12-40GHz Wide Band Detector

Preliminary

GaAs Monolithic Microwave IC

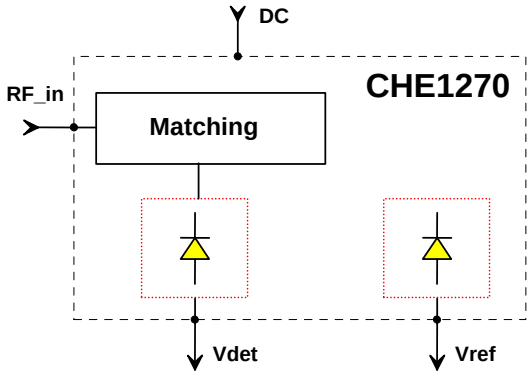
Description

The CHE1270 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.

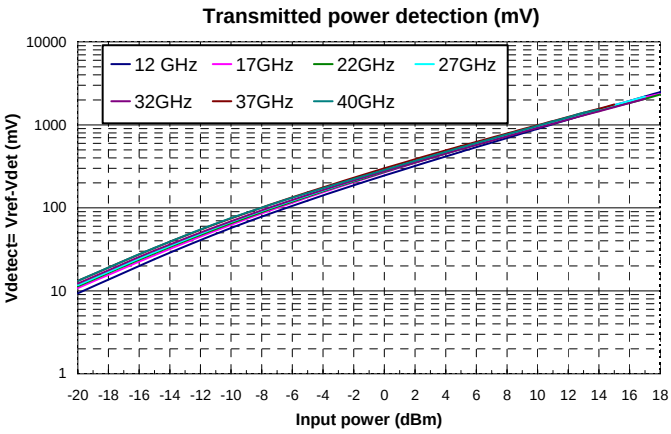
The circuit is manufactured with a Schottky diode MMIC process, 1µm gate length, via holes through the substrate and air bridges.

It is available in chip form.



Main Features

- Wide frequency range 12-40GHz
- 35dB dynamic range
- ESD protected
- Chip size: 1.41 x 0.89 x 0.1mm
- BCB layer protection



Main Characteristics

Tamb = +25℃, Vdc = +4.5V

Symbol	Parameter	Min	Typ	Max	Unit
F	Frequency range	12		40	GHz
Dr	Dynamic range		35		dB
RL	Return Loss		-10		dB

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

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Electrical Characteristics (1)

Tamb = +25°C, Vdc = +4.5V

Preliminary

Symbol	Parameter	Min	Typ	Max	Unit
F	Frequency range	12		40	GHz
Dr	Dynamic range		35		dB
IPr	Input Power range IPr_min IPr_max		-20 15		dBm dBm
Vdetect	Voltage detection Vref – Vdet from IPr_min to IPr_max		10 to 1800		mV
RL	Return Loss (12 – 14.5GHz) Return Loss (15 – 40GHz)		-8 -10		dB dB
Vdc	Bias voltage		4.5		V
Idc	Bias current		75		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)

Temp = +25°C

Symbol	Parameter	Values	Unit
Vdc	Bias voltage	6	V
IPr_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.

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Typical on-wafer measurements results

