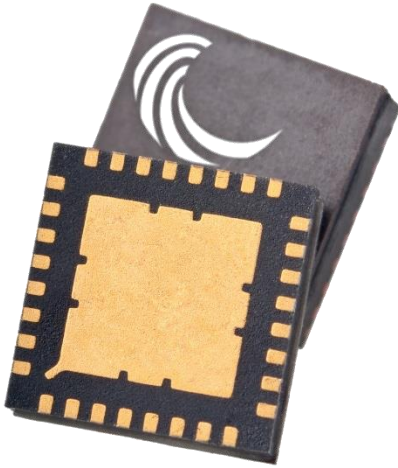


Linwave QFN 2-18 GHz Limiter LNA

LW48-700135



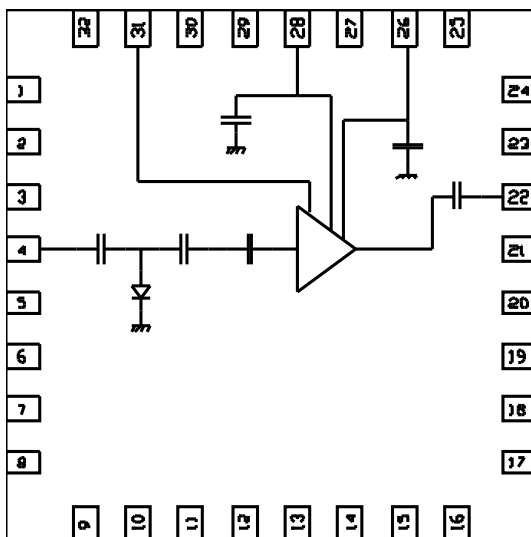
Features:

- 2-18GHz Passive, high isolation limiter
- Nominal Gain 17dB
- Noise Figure < 4.5dB, typically <3dB
- Typical Return Loss > 10dB
- TOIP typically +28dBm
- Input Power CW Survivability >5W
- Adjustable gain with Vg2
- Integrated DC Blocks on both input and output
- QFN dimensions 5.0 x 5.0 x 1.25 mm, 32 lead

Typical Application:

- Radar Warning Receiver front end
- ECM
- Phased Array Systems

Functional Diagram



Linwave reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance.

General Description:

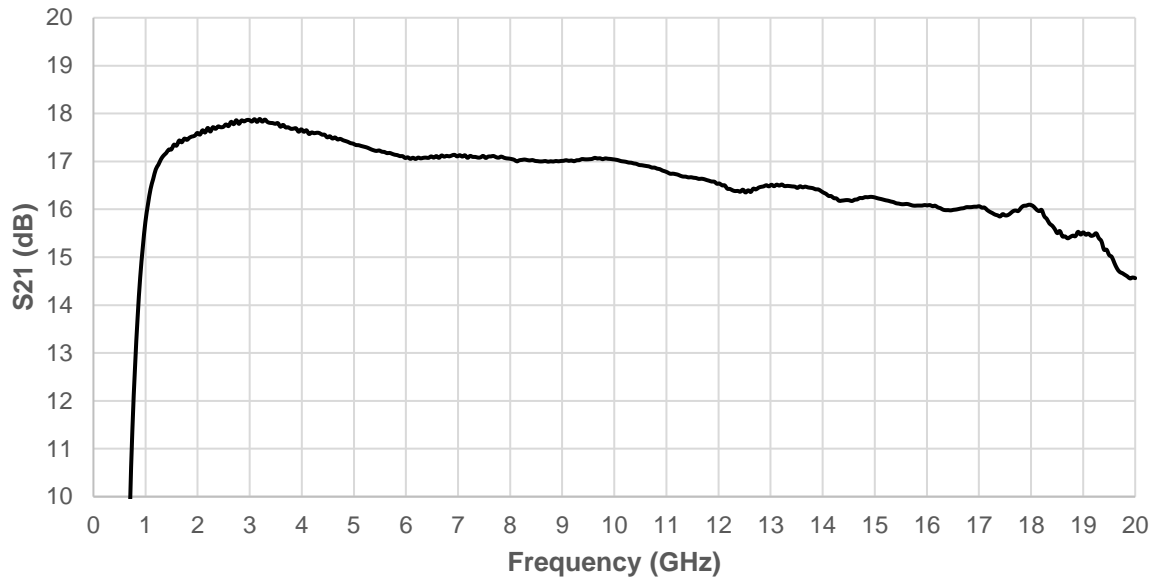
The LW48-700135 is a wideband two stage limiter and integrated LNA packaged in a leadless 5x5 mm surface mount package which operates between 2 and 18 GHz. The module provides typical gain of 17dB and return loss of >10dB.

