

## Features

- Frequency: DC~20GHz
- Dynamic Range: 30dB
- BCB Layer Protected
- Die Size: 1.25mm×1.25mm×0.1mm

## Typical Applications

- Radar and ECM
- RF/ Microwave Radio
- Military and Space
- Test and Measurement
- Instrumentation

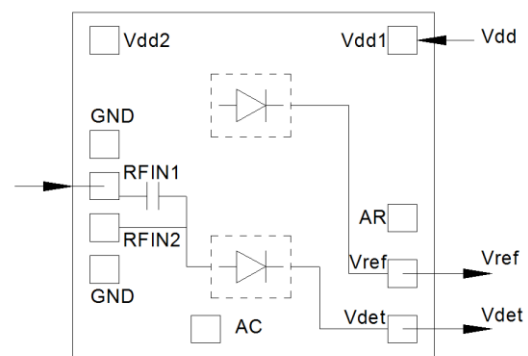
## General Description

SAC1001 is a envelope 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 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 with via holes through the substrate. It is available in bare die chip.

## Functional Diagram



## Electrical Performance ( $T_A=+25^{\circ}\text{C}$ , $V_D=+5\text{V}$ , $Z_0=+50\Omega$ )

Parameter	Min.	Typ.	Max.	Units
Frequency	DC~20			GHz
Flatness	—	1	—	dB
Dynamic Range	—	30	—	dB
Input VSWR	—	1.6	—	:1
Rise Time	—	50	—	ns
Fall Time	—	300	—	ns
$I_D$	—	2.5	—	mA

## Absolute Maximum Ratings

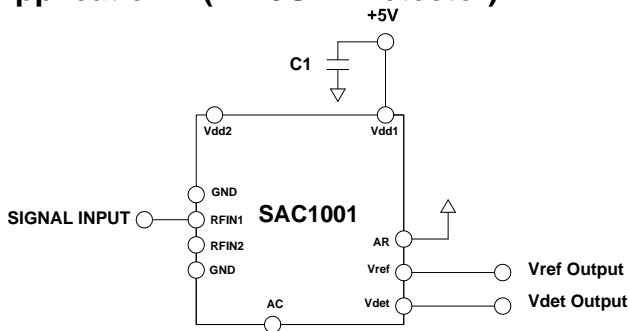
Maximum Input Power Detection	+18dBm	Operating temperature range	-55°C~+85°C
$V_D$	+6V	Storage temperature range	-65°C~+150°C

