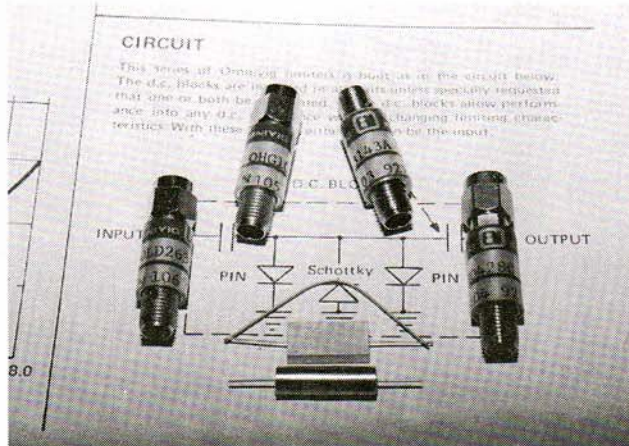


MICROWAVE LIMITERS, Schottky Turn-On Medium Power, Low R.F. Leakage



FEATURES

- LOW INSERTION LOSS
- HIGH CW POWER HANDLING
- LOW LEAKAGE
- MEDIUM HIGH PEAK POWER HANDLING
- COMPACT SIZE
- OCTAVE OR BROADBAND OPTIMIZATION AVAILABLE
- HERMETIC PACKAGE
- REDUCED SPIKE LEAKAGE OVER CONVENTIONAL PIN LIMITERS

DESCRIPTION

Omniyig's Schottky turn-on limiters are designed for octave-band performance, although their multi-octave performance is excellent. The OLD2644A is an 8.0 to 16.0 GHz unit with SMA connectors. This limiter performs quite well from 2.0 to 18.0 GHz and extremely well from 4.0 to 18.0 GHz. In the 2.0 to 4.0 GHz frequency range, this unit's insertion loss may increase slightly due to Ku-band d.c. blocks and the leakage power will rise slightly due to X-Ku-band diode spacing. The OLD2716A is a 1.0 to 2.0 GHz unit with SMA connectors. This limiter performs quite well from 0.5 to 6.0 GHz. There are models which are optimized for any octave from 0.1 to 18.0 GHz. All limiters are available with SMA connectors, or cylindrical module, or rectangular module for stripline or microstrip applications. Limiters are normally supplied with internal d.c. block, but can be supplied with one or both d.c. blocks eliminated. Limiters may be supplied with other connector options as specials.

The Omniyig Schottky turn-on limiters are optimized for low insertion loss and VSWR at ≤ 0 dBm. At and above the turn-on point (+5 to +10 dBm), these limiters operate as variable shunt R.F. impedances and are therefore reflective.

These limiters are fabricated from semiconductor chips utilizing high temperature die attach and thermocompression bonding techniques. The limiters are hermetically sealed.

APPLICATIONS

Omniyig limiters are designed to be used in a number of applications. The first and most common is to protect from burn-out during high CW power (up to 10 watts) and medium high peak power (up to 1 KW). These types of limiters have been put in front of tunnel diode amplifiers, detectors, mixers, and other sensitive microwave components or receivers.

Another application for this type of limiter is to shape frequency response of the output of microwave sources such as leveling a Gunn oscillator or transistor oscillator. This is accomplished simply by screwing on to the output. Because of the reflective nature of

SPECIALS & PERFORMANCE COMMENTS

The recovery time associated with this Series of limiter is in the range of 200 to 500 nanoseconds. The recovery time may be reduced to 50 to 100 nanoseconds by adding a discharge path speed-up resistor. By choosing the proper resistance value, this only raises the leakage power a few tenths of a dB. The speed-up resistor can also be tailored to raise the turn-on point (1 dB compression). The normal turn-on is approximately +5 to +10 dBm. This can be raised to +20 dBm or any point in between. The maximum leakage also increases.

The limiters may be used as a switch/limiter by eliminating one of the d.c. blocks and applying bias on the center conductor. This will reverse bias the Schottky diode while forward biasing the PIN diodes. Since this bias level is usually one volt across the PIN diodes, there is no danger of harming the Schottky.

