

Monolithic CMOS Analog Multiplexers

ABSOLUTE MAXIMUM RATINGS

Voltage Referenced to V ⁻	Operating Temperature (A Suffix)	-55°C to 125°C
V ⁺	(B Suffix)	-25°C to 85°C
GND	(C Suffix)	0°C to 70°C
Digital Inputs V _S , V _D (Note 1)	Power Dissipation (Package)*	
-2V to (V ⁺ + 2V) or	28 Pin Ceramic DIP**	1200mW
20mA, whichever occurs first.	28 Pin Plastic DIP***	625mW
Current, Any Terminal Except S or D		
30mA		
Continuous Current, S or D		
20mA		
Peak Current, S or D		
(Pulsed at 1msec, 10% duty cycle max)		
40mA	*All leads soldered or welded to PC board.	
Storage Temperature (A & B Suffix)	**Derate 16mW/°C above 75°C	
-65°C to 150°C	***Derate 8.3mW/°C above 75°C	
(C Suffix)		
-65°C to 125°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, GND = 0V, T_A = 25°C, unless otherwise indicated.)

PARAMETER	SYMBOL	TEST CONDITIONS	DG506AA DG507AA			DG506AB/C DG507AB/C			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
SWITCH									
Analog Signal Range	V _{ANALOG}		-15		15	-15		15	V
Drain-Source ON Resistance	r _{DS(on)}	Sequence Each Switch On	V _D = 10V, I _S = -200μA		270	400	270	450	Ω
		V _{AL} = 0.8V, V _{AH} = 2.4V, V _{EN} = 2.4V	V _D = -10V, I _S = -200μA		230	400	230	450	
Greatest Change in Drain-Source ON Resistance Between Channels	Δr _{DS(on)}	Δr _{DS(on)} = $\left(\frac{r_{DS(on)MAX} - r_{DS(on)MIN}}{r_{DS(on)AVE}} \right)$ -10V ≤ V _S ≤ 10V	6			6			%
Source OFF Leakage Current	I _{S(off)}		V _S = 10V, V _D = -10V	-1	0.002	1	-5	0.002	5
			V _S = -10V, V _D = 10V	-1	-0.005	1	-5	-0.005	5
Drain OFF Leakage Current	I _{D(off)}	V _{EN} = 0.8V V _{AL} = 0.8V	V _D = 10V, V _S = -10V	-10	0.02	10	-20	0.02	20
			V _D = -10V, V _S = 10V	-10	-0.03	10	-20	-0.03	20
			V _D = 10V, V _S = -10V	-5	0.007	5	-10	0.007	10
			V _D = -10V, V _S = 10V	-5	-0.015	5	-10	-0.015	10
Channel ON Leakage Current	I _{D(on)} ⁴	Sequence Each Switch On V _{AL} = 0.8V, V _{AH} = 2.4V, V _{EN} = 2.4V	V _{S(all)} = V _D = 10V	-10	0.03	10	-20	0.03	20
			V _{S(all)} = V _D = -10V	-10	-0.06	10	-20	-0.06	20
			V _{S(all)} = V _D = 10V	-5	0.015	5	-10	0.015	10
			V _{S(all)} = V _D = -10V	-5	-0.03	5	-10	-0.03	10
INPUT									
Address Input Current, Input Voltage High	I _{AH}	V _A = 2.4V	-10	-0.002		-10	-0.002		μA
		V _A = 15V		0.006	10		0.006	10	
Address Input Current, Input Voltage Low	I _{AL}	All V _A = 0	V _{EN} = 2.4V	-10	-0.002		-10	-0.002	μA
			V _{EN} = 0	-10	-0.002		-10	-0.002	

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ELECTRICAL CHARACTERISTICS (Continued)

($V^+ = 15V$, $V^- = -15V$, GND = 0V, $T_A = 25^\circ C$, unless otherwise indicated.)