# SAC1001

GaAs MMIC Envelope Detector  
DC~20GHz

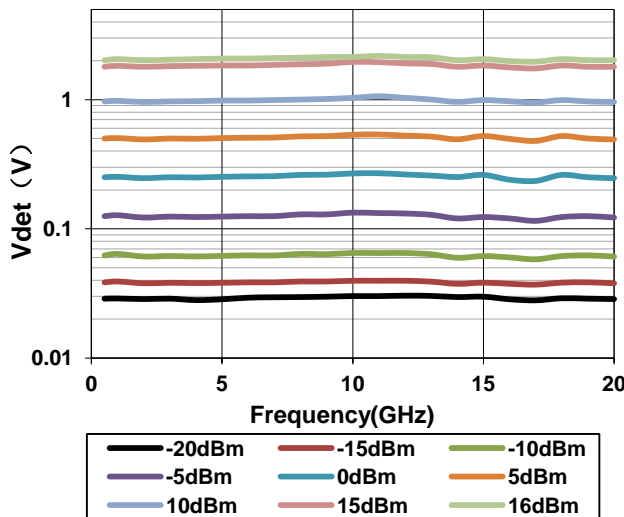
Rev 2.4

## Application 1 (1~20GHz Detector)

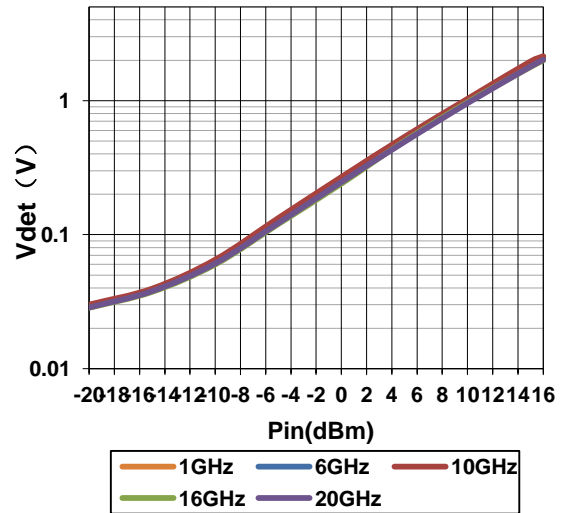


## Application 1 Typical Performance Curve

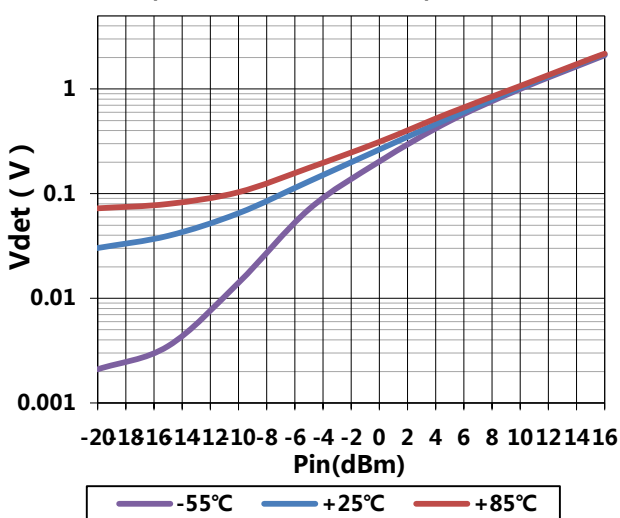
Vdet vs. Frequency for Various Input Power



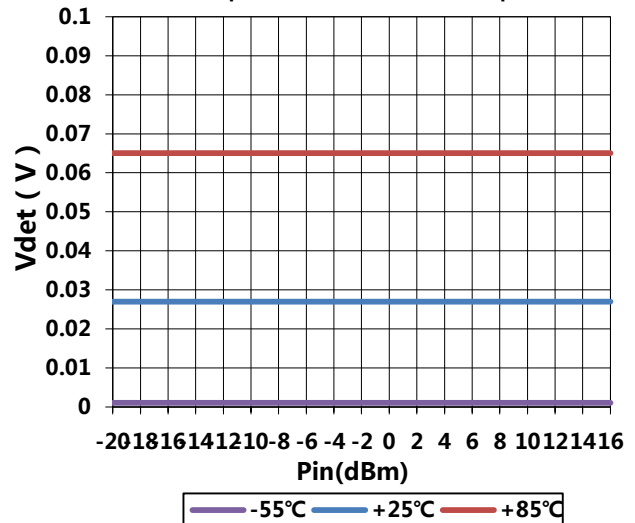
Vdet vs. Input Power for Various Frequency



Vdet vs. Input Power for Various Temperature at 10GHz



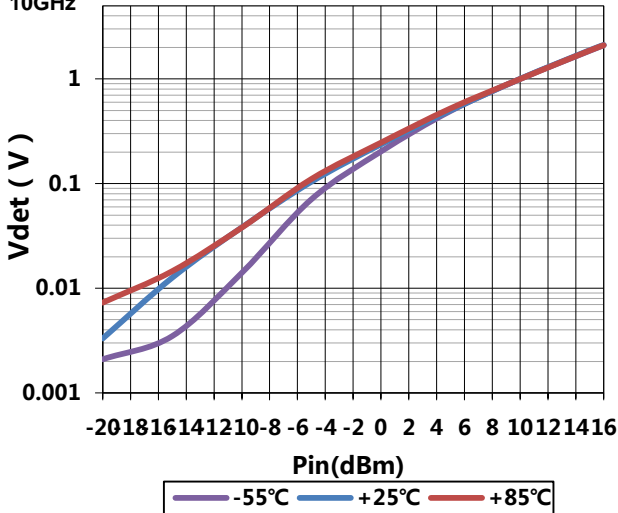
Vref vs. Input Power for Various Temperature