These limiters operate as reflective devices. In some uses, a good match is required for proper operation. Omniyig limiters can be integrated with an isolator on one or both ports.

The second PIN diode may be eliminated to improve insertion loss. This changes the leakage curves to be similar to the conventional PIN limiters. The leakage power is 3 dB or 4 dB lower than conventional PIN limiters. The power handling is lowered. These designs can be modified and diodes selected to handle 3 dB higher power.

these limiters, they may be integrated with a ferrite to give a good source match. This integration can be implemented at Omniyig as a special, such that size can be minimized and performance optimized.

These limiters have been used on the input of traveling-wave tube amplifiers to keep the TWTA from going into overdrive when large signals are applied to the amplifier input. This same application applies in TWTA chains using one of these limiters between the amplifiers in the chain so that the input amplifier cannot overdrive the output amplifier.

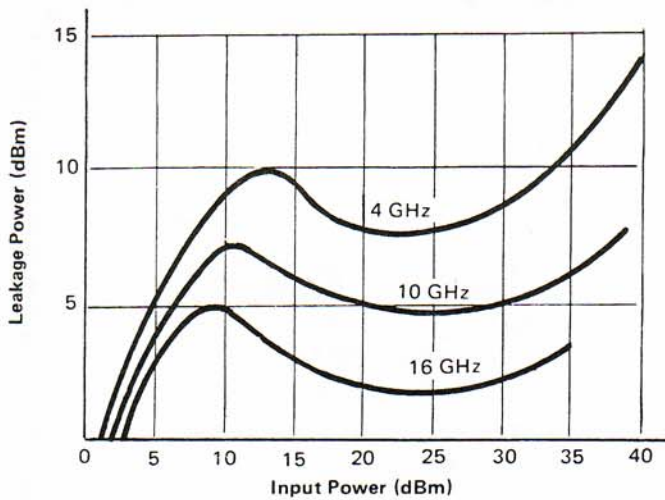
ELECTRICAL SPECIFICATIONS

	MODEL NUMBER ⁵	FREQUENCY RANGE (GHz)	MAX. INSERTION LOSS (dB) ¹	MAX. VSWR ¹ — : 1	MAX. LEAKAGE POWER (dBm) ²	MAX. CW POWER (Watts) ⁴	MAX. PEAK POWER (Watts) ^{3,4}	OUTLINE STYLE NUMBER
SMA MALE INPUT SMA FEMALE OUTPUT	OLD2801A	0.1-0.5	0.5	1.35	15	10	500	28
	OLD2802A	0.1-1.0	0.5	1.35	15	10	500	28
	OLD2808A	0.5-1.0	0.7	1.35	15	10	500	28
	OLD2809A	0.5-2.0	0.7	1.35	15	10	500	28
	OLD2816A	1.0-2.0	0.7	1.35	15	10	500	28
	OLD2817A	1.0-4.0	1.0	1.5	15	10	500	28
	OLD2725A	2.0-4.0	1.0	1.5	14	10	500	27
	OLD2762A	2.0-8.0	1.2	1.7	14	10	500	27
	OLD2731A	2.5-5.0	1.0	1.5	14	10	500	27
	OLD2733A	4.0-8.0	1.2	1.7	13	10	500	27
	OLD2635A	4.0-18.0	2.5	2.0	13	5	200	26
	OLD2737A	5.0-10.0	1.4	1.7	13	7	300	27
	OLD2641A	7.0-11.0	1.6	1.7	13	5	300	26
	OLD2643A	8.0-12.0	1.8	1.8	13	5	250	26
	OLD2644A	8.0-16.0	2.2	2.0	13	3	200	26
	OLD2645A	8.0-18.0	2.5	2.0	13	3	200	26
	OLD2649A	12.0-18.0	2.5	2.0	13	3	200	26
