ^{*1} :	148*72*19mm 5.827*2.835*0.748in
Weight:	590g
RF Connectors:	N Female
Outer Conductor:	Nickel plated brass
Female Inner Conductor:	Gold plated beryllium copper
Housing:	Aluminum

[1] Exclude connectors.

Environmental

Temperature:	-40~+65°C
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Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QCA10-0.5-4-15

Customization is available upon request.

QCA50

0.9~4GHz, 0~10dB, 50W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	0.9~4GHz
Band Width:	100, 200MHz
Attenuation Accuracy:	±0.5dB
Attenuation Range:	0~10dB
Insertion Loss:	1.0dB max.
VSWR:	1.5dB max.
Impedance:	50Ω
Average Power:	50W

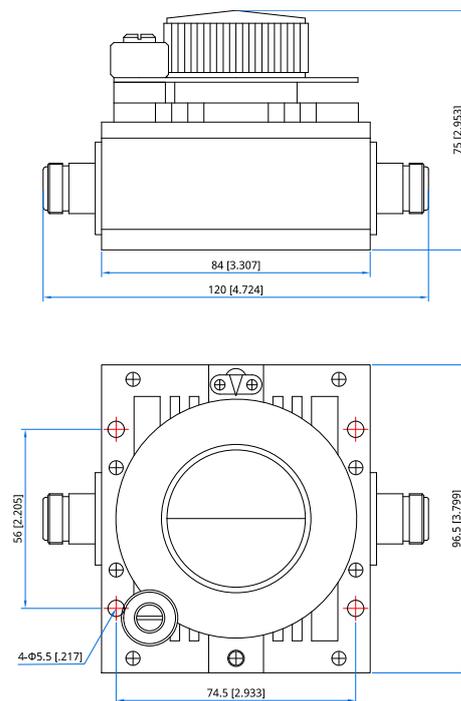
Mechanical

Size:	120*96.5*75mm 4.724*3.799*2.953in
Weight:	1.2Kg
RF Connectors:	N Female
Outer Conductor:	Nickel plated brass
Female Inner Conductor:	Gold plated beryllium copper
Housing:	Aluminum
Mounting:	4-Φ5.5mm through-hole

Environmental

Temperature:	-40~+65°C
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Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QCA50-X-Y-10

X: Start frequency in GHz

Y: Stop frequency in GHz

Examples:

To order an attenuator, 2-2.2GHz, N female, 0~10dB attenuation, specify QCA50-2-2.2-10.

Customization is available upon request.

QCA75

0.9~4GHz, 0~15dB, 75W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	0.9~4GHz
Band Width:	100, 200MHz
Attenuation Accuracy:	±0.5dB
Attenuation Range:	10, 15dB
VSWR:	1.5 max.
Insertion Loss:	1.0dB max.
Impedance:	50Ω
Average Power:	75W

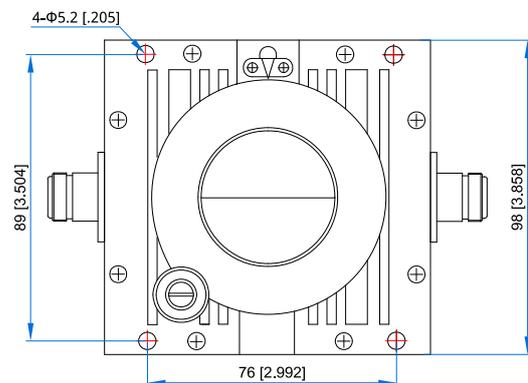
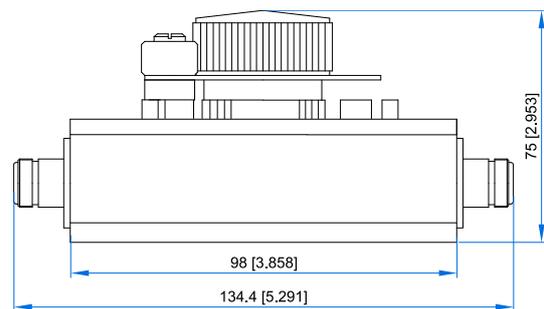
Mechanical

Size:	134.4*98*75mm 5.291*3.858*2.953in
Weight:	1.5Kg
RF Connectors:	N Female
Outer Conductor:	Nickel plated brass
Female Inner Conductor:	Gold plated beryllium copper
Housing:	Aluminum
Mounting:	4-Φ5.2mm through-hole

Environmental

Temperature: -40~+65°C

Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QCA75-X-Y-Z

X: Start frequency in GHz
 Y: Stop frequency in GHz
 Z: Maximum attenuation in dB

Examples:

To order an attenuator, 2.9-3.1GHz, N female, 0~10dB attenuation, specify QCA75-2.9-3.1-10.

