Analog Switches

AM1000,AM1001,AM1002 silicon N-channel high speed analog switch

general description

The AM1000 series are junction FET integrated circuit analog switches. These devices commutate faster and with less voltage spiking than any other analog switch presently available. By comparison, discrete JFET switches require elaborate drive circuits to obtain reasonable performance for high toggle rates. Encapsulated in a four pin TO-72 package, these units require a minimum of circuit board area. Switching transients are greatly reduced by a monolithic integrated circuit process. The resulting analog switch device provides the following features:

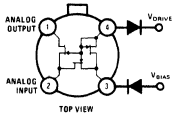
- Low ON Resistance 30Ω
- High Analog Signal Frequency 100 MHz
- High Toggle Rate 4 MHz
- Low Leakage Current 250 pA
- Large Analog Signal Swing ±15V
- Break Before Make Action

The AM1000 series of analog switches are particularly suitable for the following applications:

- High Speed Commutators
- Multiplexers
- Sample and Hold Circuits
- Reset Switching
- Video Switching

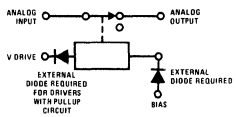
schematic and connection diagram

TO-72 Package



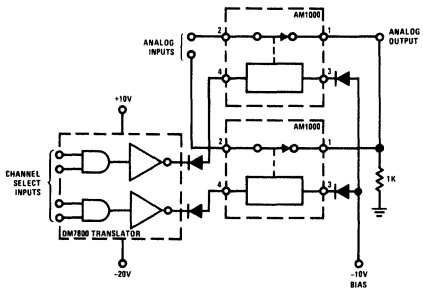
Order Number AM1000H, AM1001H or AM1002H
See Package 9A

equivalent circuit

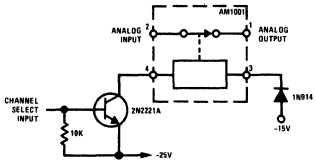


typical applications

±10 Volt Swing Analog Switch 0.5% Accuracy



±15 Volt Swing Analog Switch



absolute maximum ratings

	AM1001	AM1000 AM1002
V_{IN} (Note 1)	+50V	+40V
V_{OUT} (Note 1)	+50V	+40V
V_{DRIVE} (Note 1)	-50V	-40V
V_{BIAS} (Note 1)	+50V	+40V

Power Dissipation @ T_A = 25°C	300 mW
Linear Derating Factor	1.7 mW/°C
Power Dissipation @ T_C = 125°C	150 mW
Linear Derating Factor	6 mW/°C
Maximum Junction Operating Temperature	-55°C to +150°C
Storage Temperature	+200°C
Lead Temperature (Soldering, 10 sec)	+300°C

electrical characteristics

ON CHARACTERISTICS (Note 2)

PARAMETER	CONDITION		MIN	TYP	MAX	UNITS
R_{ON}	V_{DRIVE} = +15V, V_{BIAS} = -15V I_{IN} = 1 mA, V_{OUT} = 0V	AM1001	20	40	50	Ω
R_{ON}	V_{DRIVE} = +10V V_{BIAS} = -10V I_{IN} 1 mA, V_{OUT} = 0V	AM1000 AM1002	20 20	25 50	30 100	Ω Ω

OFF CHARACTERISTICS

PARAMETER	CONDITION	AM1000 AM1001			AM1002			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
$I_{OUT(OFF)}$	V_{DRIVE} = -20V, V_{BIAS} = -10V V_{IN} = -10V, V_{OUT} +10V							
	T_A = +25°C		05	25		0.5	1	nA
	T_A = +125°C		025	25		0.2	1	μA
$I_{OUT(OFF)}$	V_{DRIVE} = -20V, V_{BIAS} = -10V V_{IN} = +10V, V_{OUT} = -10V							
	T_A = +25 C		05	25		0.5	1	nA
	T_A = +125 C		05	25		0.2	1	μA

DRIVE CHARACTERISTICS (Note 3)

PARAMETER	CONDITION	MIN	TYP	MAX	UNITS
I_{DRIVE} (Switch OFF)	V_{DRIVE} = -20V, V_{BIAS} = -10V AM1000, 1001, 1002 V_{IN} = ±10V, V_{OUT} = ±10V		5	10	mA

SWITCHING CHARACTERISTICS

PARAMETER	CONDITION	AM1000 MAX	AM1001 MAX	AM1002 MAX	UNITS
t_{ON}	See Switching Time Test Circuit	100	150	200	ns
t_{OFF}		100	100	100	ns

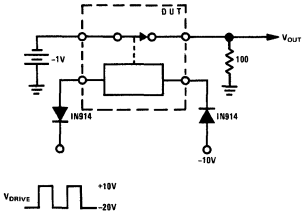
Note 1: The maximum voltage ratings may be applied between any pin or pins simultaneously. Power dissipation may be exceeded in some modes if the voltage pulse exceeds 10 ms. Normal operation will not cause excessive power dissipation even in a dc switching application.

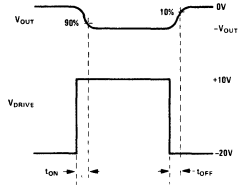
Note 2: All parameters are measured with external silicon diodes. See electrical connection diagram for proper diode placement

Note 3: I_{BIAS} (Switch OFF) is equal to I_{DRIVE} (Switch OFF). $I_{(BIAS)}$ (Switch ON), is equal to external diode leakage.

Note 4: Rise and fall times of V_{DRIVE} shall be 15 ns maximum for switching time testing.

switching time test circuit and waveforms





8