SMA FEMALE INPUT SMA FEMALE OUTPUT	OLD3301A	0.1-0.5	0.5	1.35	15	10	500	33
	OLD3302A	0.1-1.0	0.5	1.35	15	10	500	33
	OLD3308A	0.5-1.0	0.7	1.35	15	10	500	33
	OLD3309A	0.5-2.0	0.7	1.35	15	10	500	33
	OLD3316A	1.0-2.0	0.7	1.35	15	10	500	33
	OLD3317A	1.0-4.0	1.0	1.5	15	10	500	33
	OLD3225A	2.0-4.0	1.0	1.5	14	10	500	32
	OLD3226A	2.0-8.0	1.2	1.7	14	10	500	32
	OLD3231A	2.5-5.0	1.0	1.5	14	10	500	32
	OLD3233A	4.0-8.0	1.2	1.7	13	10	500	32
	OLD3135A	4.0-18.0	2.5	2.0	13	5	200	31
	OLD3237A	5.0-10.0	1.4	1.7	13	7	300	32
	OLD3141A	7.0-11.0	1.6	1.7	13	5	300	31
	OLD3143A	8.0-12.0	1.8	1.8	13	5	250	31
	OLD3144A	8.0-16.0	2.2	2.0	13	3	200	31
	OLD3145A	8.0-18.0	2.5	2.0	13	3	200	31
	OLD3149A	12.0-18.0	2.5	2.0	13	3	200	31
CYLINDRICAL MODULE	OLD6201K	0.1-0.5	0.5	1.35	15	10	500	62
	OLD6202K	0.1-1.0	0.5	1.35	15	10	500	62
	OLD6208K	0.5-1.0	0.7	1.35	15	10	500	62
	OLD6209K	0.5-2.0	0.7	1.35	15	10	500	62
	OLD6216K	1.0-2.0	0.7	1.35	15	10	500	62
	OLD6217K	1.0-4.0	1.0	1.5	15	10	500	62
	OLD6025K	2.0-4.0	1.0	1.5	14	10	500	60
	OLD6026K	2.0-8.0	1.2	1.7	14	10	500	60
	OLD6031K	2.5-5.0	1.0	1.5	14	10	500	60
	OLD6033K	4.0-8.0	1.2	1.7	13	10	500	60
	OLD5935K	4.0-18.0	2.5	2.0	13	5	250	59
	OLD6037K	5.0-10.0	1.4	1.7	13	7	300	60
	OLD5941K	7.0-11.0	1.6	1.7	13	5	300	59
	OLD5943K	8.0-12.0	1.8	1.8	13	5	250	59
	OLD5944K	8.0-16.0	2.2	2.0	13	3	200	59
	OLD5945K	8.0-18.0	2.5	2.0	13	3	200	59
	OLD5949K	12.0-18.0	2.5	2.0	13	3	200	59
RECTANGULAR MODULE	OLD5401K	0.1-0.5	0.5	1.35	15	10	500	54
	OLD5402K	0.1-1.0	0.5	1.35	15	10	500	54
	OLD5408K	0.5-1.0	0.7	1.35	15	10	500	54
	OLD5409K	0.5-2.0	0.7	1.35	15	10	500	54
	OLD5416K	1.0-2.0	0.7	1.35	15	10	500	54
	OLD5417K	1.0-4.0	1.0	1.5	15	10	500	54
	OLD5325K	2.0-4.0	1.0	1.5	14	10	500	53
	OLD5326K	2.0-8.0	1.2	1.7	14	10	500	53
	OLD5331K	2.5-5.0	1.0	1.5	14	10	500	53
	OLD5333K	4.0-8.0	1.2	1.7	13	10	500	53
	OLD5235K	4.0-18.0	2.5	2.0	13	5	200	52
	OLD5337K	5.0-10.0	1.4	1.7	13	7	300	53
	OLD5241K	7.0-11.0	1.6	1.7	13	5	250	52
	OLD5243K	8.0-12.0	1.8	1.8	13	5	200	52
	OLD5244K	8.0-16.0	2.2	2.0	13	3	200	52
	OLD5245K	8.0-18.0	2.5	2.0	13	3	200	52
	OLD5249K	12.0-18.0	2.5	2.0	13	3	200	52

