

12-40GHz Wide Band Detector

GaAs Monolithic Microwave IC

Preliminary

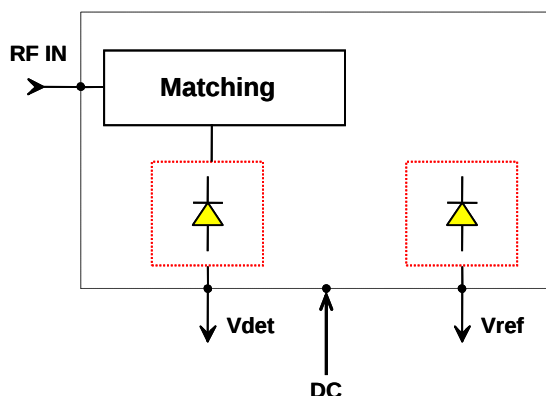
Description

The CHE1270a is a detector that integrates a matched detection diode (Vdet). A reference diode is also available to be used in differential mode (Vref).

It is designed for a wide range of applications where an accurate transmitted power control is required, typically commercial communication systems.

The circuit is manufactured with a Schottky diode MMIC process, 1μm gate length, via holes through the substrate and air bridges.

It is available in chip form.

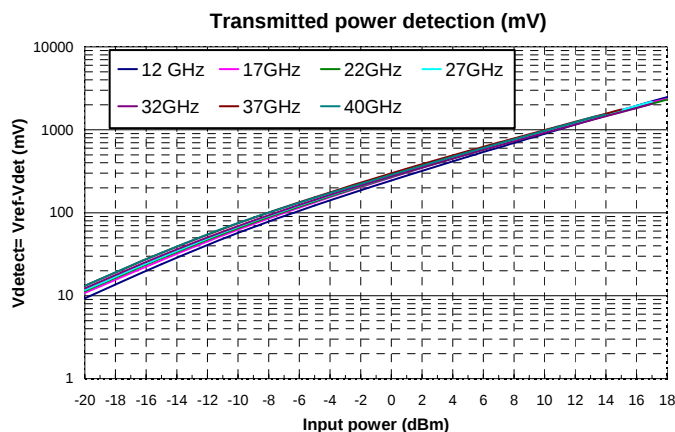


Main Features

- Wide frequency range 12-40GHz
- 30dB dynamic range
- ESD protected
- Chip size: 1.41 x 0.89 x 0.1mm
- BCB layer protection

Main Characteristics

Tamb = +25°C, Vdc = +4.5V



Symbol	Parameter	Min	Typ	Max	Unit
F	Frequency range	12		40	GHz
Dr	Dynamic range		30		dB
RL	Return Loss		-10		dB

ESD Protection: Electrostatic discharge sensitive device. Observe handling precautions!

*Preliminary***Electrical Characteristics (1)**

Tamb = +25°C, Vdc = +4.5V

Symbol	Parameter	Min	Typ	Max	Unit
F	Frequency range	12		40	GHz
Dr	Dynamic range (for Input Power detection)		30		dB
IPd	Input Power detection	-15		15	dBm
Vdetect	Voltage detection Vref – Vdet from IPd_min to IPd_max		10 to 2000		mV
RL	Return Loss (12 – 14.5GHz)		-8		dB
	Return Loss (15 – 40GHz)		-10		dB
Vdc	Bias voltage		4.5		V
Idc	Bias current		70		μA

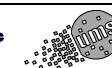
(1) These values are representative of on-wafer measurements that are made without bonding wires at the RF ports but with 27kΩ resistor in parallel on pads Vdet and Vref.

Absolute Maximum Ratings (1)

Tamb = +25°C

Symbol	Parameter	Values	Unit
Vdc	Bias voltage	6	V
IPd_max	Maximum Input power	18	dBm
Top	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature range	-55 to +125	°C

(1) Operation of this device above anyone of these paramaters may cause permanent damage.