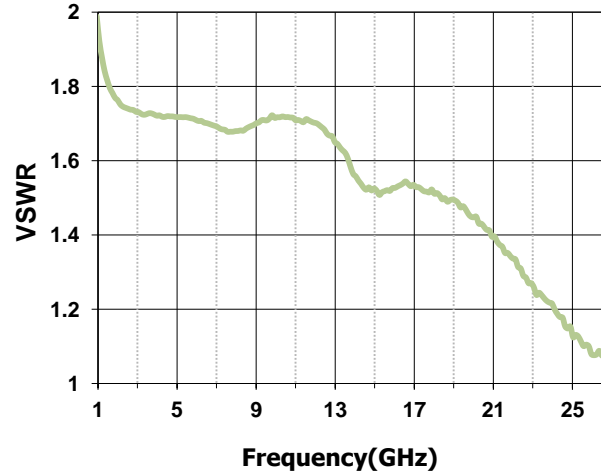
### SuperApex Corporation

Address: 111 Barclay Boulevard, Ste. 211, Lincolnshire, IL 60069, USA  
 Tel: 1-847-573-9866, 1-847-505-8319  
 E-mail: sales@superapexco.com  
 Website: www.superapexco.com

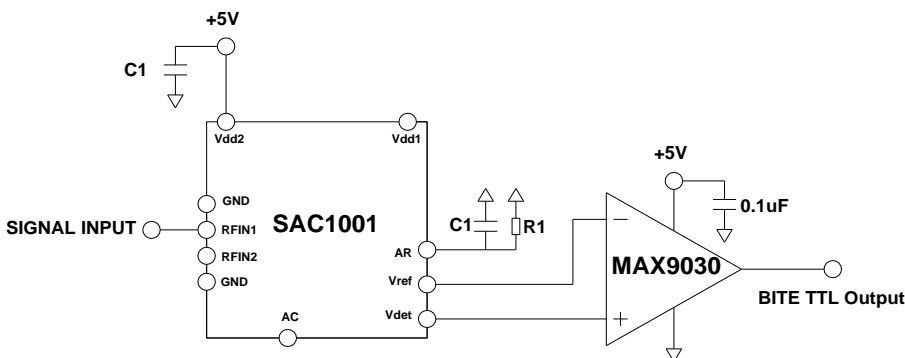
Vdet-Vref vs. Input Power for Various Temperature at 10GHz



VSWR IN(:1) vs. Frequency



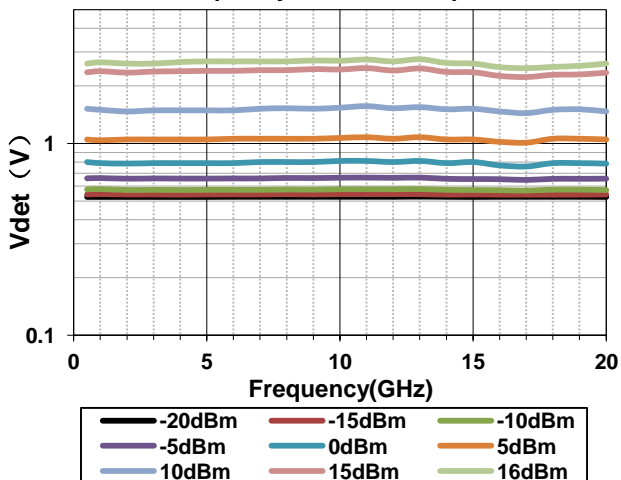
## Application 2(1~20GHz BITE)



