Limiter

RLM-33+

50Ω Broadband 30 to 3000 MHz

The Big Deal

- Wide Frequency range 30 to 3000 MHz
- Excellent limiting beyond +12 dBm input power
- Very quick recovery time, 10 nsec
- Low insertion loss, 0.23 dB

CASE STYLE: TT1224

Product Overview

The RLM-33+ is packaged in a miniature size (0.25 X 0.3 in.) and protects against ESD and input power surges over a frequency range 30 to 3000 MHz. Construction is on a micro strip low loss dielectric material and cased into Mini-Circuits high volume, low cost “R” package for cost efficiencies.

The RLM-33+ limiter provides excellent protection of low noise amplifiers in hostile environments where unwanted signals prevail such as in manufacturing sites, train tunnels, etc.

Key Features

Feature	Advantages
Limiting abilities from +12 to +30 dBm	Protects against strong undesired signals and prevents burn out of amplifiers
Frequency coverage 30 to 3000 MHz	Protects against many different types of unwanted signals including ESD
Surface mount package, miniature size	Allows convenient placement in amplifiers incorporating this protective device
Low insertion loss and VSWR	Provides minimal degradation to amplifier performance, especially for low noise amplifiers where input loss is critical
Low Cost	A practical solution to incorporate into amplifier design with a minimal affect on cost

+12 to +30 dBm

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Generic photo used for illustration purposes only

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+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Input Power	2W

Permanent damage may occur if any of these limits are exceeded.

Pin Connections

INPUT	1
OUTPUT	4
GROUND	2,3,5,6

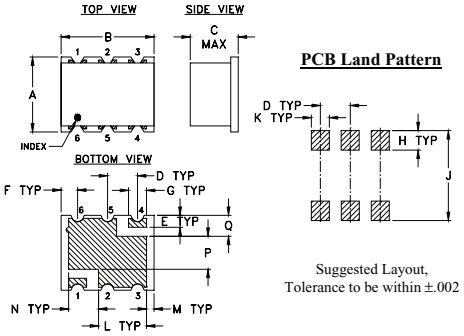
Features

- wideband, 30 to 3000 MHz
- low insertion loss 0.23 dB typ.
- fast recovery time, 10nsec typ.
- excellent VSWR 1.05:1 typ.
- low output power, 11.5 dBm typ.

Applications

- military, hi-rel applications
- stabilizing generator outputs
- reducing amplitude variations
- protects low noise amplifiers and other devices from ESD or input power damage

Outline Drawing



Outline Dimensions (inch / mm)

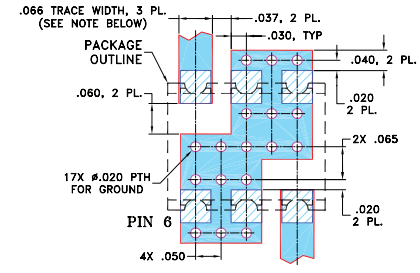
A	B	C	D	E	F	G	H
.25	.31	.16	.100	.040	.055	.060	.065
6.35	7.87	4.06	2.54	1.02	1.40	1.52	1.65

J	K	L	M	N	P	Q	wt.
.300	.060	.160	.025	.100	.110	.070	grams
7.62	1.52	4.06	0.64	2.54	2.79	1.78	0.16

Electrical Specifications

Parameter	Condition	Min.	Typ.	Max.	Units
Frequency Range		30		3000	MHz
Linear Range					
Max Input Power	less than 1 dB compression	—	—	5	dBm
Insertion Loss	less than +5 dBm input power	—	0.23	0.7	dB
VSWR	less than +5 dBm input power	—	1.05	1.5	:1
Limiting Range					
Input Power	>1dB compression filtered signal frequency	+12	—	+30	dBm
Output Power		—	+11.5	—	dBm
Δ Output/ Δ 1dB Input	Input Power Range (dBm)				
	12 to 20	—	0.2	—	dB/dB
	20 to 25	—	0.2	—	
	25 to 30	—	0.2	—	
Recovery Time	1 watt pulse 50 µsec pw 1kHz duty cycle recovery to within 90% of final value.	—	10	—	nsec
Response Time	-30 to +30 dBm input 50 µsec PW 1 kHz duty cycle	—	2	—	nsec

Demo Board MCL P/N: TB-393
Suggested PCB Layout (PL-258)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Typical Performance Data