Tamb = +25℃, Vdc = +4.5V, 27kΩ resistor in parallel on pads Vdet and Vref

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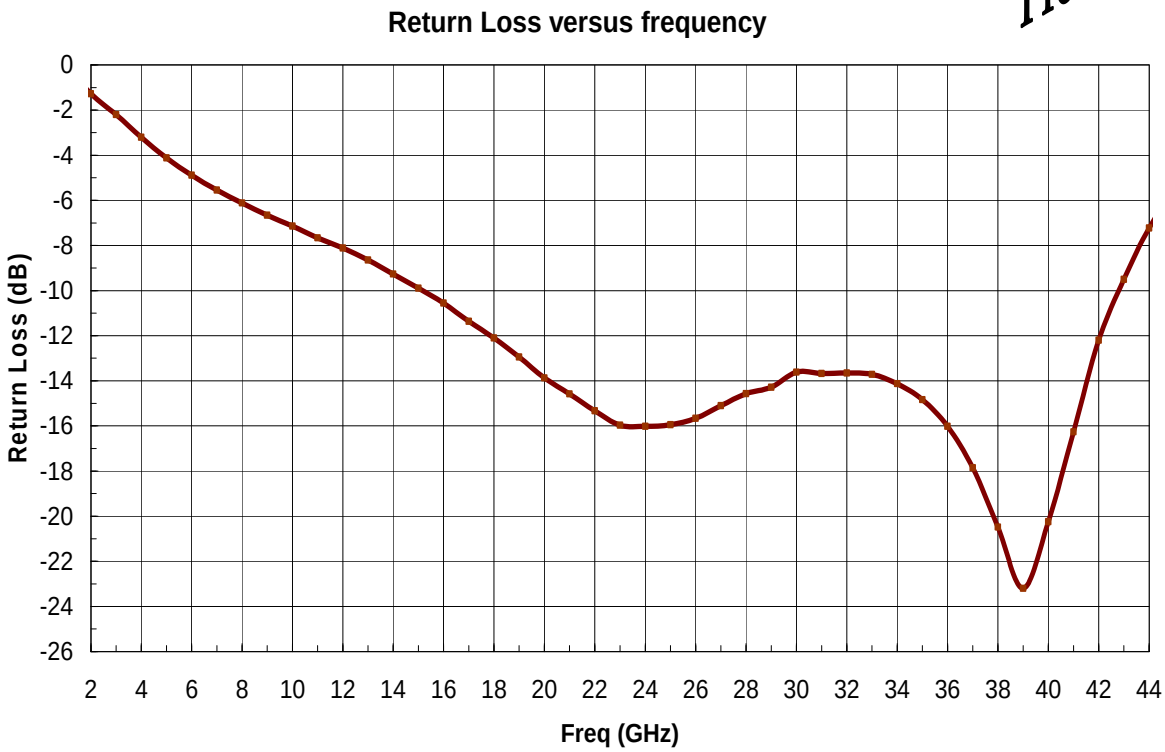