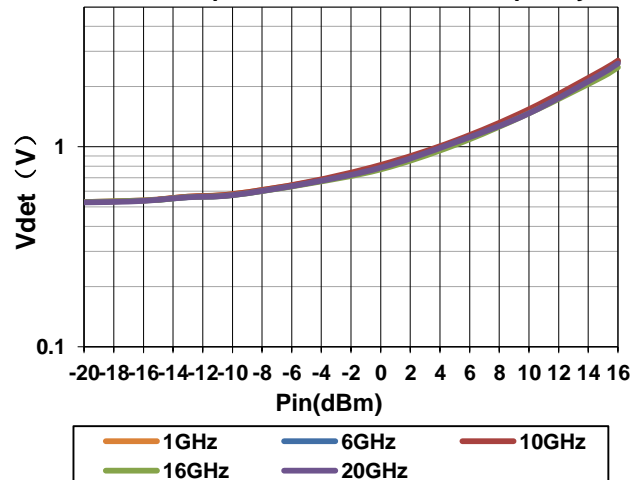
The circuit is used in built-in test equipment. Resistor R1 sets threshold power. When the input signal is higher than threshold power, the comparator MAX9030 generates output TTL high level. R1: 510ohm~5.1KOhm.

## Application 2 Typical Performance Curve (R1=00hm)

Vdet vs. Frequency for Various Input Power



Vdet vs. Input Power for Various Frequency

