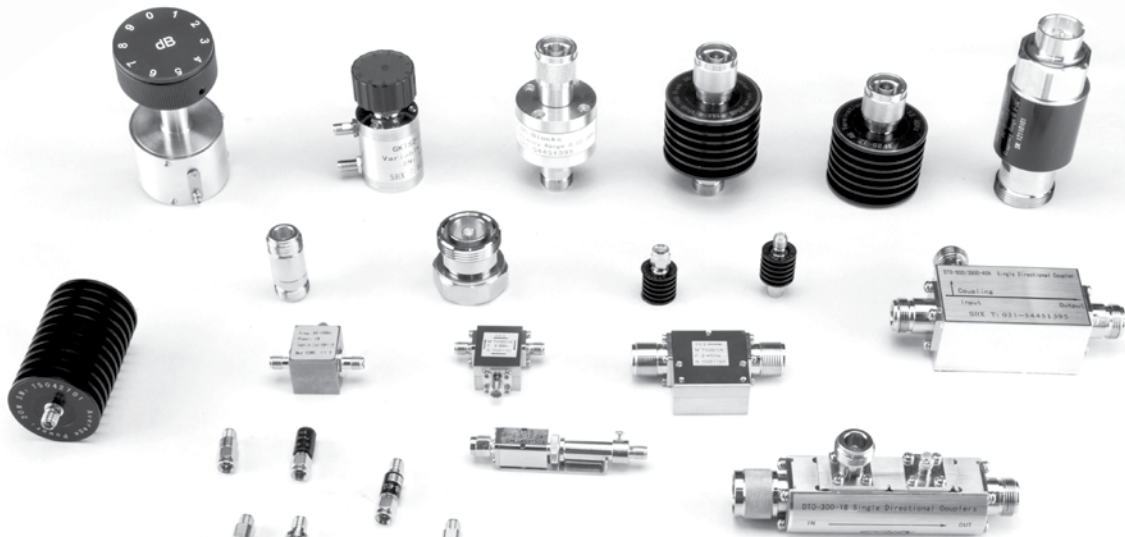


RF & MICROWAVE COMPONENTS SELECTOR GUIDE

Attenuators | Terminations | Phase Shifters | Couplers | Adapters



Richardson Electronics is proud to be the global provider for SHX, a leading manufacturer of precision RF & Microwave components. For nearly 70 years, Richardson Electronics has been your industry-leading global provider of engineered solutions, power grid and microwave tubes. With the launch of the Power & Microwave Technologies group, we continue this legacy and complement it with new solid-state technologies.

As a manufacturer and authorized distributor, our strategy is to provide specialized technical expertise and engineered solutions based on our core engineering and manufacturing capabilities. We provide solutions and add value through design-in support, systems integration, prototype design and manufacturing, testing, logistics, and aftermarket technical service and repair—all through our existing global infrastructure.

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ELECTRON TUBES & COMPONENTS

CPI
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RF & MICROWAVE

AMOTECH
Anaren
Anokiwave
Dynawave
IDT
Infiniti Microwave
LiConn, Inc.
MACOM
Qorvo
SHX
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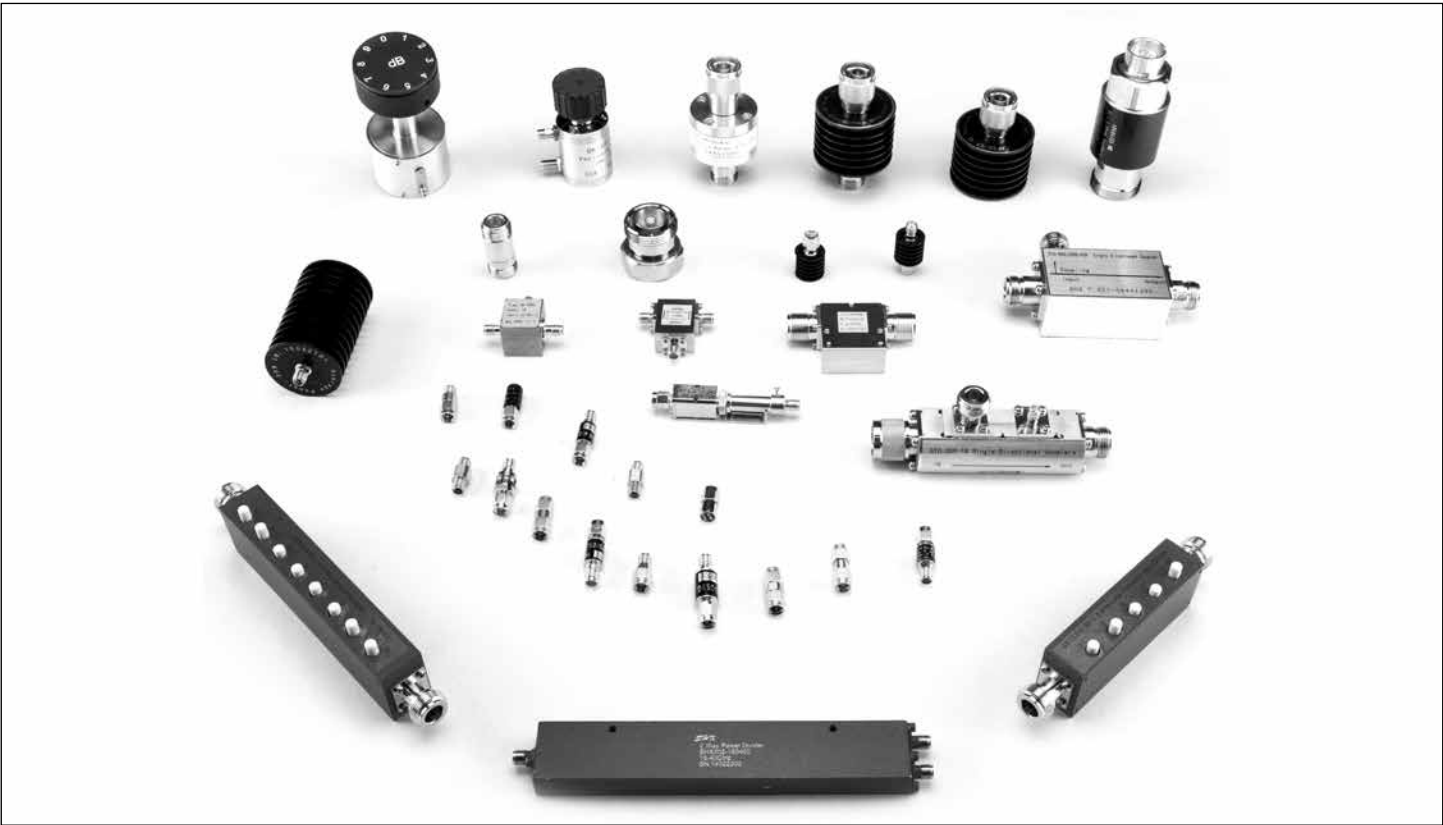
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Coaxial Fixed Attenuators - 50 Ohm

Richardson Electronics carries a wide variety of SHX fixed attenuators with 50 Ohm and 75 Ohm impedance and available with 2.4 mm, 2.92 mm, 7/16 DIN, 7 mm, BNC, F, N, SMA and TNC connectors. RF attenuation values for these fixed attenuators range from 0 dB to 60 dB. Frequency ranges are from DC to 50 GHz, including the low-to-high-power attenuators that have the power handling up to 500 Watts.



