

LC1502

5.0 TO 1500 MHz TO-8 LIMITER

Typical Values	LC1502
Voltage Variable Limiting Level	-13 to 0 dB
Low Insertion Loss	<2.0 dB
Balanced Circuit:	
High Even Order Suppression	>50 dB at +10 dBm Input
Fast Recovery Time	< 50 ns
High Performance Thin Film	
Standard Size TO-8 Package	

SPECIFICATIONS*

Parameter	Typical	Guaranteed	
		0 to 50 °C	-55 to +85 °C
Frequency (Min.)	5-1600 MHz	5-1500 MHz	5-1500 MHz
Frequency Variation	<0.1 dB/100 MHz	0.2 dB/100 MHz	0.3 dB/100 MHz
Insertion Loss	To 1000 MHz	1.9 dB	2.5 dB
	To 1500 MHz	2.7 dB	3.5 dB
Input SWR (Max.) (P _{IN} <+20 dBm)	To 1000 MHz	1.4:1	1.8:1
	To 1500 MHz	1.6:1	2.0:1
Output SWR (Max.) (P _{IN} <-10 dBm)	To 1000 MHz	1.4:1	1.8:1
	To 1500 MHz	1.6:1	2.0:1
Flatness vs. Freq. (Max) (P _{IN} <+20 dBm)	To 500 MHz	<±0.1 dB	<±0.3 dB
	To 1000 MHz	<±0.2 dB	<±0.5 dB
	To 1500 MHz	<±0.5 dB	<±1.1 dB
Bias Current (Max.)	+20 Vdc	9.5 mA	11.5 mA
	+15 Vdc	7.0 mA	9.0 mA
	+10 Vdc	4.7 mA	6.0 mA
	+5 Vdc	2.2 mA	3.5 mA

LIMITING AND INSERTION LOSS CHARACTERISTICS (25 °C)								
Bias Voltage	Output level at Limiting Threshold (1 dB Compression)		Maximum Output Limiting Level (+20 dBm Input)		Insertion Loss (500 MHz)		Insertion Loss (1000 MHz)	
	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.
+20 volts	-2.0 dBm	0.0 dBm	+2.0 dBm	+3.0 dBm	1.7 dB	2.0 dB	1.8 dB	2.2 dB
+15 volts	-2.5 dBm	-1.0 dBm	+1.0 dBm	+2.0 dBm	1.9 dB	2.2 dB	2.0 dB	2.4 dB
+10 volts	-4.0 dBm	-3.0 dBm	-1.0 dBm	0.0 dBm	2.3 dB	2.8 dB	2.5 dB	3.0 dB
+ 5 volts	-9.0 dBm	—	-7.0 dBm	—	3.1 dB	—	3.3 dB	—

* Measured in a 50-ohm system at +15 Vdc bias unless otherwise specified.

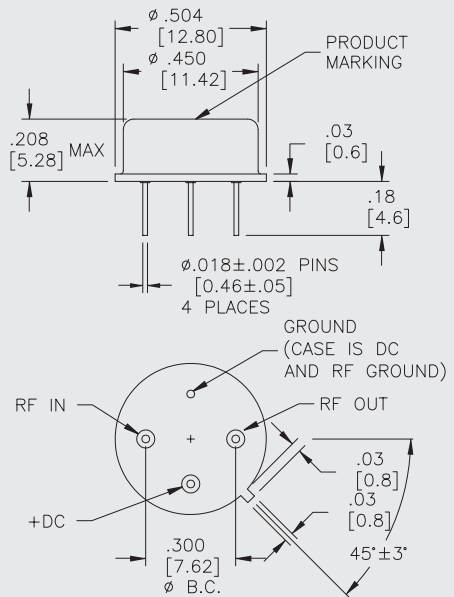
ABSOLUTE MAXIMUM RATINGS

Ambient Operation Temperature	-55°C to 110°C
Storage Temperature	-62° to 150 °C
Maximum Case Temperature	125 °C
Maximum DC Voltage	+25 Volts
Maximum Continuous RF Input Power	200 Milliwatts
Maximum Peak Power (3 μsec Max.)	1 Watt
Burn-in Temperature	125°C
Thermal Resistance ¹ (θ _{jc})	2.1 °C/Watt
Junction Temperature Rise Above Case (T _{jc})	0.2 °C

¹ Thermal resistance is based on total power dissipation.