The LW48-700135 limiter LNA input and output are internally matched to 50 Ohms and are internally DC blocked.

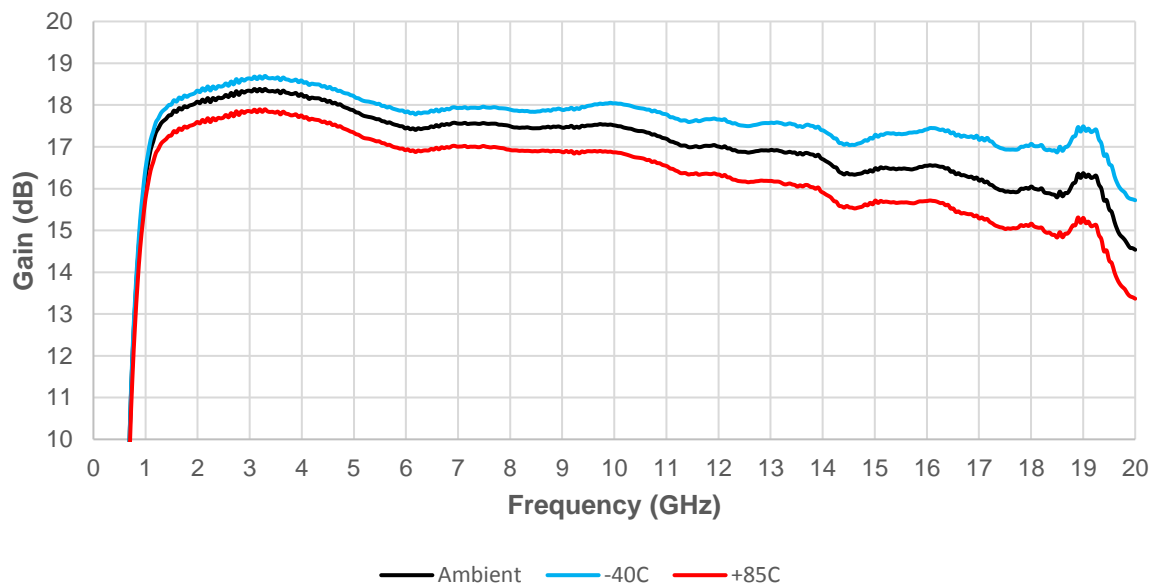
Data sheet Iss 03, dated 16/08/17 DS00-700135-03, No. 2992

For price, delivery and to place orders please contact
 Linwave Technology Ltd, Marlin Building, Sadler Road, Lincoln, LN6 3RS
 Company Reg No 4478971 (England)
 Phone:+44 (0) 1522 681811 Fax:+44 (0) 1522 681911
 Email enquiries@linwave.co.uk Website www.linwave.co.uk
 © 2015 Linwave Technology