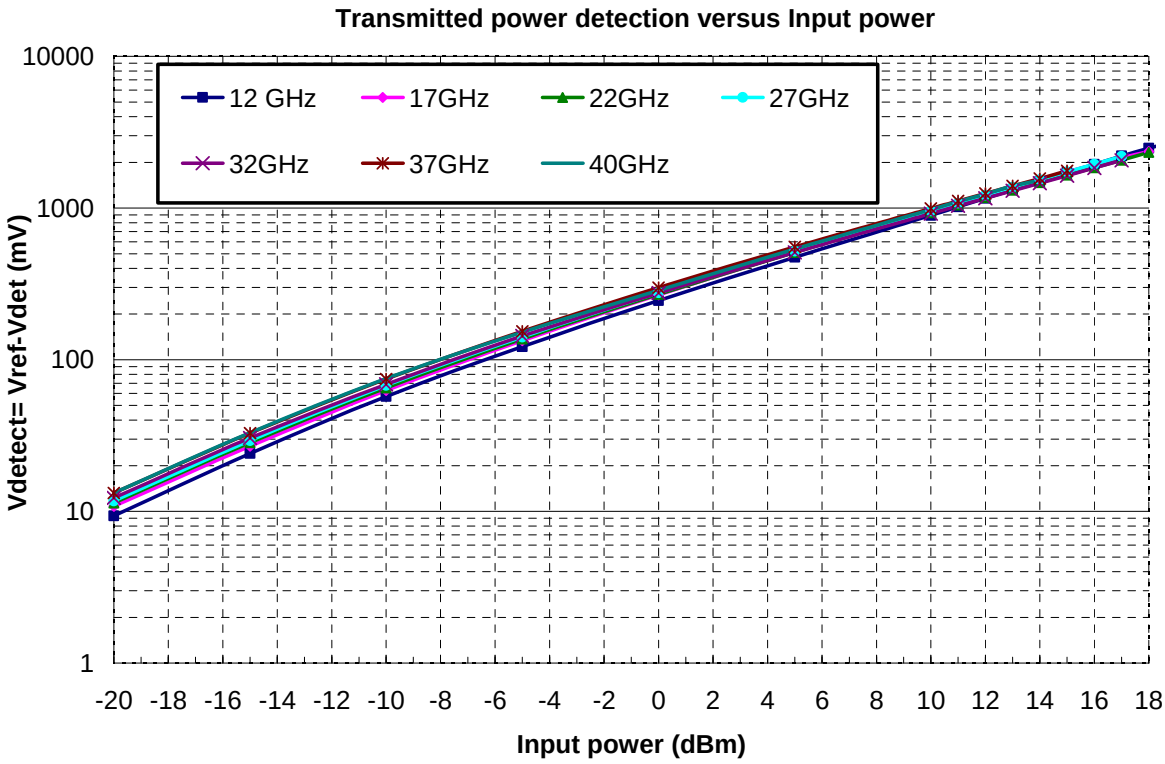

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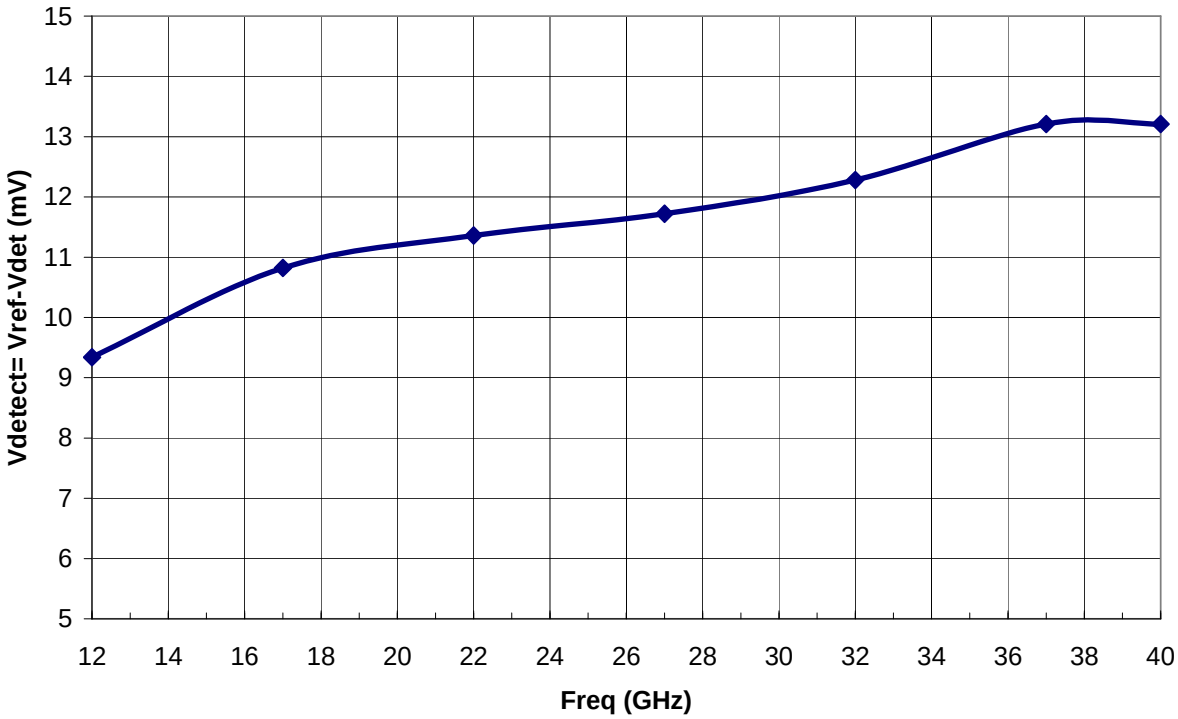