Model Number	Average Power (W)	Peak Power (kW)	Frequency Range (GHz)	Max VSWR	Nominal Attenuation Value (dB)	Connector Type
4.3-10 TS10	10	1	DC-6	1.25	1-9,10,20,30,40	4.3-10
4.3-10 TS25	25	1	DC-6	1.25	1-9,10,20,30,40	4.3-10
4.3-10 TS50	50	5	DC-8	1.30	10,20,30,40	4.3-10
4.3-10 TS100-D	100	5	DC-4	1.25	20,30,40	4.3-10
4.3-10 WTS100	100	5	DC-6	1.30	10,20,30,40	4.3-10
4.3-10 WTS150	150	5	DC-6	1.30	10,20,30,40	4.3-10
4.3-10 WTS200	200	5	DC-6	1.40	10,20,30,40	4.3-10
TNC2	2	0.5	DC-18	1.15-1.35	1-9,10,20,30	TNC
TNC2H	2	0.5	DC-18	1.15-1.35	40,50,60,70,80,90	TNC
TNC5	5	0.5	DC-18	1.15-1.35	1-9,10,20,30	TNC
TNC5H	5	0.5	DC-18	1.15-1.35	40,50,60,70,80,90	TNC
TNC10	10	1	DC-18	1.15-1.35	1-9,10,20,30	TNC
TNC10H	10	1	DC-18	1.15-1.35	40,50,60,70,80,90	TNC
TNC25	25	1	DC-18	1.15-1.35	10,20,30,40	TNC
TNC50-A	50	1	DC-18	1.15-1.40	3,6,10,20,30,40	TNC
TNC50-B	50	1	DC-18	1.15-1.30	10,20,30,40	TNC
TNC100	100	1	DC-18	1.30-1.40	10,20,30,40	TNC
TNC150	150	1	DC-18	1.30-1.45	10,20,30,40	TNC
TNC200	200	1	DC-18	1.30-1.50	30,40	TNC
2.4TS2	2	0.2	DC-40	1.25-1.35	1-9,10,20,30,40	2.4 mm
2.4TS5	5	0.2	DC-40	1.20-1.35	1-9,10,20,30,40	2.4 mm
2.4TS10	10	0.2	DC-40	1.25-1.40	10,20,30,40	2.4 mm
2.4TS20	20	0.2	DC-40	1.30-1.40	10,20,30,40	2.4 mm
2.92TS0.5	0.5	0.2	DC-40	1.25-1.35	1-9,10-20,20-30,40	2.92 mm
2.92TS1	1	0.2	DC-40	1.25-1.35	1-9,10-20,20-30,40	2.92 mm
2.92TS2	2	0.2	DC-40	1.25-1.35	1-9,10-20,20-30,40	2.92 mm
2.92TS5	5	0.2	DC-40	1.20-1.35	1-9,10-20,20-30,40	2.92 mm
2.92TS10	10	0.2	DC-40	1.25-1.40	10,20,30,40	2.92 mm
2.92TS20	20	0.2	DC-40	1.30-1.40	10,20,30,40	2.92 mm
2.92TS30	30	0.2	DC-40	1.25-1.40	30	2.92 mm
2.92TS50	50	0.2	DC-40	1.60	30,40	2.92 mm
3.5TS2	2	0.5	DC-26.5	1.15-1.25	1-10,10-20,20-30,40,50,60,70	3.5 mm
3.5TS5	5	0.5	DC-26.5	1.15-1.25	1-10,10-20,20-30,40,50,60,70	3.5 mm
3.5TS10	10	0.5	DC-26.5	1.15-1.25	1-10,20,30,40,50,60,70	3.5 mm
3.5TS25	25	0.5	DC-26.5	1.20-1.30	3,6,10,20,30,40	3.5 mm
3.5TS50	50	0.5	DC-26.5	1.20-1.30	3,6,10,20,30,40	3.5 mm
SSMA	2	0.2	DC-12.4	1.25-1.35	1-9,10,20,30	SSMA
RPSMA	2	0.5	DC-6	1.15-1.20	1-9,10,20,30	RPSMA

