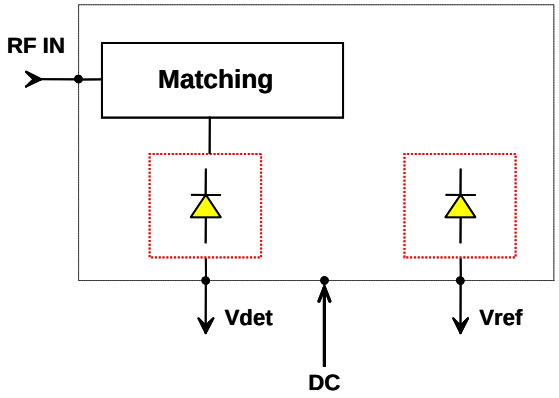
CHE1270a99F

5 - 44GHz Detector

GaAs Monolithic Microwave IC

Description

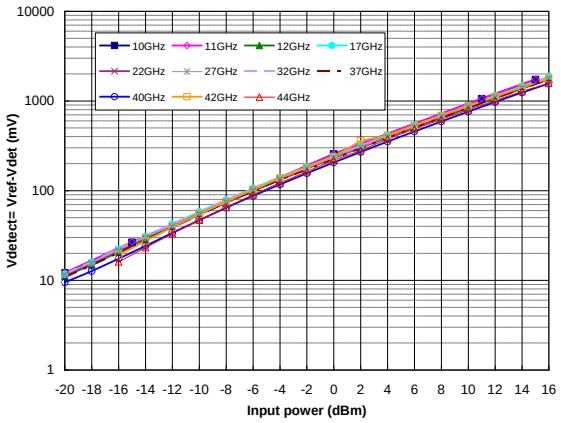
The CHE1270a99F is a detector that integrates a matched detection diode (Vdet). A reference diode is also available to be used in differential mode (Vref).
It is designed for a wide range of applications where an accurate transmitted power control is required, typically commercial communication systems.
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 5-44GHz
- 30dB dynamic range
- ESD protected
- Chip size: 1.41 x 0.89 x 0.1mm

Transmitted power detection (mV)



Main Characteristics

Tamb.= +25°C

Symbol	Parameter	Min	Typ	Max	Unit
Freq	Frequency range	5		44	GHz
Dr	Dynamic range	30			dB
RL	Return Loss		-10		dB

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Main Characteristics

Tamb.= +25°C, Vdc = +4.5V

Symbol	Parameter	Min	Typ	Max	Unit
Freq	Frequency range	5		44	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	5		2200	mV
RL	Return Loss (5 – 10GHz) Return Loss (10 – 12GHz) Return Loss (12 – 14.5GHz) Return Loss (14.5 – 42GHz) Return Loss (42 – 44GHz)		-4 -7 -8 -10 -7	-3 -5 -6 -8 -5	dB dB dB dB dB
Vdc	Bias voltage		4.5		V
Idc	Bias current	50	70	90	µA

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.

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Absolute Maximum Ratings (1)

Tamb.= +25°C

Symbol	Parameter	Values	Unit
Vdc	Drain bias voltage	6V	V
IPdmax	Maximum Input Power detection	+18	dBm
Ta	Operating temperature range	-40 to +95	°C
Tstg	Storage temperature range	-55 to +150	°C