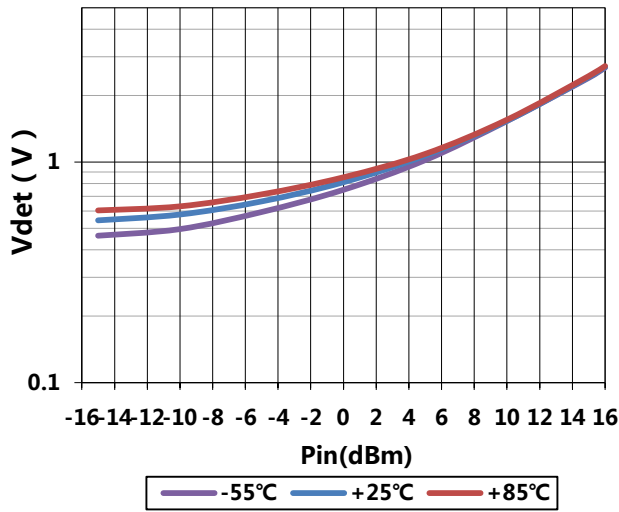


# SAC1001

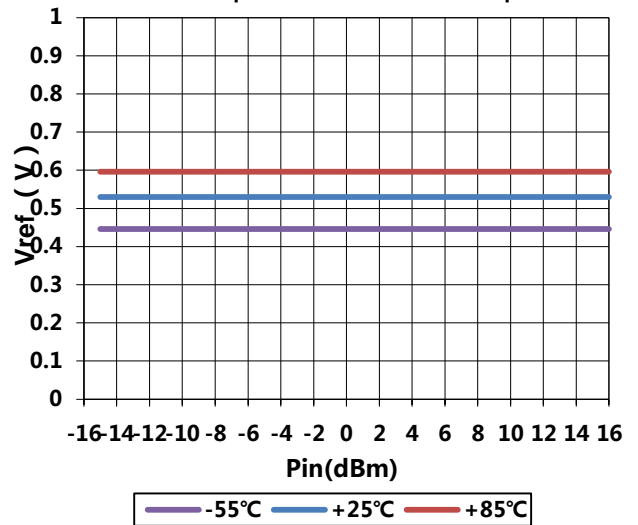
GaAs MMIC Envelope Detector  
DC~20GHz

Rev 2.4

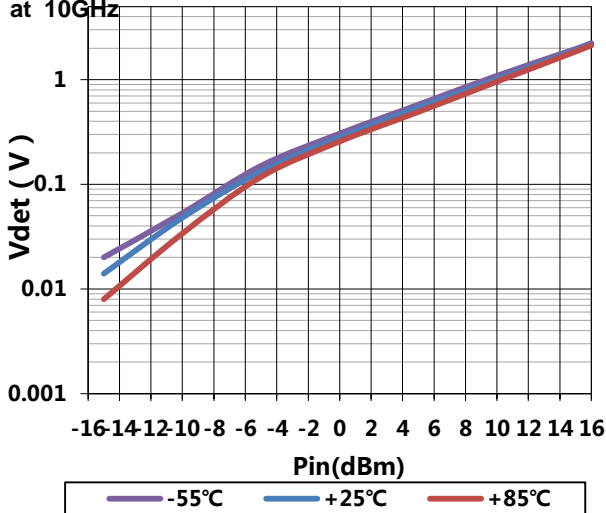
Vdet vs. Input Power for Various Temperature at 10GHz



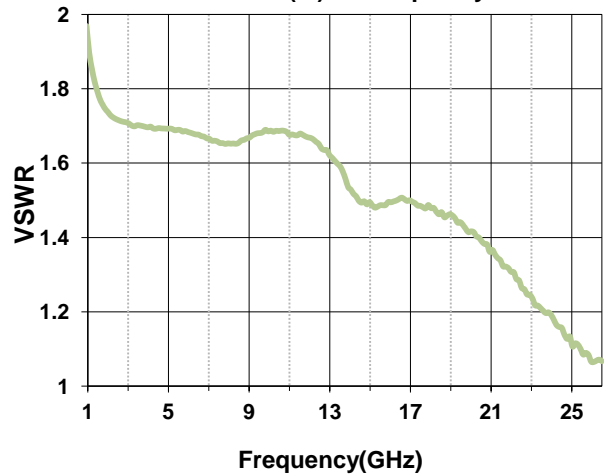
Vref vs. Input Power for Various Temperature



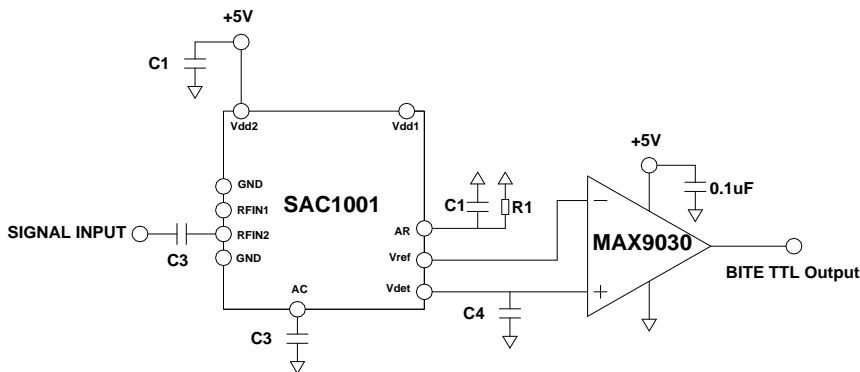
Vdet-Vref vs. Input Power for Various Temperature at 10GHz