PARAMETER	SYMBOL	TEST CONDITIONS	DG506AA DG507AA			DG506AB/C DG507AB/C			UNITS
			MIN (Note 2)	TYP (Note 3)	MAX (Note 3)	MIN (Note 2)	TYP (Note 3)	MAX (Note 3)	
DYNAMIC									
Switching Time Of Multiplexer	$t_{\text{transition}}$	See Figure 1	0.6	1	0.6				μs
Break-Before-Make Interval	t_{open}	See Figure 3	0.2		0.2				
Enable Turn-ON Time	$t_{\text{on(EN)}}$	See Figure 2	1		1				
Enable Turn-OFF Time	$t_{\text{off(EN)}}$		0.4		0.4				
OFF Isolation ²	OIRR	$V_{\text{EN}} = 0$, $R_L = 1k\Omega$, $C_L = 15pF$ $V_S = 7V_{\text{rms}}$, $f = 500kHz$	68		68				dB
Source OFF Capacitance	$C_{S(\text{off})}$	$V_{\text{EN}} = 0$, $f = 140kHz$	$V_S = 0$		6	$V_D = 0$		6	pF
Drain OFF Capacitance	DG506A		$V_D = 0$		45	$V_D = 0$		45	
	DG507A		$V_D = 0$		23	$V_D = 0$		23	
SUPPLY									
Positive Supply Current	I^+	$V_{\text{EN}} = 0V$ or $5V$, All $V_A = 0$.13	.25	.13	.3			mA
Negative Supply Current	I^-		-.15	-.07	-.25	-.07			

Note 1: Signals on S_X , D_X , or IN_X exceeding V^+ or V^- will be clamped by internal diodes. Limit forward diode current to maximum current ratings.

Note 2: The algebraic convention whereby the most negative value is a minimum, and the most positive value is a maximum, is used in this data sheet.

Note 3: Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

Note 4: $I_{D(\text{on})}$ is leakage from driver into "ON" switch.

Note 5: OFF isolation = $20 \log \frac{V_D}{V_S}$, V_S = input to "OFF" switch, V_D = output due to V_S .

DG506A/DG507A

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ELECTRICAL CHARACTERISTICS (Over Temperature)

($V^+ = 15V$, $V^- = -15V$, GND = 0V, T_A = Over Temperature Range, unless otherwise indicated.)

PARAMETER	SYMBOL	TEST CONDITIONS	DG506AA DG507AA			DG506AB/C DG507AB/C			UNITS	
			MIN (Note 2)	TYP (Note 3)	MAX (Note 3)	MIN (Note 2)	TYP (Note 3)	MAX (Note 3)		
SWITCH										
Analog Signal Range	V_{ANALOG}		-15		15	-15		15	V	
Drain-Source ON Resistance	$r_{DS(on)}$	Sequence Each Switch On $V_{AL} = 0.8V$, $V_{AH} = 2.4V$, $V_{EN} = 2.4V$	$V_D = 10V$, $I_S = -200\mu A$		500			550	Ω	
			$V_D = -10V$, $I_S = -200\mu A$		500			550		
Source OFF Leakage Current	$I_{S(off)}$	$V_{EN} = 0.8V$ $V_{AL} = 0.8V$	$V_S = 10V$, $V_D = -10V$	-50	50	-50		50	nA	
Drain OFF Leakage Current	DG506A DG507A		$I_{D(off)}$	$V_S = -10V$, $V_D = 10V$	-50	50	-50			50
				$V_D = 10V$, $V_S = -10V$	-300	300	-300			300
				$V_D = -10V$, $V_S = 10V$	-300	300	-300			300
				$V_D = 10V$, $V_S = -10V$	-200	200	-200			200
Channel ON Leakage Current	DG506A DG507A		$I_{D(on)}^4$	Sequence Each Switch On $V_{AL} = 0.8V$, $V_{AH} = 2.4V$, $V_{EN} = 2.4V$	$V_{S(All)} = V_D = 10V$	-300	300	-300		
		$V_{S(All)} = V_D = -10V$		-300	300	-300		300		
		$V_{S(All)} = V_D = 10V$		-200	200	-200		200		
		$V_{S(All)} = V_D = -10V$		-200	200	-200		200		
INPUT										
Address Input Current, Input Voltage High	I_{AH}	$V_A = 2.4V$		-30		-30			μA	
			$V_A = 15V$		30		30			
Address Input Current, Input Voltage Low	I_{AL}	All $V_A = 0$	$V_{EN} = 2.4V$	-30		-30				
			$V_{EN} = 0$		30		30			

Note 1: Signals on S_x , D_x , or IN_x exceeding V^+ or V^- will be clamped by internal diodes. Limit forward diode current to maximum current ratings.