S21



Gain Over Temperature

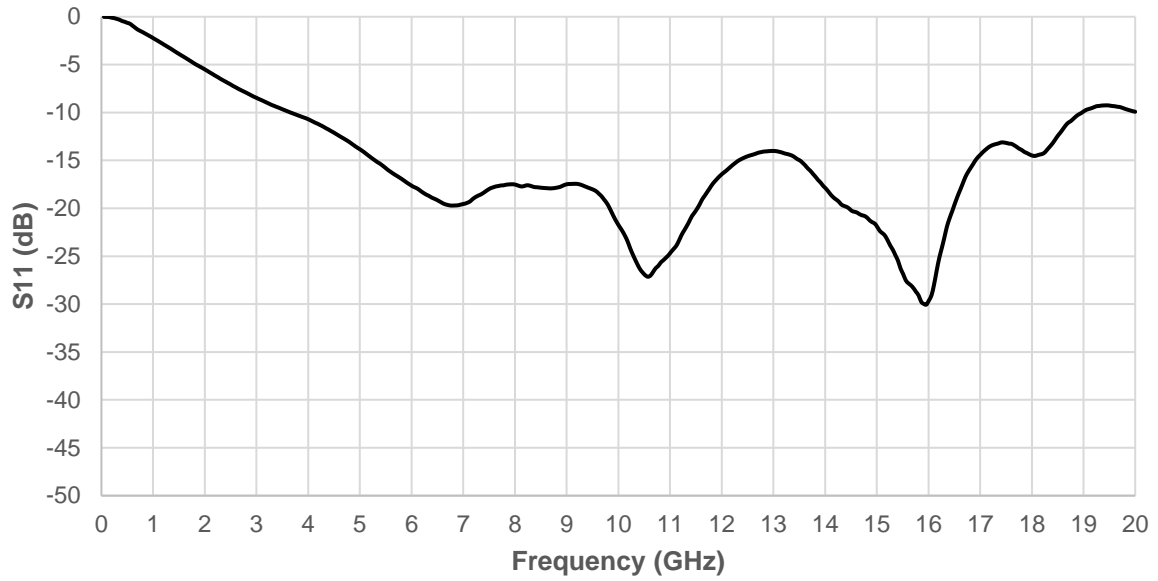


Linwave reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance.

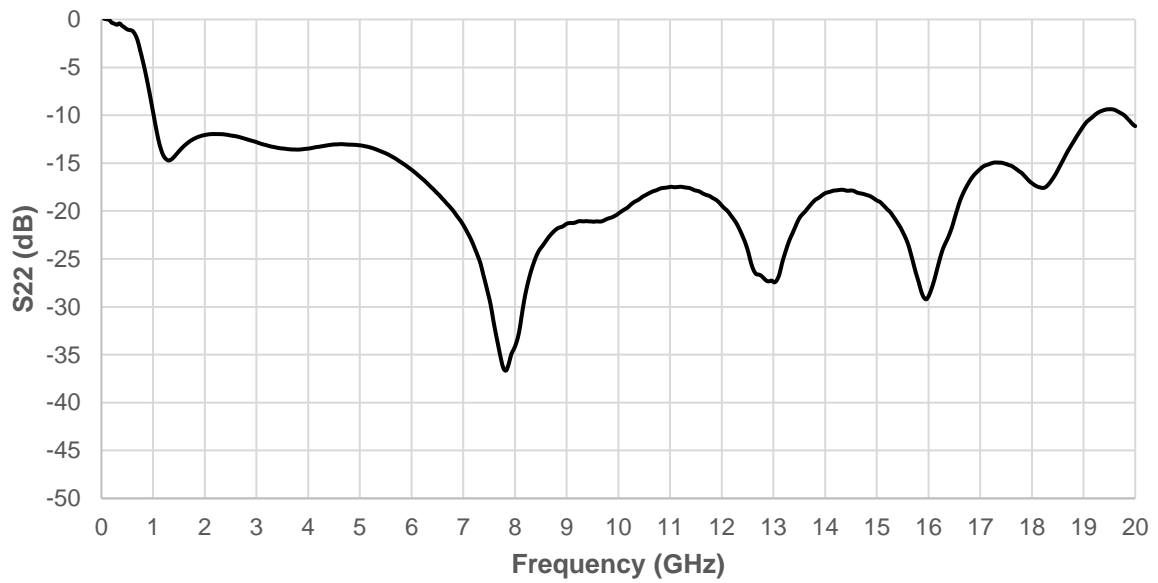
Data sheet Iss 03, dated 16/08/17 DS00-700135-03, No. 2992

For price, delivery and to place orders please contact
Linwave Technology Ltd, Marlin Building, Sadler Road, Lincoln, LN6 3RS
Company Reg No 4478971 (England)
Phone:+44 (0) 1522 681811 Fax:+44 (0) 1522 681911
Email enquiries@linwave.co.uk Website www.linwave.co.uk
© 2015 Linwave Technology

