High Speed Quad SPST Analog Switch

ABSOLUTE MAXIMUM RATINGS

Supply Voltage (Between Pins 4 and 13) 36V
Digital Input Voltage (Pins 1, 8, 9, 16) ..... $+V_{SUPPLY}$ +4V
$-V_{SUPPLY}$ −4V
Analog Input Voltage (S to D) ..... $+V_{SUPPLY}$ +2.0V
Pins 2, 3, 6, 7, 10, 11, 14, 15 ..... $-V_{SUPPLY}$ −2.0V
Peak Current, S or D 80mA
Total Power Dissipation (Note 1) 750mW

Maximum Junction Temperature ..... 175°C
Operating Temperature
MAX334M ..... −55°C to +125°C
MAX334E ..... −40°C to +85°C
MAX334C ..... 0°C to +70°C
Storage Temperature ..... −65°C to +150°C

Stresses listed under "Absolute Maximum Ratings" may be applied (one at a time) to devices without resulting in permanent damage. These are stress ratings only, and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to Absolute Maximum Ratings conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V^+ = +15V, V^- = −15V, V_{AH} (Logic Level High) = 3.0V, V_{AL} (Logic Level Low) = +0.8V, GND = 0V, unless otherwise specified.)

PARAMETER		TEMPERATURE	MAX334M/E			MAX334C			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
ANALOG SWITCH CHARACTERISTICS									
V_S, Analog Signal Range		Full	−15		+15	−15		+15	V
R_{ON}, On Resistance (Note 2)		+25°C		30	50		30	50	Ω
		Full			75			75	
R_{ON} Match		+25°C		3			3		%
$I_{S(OFF)}$, Off Input Leakage Current	V_S = 14V, V_D = −14V	+25°C	−1	.3	1	−1	.3	1	nA
	V_S = −14V, V_D = 14V	Full	−100		100	−50		50	
$I_{D(OFF)}$, Off Output Leakage Current	V_D = 14V, V_S = −14V	+25°C	−1	.3	1	−1	.3	1	nA
	V_D = −14V, V_S = 14V	Full	−100		100	−50		50	
$I_{D(ON)}$, On Leakage Current	V_D = V_S = 14V	+25°C	−1	.1	1	−1	.1	1	nA
	V_D = V_S = −14V	Full	−100		100	−50		50	
DIGITAL INPUT CHARACTERISTICS									
V_{AL} Input Low		+25°C							V
		Full			0.8			0.8	
V_{AH} Input High		+25°C							V
		Full	3.0			3.0			
I_{AL}, Input Leakage Current (Low)		+25°C	−1.0	0.1	1.0	−1.0	0.1	1.0	μA
		Full	−10		10	−10		10	
I_{AH}, Input Leakage Current (High)		+25°C	−1.0	0.1	1.0	−1.0	0.1	1.0	μA
		Full	−10		10	−10		10	

Note 1: Derate 8mW/°C above T_A = 75°C, θ_{JA} = 100°C/W, θ_{JC} = 60°C/W
Note 2: V_{OUT} = ±10V, I_{OUT} = 1mA
Note 3: R_L = 1kΩ, C_L = 35pF, V_{IN} = +10V, V_A = +3V (See Switching Waveforms)
Note 4: V_A = 3V, R_L = 1kΩ, C_L = 10pF, V_{IN} = 3Vrms, f = 100kHz
Note 5: V_A = 3V, R_L = 1kΩ, f = 100kHz, V_{IN} = 3Vrms
Note 6: C_L = 1000pF, V_{IN} = 0V, R_{IN} = 0Ω, $\Delta Q = C_L \times \Delta V_O$
Note 7: V_A = 3V or V_A = 0 for all switches
Note 8: t_{BBM} is fastest turn-on time (of the four switches) minus the slowest turn-off time.

ELECTRICAL CHARACTERISTICS (Continued)

(V^+ = +15V, V^- = -15V, V_{AH} (Logic Level High) = 3.0V, V_{AL} (Logic Level Low) = +0.8V, GND = 0V, unless otherwise specified.)

PARAMETER		TEMPERATURE	MAX334M/E			MAX334C			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
SWITCHING CHARACTERISTICS									
t_{ON}, Switch ON Time (Note 3)		+25°C		70	100		70	120	ns
t_{ON}, Switch ON Time (Note 3)		Full		100			125		ns
t_{OFF1}, Switch OFF Time (Note 3)		+25°C		40	50		40	75	ns
t_{OFF1}, Switch OFF Time (Note 3)		Full		50			75		ns
t_{OFF2}, Switch OFF Time (Note 3)		+25°C		150			150		ns
Output Settling Time 0.1%		+25°C		180			180		ns
t_{BBM}, Break-Before-Make (Note 8)		+25°C	10	30			30		ns
"Off Isolation" (Note 4)		+25°C		72			72		dB
Crosstalk (Note 5)		+25°C		86			86		dB
Charge Injection (Note 6)		+25°C		10			10		pC
$C_{S(OFF)}$, Input Switch Capacitance		+25°C		10			10		pF
Output Switch Capacitance	$C_{D(OFF)}$	+25°C		10			10		pF
	$C_{D(ON)}$	+25°C		30			30		
C_A, Digital Input Capacitance		+25°C		18			18		pF
$C_{DS(OFF)}$, Drain-to-Source Capacitance		+25°C		.5			.5		pF
POWER REQUIREMENTS (Note 7)									
P_D, Power Dissipation		+25°C		120			120		mW
		Full							
I^+, Current (Pin 13)		+25°C		4.5			4.5		mA
		Full			10.0			10.0	
I^-, Current (Pin 4)		+25°C		3.5			3.5		mA
		Full			6			6	