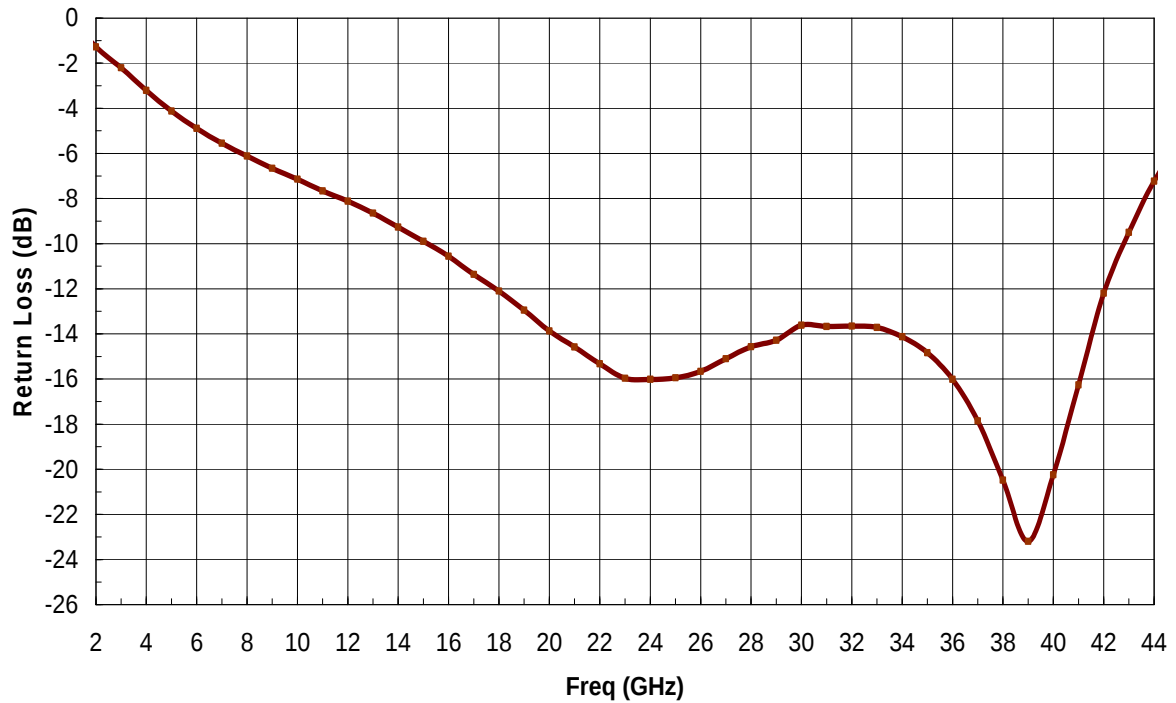


Typical on-wafer measurements results

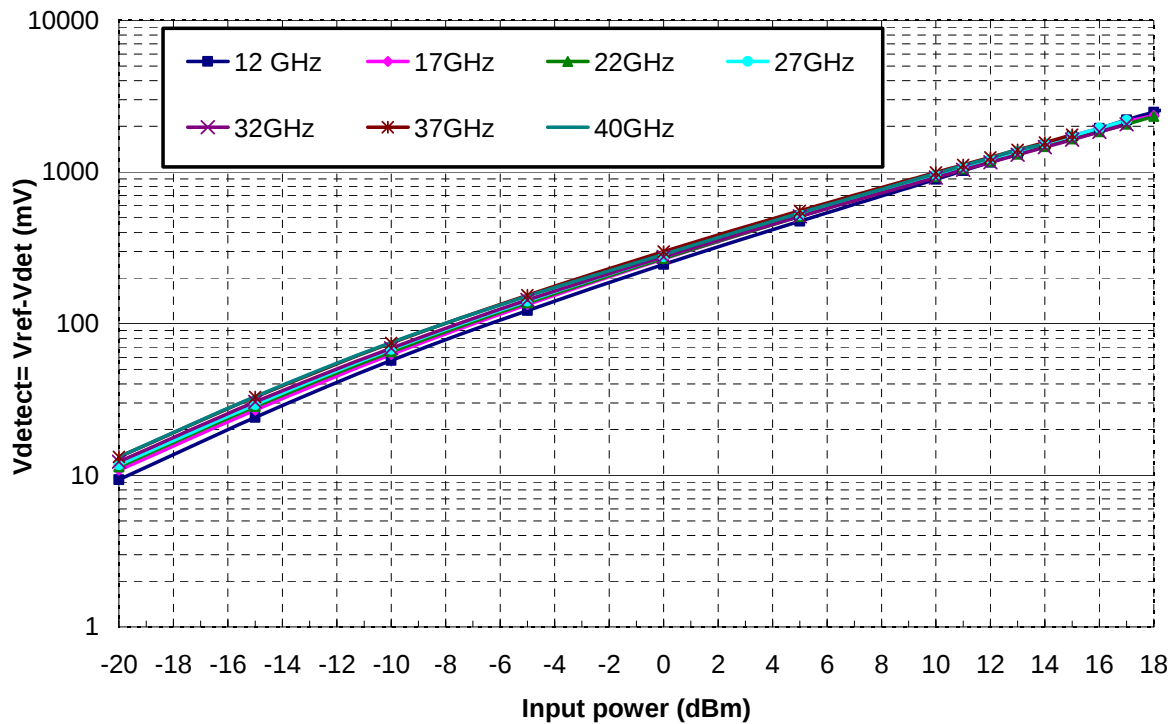
Tamb = +25°C, Vdc = +4.5V, 27k Ω resistor in parallel on pads Vdet and Vref