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

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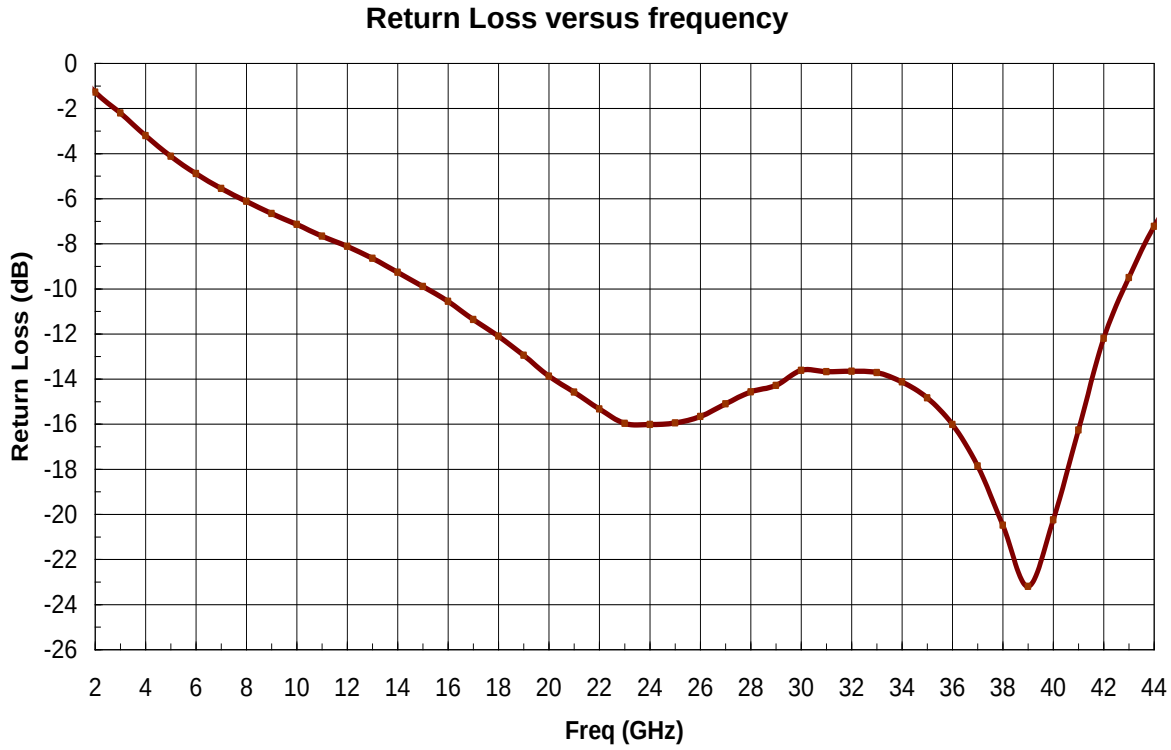
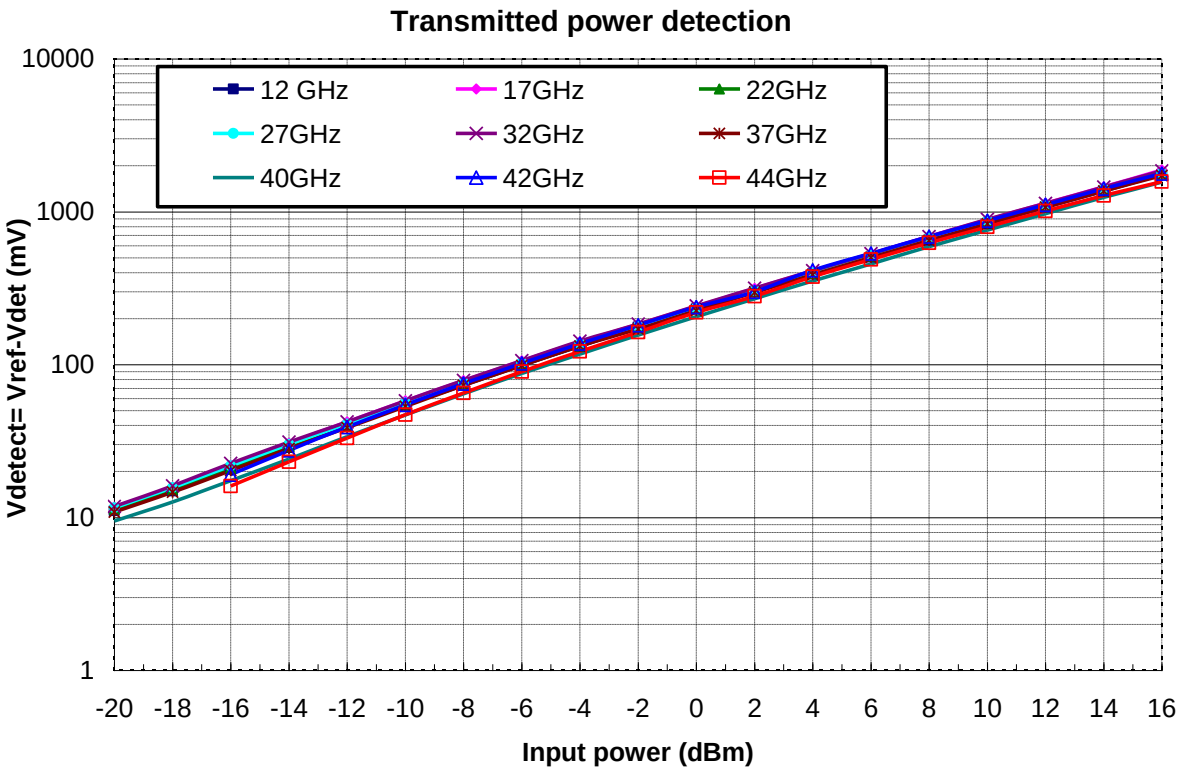
Typical on wafer Measurements

