SAC1001

GaAs MMIC Envelope Detector
DC~20GHz

Rev 2.5

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

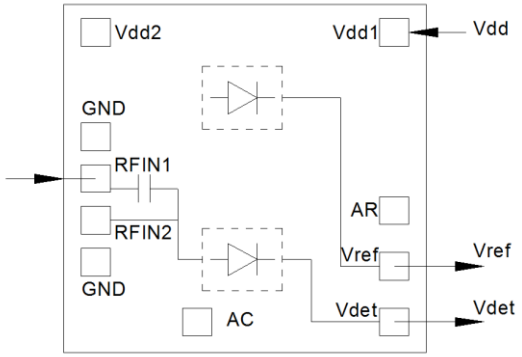
General Description

SAC1001 is an 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℃, V_D=+5V, Z_0=+50Ω

Parameter	Min.	Typ.	Max.	Units
Frequency		DC~20		GHz
Flatness	—	1	—	dB
Dynamic Range	—	30	—	dB
Input VSWR	—	1.6	—	:1
Rise Time	—	100	—	ns
Fall Time	—	300	—	ns
I_D	—	2.5	—	mA

Absolute Maximum Ratings

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

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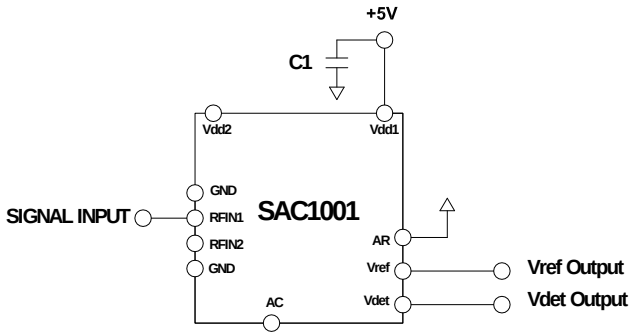
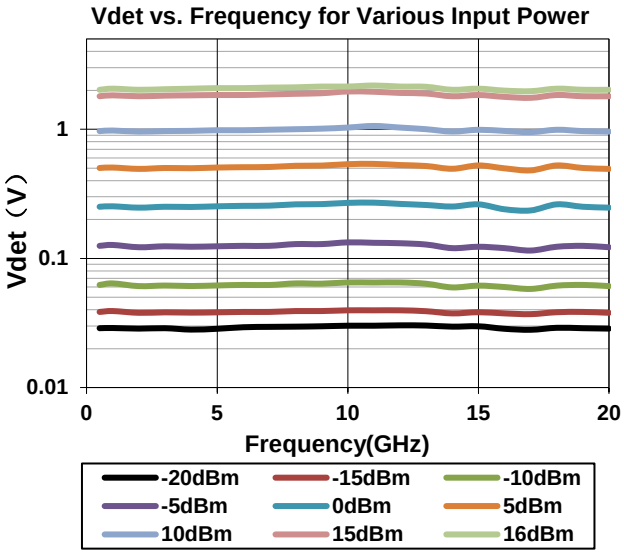
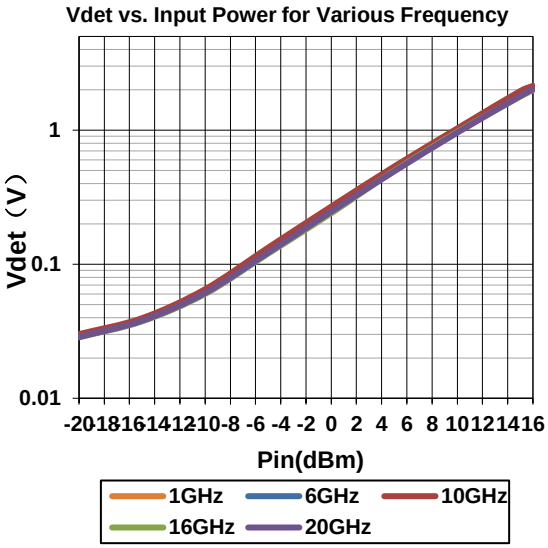
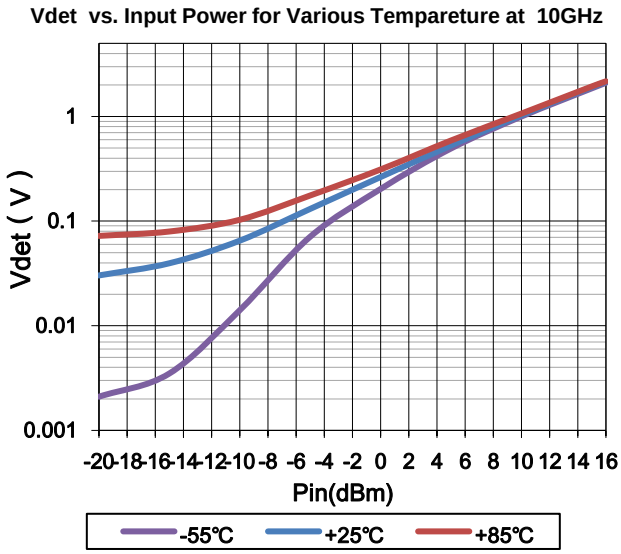
Application 1 (1~20GHz Detector)