Coaxial Fixed Attenuators - 50 Ohm

Model Number	Average Power (W)	Peak Power (kW)	Frequency Range (GHz)	Max VSWR	Nominal Attenuation Value (dB)	Connector Type
DTS10GH-GRB	10	1	DC-12.4	1.15-1.40	1-9,10,20	BMA
QMA2	2	0.5	DC-6	1.15-1.20	1-9,10,20,30	QMA-SMA
SMAS	2	0.5	DC-26.5	1.15-1.30	1-6,7-8,9-12	SMA(M,F)
SMA	2	0.5	DC-18	1.15-1.35	1-9,10,20,30	SMA(M,F)
SMAG	2	0.5	DC-18	1.15-1.30	1-9,10,20,30,40,50	SMA(M,F)
SMAG2	2	0.5	DC-26.5	1.15-1.35	1-9,10,20,30,40	SMA(M,F)
SMAKF	2	0.5	DC-26.5	1.15-1.35	1-9,10,20,30	SMA(F,F)
SMAGH	2	0.5	DC-26.5	1.15-1.40	30,40,50,60,70,80,90	SMA
SMA5	5	0.5	DC-26.5	1.15-1.35	3,6,10,20,30,40,50	SMA(M,F)
SMA10	10	0.5	DC-26.5	1.15-1.35	3,6,10,20,30,40	SMA
SMA25	25	1	DC-26.5	1.20-1.35	10,20,30,40	SMA
DTS50GA	50	0.5	DC-26.5	1.20-1.30	10,20,30,40,50,60	SMA
TS2	2	0.5	DC-6	1.10-1.25	1-9,10,20,30,40	N,SMA,TNC, BNC,CC11
TS2G	2	0.5	DC-18	1.15-1.40	1-9,10,20,30,40,50	N,TNC
TS2GA	2	0.5	DC-18	1.10-1.30	1-9,10,20,30,40,50	N,TNC
TS2GH	2	0.5	DC-18	1.15-1.35	40,50,60,70,80,90	N,TNC
TS5	5	0.5	DC-6	1.10-1.25	1-9,10,20,30,40	N,SMA,TNC, BNC,CC11,L16
TS5G	5	0.5	DC-18	1.15-1.40	1-9,10,20,30,40,50	N,TNC
TS5GA	5	0.5	DC-18	1.10-1.30	1-9,10,20,30,40,50	N,TNC
TS5GH	5	0.5	DC-18	1.15-1.35	40,50,60,70,80,90	N,TNC
DTS10	10	1	DC-6	1.10-1.25	1-9,10,20,30,40	N,SMA,BNC,TNC
DTS10G	10	1	DC-18	1.20-1.40	10,20,30,40	N,SMA,TNC
DTS10GA	10	1	DC-18	1.15-1.30	1-9,10,20,30,40	N,TNC
DTS10GH	10	1	DC-18	1.15-1.40	10,20,30,40,50,60	N,TNC
DTS25	25	1	DC-6	1.10-1.25	1-9,10,20,30,40,50	N,SMA,TNC,BNC,7/16
DTS25G	25	1	DC-18	1.20-1.40	10,20,30,40	N,TNC,SMA
DTS25G-C	25	1	DC-18	1.20-1.30	10,20,30,40,50,60,70	N,TNC
DTS25GH	25	1	DC-18	1.20-1.40	10,20,30,40,50,60	N,SMA,TNC
DTS30	30	1	DC-6	1.10-1.30	1-9,10,20,30,40	N,SMA,7/16,BNC
DTS30G-A	30	5	DC-6	1.10-1.20	3/6,10,20,30,40	N
DTS30G-B	30	5	DC-10	1.10-1.35	3/6,10,20,30,40	N
DTS50-A	50	10	DC-4	1.15-1.35	1-9,10,20,30,40	N,SMA,7/16,TNC,BNC
DDTS50	50	10	DC-4	1.15-1.35	1-9,10,20,30,40	N,7/16
DTS50G	50	5	DC-10	1.10-1.35	3/6,10,20,30,40	N,7/16
DTS50GH-C	50	1	DC-18	1.15-1.35	3,6,10,20,30,40	N,SMA
DTS50GH-D	50	1	DC-18	1.20-1.30	10,20,30,40,50,60	N
DTS50GH	50	1	DC-18	1.30-1.35	10,20,30,40	N,TNC
WDTS50	50	5	DC-10	1.10-1.35	3/6,10,20,30,40	N,7/16
DTS60	60	10	DC-4	1.15-1.35	1-9,10,20,30,40	N,SMA,7/16,TNC,BNC
DTS60G	60	5	DC-10	1.10-1.35	3/6,10,20,30,40	N,7/16
DTS80	80	10	DC-4	1.15-1.35	10,20,30,40	N,7/16,TNC,BNC
DTS80G	80	1	DC-18	1.25-1.40	10,20,30,40	N,SMA
WDTS80	80	5	DC-10	1.15-1.40	10,20,30,40	N,7/16
DTS100	100	10	DC-4	1.15-1.35	10,20,30,40-50	N,7/16

Coaxial Fixed Attenuators - 50 Ohm

Model Number	Average Power (W)	Peak Power (kW)	Frequency Range (GHz)	Max VSWR	Nominal Attenuation Value (dB)	Connector Type
DTS100-D	100	5	DC-4	1.25	30	N,7/16
DDTS100 Bi-directional	100	5	0.7-3	1.15-1.20	30,40	N
DTS100G(F)	100	1	DC-18	1.30-1.45	3,6,10,20,30,40,50	N
DTS100G-A	100	1	DC-18	1.30-1.40	3,6,10,20,30,40,50	N
DTS100G-C Bi-directional	100	1	DC-18	1.20-1.40	3,6,10,20,30,40	N
WDTS100	100	5	DC-10	1.15-1.50	3,6,10,20,30,40	N,7/16
WDTS100-C	100	5	DC-10	1.15-1.50	3,6,10,20,30,40	N,7/16
DTS150	150	10	DC-4	1.15-1.40	10,20,30,40-50	N,7/16
DTS150G(F)	150	1	DC-18	1.30-1.45	3,6,10,20,30,40,50	N,SMA
DTS150G-A	150	1	DC-18	1.25-1.45	3,6,10,20,30,40,50	N
WDTS150	150	5	DC-10	1.15-1.50	3,6,10,20,30,40	N,7/16
DTS200	200	10	DC-4	1.20-1.40	10,20,30,40-50	N,7/16
WDTS200	200	5	DC-10	1.15-1.45	10,20,30,40	N,7/16
DTS200G(F)	200	1	DC-18	1.25-1.50	10,20,30,40,50	N
DTS250	250	10	DC-4	1.20-1.40	10,20,30,40-50	N,7/16
DTS250-B	250	10	DC-5	1.15	40	N,7/16
WDTS250	250	5	DC-10	1.20-1.45	10,20,30,40	N,7/16
WDTS250-C	250	5	DC-10	1.20-1.45	10,20,30,40	N,7/16
DTS250G(F)	250	1	DC-18	1.25-1.55	10,20,30,40,50	N
DTS300	300	10	DC-4	1.20-1.50	10,20,30,40-50	N,7/16
DTS300GH(F)	300	1	DC-18	1.20-1.55	10,20,30,40,50	N
WDTS300	300	5	DC-10	1.25-1.45	30,40-50	N,7/16
DTS350G(F)	350	1	DC-13	1.30-1.50	6,10,20,30,40	N
DTS350GH	350	1	DC-4	1.30	30	N
DTS400	400	10	DC-4	1.20-1.50	10,20,30,40,50	N,7/16
WDTS400	400	5	DC-10	1.25-1.45	40,50	N,7/16
DTS500	500	10	DC-4	1.20-1.50	10,20,30,40,50	N,7/16
WDTS500	500	5	DC-10	1.25-1.45	30,40,50	N,7/16
DTS800	800	10	DC-4	1.20-1.50	40,50,60	N,7/16
WDTS1000	1000	5	DC-6	1.35	50	N,7/16
GDTS1000	1000	10	DC-3	1.40	40,50	N,7/16
GDTS1500	1500	10	DC-3	1.40	40,50	N,7/16
GDTS2000	2000	10	DC-3	1.40	40,50	N,7/16
DTS1000 (Oil-cooled)	1000	50	DC-2	1.20-1.30	30,40,50	N,7/16
DTS2000 (Oil-cooled)	2000	50	DC-2	1.20-1.30	30,40,50	N,7/16
DTS3000 (Oil-cooled)	3000	50	DC-2	1.30	30,40,50	N,7/16
DTS4000 (Oil-cooled)	4000	100	DC-1	1.40	30,40,50	N,7/16
DTS5000 (Oil-cooled)	5000	100	DC-1	1.40	30,40,50	7/16,L36,L52
DTS10000 (Oil-cooled)	10000	100	DC-1	1.40	30,40,50	7/16,L36,L52

RF Coax Terminations

Coaxial fixed terminations absorb RF & Microwave energy and are commonly used as dummy loads of antennas and transmitters. They are also used as match ports in many multi-port microwave devices such as circulators and directional couplers to make these ports, which are not involved in the measurement, be terminated in their characteristic impedance in order to ensure an accurate measurement.

TF series high power coaxial fixed terminations range in power from 1 W to 50 kW, frequency range of DC to 40 GHz and very low VSWR.