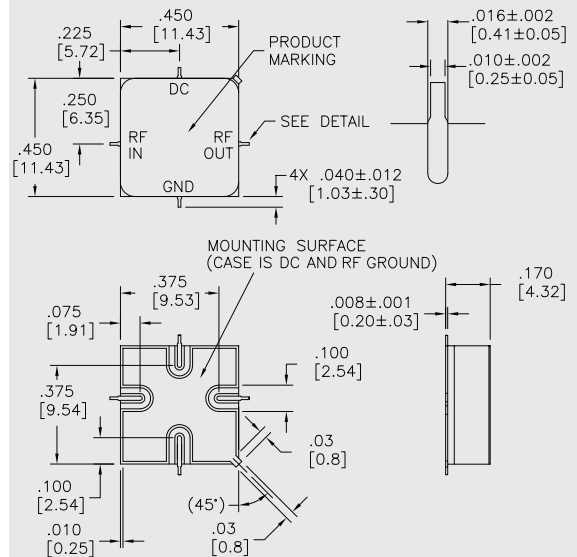
LC1502

TO-8 Package for Limiters



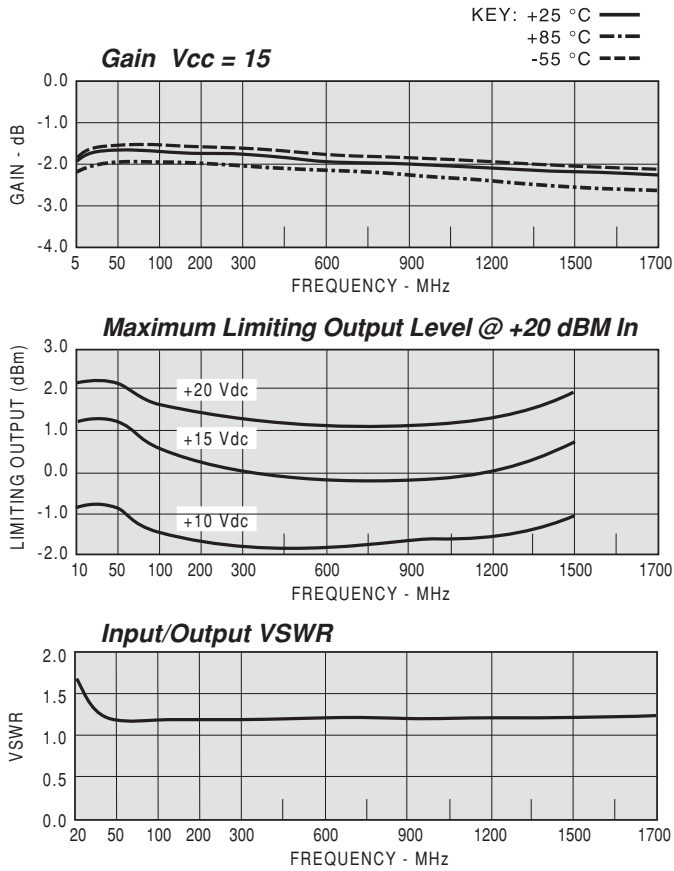
LS1502

SMT0-8 Package for Limiters



DIMENSIONS ARE IN INCHES [MILLIMETERS]