Customization is available upon request.

QCAK1

0.9~10.5GHz, 0~20dB, 100W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	0.9~10.5GHz
Band Width:	100, 200MHz
Attenuation Accuracy:	±0.5dB@0.9~4GHz ±1.0dB@5~10.5GHz
Attenuation Range:	10, 12, 15, 20dB
VSWR:	1.5 max.@0.9~4GHz 1.55 max.@5~6GHz 1.6 max.@9.5~10.5GHz
Insertion Loss:	1.0dB max.@0.9~4GHz 1.2dB max.@5~6GHz 1.5dB max.@9.5~10.5GHz
Impedance:	50Ω
Average Power:	100W

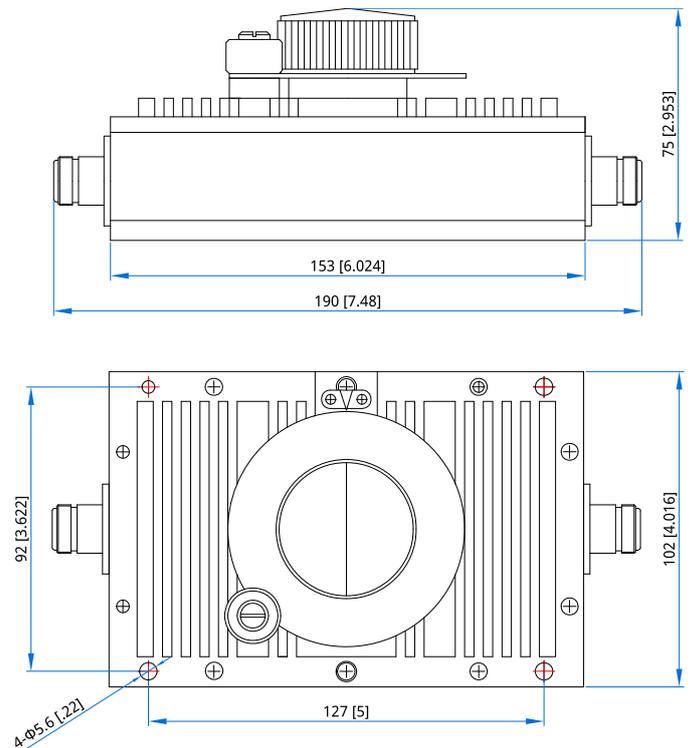
Mechanical

Size:	190*102*75mm 7.48*4.016*2.953in
Weight:	2Kg
RF Connectors:	N Female
Outer Conductor:	Nickel plated brass
Female Inner Conductor:	Gold plated beryllium copper
Housing:	Aluminum
Mounting:	4-Φ5.6mm through-hole

Environmental

Temperature:	-40~+65°C
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Outline Drawings



Unit: mm [in]
Tolerance: ±1mm [±0.04in]

How To Order

QCAK1-X-Y-Z

- X: Start frequency in GHz
- Y: Stop frequency in GHz
- Z: Maximum attenuation in dB

Examples:

To order an attenuator, 2.5-2.7GHz, N female, 0~20dB attenuation, specify QCAK1-2.5-2.7-20.

Customization is available upon request.