Model Number Note

- **TNC-F** — Average power 2W-200W, frequency range DC-18 GHz
- **SMAF** — Average power 1W, 2W frequency range DC-40 GHz
- **TF** — High power coaxial terminations with average power 2W-10 kW, frequency range DC-18 GHz
- **WTF** — Broadband high power coaxial terminations with average power 50W-1000W, frequency range DC-18 GHz
- **GTF** — Dry high power coaxial terminations with average power 1-2 kW, frequency range DC-4 GHz
- **DBF** — High power coaxial standard terminations with average power 50-150W, frequency range DC-3 GHz
- **WNTF** — Inset terminations with average power 50-150W, frequency range DC-18 GHz
- **NDTF** — Inset terminations with average power 50-300W, frequency range DC-4 GHz
- **WNTDF** — Inset terminations with average power 50-200W, frequency range DC-18 GHz
- **FDTF** — Serial waterproof terminations average power from 25W to 100W, frequency range DC-4 GHz
- **SHX** — 50 kW water loads average power from 25 kW to 50 kW, frequency range DC-500 MHz
- **TF-LIM** — Low PIM terminations with average power 2W-200W and PIM from -120 dBc to -160 dBc, frequency range DC-4 GHz

Mismatch Terminations

TSF Serial Narrow Band Mismatch Termination



Model Number	Average Power(W)	Frequency Range(GHz)	VSWR	Connector type	Dimensions (mm)	Weight (kg)
TSF2	2	$f_0 \pm 5\%$	1.5,2,2.5,3,3.5,4,4.5,5	N,SMA,BNC,TNC	20×53	0.05
TSF50	50	$f_0 \pm 5\%$		N,SMA,BNC,TNC	110×60×60	0.5
TSF100	100	$f_0 \pm 5\%$		N,SMA,BNC,TNC	210×80×60	1.8
TSF150	150	$f_0 \pm 5\%$		N	210×80×60	1.8
TSF200	200	$f_0 \pm 5\%$		N	250×98×60	2.7
TSF250	250					
TSF300	300	$f_0 \pm 5\%$	1.5,2,2.5,3,3.5,4	N	A:305×98×60	3.5
					B:330×140×130	7.2
TSF400	400	$f_0 \pm 5\%$		N	A:305×98×60	3.5
					B:330×140×130	7.2
TSF500	500	$f_0 \pm 5\%$		N	420×140×130	9.3
TSF800	800	$f_0 \pm 5\%$		N,L29,IF45	485×260×141	17.5
TSF1000	1000					
TSF2000	2000	$f_0 \pm 5\%$		L29,IF45	610×195×580	30
TSF3000	3000	$f_0 \pm 5\%$		L29,L36	840×240×900	68
TSF5000	5000	$f_0 \pm 5\%$		L29,L36	870×330×910	110
TSF10000	10000	$f_0 \pm 5\%$		L36,L52	870×330×910	110
TSF50000	50000	$f_0 \pm 5\%$	3	IF110	1528×560×785	150

Note:

- * Frequency range optional and narrow band
- ** Connector type and VSWR according to customer's demand, accuracy $\pm 5\%$
- *** Custom designs with higher accuracy and frequency are available.
- **** Dimensions tolerance $\pm 2\%$
- ***** Dimensions and specifications refer to connector type N unless otherwise specified.

Mismatch Terminations (2 W-50 kW, f0±5% GHz)

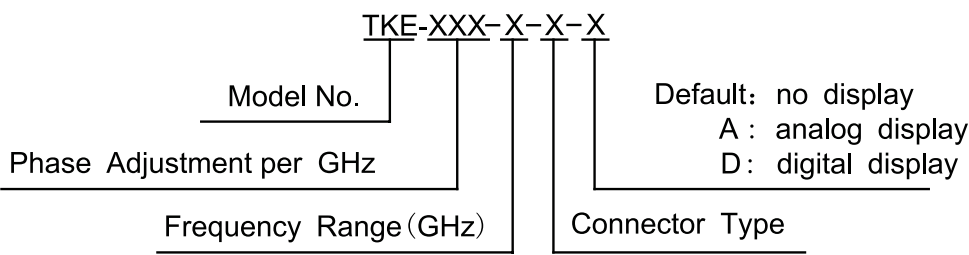
Model Number	Average Power (W)	Frequency Range (GHz)	VSWR	Connector Type
TSF xx	2-50000	f0±5%	1.5,2,2.5,3,3.5,4,4.5,5	N,SMA,BNC,TNC
WTSF xx	50-300	0.03-2.2	(1.10-6) ±7%	N, SMA, 7/16
GTSF100	100	0.85-0.96, 1.92-2.17	(1.2-5) ±0.5	N
BPSSF	40,100	0.85-0.96, 14-14.5	1.5,2,2.5,3,3.5,4	N, SMA
BPSGTSF	100	0.85-0.96, 1.92-2.17	1.2-5	N

Low PIM Terminations (100 W-200 W, 0.8-3 GHz)

Model Number	Average Power (W)	Peak Power (kW)	Frequency Range (GHz)	MAX VSWR	Connector Type
LIM-TF2-A	2	0.5	DC-3	1.15	N
LIM-TF5	5	0.5	DC-3	1.15	N
LIM-TFE10	10	1	DC-3	1.20	N
LIM-TFE25	25	1	DC-3	1.20	N
LIM-TFE50	50	1	DC-3	1.10	N
LIM-TF100	100	10	DC-3	1.20	N
LIMTF300-A	300	1	DC-3	1.35	N
TF25-LIM-0830-DIN	25	—	0.8-3	1.20	7/16
TF50-LIM-DIN	50	—	0.8-3	1.20	7/16
TF100-LIM-DIN	100	—	0.8-3	1.20	7/16
TF200-LIM-DIN	200	—	0.8-3	1.20	7/16
TF100-LIM-0830-DIN	100	—	0.8-3	1.20	7/16
TF200-LIM-0830-DIN	200	—	0.8-3	1.20	7/16

Phase Shifters

Phase shifters are used to continuously transform the delay the signal and adjust phase of measure system in RF transmission system and in phase-controlled antenna array radar.



Example: TKE-45-6-S refers to TKE phase shifter with frequency range DC-6 GHz and phase adjustment 45° per GHz, connector type SMA and no display.



Model number: BPS-H
Impedance: 50Ω
Average power: 10 W
Peak power (5us): 500 W
Temperature range:
Operation: -10°C ~ +50°C
Non-operation: -40°C ~ +70°C

Model Number	Frequency Range(GHz)	Max VSWR	Insertion Loss(dB)	Phase Adjustment	Connector Type	Dimensions (mm)	Weight (g)
BPS-H-15-6-N	DC-6	≤1.50	≤1.25	0-90°	N(J,K)	64×28×22	105
BPS-H-15-6-S					SMA(K,K)	43×29×10	25
BPS-H-15-6-P					(Lead)	28×29×10	20

Directional Couplers

Single Directional Couplers

Single directional couplers are used to supervise and control a transmitter's output power and output spectrum. They are also taken as a power meter together with detector or level indicator.