S11



S22

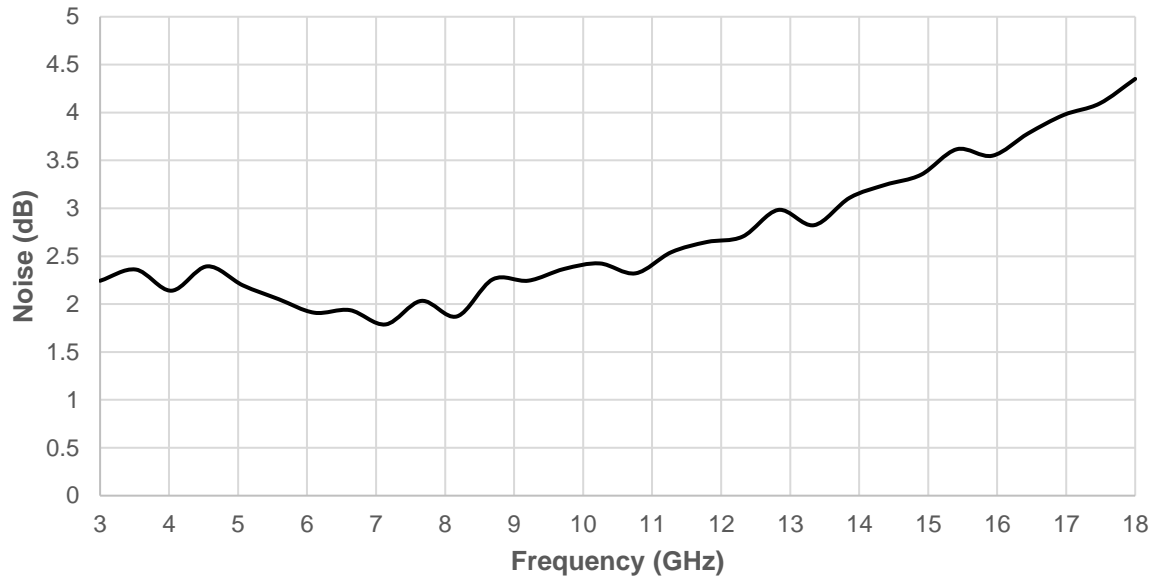


Linwave reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance.

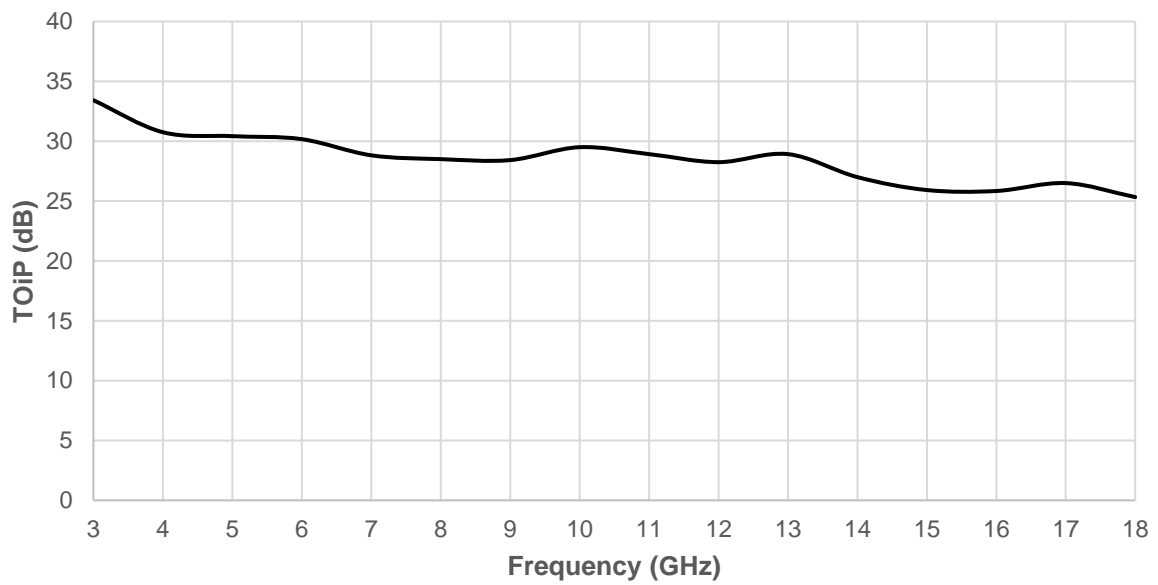
Data sheet Iss 03, dated 16/08/17 DS00-700135-03, No. 2992

For price, delivery and to place orders please contact
Linwave Technology Ltd, Marlin Building, Sadler Road, Lincoln, LN6 3RS
Company Reg No 4478971 (England)
Phone:+44 (0) 1522 681811 Fax:+44 (0) 1522 681911
Email enquiries@linwave.co.uk Website www.linwave.co.uk
© 2015 Linwave Technology

Noise Figure



TOiP



Linwave reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance.

