R&E International

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RE46C114

Ionization Smoke Detector IC

Product Specification

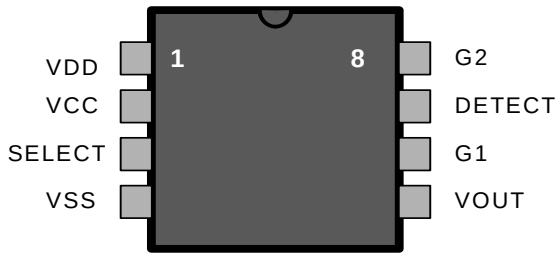
General Description

The RE46C114 is an ionization type smoke detector IC. It is intended for applications using ionization type chambers to detect smoke. When enabled, VOUT is 1/2 of either the DETECT input or VDD depending on the status of the SELECT input. When the Select input is allowed to float the circuit is in the low current mode with only the guard amplifier enabled.
Utilizing low power CMOS technology the RE46C114 was designed for use in smoke detectors that comply with Underwriters Laboratory Specification UL217.

Features

- Guard Outputs for Ion Detector Input
- ± 0.75pA Detect Input Current
- Microprocessor A/D Compatible Analog Output
- Low Quiescent Current Consumption (<10uA)
- Available in 8L PDIP or 8L N SOIC
- 2000V ESD Protection (HBM)
- Available in Standard Packaging or RoHS compliant Pb free packaging

Pin Configuration



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNITS
Supply Voltage	V_{DD}	12.5	V
Supply Voltage	V_{CC}	6	V
Detect Input Voltage Range	V_{INDET}	V_{DD} +.3	V
SELECT Input Voltage Range	V_{INSEL}	V_{CC} +.3	V
Operating Temperature	T_A	-10 to 60	°C
Storage Temperature	T_{STG}	-55 to 125	°C
Maximum Junction Temperature	T_J	150	°C

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only and operation at these conditions for extended periods may affect device reliability.

This product utilizes CMOS technology with static protection; however proper ESD prevention procedures should be used when handling this product. Damage can occur when exposed to extremely high static electrical charge

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Electrical Characteristics at TA = 25°C, VDD=9V, VCC=5V, VSS=0V (unless otherwise noted)

Parameter	Symbol	Test Pin	Test Conditions	Limits			
				Min	Typ	Max	Units
Supply Voltage	V_{DD}	1	Operating	6		12	V
	V_{CC}	2	Operating	2.7		5.5	V
Supply Current	I_{DD}	1	SELECT=open, DETECT=4.5V, VDD=9V		3	4.5	uA
		1	SELECT=open, DETECT=6V, VDD=12V		4	5.5	uA
		1	SELECT=VCC or VSS, DETECT=4.5V, VDD=9V		60	90	uA
	I_{CC}	2	SELECT=open, VCC=5V DETECT=4.5V, VDD=9V		2.75	4.3	uA
		2	SELECT=open, VCC=3V, DETECT=6V, VDD=12V		1	1.75	uA
Input Voltage High	V_{ih}	3	SELECT	V_{CC}-.4			V
Input Voltage Low	V_{il}	3	SELECT			0.4	V
Input Leakage	IL_{det}	7	VDD=12V, DETECT=VDD or VSS, 0-40% RH	-0.75		0.75	pA
			VDD=12V, DETECT=VDD or VSS, 85% RH, See Note 1	-1.5		1.5	pA
	IL_{sel}	3	SELECT=VCC or VSS VCC=5V	-15		45	uA
			SELECT=VCC or VSS VCC=3V	-4		15	uA
Offset Voltage	VG_{OS}	6,8		-50		50	mV
Common Mode Voltage	V_{CM}	7	Guard Amplifier	2		V_{DD}-.5	V
Output Impedance		6,8	Guard Amplifier			10	k0
Output Voltage	V_{out}	5	VDD=6V to 12V, SELECT=VSS, RL=10K	-2% - 20mV	.5*V_{DD}	2% + 20mV	V
		5	DETECT= 2V to VDD-.5V, SELECT=VCC, RL=10K	-2% - 20mV	.5*V_{DETECT}	2% + 20mV	V

Note 1: Sample test only

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PIN DESCRIPTIONS

PIN 1 (VDD) - This pin should be connected to the most positive supply potential, typically a 9 Volt battery. The VDD voltage can range between 6V and 12V with respect to VSS. Reverse battery protection must be provided externally.