TYPICAL PERFORMANCE



TYPICAL AUTOMATIC TEST DATA

Model: LC1502		Vcc=+15V					Icc=8.02	
FREQ	SWR	SWR	GAIN	PHASE	DELAY	REV/ISO	REV/ISO	
MHZ	IN	OUT	DB	DEG	NSEC	DB	DB	
5	1.68	1.68	-1.93	15		-1.90	-1.90	
50	1.17	1.17	-1.64	-2		-1.60	-1.60	
100	1.16	1.16	-1.66	-7	0.25	-1.70	-1.70	
200	1.17	1.17	-1.70	-14	0.21	-1.70	-1.70	
300	1.17	1.17	-1.74	-22	0.20	-1.70	-1.70	
400	1.17	1.18	-1.80	-29	0.20	-1.80	-1.80	
500	1.16	1.18	-1.87	-36	0.20	-1.90	-1.90	
600	1.16	1.18	-1.93	-43	0.19	-1.90	-1.90	
700	1.16	1.18	-1.94	-49	0.19	-1.90	-1.90	
800	1.15	1.18	-1.95	-56	0.19	-1.90	-1.90	
900	1.15	1.18	-1.96	-63	0.19	-2.00	-2.00	
1000	1.14	1.18	-1.97	-71	0.20	-2.00	-2.00	
1100	1.13	1.18	-1.99	-78	0.20	-2.00	-2.00	
1200	1.13	1.18	-2.02	-85	0.20	-2.00	-2.00	
1300	1.13	1.18	-2.05	-92	0.20	-2.00	-2.00	
1400	1.13	1.19	-2.10	-99	0.19	-2.10	-2.10	
1500	1.14	1.2	-2.13	-107	0.20	-2.10	-2.10	
1600	1.15	1.2	-2.18	-114	0.20	-2.20	-2.20	
1700	1.16	1.21	-2.19	-121	0.21	-2.20	-2.20	

Model: LC1502		LINEAR S-PARAMETERS								Icc=8.02	
FREQ.		S11		S21		S12		S22		REV/ISO	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	DB
5	0.25	-59.1	0.80	15.3	0.800	15.2	0.08	0.25	0.08	-59.3	-18.5
50	0.08	-18.3	0.83	-2.2	0.828	-2.2	0.08	-18.5	0.08	-18.5	-12.5
100	0.08	-12.7	0.83	-6.7	0.826	-6.7	0.08	-12.5	0.08	-12.5	-13.7
200	0.08	-13.7	0.82	-14.3	0.822	-14.3	0.08	-13.7	0.08	-13.7	-19.2
300	0.08	-18.7	0.82	-21.6	0.818	-21.6	0.08	-18.7	0.08	-18.7	-26.1
400	0.08	-24.5	0.81	-28.8	0.812	-28.8	0.08	-24.5	0.08	-24.5	-35.3
500	0.08	-33.3	0.81	-35.8	0.806	-35.8	0.08	-33.3	0.08	-33.3	-47.2
600	0.08	-42.2	0.80	-42.6	0.800	-42.6	0.08	-42.2	0.08	-42.2	-59.4
700	0.07	-51.2	0.80	-49.4	0.799	-49.4	0.08	-51.2	0.08	-51.2	-68.5
800	0.07	-64.1	0.80	-56.3	0.800	-56.3	0.08	-64.1	0.08	-64.1	-79.7
900	0.07	-76.7	0.80	-63.3	0.799	-63.3	0.08	-76.7	0.08	-76.7	-89.7
1000	0.06	-88.6	0.80	-70.5	0.797	-70.5	0.08	-88.6	0.08	-88.6	-100.8
1100	0.06	-104.2	0.79	-77.7	0.794	-77.7	0.08	-104.2	0.08	-104.2	-111.4
1200	0.06	-119.4	0.79	-84.8	0.793	-84.9	0.08	-119.4	0.08	-119.4	-122.7
1300	0.06	-132.0	0.79	-92.2	0.790	-92.2	0.08	-132.0	0.08	-132.0	-133.3
1400	0.06	-148.7	0.78	-99.2	0.786	-99.3	0.09	-148.7	0.09	-148.7	-144.0
1500	0.07	-163.0	0.78	-106.6	0.782	-106.7	0.09	-163.0	0.09	-163.0	-154.7
1600	0.07	-176.2	0.78	-113.8	0.778	-113.8	0.09	-176.2	0.09	-176.2	-164.2
1700	0.07	-170.6	0.78	-121.2	0.776	-121.2	0.09	-170.6	0.09	-170.6	