Data sheet Iss 03, dated 16/08/17 DS00-700135-03, No. 2992

For price, delivery and to place orders please contact
Linwave Technology Ltd, Marlin Building, Sadler Road, Lincoln, LN6 3RS
Company Reg No 4478971 (England)
Phone:+44 (0) 1522 681811 Fax:+44 (0) 1522 681911
Email enquiries@linwave.co.uk Website www.linwave.co.uk
© 2015 Linwave Technology

Pin Designations	
Pin No.	FUNCTION
Pin 4	RF IN
Pin 22	RF OUT
Pin 26	Vg1
Pin 28	+5V
Pin 31	Vg2
Pins 1-3, 5-21	GROUND
Pins 23-25, 27	GROUND
Pins 29, 30 & 32	GROUND

Pin Descriptions

Pin Number	Function	Description
4	RF IN	This pad is AC coupled and matched to 50 ohms
22	RF OUT	This pad is AC coupled and matched to 50 ohms
26	Vg1	Gate supply, typically -0.55V
28	Vd	Drain supply, +5V
31	Vg2	Gate supply, typically +1.3V
1, 7-19	N/C	The pins are not connected internally; however, all data shown was measured with these pins connected to RF/DC ground externally.
25, 27	N/C	The pins are not connected internally; however, all data shown was measured with these pins connected to RF/DC ground externally.
29,30,32	N/C	The pins are not connected internally; however, all data shown was measured with these pins connected to RF/DC ground externally.
2,3,5,6,20,21,23,24	GROUND	Must be connected to RF/DC ground
Ground paddle	GROUND	Must be connected to RF/DC ground

Recommended Bias-up Procedure

1. Pinch-off device by setting Vg (Vg1) to -1.5V
2. Increase Vd (Vd1) from 0V to 5V while monitoring drain current which should **NOT** go above 0.2mA
3. Increase Vc (Vg2) from 0V to 1.3V
4. Increase Vg (Vg1) until drain current reaches 100 mA

Recommended Bias-Down Procedure

1. Decrease Vg (Vg1) to -1.5V
2. Decrease Vc (Vg2) to 0 V
3. Decrease Vd to 0 V

Linwave reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance.

Data sheet Iss 03, dated 16/08/17 DS00-700135-03, No. 2992

For price, delivery and to place orders please contact
 Linwave Technology Ltd, Marlin Building, Sadler Road, Lincoln, LN6 3RS
 Company Reg No 4478971 (England)
 Phone:+44 (0) 1522 681811 Fax:+44 (0) 1522 681911
 Email enquiries@linwave.co.uk Website www.linwave.co.uk
 © 2015 Linwave Technology

TABLE I**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value
P_{IN}	Input CW Power	+37dBm
T_M	Mounting Temperature (30 secs)	260°C
T_{STG}	Storage Temperature	-55 to +125°C
T_{OP}	Operating Temperature	-40 to +85°C

TABLE II**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Limit			Units
		Min	Typ	Max	
Vd	Drain Voltage	4.7	5	7	V
Vg1	Gate 1 Voltage	-2	-0.55	0	V
Vg2	Gate 2 Voltage	-2	1.3	3	V
Id	Drain Current		100		mA

Linwave reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance.