Tamb.= +25°C, Vdc = +4.5V





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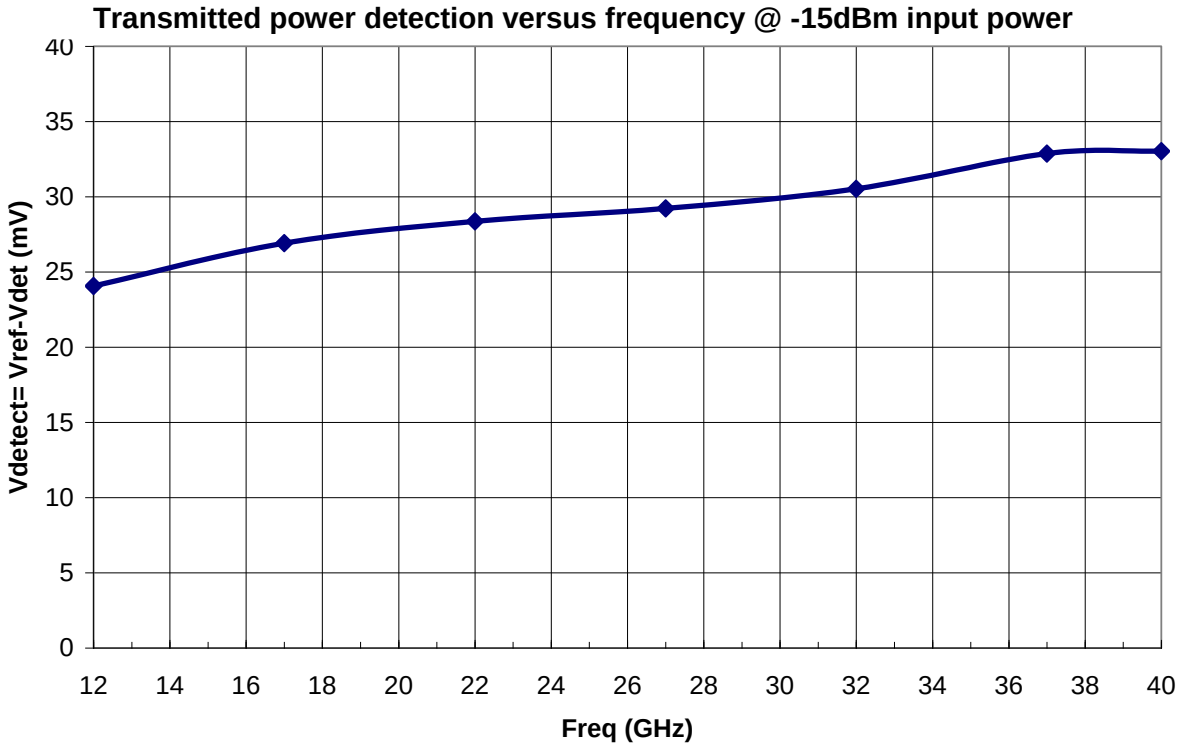
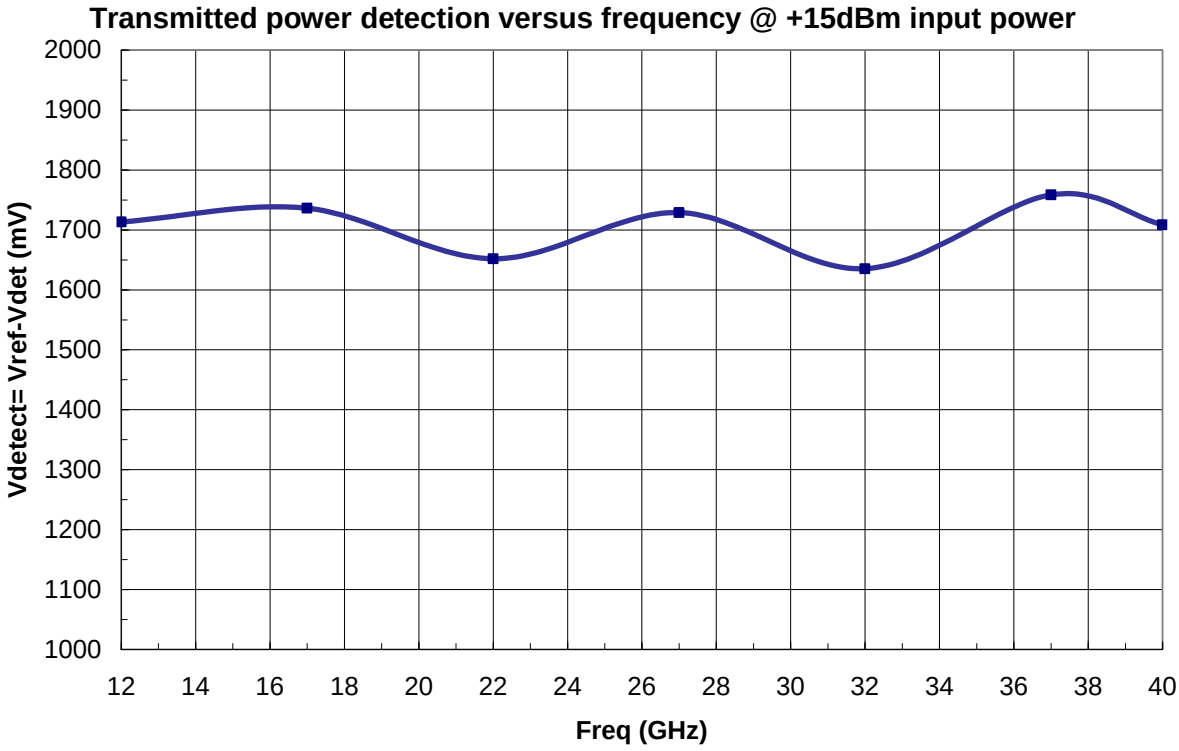
Typical on wafer Measurements