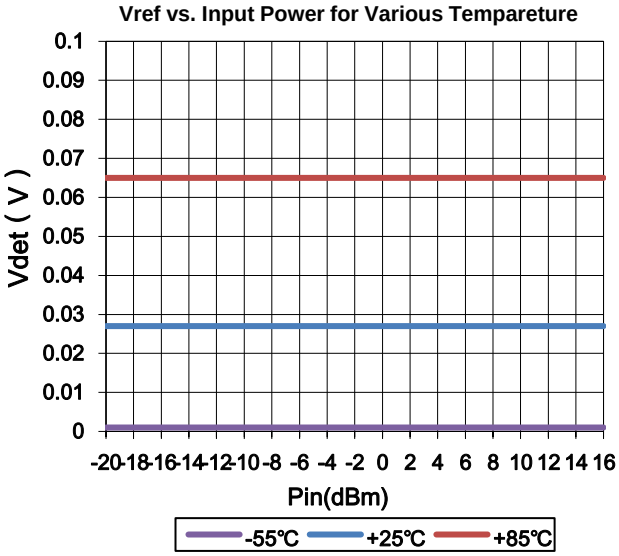


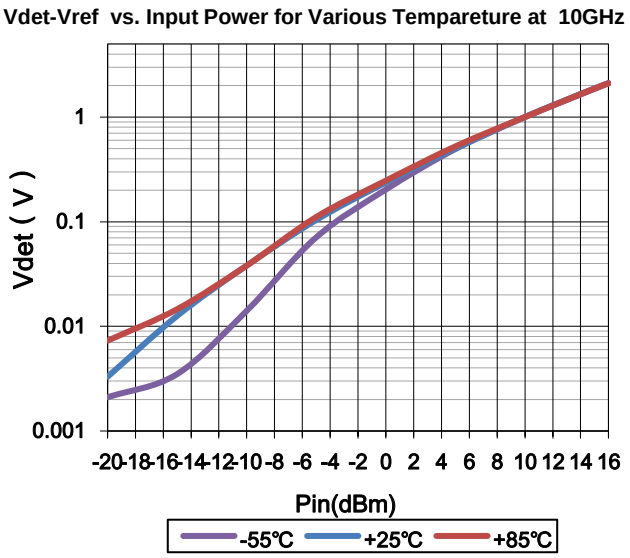
Application 1 Typical Performance Curve

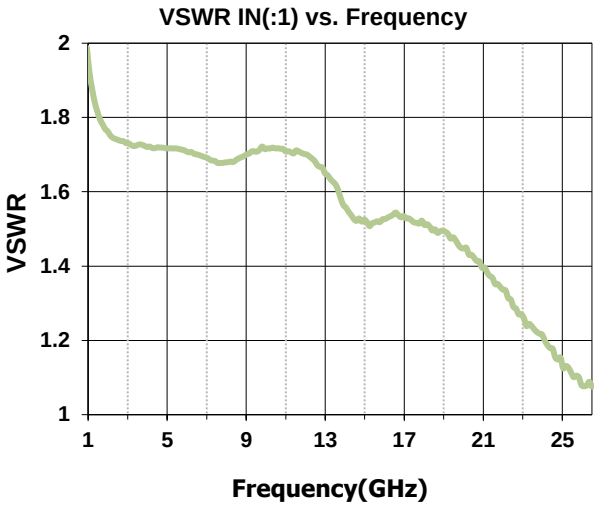




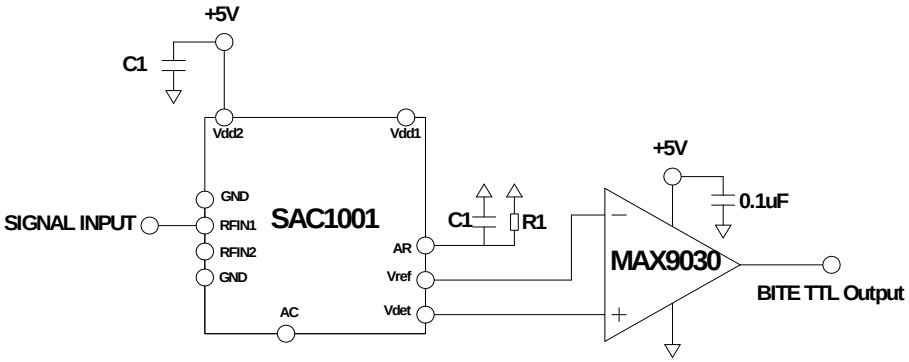








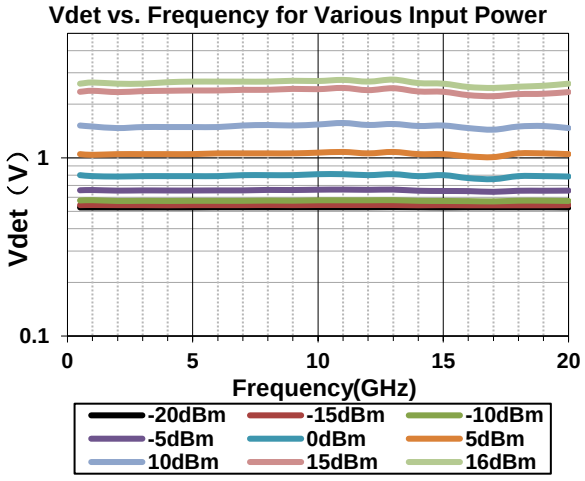
Application 2(1~20GHz BITE)

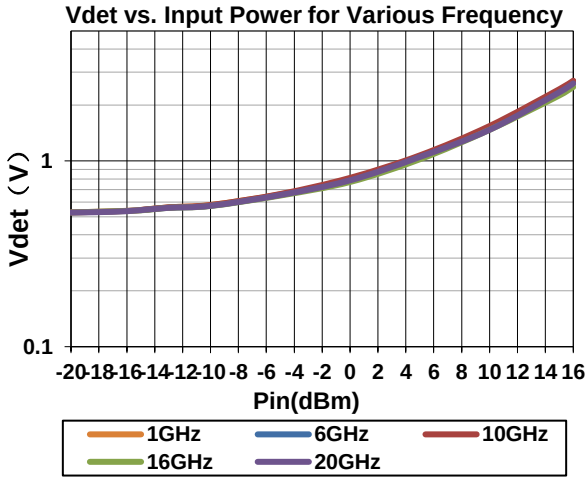


The circuit is used in built-in test equipment. Resistor R1 sets threshold power. When the input signal is higher than threshold power, the comparator MAX9030 generates output TTL high level.

R1: 51Ohm ~ 5.1KOhm.