Data sheet Iss 03, dated 16/08/17 DS00-700135-03, No. 2992

*For price, delivery and to place orders please contact
 Linwave Technology Ltd, Marlin Building, Sadler Road, Lincoln, LN6 3RS
 Company Reg No 4478971 (England)
 Phone:+44 (0) 1522 681811 Fax:+44 (0) 1522 681911
 Email enquiries@linwave.co.uk Website www.linwave.co.uk
 © 2015 Linwave Technology*

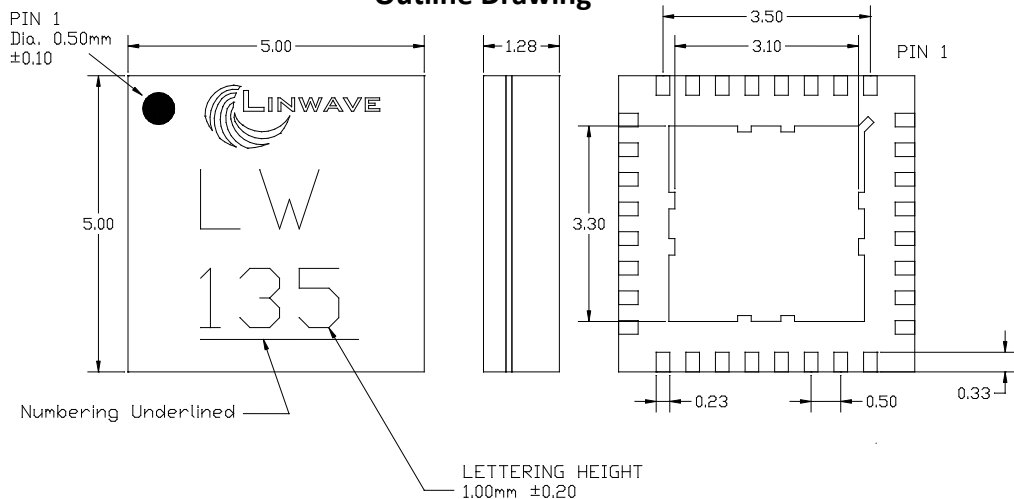
TABLE III

RF CHARACTERISTICS

(T_a = 25°C)

Symbol	Parameter	Test Condition	Limit			Units
			Min	Typ	Max	
	Gain	F = 4-18GHz		17		dB
NF	Noise Figure	F = 4-18GHz		2.5	4.5	dB
	Output TOIP	F = 4-18GHz 0dBm Output		28		dBm
P1dB	Output 1dB Compression Point	F = 4-18GHz		19		
	Input Return Loss	F = 4-18GHz	10	15		dB
P #1	Power Handling 10% 100uS	F = 1-18GHz	15			W
P #2	Power Handling 25% 250uS	F = 1-18GHz	2			W
	Recovery Time to -3dB @P #2	F = 1-18GHz			100	nS

Outline Drawing



NOTES

- 1) BODY: PLASTIC, SEMICONDUCTOR GRADE
- 2) LEAD FRAME: COPPER, 194 FH
- 3) LEAD FINISH: FULL GOLD PLATE
- 4) FRAME THICKNESS: 0.2030 ±0.0076
- 5) EXTERNAL DIMENSIONS ± 0.15
- 6) CERAMIC LID



ELECTROSTATIC SENSITIVE DEVICE OBSERVE HANDLING PRECAUTIONS

Refer to Linwave application note for suggested PC Board Land Pattern.

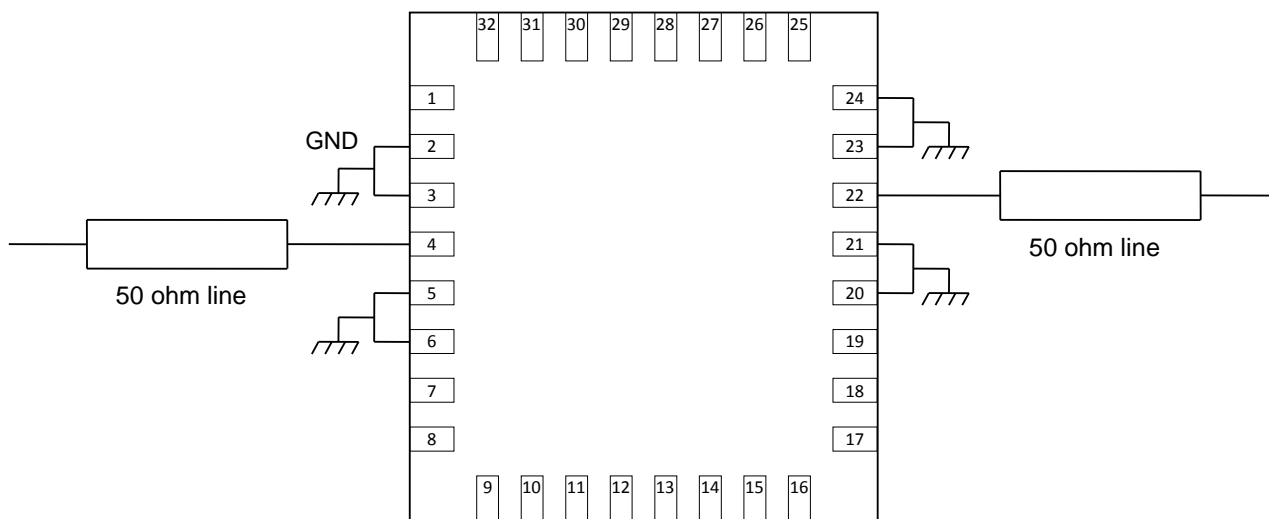
Linwave reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance.