DTO serial products feature compact small size, light, low loss of mainline transmission, excellent flatness in frequency response of coupling value, high power capacity, stable performance and high reliability.



Impedance: 50

Temperature Range:

Operating: -20°C ~ +60°C

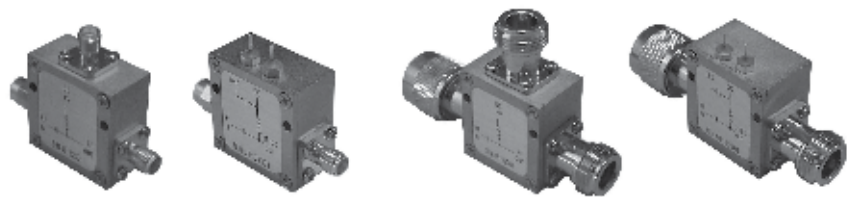
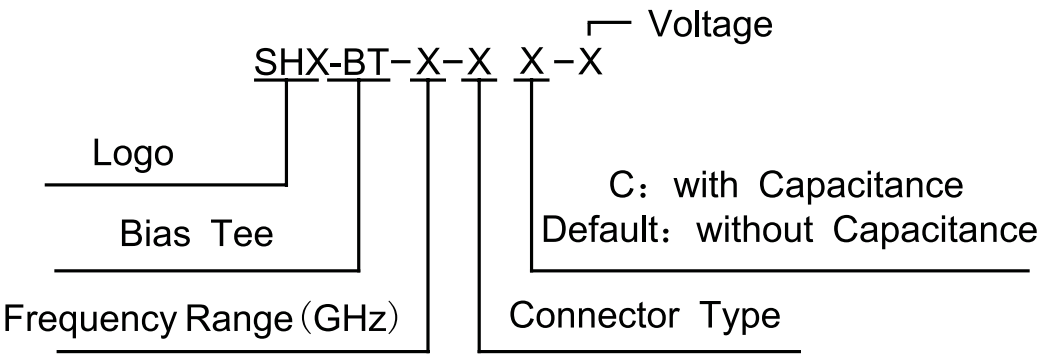
Non-operating: -40°C ~ + 70°C



Model Number	Frequency Range(GHz)	Coupling Value(dB)	Directivity (dB)	VSWR	Insertion Loss(dB)	Input Power(W)	Connector Type	Dimensions (mm)	Weight (Kg)
DTO-100/400-10	0.1-0.4	10±1	≥20	≤1.20	≤0.8	100	N(F)	256×50×25	0.5
DTO-0-20	0.1-0.4	20	≥22	≤1.20	≤0.4	400	N	360×56×27	2.5
DTO-0-24	0.1-0.4	24±1.5	≥20	≤1.20	≤0.5	100	SMA	155×57×27	0.5
DTO-0-30A	0.1-0.4	30	≥20	≤1.20	≤0.4	400	N	360×56×27	2.5
DTO-0-10B	0.1-0.8	10~13.5(0.1-0.15G)	≥20	≤1.25	≤1.2	150	N(F,F)	260×26×80	1.1
		10±1.5(0.15-0.8G)							
DTO-0-30C	0.1-0.8	26.5~31(0.1-0.4G)	≥20	≤1.20	≤0.4	400	N	360×60×26	1.0
		30±1(0.4-0.8G)							
DTO-0-30	0.2-0.3	30±0.8	≥20	≤1.15	≤0.3	500	N(F,F)	226×66×20	0.58
DT0-0-10	0.225-0.4	10±2	≥20	≤1.20	≤0.8	300	N(F,F)	162×44×20	0.28
DTO-0-30B	0.3-0.5	30	≥20	≤1.15	≤0.4	300	N	310×55×26	0.82
DTO-300/2400-10H	0.3-2.4	10±1.6	≥15	≤1.40	≤1.2	100	N(F)	129×50×26	0.2
DTO-300/2400-40H	0.3-2.4	40±1.8	≥15	≤1.30	≤0.5	150	N(F)	129×50×26	0.2
DTO-0.6/3.9-10S	0.6-3.9	10±1.5	≥18	≤1.20	≤1.0	100	SMA(F)	97×34×12	0.15
DTO-0.6/3.9-20S	0.6-3.9	20±1.5	≥18	≤1.20	≤0.8	100	SMA(F)	97×34×12	0.15
DTO-0.6/3.9-30S	0.6-3.9	30±1.5	≥18	≤1.20	≤0.5	100	SMA(F)	97×34×12	0.15
DTO-2-10A	0.8-2.2	10±1	≥20	≤1.12	≤0.8	200	N	130×52×27	0.38
DTO-0.8/3.5-20-A	0.8-3.5	20±1.7	≥20	≤1.25	≤0.4	50	SMA(F,F)	94×44×18	0.145
DTO-3-20-ZD0704	2-4	20±2	≥20	≤1.25	≤0.4	10	SMA(F)	48×24×10	0.035
DTO-3-50-ZD0704	2-4	50±2	≥20	≤1.25	≤0.4	10	SMA(F,F)	48×26×10	0.035
DTO-4.6-10	4.6±1MHz	10±0.3	≥15	≤1.20	≤0.9	50	SMA(F),N(F)	69×50×16	0.14
DTO-4.6-20	4.6±1MHz	20±0.3	≥20	≤1.20	≤0.9	50	SMA(F),N(F)	69×50×16	0.14
DTO-12/18-6	12-18	6±1	≥10	≤1.50	≤2.5	20	SMA	55×29×10.7	0.06

The SHX Bias Tee series provides both DC bias current and RF signal via bias network. The features include small size, light and flat frequency response, it is used in microwave measurement area such as amplifier, programmable attenuation and switch circuit, etc.

Order Information



Model Number	RF Power (W)	Frequency Range(GHz)	VSWR	Insertion Loss(dB)	Interface	Bias Voltage	Bias Current	Dimensions (mm)	Weight (g)
SHX-BT-3-S	≤5	0.01-3	≤1.20	≤1.0	RF IN SMA(J) RF+DC OUT SMA(K) DC IN SMA(K)	12V 24V 32V 48V 72V	100mA 100mA 100mA 500mA 1A	52×39.5×15.5	45
SHX-BT-4.2-S		0.01-4.2	≤1.25	≤1.25					
SHX-BT-3-SC		0.01-3	≤1.20	≤1.0	RF IN SMA(J) RF+DC OUT SMA(K) DC IN (Capacitance)			52×38×15.5	40
SHX-BT-4.2-SC		0.01-4.2	≤1.25	≤1.25					
SHX-BT-3-N		0.01-3	≤1.20	≤1.0	RF IN N(J) RF+DC OUT N(K) DC IN N(K)			74×50×20	95
SHX-BT-4.2-N		0.01-4.2	≤1.25	≤1.25					
SHX-BT-3-NC		0.01-3	≤1.20	≤1.0	RF IN N(J) RF+DC OUT N(K) DC IN (Capacitance)			74×40×20	90
SHX-BT-4.2-NC		0.01-4.2	≤1.25	≤1.25					

Note:
* Dimensions tolerance ±2%
** Dimensions and specifications refer to connector type N unless otherwise specified.
*** Custom designs available.