Typical Single Supply Operation (V^- = GND, V_S = +10V, R_L = 1000 Ohms)

V^+	$R_{DS(ON)}$ (Ohms)	T_{ON} (ns)	T_{OFF} (ns)	TTL Compatible?	I_{V+} with TTL_{IN} = 3V on all switches
+5*	200	360	25	Yes	6.0μA
+10	85	150	30	Yes	1.5mA
+12	75	140	25	Yes	2.0mA
+15	65	100	25	Yes	4.5mA
+20	55	70	25	Yes	7.0mA
+25	50	50	30	V_{AH} = 4V	10.0mA
+30	45	45	40	V_{AH} = 4V	14.0mA

*V_S = +5V, for this case.

Typical Single Supply Charge Injection (C_L = 1000pF)

V_{ANALOG}	V^+ SUPPLY VOLTAGE				
	+5V	+10V	+15V	+20V	+30V
0V	7pC	10pC	10pC	6pC	12pC
V^+	4pC	6pC	6pC	6pC	14pC

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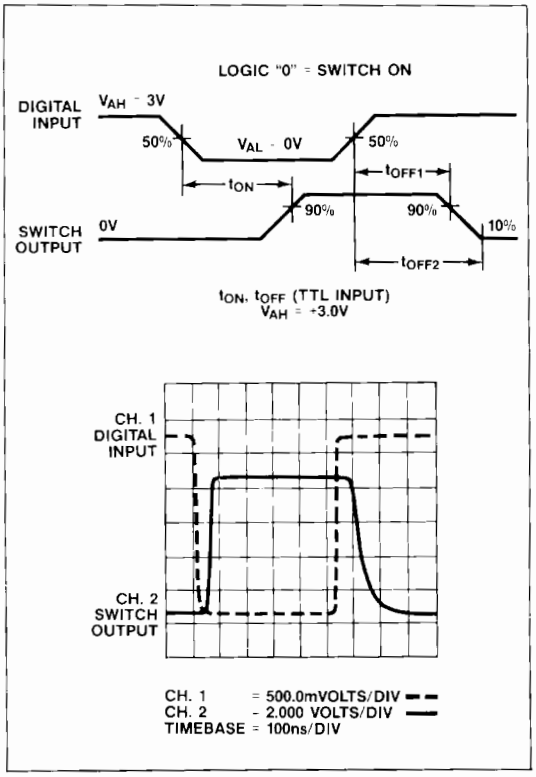
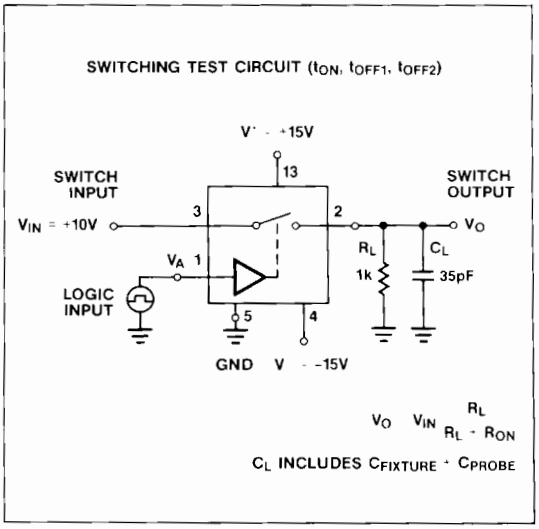
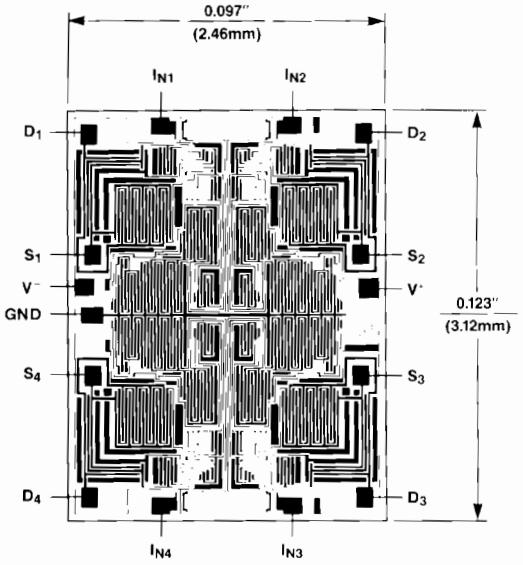
Switching Waveforms



Test Circuit



Chip Topography



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