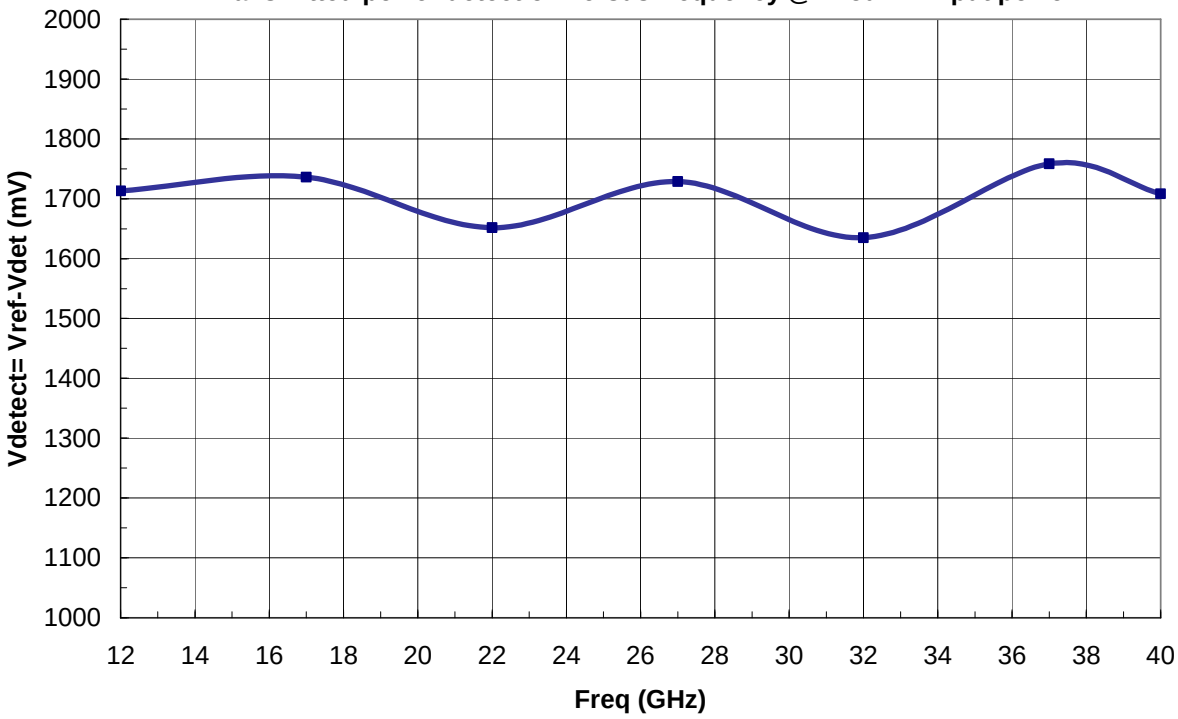
Transmitted power detection versus frequency @ -20dBm Input power