Freq. (MHz)	I. Loss (dB) in Linear Range at -10 dBm	VSWR (:1) in Linear Range at -10 dBm	Power Output (dBm) +12 dBm Input	Power Output (dBm) +20 dBm Input	Power Output (dBm) +25 dBm Input	Power Output (dBm) +30 dBm Input	Δ Output / Δ 1dB Input +12 to +20 dBm Input	Δ Output / Δ 1dB Input +20 to +25 dBm Input	Δ Output / Δ 1dB Input +25 to +30 dBm Input
30.00	0.08	1.23	9.81	11.21	11.80	12.41	0.18	0.12	0.12
50.00	0.06	1.13	9.72	10.92	11.45	11.53	0.15	0.11	0.02
70.00	0.06	1.09	9.66	10.82	11.28	11.54	0.15	0.09	0.05
90.00	0.06	1.07	9.75	10.90	11.29	11.98	0.14	0.08	0.14
100.00	0.06	1.06	9.78	10.86	11.26	12.01	0.14	0.08	0.15
1000.00	0.22	1.05	8.36	9.48	12.01	13.78	0.14	0.51	0.35
1200.00	0.23	1.06	8.00	9.52	12.66	13.22	0.19	0.63	0.11
1600.00	0.29	1.07	7.31	10.59	12.37	11.29	0.41	0.36	-0.22
2000.00	0.32	1.07	6.62	11.44	9.71	10.77	0.60	-0.35	0.21
2200.00	0.34	1.08	6.48	10.73	8.92	11.37	0.53	-0.36	0.49
2400.00	0.39	1.11	6.66	9.78	8.08	11.49	0.39	-0.34	0.68
2600.00	0.40	1.12	7.16	8.65	7.30	11.64	0.19	-0.27	0.87
2800.00	0.41	1.13	7.57	7.25	6.87	11.76	-0.04	-0.08	0.98
3000.00	0.43	1.13	7.51	5.62	6.94	12.05	-0.24	0.26	1.02

Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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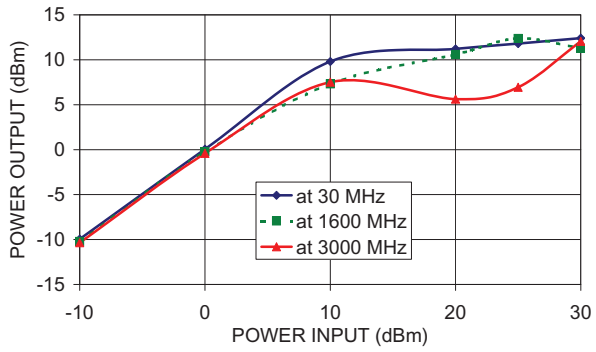
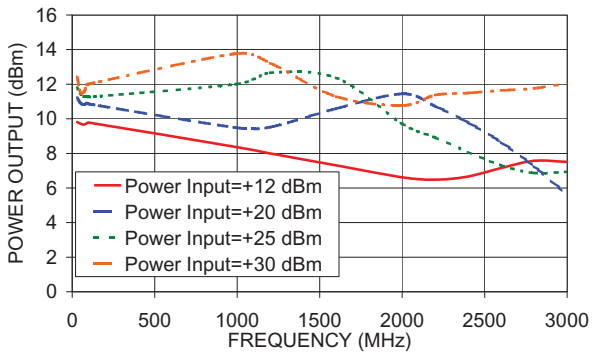
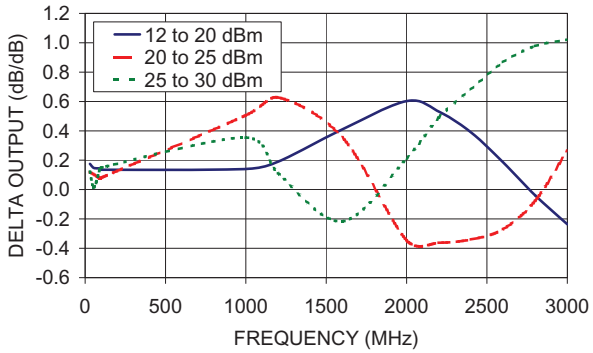
RLM-33+
POWER OUTPUT vs. POWER INPUT



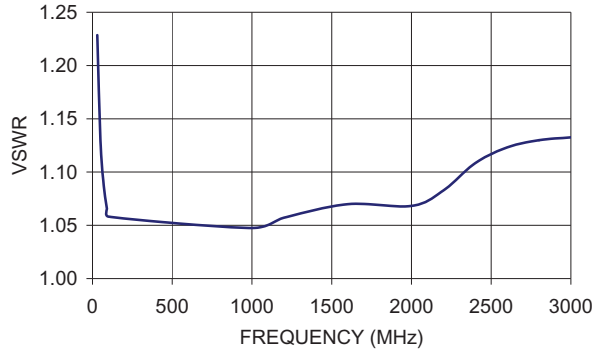
RLM-33+
POWER OUTPUT vs. FREQUENCY



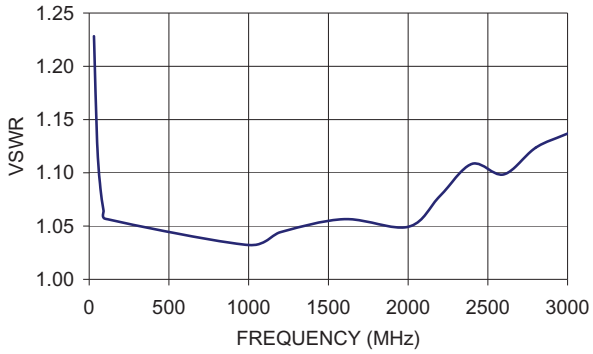
RLM-33+
DELTA OUTPUT/DELTA 1dB INPUT



RLM-33+
INPUT VSWR IN LINEAR RANGE



RLM-33+
OUTPUT VSWR IN LINEAR RANGE



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