TEMPERATURE COMPENSATED, VOLTAGE CONTROLLED, ABSORPTIVE, CONTINUOUSLY VARIABLE

ATTENUATORS, PIN DIODE SERIES 1-GT-TT/TR

0.25-18 GHz

GENERAL INFORMATION: KDI/Triangle's pin diode attenuators continuously change the amplitude of a microwave signal by applying a varying D.C. voltage. A matched configuration keeps the VSWR low through all values of attenuation. Because these units are temperature compensated they maintain their attenuation accuracy vs. frequency over a greater temperature range than the non-temperature compensated units.

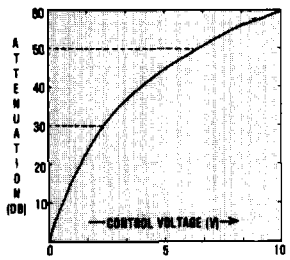
FREQUENCY RANGE: 0.25 to 18.0 GHz

RF IMPEDANCE: 50 OHMS

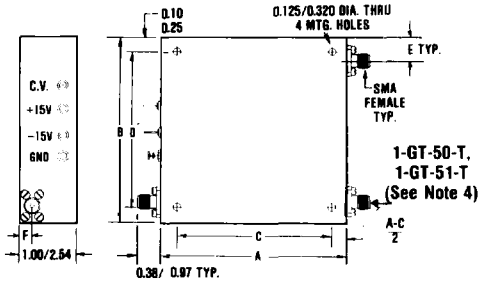
DC VOLTAGE: ±15 volts at ±50 mA max.

CONTROL VOLTAGE: 0-10 volts produces 0-32 dB for 32 dB models and 0-64 dB for 64 dB models. Other values of control voltage can be provided on request.

CONTROL INPUT IMPEDANCE: 10 K ohms, 20 pf.



Typical curve of attenuation vs. voltage for 1-GT-T, 64 dB Models.



1-GT-50-T,
1-GT-51-T
(See Note 4)

MECHANICAL OUTLINES

KEY: INCHES/CENTIMETERS XX ±.03 XXX ±.010 / XX ±.08 ±.025

Out-line	A In./cm.	B In./cm.	C In./cm.	D In./cm.	E In./cm.	F In./cm.
1	5.00/12.70	3.00/7.62	4.600/11.684	2.800/7.112	0.75/1.91	0.19/0.48
2	5.00/12.70	2.50/6.35	4.600/11.684	2.300/5.842	0.32/0.81	0.19/0.48
3	3.50/8.89	3.50/8.89	3.100/7.874	3.300/8.382	0.63/1.60	0.25/0.64
4	3.50/8.89	1.75/4.45	3.100/7.874	1.550/3.937	0.38/0.97	0.19/0.48
5	2.50/6.35	2.50/6.35	2.100/5.334	2.300/5.842	0.32/0.81	0.25/0.64
6	1.80/4.57	1.80/4.57	1.400/3.556	1.600/4.064	0.35/0.89	0.250.64
7	1.50/3.81	1.50/3.81	1.100/2.794	1.300/3.302	0.32/0.81	0.25/0.64
8	2.00/5.08	1.82/4.60	1.800/4.572	1.050/2.667	1.56/3.96	0.34/0.86

RF POWER: To prevent self biasing, the attenuator should be operated at less than 100 mW CW 60 watts peak. Units will not be damaged by application of 1 watt CW 100 watts peak.

TEMPERATURE INFORMATION: 1-GT-TT Series are compensated over the temperature range of −55°C to +85°C. 1-GT-TR Series are compensated over the temperature range of 0°C to +70°C.

SWITCHING SPEED: Standard models can be changed from any value of attenuation to any other value in 10 microsec. Units can be provided with switching speed to 200 nanosec. on request. Speed is related to max attenuation required. That is, 32 dB models are faster than 64 dB models. Insertion Loss will increase by a factor of 1.6 on higher speed models.

ENVIRONMENT: MIL-E-5400, MIL-STD-202, MIL-E-16400, MIL-STD-883 (Special request only).

CONNECTORS: SMA standard, others on request.