Application 2 Typical Performance Curve (R1=0Ohm)





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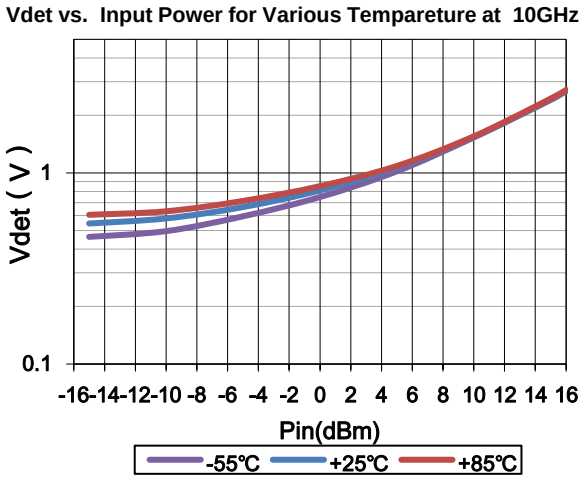
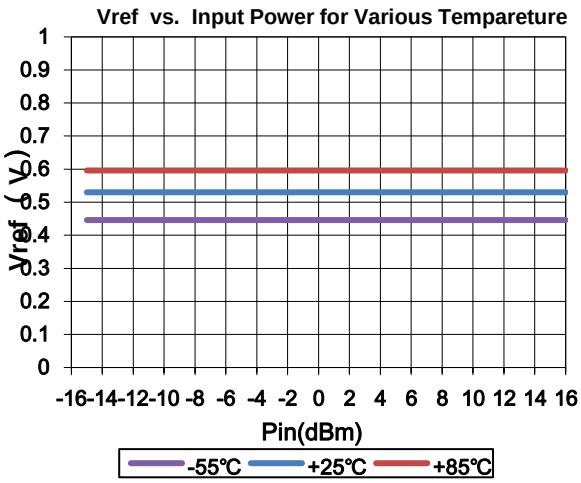
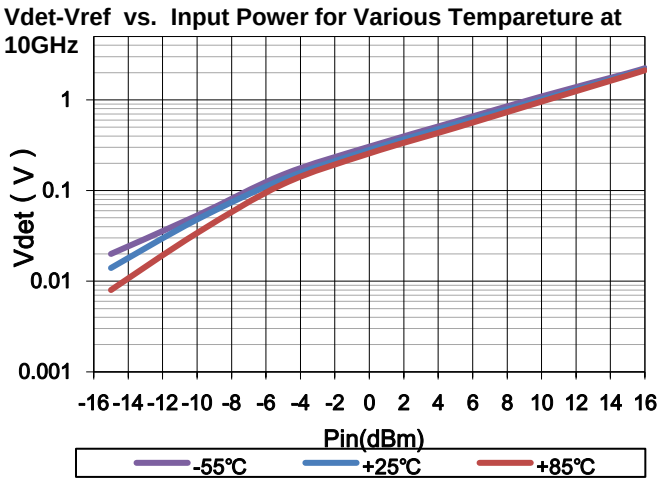
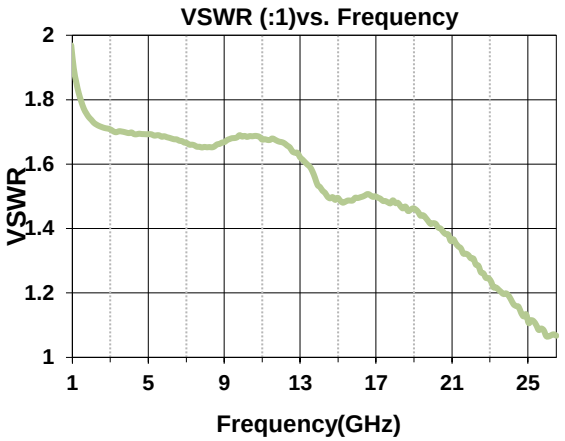
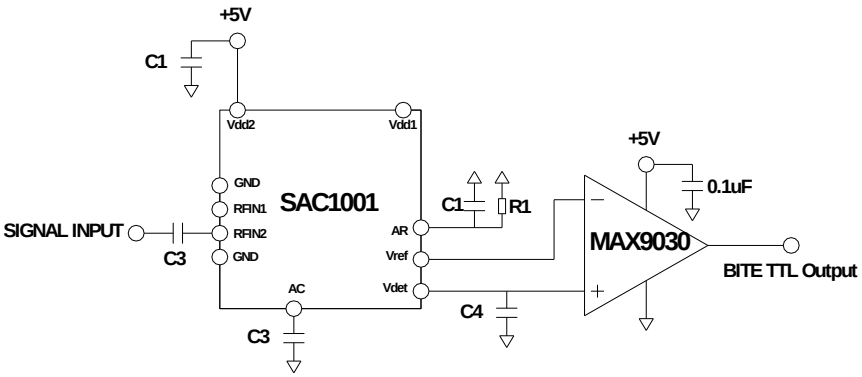