Tamb.= +25°C, Vdc = +4.5V





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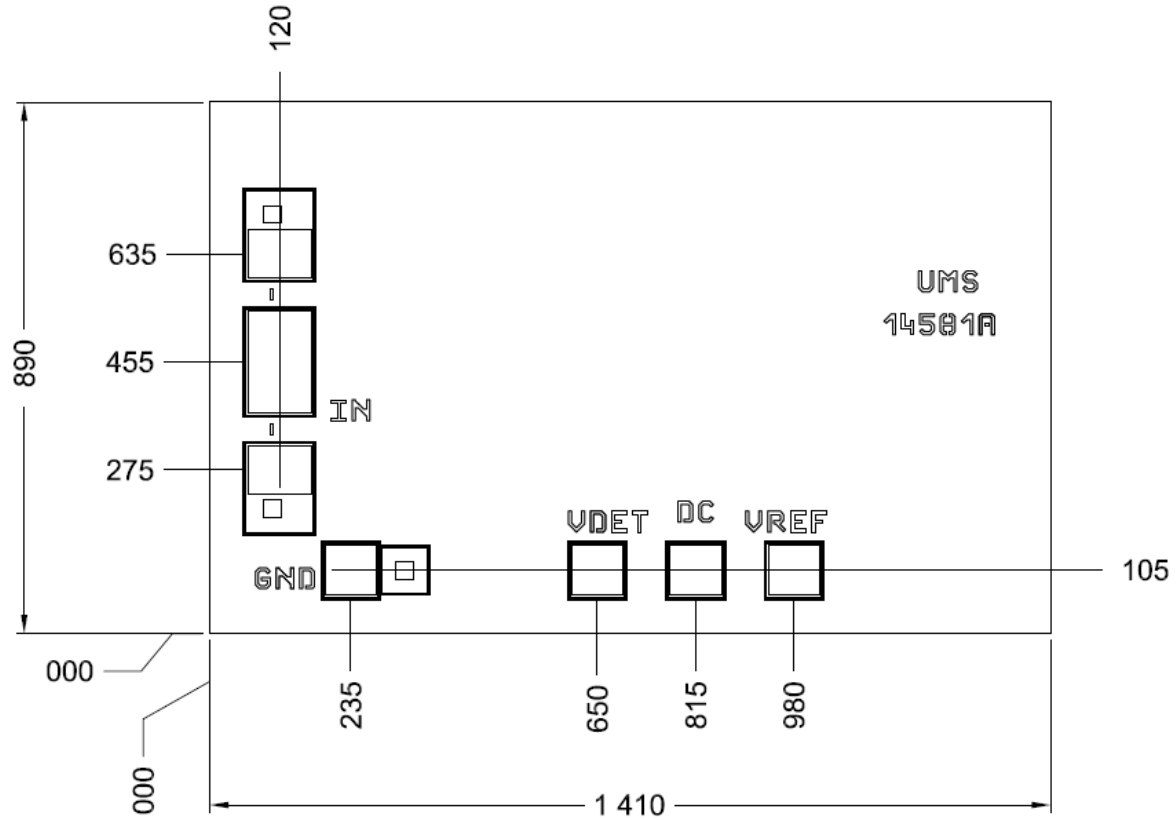
Mechanical data



Chip thickness: 100µm
Chip size: 1.41 x 0.89 x 0.1mm ±35µm
DC Pads Size: 100/100 µm
All dimensions are in micrometers

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

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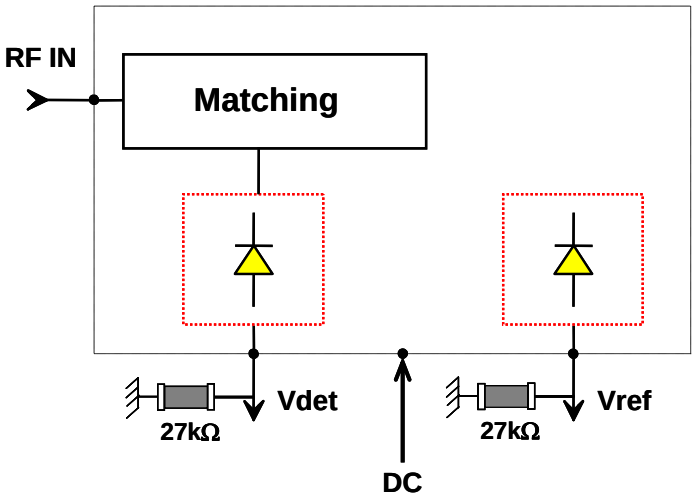
Notes



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.

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Recommended ESD management

Refer to the application note AN0020 available at https://www.ums-rf.com for ESD sensitivity and handling recommendations for the UMS products.

Recommended environmental management

UMS products are compliant with the regulation in particular with the directives RoHS N°2011/65 and REACh N°1907/2006. More environmental data are available in the application note AN0019 also available at https://www.ums-rf.com.

Ordering Information

Chip form:	CHE1270a99F/00

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