Power Dividers/Combiners

SHX Dividers/Combiners are mainly used in feed networks in antenna arrays, mixers and balanced amplifiers. They finish the work of distributing, combining and measuring power, isolating signal sources and measuring swept reflected coefficient.

Model Number: SHX-GF2-2-18
Impedance: 50Ω
Connector Type: SMA (F, F), SMA (M, F)
Temperature Range: -55°C ~ +100°C



Model Number	Frequency Range(GHz)	Average Power(W)	Insertion Loss(dB)	Max VSWR	Max Amplitude Balance Between J2 & J3(dB)	Dimensions (mm)	Weight (g)
SHX-GF2-2-18	DC-4	1	6±0.2	1.25	0.2	SMA(F,F):40×20×32 SMA(M,F):40×20×35	85
	4-10		6±0.4	1.25	0.4		
	10-18		6 +1.25 -0.5	1.35	0.4		

Model Number: SHX-GF2-2-18N
Impedance: 50Ω
Connector Type: N (F, F), N (M, F)
Temperature Range: -55°C ~ +100°C



Model Number	Frequency Range(GHz)	Average Power(W)	Insertion Loss(dB)	Max VSWR	Max Amplitude Balance Between J2 & J3(dB)	Dimensions (mm)	Weight (g)
SHX-GF2-2-18N	DC-4	1	6±0.2	1.25	0.2	43.5×20×41	120
	4-10		6±0.4	1.35	0.4		
	10-18		6 +1.5 -0.5	1.40	0.4		

Model Number: SHX-GF2
Impedance: 50Ω, 75Ω,
Connector Type: N, SMA, BNC
Temperature Range:
Operation: -10°C ~ +50°C
Non-operation: -40°C ~ +70°C



Model Number	Frequency Range(GHz)	Average Power(W)	Insertion Loss(dB)	Max VSWR	Dimensions (mm)	Weight (g)
SHX-GF2-2	DC-2.5	2	6±0.75	≤1.3	64×51×20	120
SHX-GF2-5	DC-1.5	5	6±0.5	≤1.25	64×51×20	120
SHX-GF2-10	DC-1	10	6±0.5	≤1.2	74×58×20	160

* Dimensions tolerance ±2%
** Dimensions and specifications refer to connector type N unless otherwise specified.
*** Custom designs available.

Circulators/Isolators

Circulators and Isolators permit flow of microwave energy in one direction only. Isolators make energy from input to output, and circulators control energy transfer follow one certain loop. The result is that each class and system of microwave equipment is independent and isolated.



Model Number	Frequency Range(GHz)	Band Width(MHz)	Insertion Loss(dB)	Isolation (dB)	VSWR	Average Power(W)	Dimensions (mm)	Connector Type
SHX-TH0301A	0.3-0.4	30	0.3	25	≤1.20	150	52×58×22	SMA,N
SHX-TH0401A	0.4-0.6	30	0.3	25	≤1.20	150	44×50×21	SMA,N
SHX-TH0701	0.4-0.6	10	0.3	23	≤1.20	150	35×38×20	SMA,N
	0.6-1.0	30						
SHX-TH101	0.8-1.2	70	0.3	23	≤1.20	60	30×33×20	SMA,N
		200	0.5	20	≤1.25			
SHX-TH101-S	0.8-1.2	70	0.3	23	≤1.20	60	30×33×15	SMA
		200	0.5	20	≤1.25			
SHX-TH101A	1.2-2.5	70	0.3	23	≤1.20	60	25.4×28.5×20	SMA,N
		200	0.4	20	≤1.25			
SHX-TH101F	0.95-2.0	70	0.3	23	≤1.20	20	25×25×15	SMA
	1.0-2.0	200	0.4	20	≤1.25			
SHX-TH201J	1-2	1000	0.7	14	≤1.45	30	70×80×21	SMA,N
SHX-TH201	1.8-3	200	0.3	23	≤1.20	20	28×30×19	SMA,N
		400	0.4	20	≤1.20			
SHX-TH201B1	1.5-2.5	70	0.3	23	≤1.20	30	20×25.4×15	SMA
SHX-TH201F	2-3.5	200	0.3	23	≤1.20	20	25×25×15	SMA
		400	0.4	20	≤1.20			
SHX-TH301A	2-4	2000	0.6	18	≤1.40	30	32×34×15	SMA,N
SHX-TH401A	3.5-6.5	300	0.3	23	≤1.20	20	16×21×14	SMA
		600	0.4	20	≤1.20			
SHX-TH401D	3.5-6.5	300	0.3	23	≤1.20	20	20×24×18	SMA,N
		600	0.4	20	≤1.20			
SHX-TH501S	5-7	300	0.6	50	≤1.20	10	30×21×14	SMA
SHX-TH601K	4-8	4000	0.6	18	≤1.20	20	20×26×14	SMA
SHX-TH701A	6.5-18	300	0.3	23	≤1.20	10	15×19×13	SMA
		1000	0.4	20	≤1.20			
	8-12	4000	0.5	20	≤1.25	30		
	12-18	6000	0.6	17	≤1.40			

* Dimensions tolerance ±2%

** Dimensions and specifications refer to connector type N unless otherwise specified.

*** Custom designs available.

DC blocks prevent DC current flow, while permitting RF power to flow, thus isolating DC power from signal sources and measure instruments with broadband performance and low insertion loss.

Model Number: GZL - 2.92
Impedance: 50Ω
Temperature Range: -55°C ~ +100°C

Model Number	Frequency Range(GHz)	Insertion Loss(dB)	VSWR	DC Voltage(V)	Connector Type	Dimensions (mm)	Weight (g)
GZL-2.92	0.1-18	≤0.5	≤1.30	50	2.92mm	9×29	15
	18-32	≤0.75	≤1.40				
	32-40	≤1.20	≤1.55				



Model Number: DB-GZL
Impedance: 50Ω
Temperature Range: -45°C ~ +55°C

Model Number	Frequency Range(MHz)	Insertion Loss(dB)	VSWR	DC Voltage(V)	Connector Type	Dimensions (mm)	Weight (Kg)
SHX-DB-GZL-N-XX	80-3000	≤1.15	<0.25	3000V	N(J,K)	38×78.5	0.2
	3000-6000	≤1.25	<0.35				



Model Number: GZL
Impedance: 50Ω
Temperature Range: -55°C ~ +100°C

Model Number	Frequency Range(GHz)	Insertion Loss(dB)	VSWR	DC Voltage(V)	Connector Type	Dimensions (mm)	Weight (g)
GZL	0.1-4	≤0.2	≤1.15	100 250 500	N(J)-N(K)	20×60	65
	4-8	≤0.4	≤1.30				
	8-12.4	≤0.5	≤1.35				
	12.4-18	≤0.8	≤1.40				