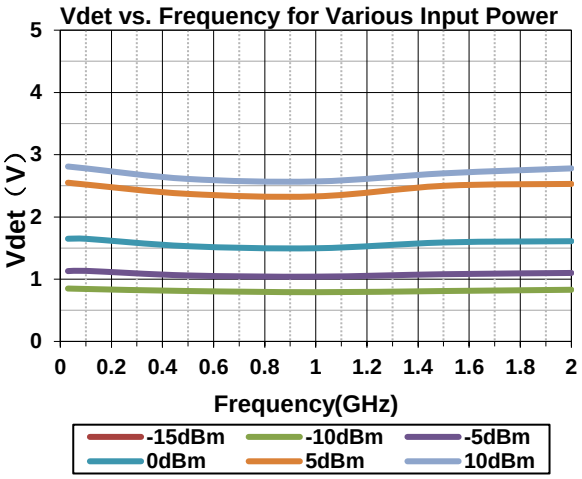
Application 3(0.03~2GHz BITE)

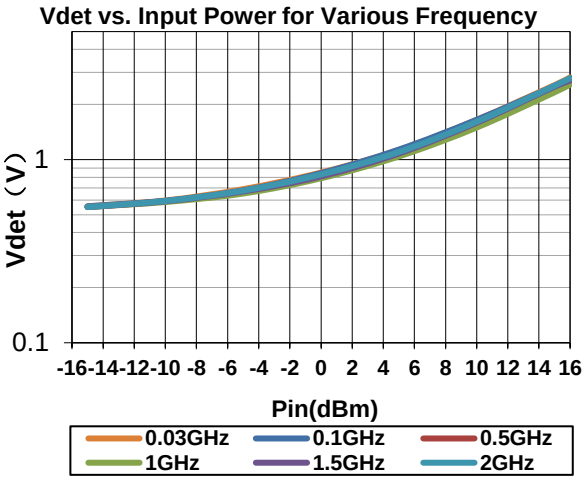


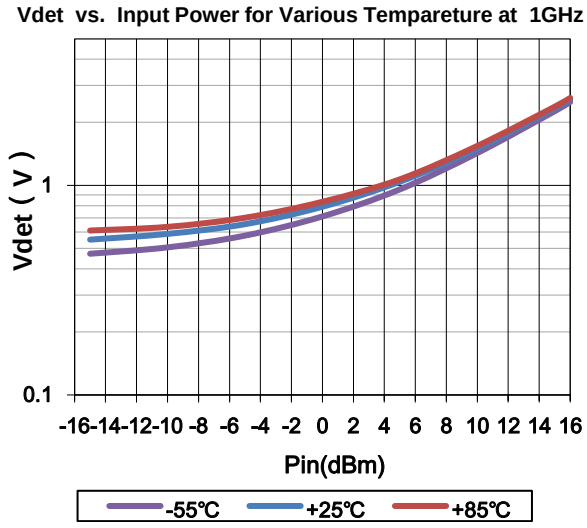
The circuit is used in built-in test equipment. Resistor R1 sets threshold power. When the input signal is higher than threshold power, the comparator MAX9030 generates output TTL high level.