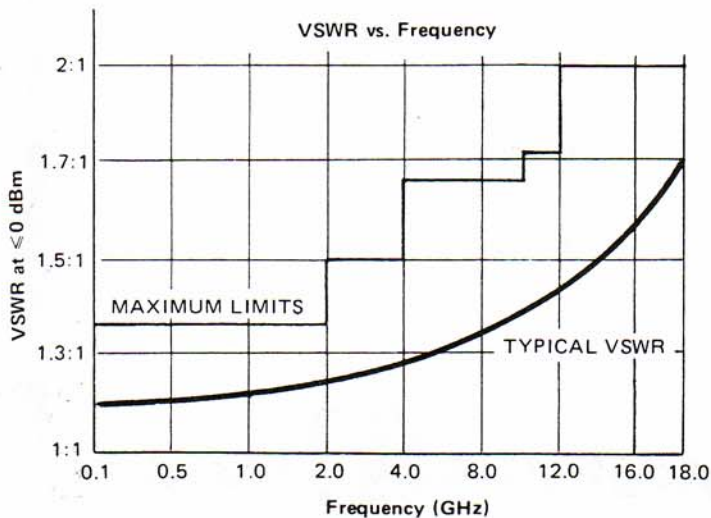
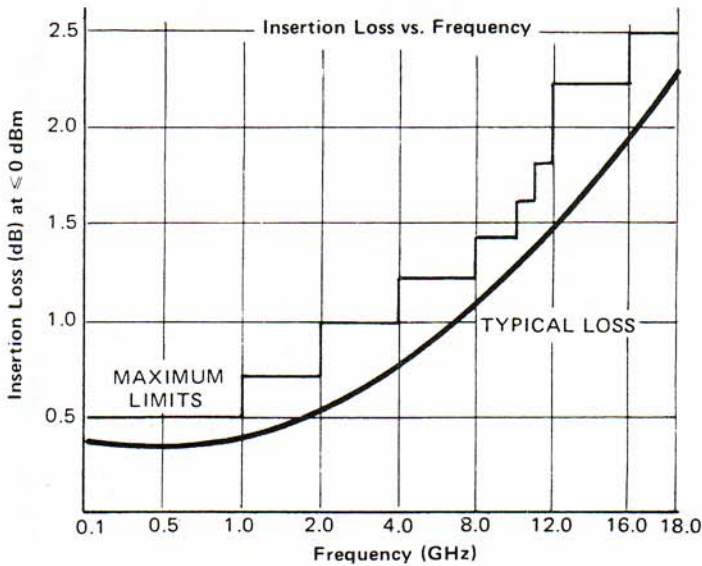
NOTES:
 1. Measured at 0 dBm input power.
 2. Measured at 1 watt input power.
 3. 1 μ sec. pulse width, 1 kHz PRF.

4. These ratings are at 25°C. See derating table for other temps.
 5. Add suffix "N" for units without D.C. blocks.

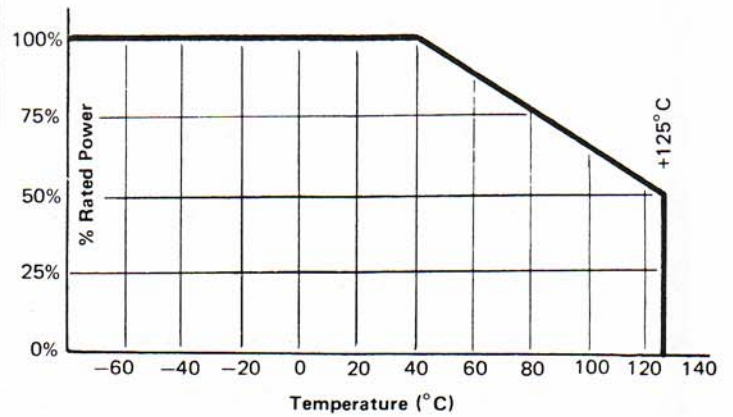
TYPICAL PERFORMANCE CURVES



TYPICAL POWER-IN VS. POWER OUT CHARACTERISTICS OF X/Ku-BAND SCHOTTKY TURN-ON LIMITER.



DERATING CURVE FOR RATED POWER (Peak and C.W.)