Model Number: GZL-SMA
Impedance: 50Ω
Temperature Range: -55°C ~ +100°C

Model Number	Frequency Range(GHz)	Insertion Loss(dB)	VSWR	DC Voltage(V)	Connector Type	Dimensions (mm)	Weight (g)
GZL-SMA-100	0.13-8	≤0.3	<1.20	50 100	SMA	10×30	10
	8-18	≤0.5	<1.30				
	18-26.5	≤0.6	<1.50				
GZL-SMA-250	0.1-4	≤0.2	<1.20	50 250	SMA	11×40	15
	4-8	≤0.4	<1.30				
	8-12.4	≤0.5	<1.40				
	12.4-18	≤0.8	<1.45				



Model Number: BLK
Impedance: 50Ω
Temperature Range: -55°C ~ +100°C

Model Number	Frequency Range(GHz)	Insertion Loss(dB)	VSWR	DC Voltage (V)	Connector Type	Dimensions (mm)	Weight (g)
BLK	0.01-2	≤0.2	<1.20	72	N(J)-N(K)	A:65×20×18	A:65
	2-4	≤0.3	<1.30		SMA(J)-SMA(K)	B:40×20×18	B:25
	4-6	≤0.5	<1.40				



*Dimensions tolerance ±2%

**Dimensions and specifications refer to connector type N unless otherwise specified.

***Custom designs available.

In-series Adapters

Model Number: 2.4 (M,F)

Impedance: 50Ω

Temperature Range: -55°C ~ +125°C

Model Number	Frequency Range(GHz)	Max VSWR	Insertion Loss(dB)	Dimensions (mm)	Weight (g)
2.4(F)-2.4(F)	DC-50	1.15	0.3	9×16.8	5
2.4(F)-2.4(M)	DC-50	1.15	0.3	9×18.3	
2.4 (M) -2.4 (M)	DC-50	1.15	0.3	7.7×20	



Model Number: 2.4 - 2.92(M,F)

Impedance: 50Ω

Temperature Range: -55°C ~ +125°C

Model Number	Frequency Range(GHz)	Max VSWR	Insertion Loss(dB)	Dimensions (mm)	Weight (g)
2.4(F)-2.92(F)	DC-40	1.15	0.3	9×20	5
2.4(F)-2.92(M)	DC-40	1.15	0.3	9×19	
2.4 (M) -2.92 (M)	DC-40	1.15	0.3	7×20.5	



Model Number: 2.92(M,F)

Impedance: 50Ω

Temperature Range: -55°C ~ +125°C

Model Number	Frequency Range(GHz)	Max VSWR	Insertion Loss(dB)	Dimensions (mm)	Weight (g)
2.92(F)-2.92(F)	DC-40	1.2	0.3	8×19.4	10~20
2.92(F)-2.92(M)	DC-40	1.15	0.3	9.3×20.7	
2.92 (M) -2.92 (M)	DC-40	1.15	0.3	9.3×22	



Model Number: 3.5 (M,F)

Impedance: 50Ω

Temperature Range: -55°C ~ +125°C

Model Number	Frequency Range(GHz)	Max VSWR	Insertion Loss(dB)	Dimensions (mm)	Weight (g)
3.5(F)-3.5(F)	DC-33	1.18	0.3	8.6×19.4	10~20
3.5(F)-3.5(M)	DC-33	1.18	0.3	9.3×20.7	
3.5(M)-3.5(M)	DC-33	1.18	0.3	9.3×22	



Model Number: SMA (M,F)

Impedance: 50Ω

Temperature Range: -55°C ~ +125°C

Model Number	Frequency Range(GHz)	Max VSWR	Insertion Loss(dB)	Dimensions (mm)	Weight (g)
SMA(F)-SMA(F)	DC-18	1.15	0.3	6.7×22.2	10~20
SMA(F)-SMA(M)	DC-18	1.15	0.3	9.3×18	
SMA(M)-SMA(M)	DC-18	1.15	0.3	9.3×22	



Model Number: N (M,F)

Impedance: 50Ω

Temperature Range: -55°C ~ +125°C

Model Number	Frequency Range(GHz)	Max VSWR	Insertion Loss(dB)	Dimensions (mm)	Weight (g)
N(F)-N(F)	DC-18	1.20	0.3	18.5×36.8	35~50
N(F)-N(M)	DC-18	1.20	0.3	20×39.9	
N(M)-N(M)	DC-18	1.20	0.3	20×40.5	



Variable/Programmable Attenuators

- DC-26.5 GHz, 2-300 W, 0-127 dB
- Wide Choice of Attenuation & Frequency Ranges & Step Sizes
- Stable Attenuation Accuracy
- High reliability & Long Switch Life
- TTLCMOS Interface and Driver Circuitry Available
- Custom Designs Available



Continuous Variable Attenuators (1 W-300 W, DC-4 GHz)

Model Number	Average Power (W)	Frequency Range (GHz)	Attenuation Range (dB)	MAX VSWR	Insertion Loss (dB)	Connector Type
GKTS50	50	0.9-4	0-10	1.5	≤1.0	N
GKTS75	75	0.9-4	0-15	1.5	≤1.0	N
GKTS100	100	0.9-10.5	0-20	1.6	≤1.5	N
GKTS300	300	0.9-10.5	0-25	1.6	≤1.5	N
GKTS2-50-4-E	2	0.5-4	0-20	1.5	≤0.5	N (F, F)
GKTS-C	1	DC-2.5	0-16	1.5	—	N, SMA
KTS-5	5	DC-2	10-60dB (1 GHz) 10-50dB (1-2 GHz)	1.5	≤10	N, SMA

Pushbutton Step Attenuators

Model Number	Average Power (W)	Frequency Range (GHz)	Attenuation Range (dB)	MAX VSWR	Insertion Loss (dB)	Connector Type
GKTSxx-1-20-3-B	2,5,10	DC-3	0-20/20	1.30	≤0.75	N, SMA
GKTSxx-2-30-3-B	2,5,10	DC-3	0-30/10	1.40	≤2.0	N, SMA
GKTSxx-4-10-3-B	2,5,10	DC-3	0-10/1	1.40-1.50	≤2.5	N, SMA
GKTSxx-5-20-3-B	2,5,10	DC-3	0-20/1	1.40-1.50	≤3.0	N, SMA
GKTSxx-5-30-3-B	2,5,10	DC-3	0-30/1	1.40-1.50	≤3.0	N, SMA
GKTSxx-6-40-3-B	2,5,10	DC-3	0-40/1	1.40-1.50	≤3.0	N, SMA
GKTSxx-8-10-3-B	2,5,10	DC-3	0-10/0.1	1.40-1.50	≤1.8	N, SMA
GKTSxx-8-60-3-B	2,5,10	DC-3	0-60/1	1.40-1.50	≤3.5	N, SMA, BNC, F
GKTSxx-8-70-3-B	2,5,10	DC-3	0-70/1	1.40-1.50	≤3.5	N, SMA
GKTSxx-8-90-3-B	2,5,10	DC-3	0-90/1	1.40-1.50	≤3.5	N, SMA
GKTS25-5-30-3-B	25	DC-3	0-23/1 0-30/1	1.30-1.60	≤7.0	N