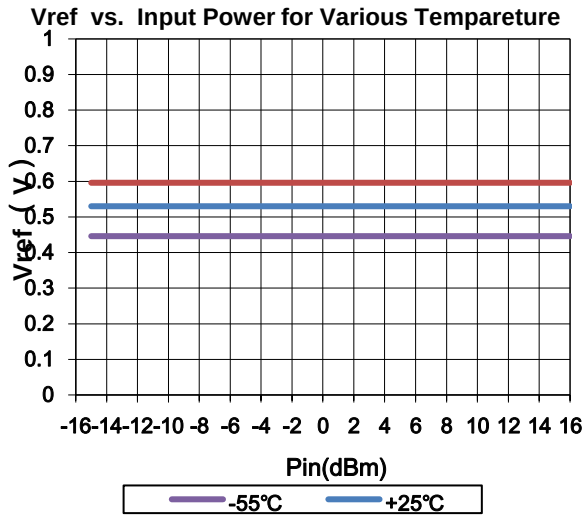
R1: 51Ohm ~ 5.1KOhm.

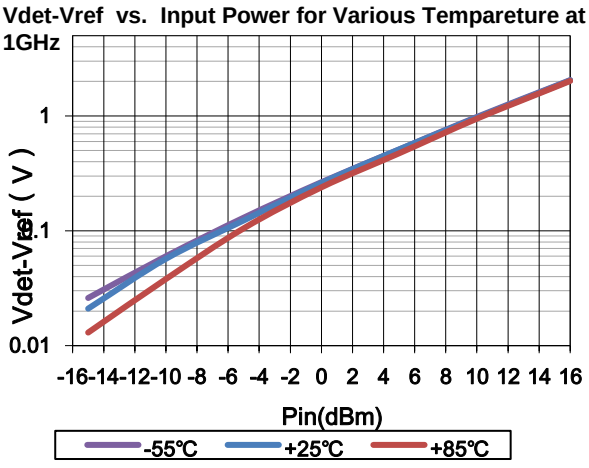
Application 3 Typical Performance Curve(R1=0Ohm)

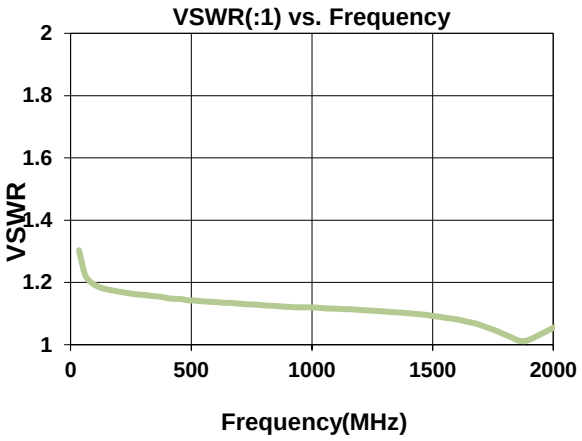












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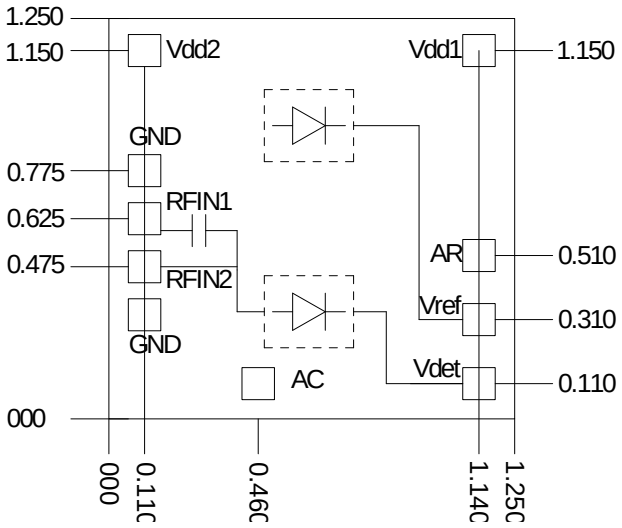
Bill of Material

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 a 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.

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