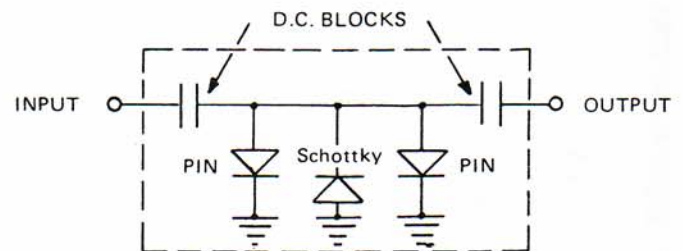


ENVIRONMENTAL

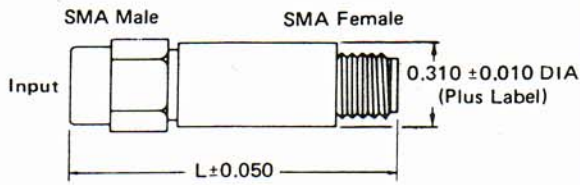
Parameter	MIL-STD-883	CONDITION
Temperature Range Storage	1008C	-65°C to +150°C
Operating (see derating curve)	1008C	-65°C to +125°C
Temperature Cycling	1010C	5 cycles, -65°C to +125°C
Thermal Shock	1011A	5 cycles, 0 to +100°C
Moisture Resistance	1004	10 days, 90 to 98% R.H.
Shock (Mechanical)	2002A	5 blows, X, Y, Z @ 50 G's
Vibration Variable Frequency	2007A	4, 4-min. cycles x, y, z @ 20 G's peak, 100 to 2,000 Hz
Constant Acceleration	2001A	X ₁ , Y ₁ , Z ₂ 500 G's

CIRCUIT

This series of Omniyig limiters is built as in the circuit below. The d.c. blocks are included in all units unless specially requested that one or both be eliminated. These d.c. blocks allow performance into any d.c. impedance without changing limiting characteristics. With these limiters, either end can be the input.

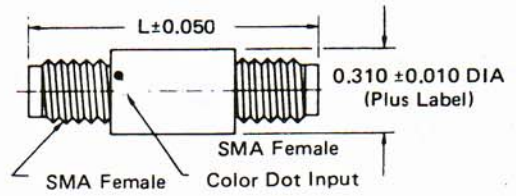


OUTLINES



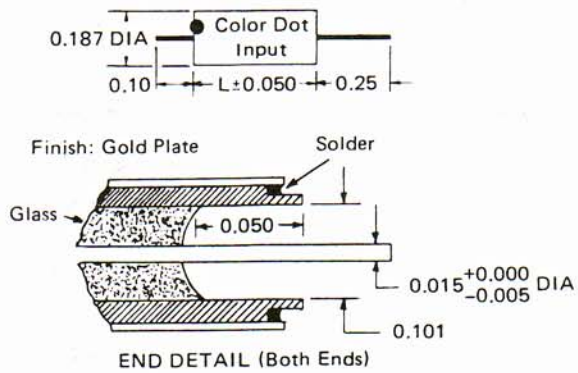
Finish: Gold Plate or Passivate Stainless Steel.

STYLE	L±0.050
25	1.10
26	1.20
27	1.30
28	1.45



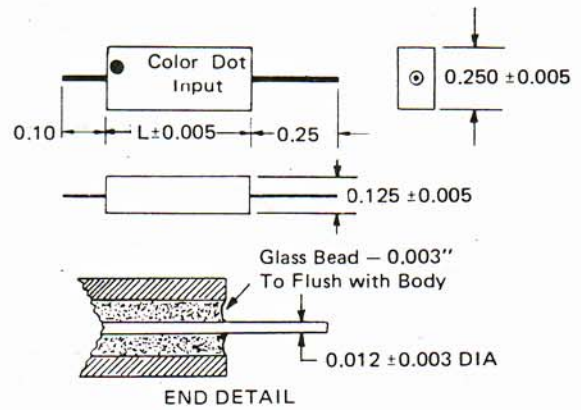
Finish: Gold Plate or Passivate Stainless Steel.

STYLE	L±0.050
30	1.05
31	1.15
32	1.25
33	1.45



Finish: Gold Plate

STYLE	L±0.005
58	0.430
59	0.530
60	0.650
62	0.800



Finish: Gold Plate

STYLE	L±0.005
52	0.330
53	0.530
54	0.750
55	1.000