Rotary Step Attenuator (2 W, DC-18 GHz)

Model Number	Average Power (W)	Frequency Range (GHz)	Attenuation Range (dB)	MAX VSWR	Insertion Loss (dB)	Connector Type
GKTSX-1-1-6-A1	2,10	DC-6	0-1/0.1	1.20-1.40	≤1.0	SMA, N
GKTSX-1-10-6-A1	2,10	DC-6	0-10/1	1.20-1.40	≤1.0	SMA, N
GKTSX-1-60-6-A1	2,10	DC-6	0-60/10	1.20-1.40	≤1.0	SMA, N
GKTSX-1-90-3-A1	2,10	DC-3	0-90/10	1.20-1.40	≤0.5	SMA, N
GKTSX-2-11-6-A2	2,10	DC-6	0-11/0.1	1.30-1.60	≤1.8	SMA, N
GKTSX-2-50-2.5-A2	2,10	DC-2.5	0-50/1	1.35	≤1.0	SMA, N
GKTSX-2-70-6-A2	2,10	DC-6	0-70/1	1.30-1.60	≤1.8	SMA, N
GKTSX-2-100-3-A2	2,10	DC-3	0-100/1	1.30-1.45	≤1.2	SMA, N
GKTSX-1-9-18-A5	2,10	DC-18	0-9/1	1.40-1.60	≤1.2	SMA (F, F)
GKTSX-1-90-18-A5	2,10	DC-18	0-90/10	1.40-1.60	≤1.5	SMA (F, F)
GKTSX-2-69-18-A6	2,10	DC-18	0-69/1	1.50-1.75	≤1.5	SMA (F, F)
GKTSX-2-99-18-A6	2,10	DC-18	0-99/1	1.50-1.75	≤1.5	SMA (F, F)
GKTSX-2-69-18-A7	2,10	DC-18	0-70/1	1.50-1.75	≤1.75	N (M, F)
GKTSX-2-99-18-A7	2,10	DC-18	0-99/1	1.50-1.75	≤1.75	N(M, F)
GKTSX-1-9-26.5-A7	2,10	DC-26.5	0-9/1	1.70	≤1.8	2.92 mm (F, F) 3.5 mm (F, F)
GKTSX-1-70-26.5-A7	2,10	DC-26.5	0-70/10	1.75	≤1.8	2.92 mm (F, F) 3.5 mm (F, F)
GKTSX-2-11-6-A3	2,10	DC-6	0-11/0.1	1.40-1.65	≤1.8	N (F, F)
GKTSX-2-70-6-A3	2,10	DC-6	0-70/1	1.40-1.65	≤1.8	N (F, F)
GKTSX-2-100-3-A3	2,10	DC-3	0-100/1	1.40-1.45	≤1.2	N (F, F)
GKTSX-3-71-6-A4	2,10	DC-6	0-71/0.1	1.50-1.75	≤2.5	N (F, F)
GKTSX-3-101-3-A4	2,10	DC-3	0-101/0.1	1.50-1.60	≤1.7	N (F, F)
GKTSX-2-90-4.3-A4	2,10	DC-4.3	0-90/1	1.50	≤1.5	N (F, F)
GKTSX-2-90-6-A4	2,10	DC-6	0-90/1	1.60	≤1.7	N (F, F)

Variable/Programmable Attenuators

Programmable Attenuators (0.2 W- 30 W, DC-18 GHz)

Model Number	Average Power (W)	Frequency Range (GHz)	Attenuation Range (dB)	MAX VSWR	Insertion Loss (dB)	Connector Type
SHX371 Serial	1	DC-18	11/1	≤1.75	0.6 dB+ 0.09 dB/GHz	SMA, N
	1	DC-18	70/10	≤1.75	0.6 dB+ 0.09 dB/GHz	SMA, N
	1	DC-18	90/10	≤1.75	0.6 dB+ 0.09 dB/GHz	SMA, N
	1	DC-18	110/10	≤1.75	0.6 dB+ 0.09 dB/GHz	SMA, N
SHX-GKTS-FS1/1-121-18-SMA		DC-18	121/1	≤2.0	≤7.8	SMA
GKTS-F Serial	2	DC-3	127/1	≤1.45	≤4.5	SMA (F, F)
GKTS-FD Serial	2	DC-3	127/1	≤1.45	≤4.5	SMA (F, F)
GKTS-FC Serial	2	DC-3	127/1	≤1.45	≤4.5	SMA (F, F)
GKTS-FS1/1	1,2	DC-5	127/1	≤1.50	≤10	N (K)
GKTS-FS2/2	1,2	DC-5	127/1	≤1.50	≤10	N (K)
GKTS-G Serial	2	DC-5	15/1	≤1.5	≤4	SMA (F, F)
	2	DC-5	70/10	≤1.5	≤4	SMA (F, F)
	2	DC-5	90/1	≤1.6	≤6	SMA (F, F)
GKTS-H Serial	0.2,0.5,1	0.2-6.0	110/0.25	≤2.0	≤12	SMA (F, F)
GKTSxx-4-10-1-D	2,5,10	DC-1	0-10/1	≤1.5	≤1.5	N, SMA, BNC, F
GKTSxx-4-10-3-D	2,5,10	2-3	0-10/1	≤1.5	≤2.5	N, SMA, BNC, F
GKTSxx-4-10-0.1-D	2,5,10	DC-0.1	0-10/1	≤1.5	≤0.5	N, SMA, BNC, F
GKTSxx-6-40-1-D	2,5,10	DC-1	0-40/1	≤1.5	≤3	N, SMA, BNC, F
GKTSxx-6-40-0.1-D	30	DC-0.1	0-40/1	≤1.3	≤0.75	N, SMA, BNC, F
GKTSxx-8-60-1-D	2,5,10	DC-1	0-60/1	≤1.5	≤3.6	N, SMA, BNC, F
GKTSxx-8-60-0.1-D	30	DC-0.1	0-60/1	≤1.3	≤1.0	N, SMA, BNC, F
GKTSxx-8-90-3-D	2,5,10	2-3	0-90/1	≤1.5	≤3.6	N, SMA, BNC, F
GKTSxx-8-90-0.1-D	30	DC-0.1	0-90/1	≤1.3	≤1.0	N, SMA, BNC, F
GKTS30-10-50.1-0.03-D	30	DC-0.03	50.1/0.1	≤1.3	≤0.5	N, SMA, BNC, F
GKTS10-10-50.1-0.03-D	10	DC-0.03	50.1/0.1	≤1.3	≤1.0	N, SMA, BNC, F

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