VSWR (:1) vs. Frequency

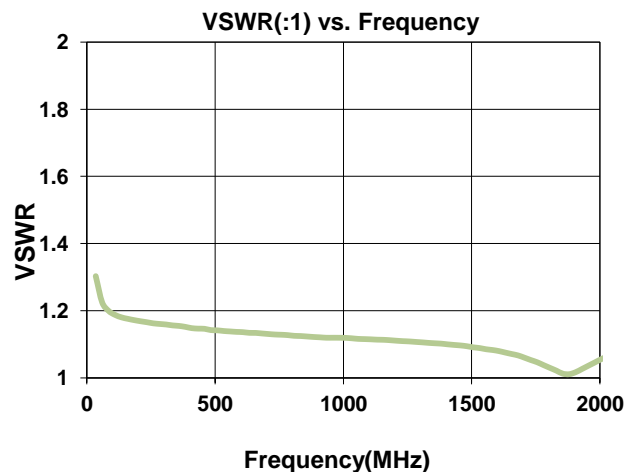
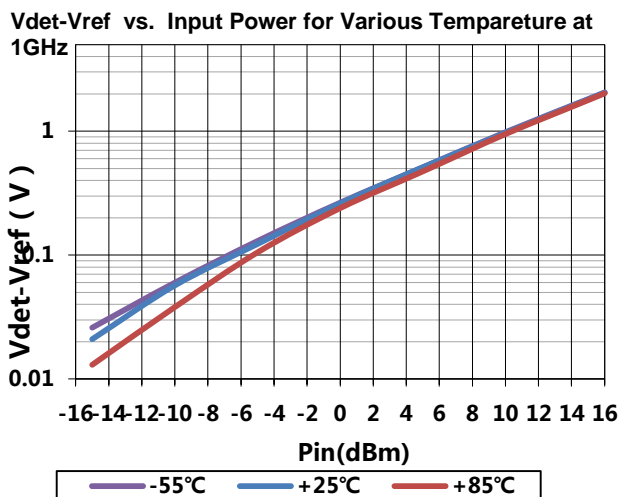
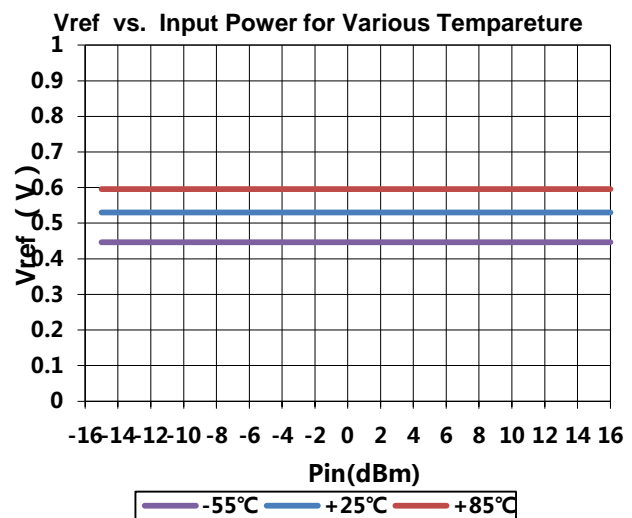
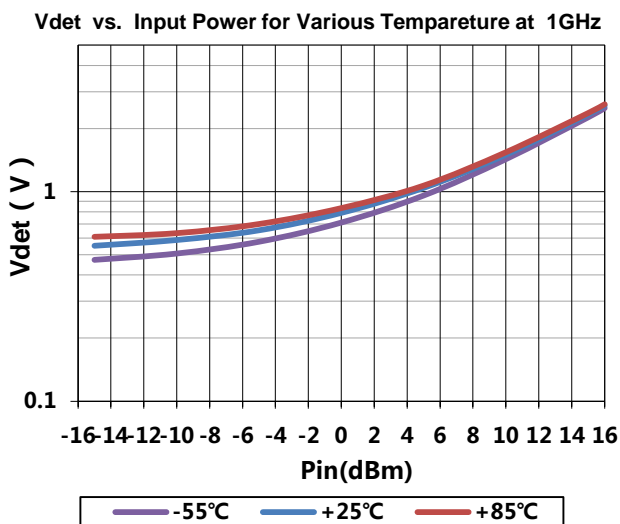
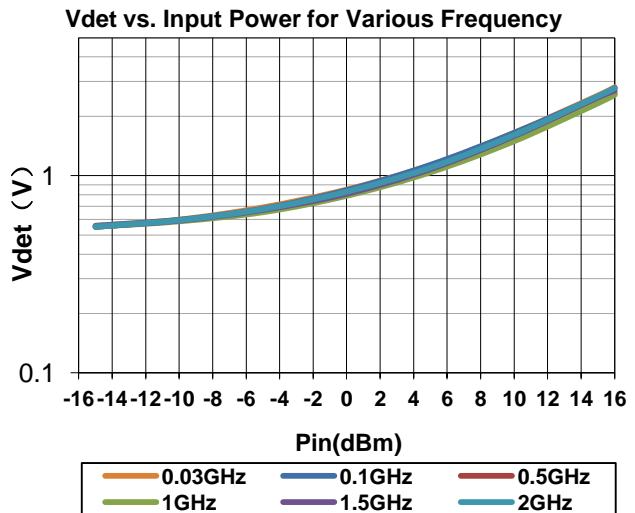
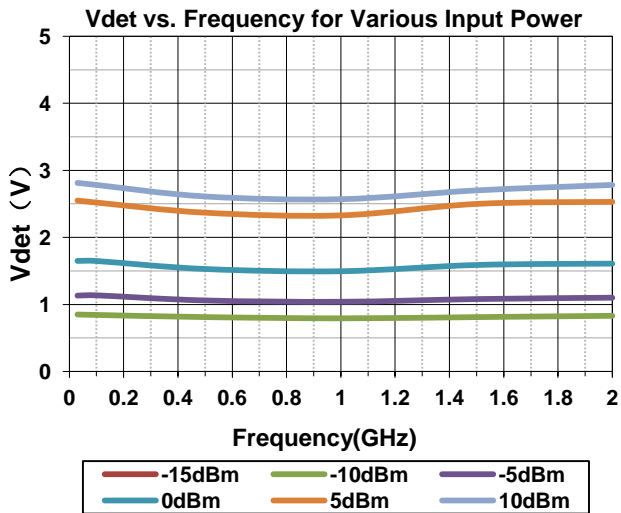