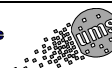
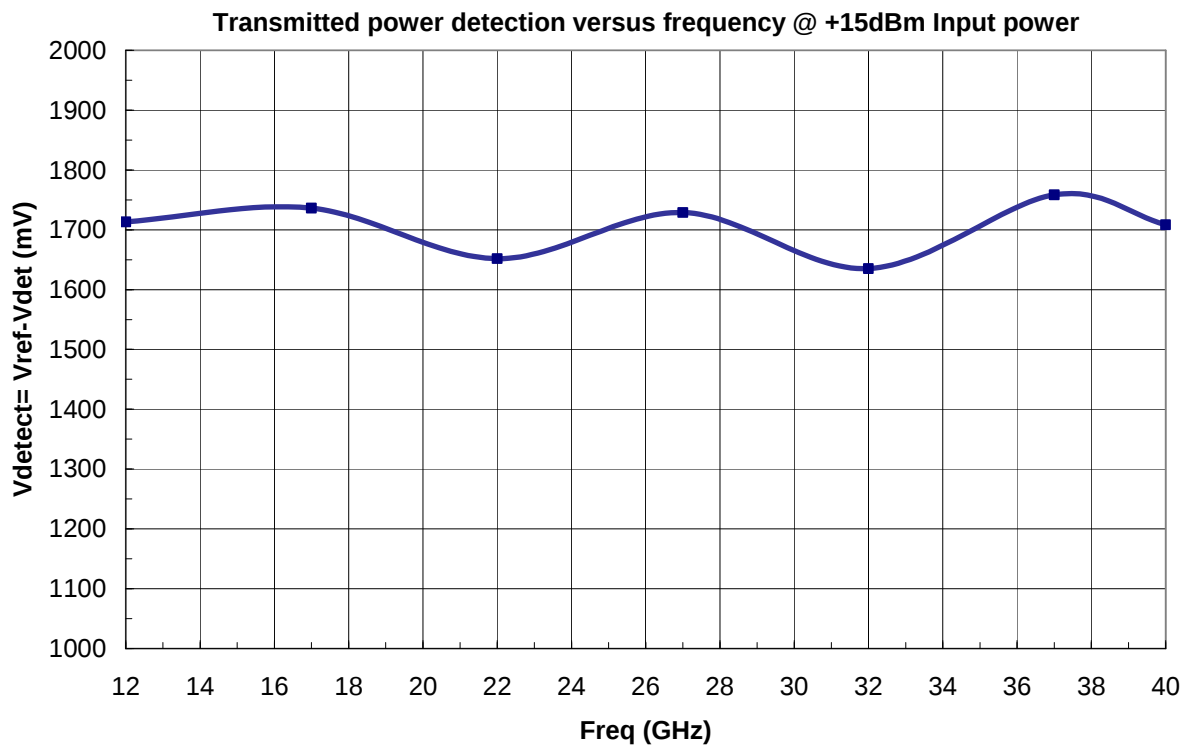
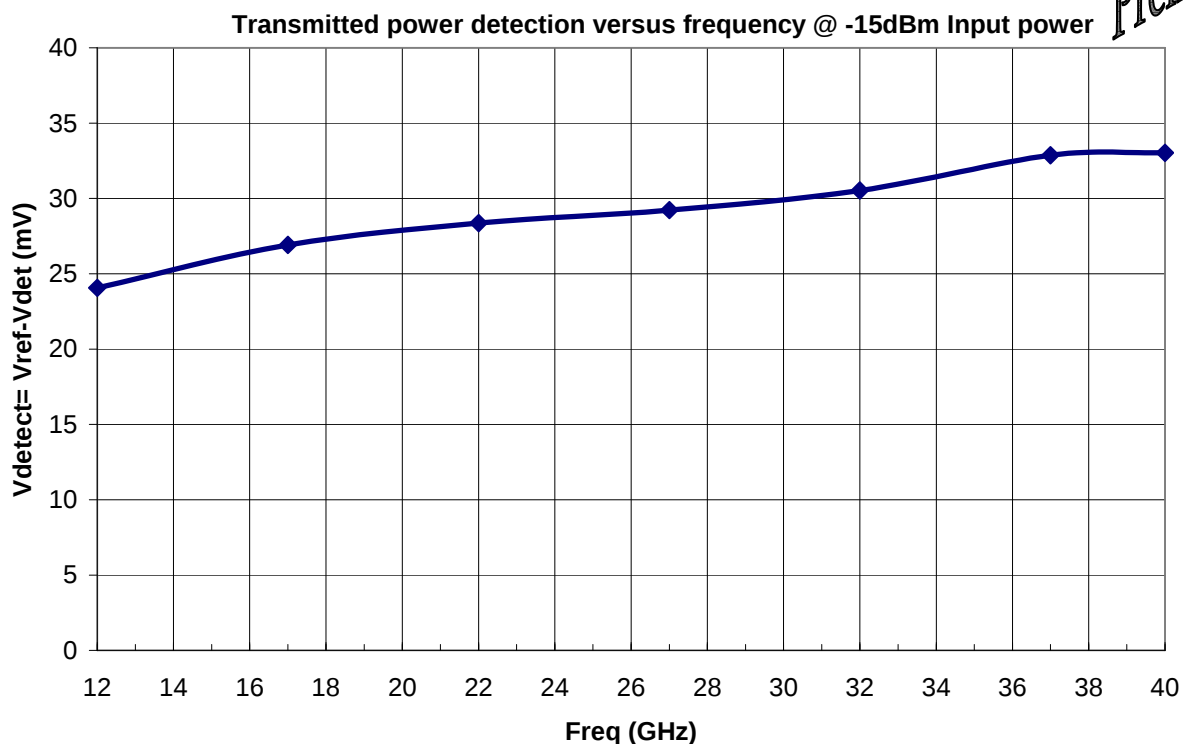
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Return Loss versus frequency