QCAK3

0.9~10.5GHz, 0~25dB, 300W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	0.9~10.5GHz
Band Width:	100, 200MHz
Attenuation Accuracy:	±0.5dB@0.9~4GHz ±1.0dB@5~10.5GHz
Attenuation Range:	10, 12, 15, 25dB
VSWR:	1.5 max.@0.9~4GHz 1.55 max.@5~6GHz 1.6 max.@9.5~10.5GHz
Insertion Loss:	1.0dB max.@0.9~4GHz 1.2dB max.@5~6GHz 1.5dB max.@9.5~10.5GHz
Impedance:	50Ω
Average Power:	300W

Mechanical

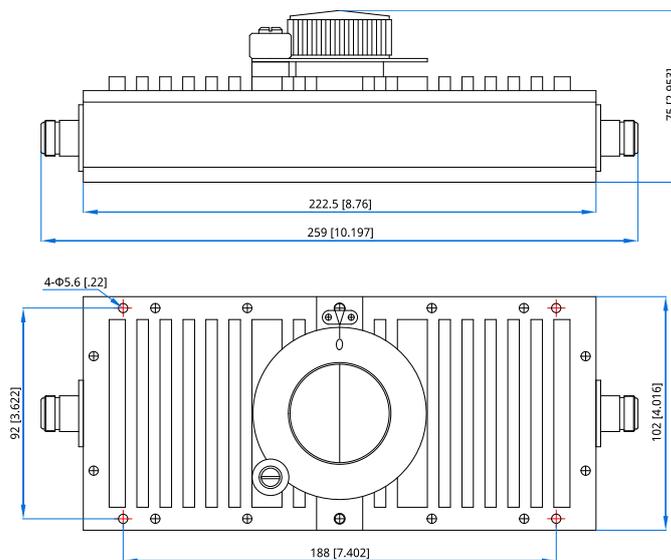
Size ^{*1} :	259*102*75mm 10.197*4.016*2.953in
Weight:	2.6Kg
RF Connectors:	N Female
Outer Conductor:	Nickel plated brass
Female Inner Conductor:	Gold plated beryllium copper
Housing:	Aluminum
Mounting:	4-Φ5.6mm through-hole

[1] Exclude connectors.

Environmental

Temperature:	-40~+65°C
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Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QCAK3-X-Y-Z

X: Start frequency in GHz

Y: Stop frequency in GHz

Z: Maximum attenuation in dB

Examples:

To order an attenuator, 2.5-2.7GHz, N female, 0~25dB attenuation, specify QCAK3-2.5-2.7-25.

Customization is available upon request.

QCA10-2-18-40

2~18GHz, 0~40dB, 10W

Features:

- * Low VSWR
- * High Attenuation Flatness

Applications:

- * Wireless
- * Transmitter
- * Laboratory Test
- * Radar

Electrical

Frequency:	2~18GHz
VSWR:	1.5 max.
Attenuation Range:	40dB
Insertion Loss:	0.4dB max.@2~4GHz 0.5dB max.@4~8GHz 0.8dB max.@8~12.4GHz 1.2dB max.@12.4~18GHz
Impedance:	50Ω
Average Power:	10W

Mechanical

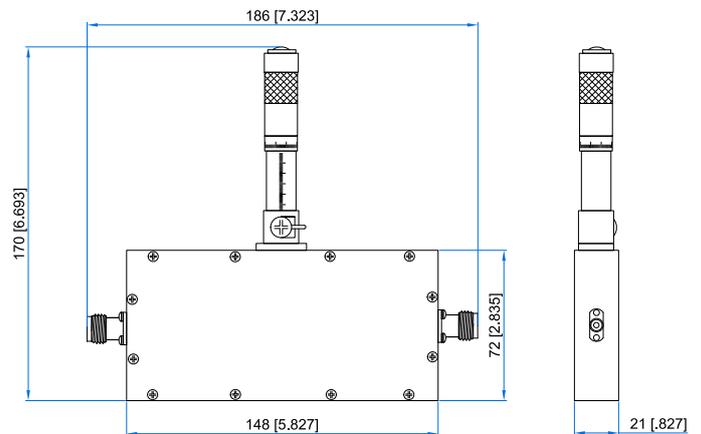
Size ^{*1} :	148*72*21mm 5.827*2.835*0.827in
Weight:	600g
RF Connectors:	N Female
Outer Conductor:	Nickel plated brass
Female Inner Conductor:	Gold plated beryllium copper
Housing:	Aluminum

[1] Exclude connectors.

Environmental

Temperature: -40~+65°C

Outline Drawings



Unit: mm [in]

Tolerance: ±1mm [±0.04in]

How To Order

QCA10-2-18-40

Customization is available upon request.