Transmitted power detection versus frequency @ +15dBm Input power



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Chip Assembly and Mechanical Data

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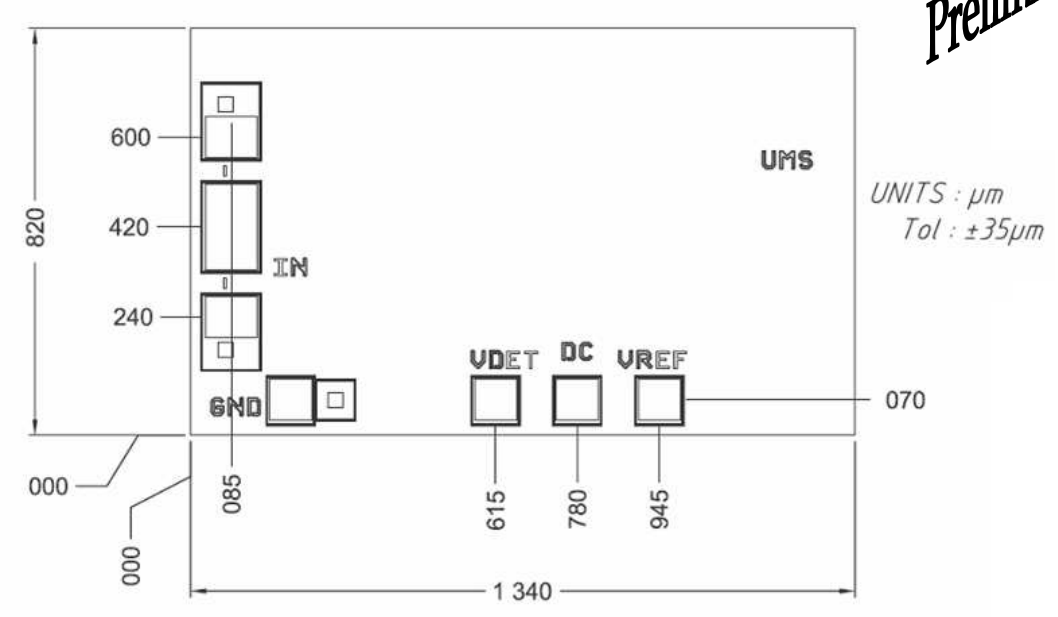
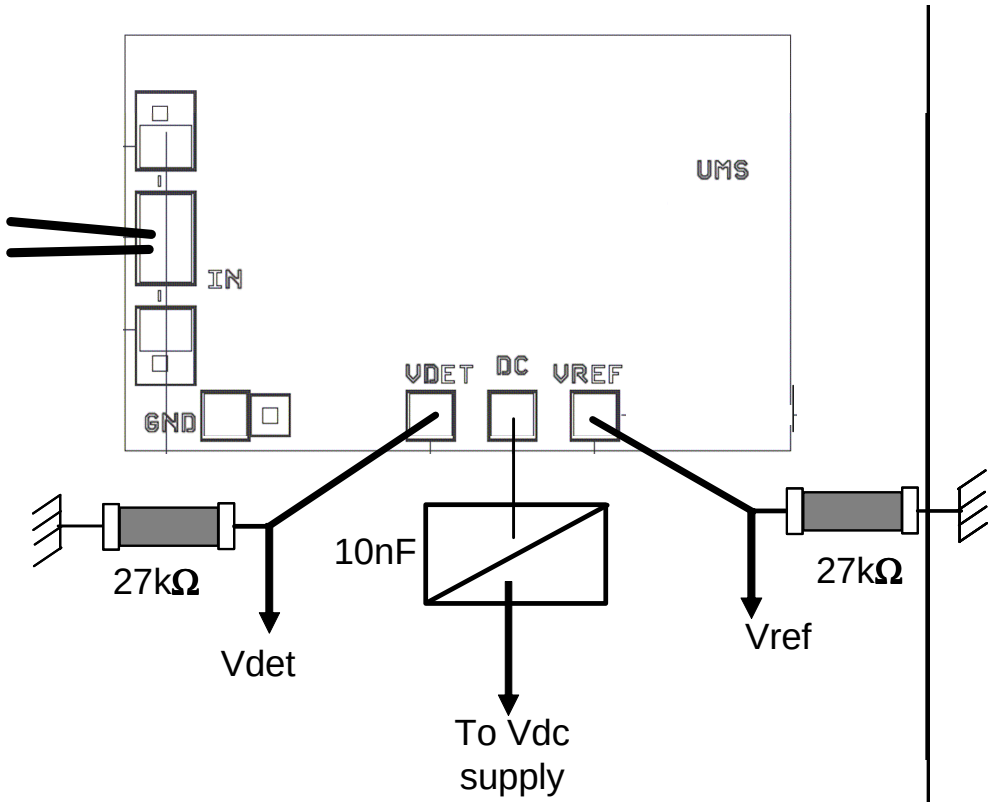


DC Pads Size: 100/100 µm, Chip thickness: 100 µm

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



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Note

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Resistors in parallel with Vdet and Vref pads have to be identical. Only a 1% variation of this resistor value might be accepted to guarantee a correct detection.

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.

Ordering Information

Chip form: CHE1270-98F/00

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