## Application 3(0.03~2GHz BITE)



The circuit is used in built-in test equipment. Resistor R1 sets threshold power. When the input signal is higher than threshold power, the comparator MAX9030 generates output TTL high level. R1: 510ohm~5.1Kohm.

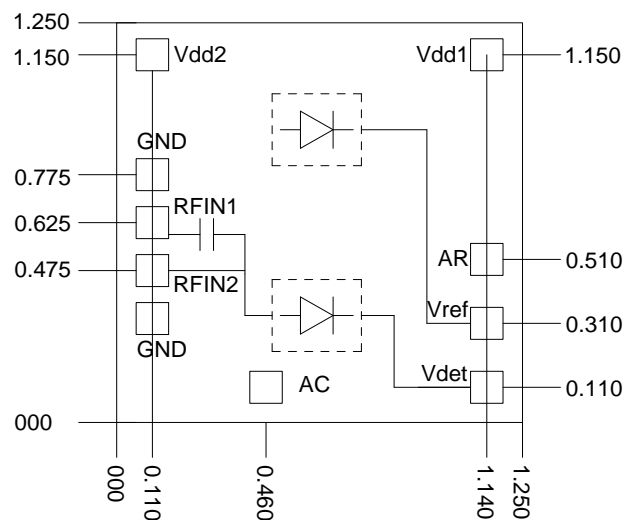
## Application 3 Typical Performance Curve(R1=0Ohm)



### Bill of Material

Reference Des	Value	Part Number	Manuf	Description
C1	330pF	116RM331M050TT	ATC	—
C2	10nF	GRM155R71H103KA88D	MURATA	0402
C3	1000pF	116RM102M050TT	ATC	—
C4	200pF	116RM201M050TT	ATC	—
R1		51Ω~5.1KΩ	MURATA	0603

### Die Outline (all dimensions are in mm)



Chip thickness:100µm

Chip size:1.25×1.25×0.1mm±35µm

Pads size:100/100µm

### ESD CAUTION



**ESD(electrostatic discharge) sensitive device. charged devices an circuit boards can discharge without detection. Damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.**