Model: LC1502		Vcc=+12V					Icc=6.37	
FREQ	SWR	SWR	GAIN	PHASE	DELAY	REV/ISO	REV/ISO	
MHZ	IN	OUT	DB	DEG	NSEC	DB	DB	
5	1.68	1.68	-2.07	15		-2.10	-2.10	
50	1.20	1.2	-1.79	-2		-1.80	-1.80	
100	1.20	1.2	-1.81	-7	0.25	-1.80	-1.80	
200	1.20	1.2	-1.85	-14	0.21	-1.80	-1.80	
300	1.20	1.21	-1.89	-22	0.20	-1.90	-1.90	
400	1.20	1.21	-1.95	-29	0.20	-2.00	-2.00	
500	1.20	1.21	-2.01	-36	0.20	-2.00	-2.00	
600	1.20	1.22	-2.07	-43	0.19	-2.10	-2.10	
700	1.19	1.22	-2.09	-49	0.19	-2.10	-2.10	
800	1.18	1.21	-2.09	-56	0.19	-2.10	-2.10	
900	1.18	1.21	-2.11	-63	0.20	-2.10	-2.10	
1000	1.17	1.21	-2.11	-71	0.20	-2.10	-2.10	
1100	1.16	1.21	-2.14	-78	0.20	-2.10	-2.10	
1200	1.16	1.21	-2.17	-85	0.20	-2.20	-2.20	
1300	1.15	1.21	-2.20	-92	0.21	-2.20	-2.20	
1400	1.15	1.22	-2.26	-99	0.20	-2.20	-2.20	
1500	1.16	1.22	-2.28	-107	0.21	-2.30	-2.30	
1600	1.16	1.23	-2.34	-114	0.20	-2.30	-2.30	
1700	1.17	1.23	-2.35	-121	0.20	-2.40	-2.40	

Model: LC1502		LINEAR S-PARAMETERS								Icc=6.37	
FREQ		S11		S21		S12		S22		REV/ISO	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	DB
5	0.26	-56.1	0.79	15.0	0.788	15	0.25	-56.1	0.25	-56.1	-15.9
50	0.09	-15.8	0.81	-2.2	0.813	-2.2	0.09	-15.8	0.09	-15.8	-11.6
100	0.09	-11.6	0.81	-6.6	0.811	-6.7	0.09	-11.6	0.09	-11.6	-14.0
200	0.09	-13.4	0.81	-14.3	0.808	-14.3	0.09	-13.4	0.09	-13.4	-19.5
300	0.09	-18.9	0.80	-21.6	0.804	-21.6	0.09	-18.9	0.09	-18.9	-26.7
400	0.09	-25.2	0.80	-28.8	0.799	-28.8	0.10	-25.2	0.10	-25.2	-35.3
500	0.09	-33.6	0.79	-35.8	0.793	-35.8	0.10	-33.6	0.10	-33.6	-46.0
600	0.09	-41.8	0.79	-42.7	0.787	-42.6	0.10	-41.8	0.10	-41.8	-57.6
700	0.09	-50.9	0.79	-49.4	0.786	-49.4	0.10	-50.9	0.10	-50.9	-68.8
800	0.08	-63.1	0.79	-56.3	0.786	-56.4	0.10	-63.1	0.10	-63.1	-77.3
900	0.08	-74.5	0.78	-63.4	0.785	-63.4	0.09	-74.5	0.09	-74.5	-86.5
1000	0.08	-85.3	0.78	-70.6	0.784	-70.6	0.09	-85.3	0.09	-85.3	-96.9
1100	0.07	-99.4	0.78	-77.7	0.781	-77.7	0.09	-99.4	0.09	-99.4	-107.4
1200	0.07	-113.3	0.78	-84.9	0.780	-84.9	0.10	-113.3	0.10	-113.3	-118.3
1300	0.07	-125.0	0.78	-92.3	0.776	-92.3	0.10	-125.0	0.10	-125.0	-128.5
1400	0.07	-140.6	0.77	-99.3	0.773	-99.4	0.10	-140.6	0.10	-140.6	-138.8
1500	0.07	-154.4	0.77	-106.7	0.769	-106.7	0.10	-154.4	0.10	-154.4	-149.2
1600	0.08	-167.8	0.76	-113.9	0.765	-113.9	0.10	-167.8	0.10	-167.8	-158.6
1700	0.08	-178.3	0.76	-121.2	0.763	-121.3	0.10	-178.3	0.10	-178.3	