Data sheet Iss 03, dated 16/08/17 DS00-700135-03, No. 2992

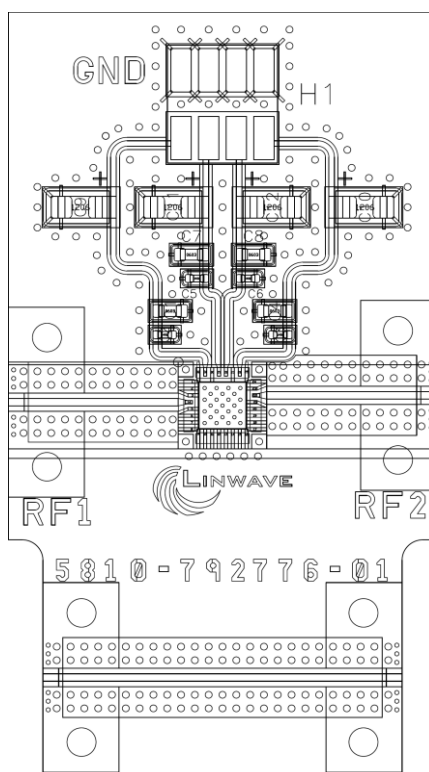
For price, delivery and to place orders please contact
 Linwave Technology Ltd, Marlin Building, Sadler Road, Lincoln, LN6 3RS
 Company Reg No 4478971 (England)
 Phone:+44 (0) 1522 681811 Fax:+44 (0) 1522 681911
 Email enquiries@linwave.co.uk Website www.linwave.co.uk
 © 2015 Linwave Technology

Application Circuit

Note: Effective heatsinking through the pallet on the underside is essential for high power operation (RF Input >1W)



Evaluation PCB



Linwave reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance.

Data sheet Iss 03, dated 16/08/17 DS00-700135-03, No. 2992

For price, delivery and to place orders please contact
 Linwave Technology Ltd, Marlin Building, Sadler Road, Lincoln, LN6 3RS
 Company Reg No 4478971 (England)
 Phone:+44 (0) 1522 681811 Fax:+44 (0) 1522 681911
 Email enquiries@linwave.co.uk Website www.linwave.co.uk
 © 2015 Linwave Technology

List of Materials for Evaluation PCB LW54-700135^[1]

Item	Description
J1-J2	Southwest Microwave 8100-302230
U1	LW48-700135 Limiter LNA
PCB ^[2]	5810-792776-01 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit board material: Rogers 4350B on FR4 backing

The circuit board used in the application should use RF circuit design techniques. The signal lines should have 50 ohms impedance and the package ground leads and package bottom should be connected directly to the ground plane similar to that shown.

A sufficient number of via holes should be used to connect the top and bottom ground planes.

Linwave reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance.

Data sheet Iss 03, dated 16/08/17 DS00-700135-03, No. 2992

*For price, delivery and to place orders please contact
Linwave Technology Ltd, Marlin Building, Sadler Road, Lincoln, LN6 3RS
Company Reg No 4478971 (England)
Phone:+44 (0) 1522 681811 Fax:+44 (0) 1522 681911
Email enquiries@linwave.co.uk Website www.linwave.co.uk
© 2015 Linwave Technology*