SERIES 1-GT-T ELECTRICAL PERFORMANCE

Model* No.	Freq. GHz	Max. VSWR	Max. Ins. Loss dB	Atten. Range Min. dB	Out-line
1-GT-10-T	0.25-0.5	1.5	0.75	32	1
1-GT-11-T	0.25-0.5	1.5	1.0	64	1
1-GT-13-T	0.50-1.0	1.5	0.75	32	2
1-GT-14-T	0.50-1.0	1.5	1.0	64	2
1-GT-16-T	0.50-2.0	1.75	1.8	32	3
1-GT-17-T	0.50-2.0	1.75	2.0	64	3
1-GT-19-T	1.0-2.0	1.5	0.8	32	4
1-GT-20-T	1.0-2.0	1.5	1.2	64	4
1-GT-22-T	1.0-4.0	1.75	2.2	32	5
1-GT-23-T	1.0-4.0	1.75	2.7	64	5
1-GT-25-T	2.0-4.0	1.5	1.3	32	4
1-GT-26-T	2.0-4.0	1.5	1.4	64	4
1-GT-28-T	2.0-8.0	1.8	2.5	32	6
1-GT-29-T	2.0-8.0	1.8	3.25	64	6
1-GT-30-T	4.0-8.0	1.75	2.5	32	6
1-GT-31-T	4.0-8.0	1.75	2.75	64	6
1-GT-32-T	4.0-12.0	1.9	2.7	32	7
1-GT-33-T	4.0-12.0	1.9	3.5	64	7
1-GT-34-T	5.0-15.0	2.0	3.0	32	7
1-GT-35-T	5.0-15.0	2.0	3.5	64	7
1-GT-37-T	6.0-18.0	2.2	3.2	32	7
1-GT-38-T	6.0-18.0	2.2	3.5	64	7
1-GT-39-T	8.0-12.4	2.0	2.5	32	7
1-GT-40-T	8.0-12.4	2.0	2.75	64	7
1-GT-41-T	8.0-18.0	2.2	2.75	32	7
1-GT-42-T	8.0-18.0	2.2	3.0	64	7
1-GT-43-T	12.0-18.0	2.0	2.75	32	7
1-GT-44-T	12.0-18.0	2.0	3.0	64	7
1-GT-50-T (4)	2.0-18.0	2.2	4.0	32	8
1-GT-51-T (4)	2.0-18.0	2.5	4.25	64	8

NOTES:

1. Harmonic Distortion: Approximately −50 dBc for $P_{in} \leq 0$ dBm at a frequency of 1.0 GHz for most units. This value improves by approximately 10 dB per octave as the frequency increases; however, since this value is dependent on bandwidth of the unit, power input, and switching speed required, the factory should be consulted if harmonic content is an important system requirement.
2. Two/Tone Intermodulation Products: Second and third order products approximately 50 dBC for $P_{in} \leq 0$ dBm (each signal) at all attenuation settings.
3. If a narrow frequency bandwidth is required, KDI/Triangle can supply a unit that is electrically optimized for that bandwidth. Mechanical dimensions will remain the same as the standard unit, and the price will generally be lower. Specify the frequency range when ordering a narrow bandwidth model, and a special part number will be assigned.
4. Add 1.5 dB to all accuracy numbers for models 1-GT-50-T and 1-GT-51-T. Two RF connectors are in line.
5. Attenuation vs. temperature only is ±0.02 dB/°C typical. (At 64dB)
6. When ordering, add suffix indicating required temperature compensation range to the model number. i.e. the 1-GT-32-T, compensated over the temperature range −55°C to +85°C, would be ordered as 1-GT-32-TT. If compensation from 0°C to +70°C is required, the model number would be 1-GT-32-TR. (See "attenuation accuracy vs frequency and temperature" tables for specifications.)
7. Monotonicity guaranteed for all models.

ATTENUATION ACCURACY vs FREQUENCY AND TEMPERATURE over the −55° C to +85° C temperature range SERIES 1-GT-TT

OCTAVE MODELS (2:1 FREQUENCY)	GREATER THAN OCTAVE MODELS
±0.75 dB to 10 dB	±1.0 dB to 10 dB
±1.2 dB to 20 dB	±1.5 dB to 20 dB
±1.5 dB to 30 dB	±2.0 dB to 30 dB
±2.0 dB to 40 dB	±2.5 dB to 40 dB
±3.0 dB to 64 dB	±4.0 dB to 64 dB
	[See note (4)]

Attenuation accuracy given above assumes 0.1% regulation of power supply voltages.

ATTENUATION ACCURACY vs FREQUENCY AND TEMPERATURE over the 0° C to +70° C temperature range SERIES 1-GT-TR

OCTAVE MODELS (2:1 FREQUENCY)	GREATER THAN OCTAVE MODELS
±0.6 dB to 10 dB	±0.8 dB to 10 dB
±1.0 dB to 20 dB	±1.5 dB to 20 dB
±1.3 dB to 30 dB	±1.7 dB to 30 dB
±1.7 dB to 40 dB	±2.2 dB to 40 dB
±2.4 dB to 64 dB	±3.5 dB to 64 dB
	[See note (4)]

Attenuation accuracy given above assumes 0.1% regulation of power supply voltages.

*Add T or R suffix (see temperature information).

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