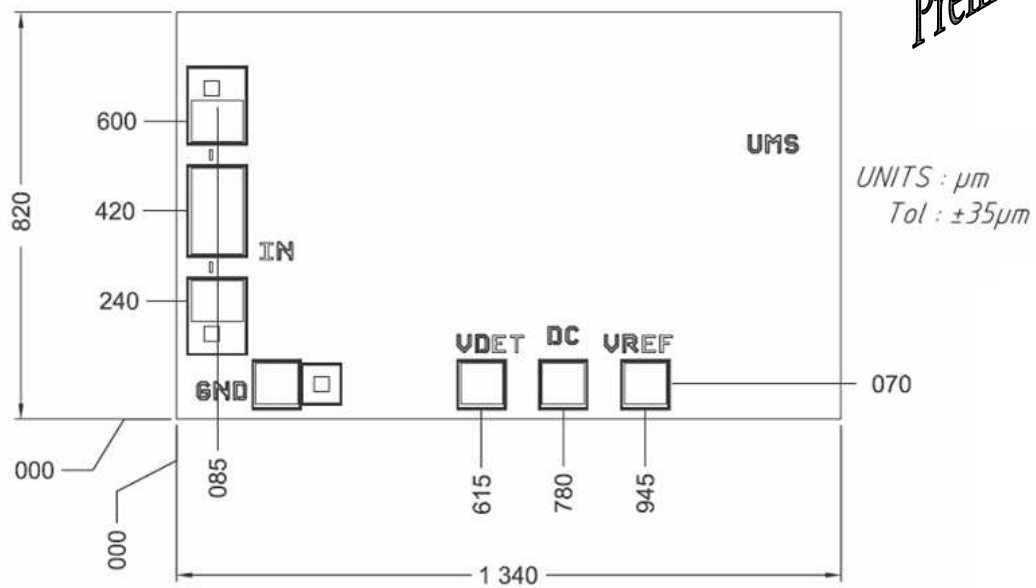
Transmitted power detection versus Input power



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Chip Assembly and Mechanical Data

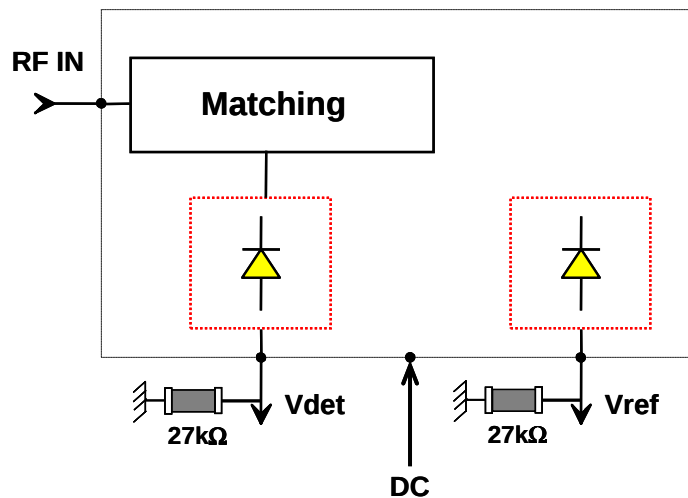
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DC Pads Size: 100/100 μm , Chip thickness: 100 μm

Note: Supply feed might be capacitively bypassed. 25µm diameter gold wire is to be preferred.

Notes

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Recommended external resistors assembly

27kΩ resistors in parallel with Vdet and Vref pads are recommended to provide the best behaviour in the whole operating temperature range.

As the voltage detection is the difference between Vref and Vdet, the external resistor value should be identical on these two ports.

For information, a variation of 3% leads around 1mV variation of detected voltage.

Due to ESD protection circuits on RF input, an external capacitance might be requested to isolate the product from external voltage that could be present on the RF access.

ESD protections are also implemented on Vdet and Vref accesses.

Due to the BCB coating on the chip, qualification domain implies the chip must be glued.

Ordering Information

Chip form: CHE1270a-98F/00

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