PIN 2 (VCC) – This positive supply potential can range between 2.7V and 5.5V with respect to VSS and must be less than the VDD voltage. This pin is usually connected to a microprocessor positive supply voltage.

PIN 3 (SELECT) – This input pin determines the function of VOUT. This pin is typically driven by a microprocessor port. The input high level should not exceed VCC. If left floating VOUT is inactive and pulled internally to VSS. If SELECT is at the VIL (low) level then VOUT is nominally 1/2 of the VDD voltage. If SELECT is at the VIH level (high) then VOUT is nominally 1/2 of the DETECT voltage.

PIN 4 (VSS) – This pin is the negative supply potential and is usually connected to ground.

PIN 5 (VOUT) – This analog output is a representation of VDD or DETECT or is at VSS depending on the status of the SELECT input. Typically this output is connected to a microprocessor A to D input to monitor the status of the supply voltage and the ionization chamber voltage.

PIN 6, 8 (G1, G2) – These pins are connected to the internal guard amplifier output and are within ±50mV of the DETECT input. These outputs are always active and help to minimize surface leakage to the DETECT pin.

PIN 7 (DETECT) - This input is typically interfaced to an ionization chamber to sense the presence of smoke. Input leakage is less than ±.75pA on this input.

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Functional Block Diagram

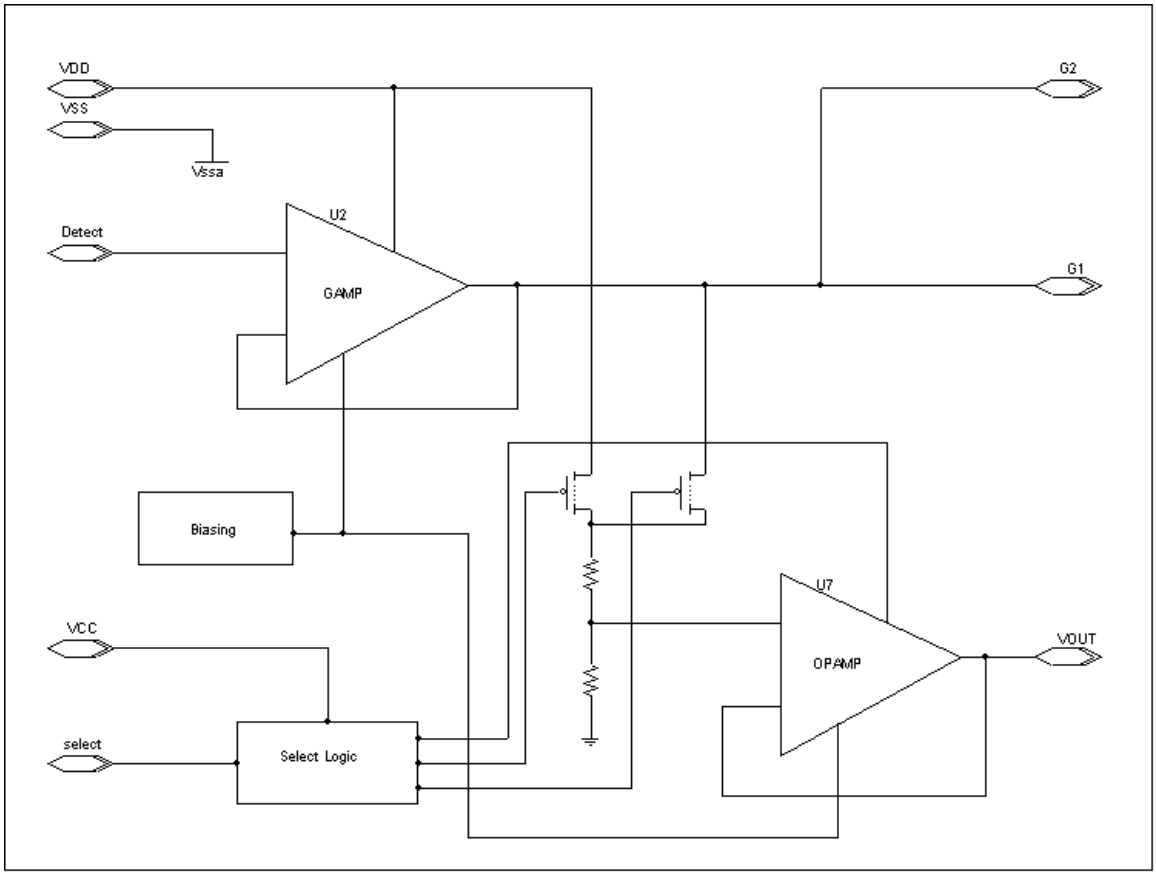


Figure 1

Typical Application

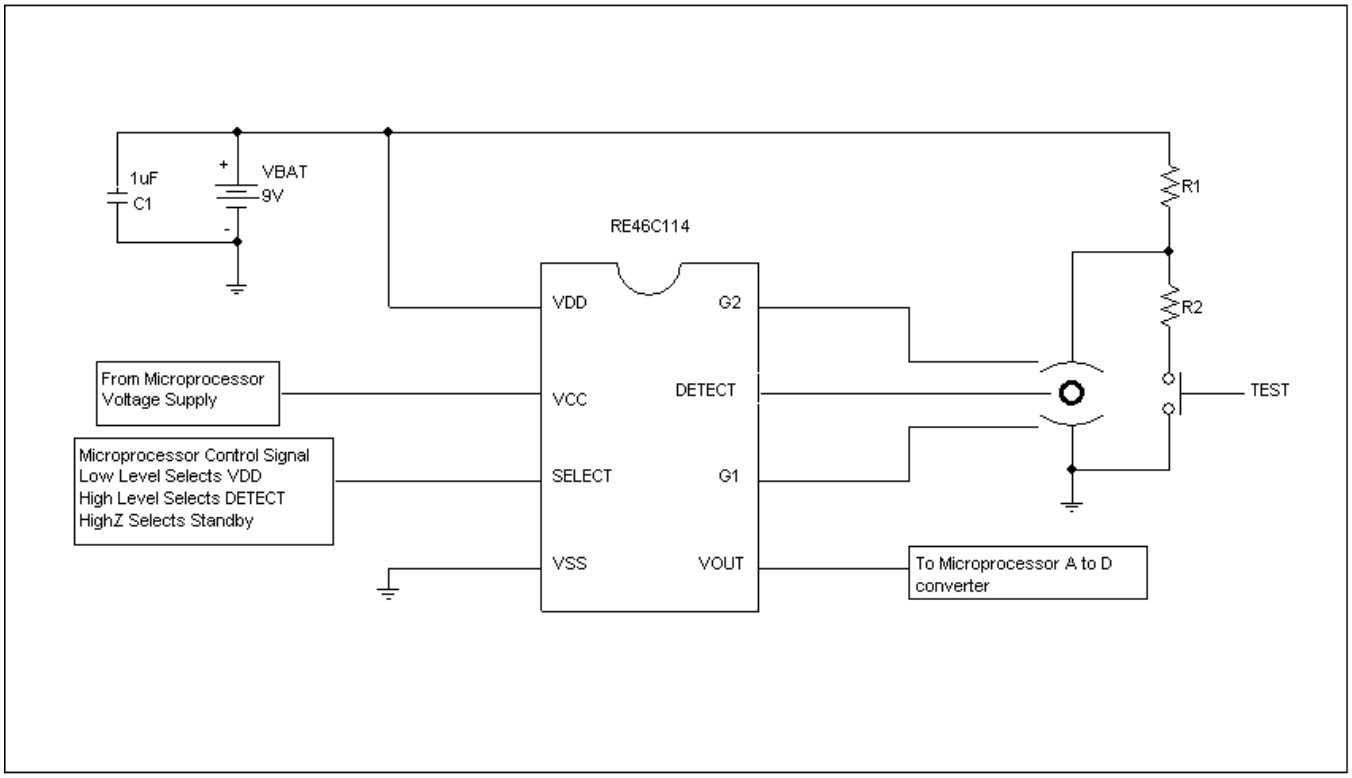


Figure 2

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