Note 2: The algebraic convention whereby the most negative value is a minimum, and the most positive value is a maximum, is used in this data sheet.

Note 3: Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

Note 4: $I_{D(on)}$ is leakage from driver into "ON" switch.

Note 5: OFF isolation = $20 \log \frac{V_D}{V_S}$, V_S = input to "OFF" switch, V_D = output due to V_S .

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DG506A/DG507A

Truth Tables

DG506A					
A ₃	A ₂	A ₁	A ₀	EN	ON SWITCH
X	X	X	X	0	NONE
0	0	0	0	1	1
0	0	0	1	1	2
0	0	1	0	1	3
0	0	1	1	1	4
0	1	0	0	1	5
0	1	0	1	1	6
0	1	1	0	1	7
0	1	1	1	1	8
1	0	0	0	1	9
1	0	0	1	1	10
1	0	1	0	1	11
1	0	1	1	1	12
1	1	0	0	1	13
1	1	0	1	1	14
1	1	1	0	1	15
1	1	1	1	1	16

DG507A				
A ₂	A ₁	A ₀	EN	ON SWITCH
X	X	X	0	NONE
0	0	0	1	1
0	0	1	1	2
0	1	0	1	3
0	1	1	1	4
1	0	0	1	5
1	0	1	1	6
1	1	0	1	7
1	1	1	1	8

Logic "0" = $V_{AL} \leq 0.8V$, Logic "1" = $V_{AH} \geq 2.4V$
 "0" = DON'T CARE

Switching Time Test Circuit

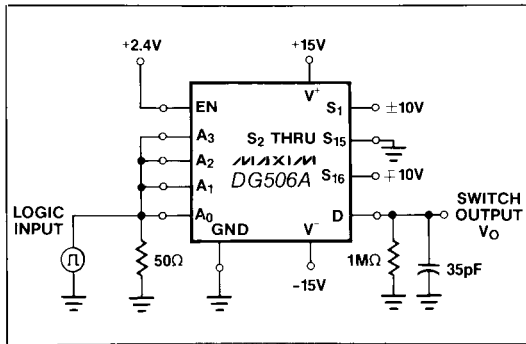


Figure 1A. Transition Switching Time

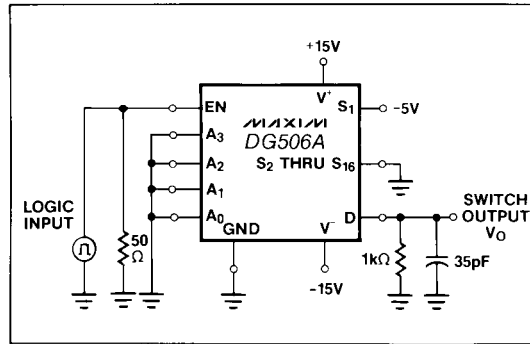


Figure 2A. Enable Switching Time

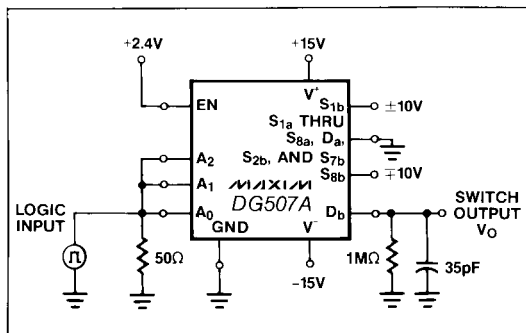


Figure 1B. Transition Switching Time

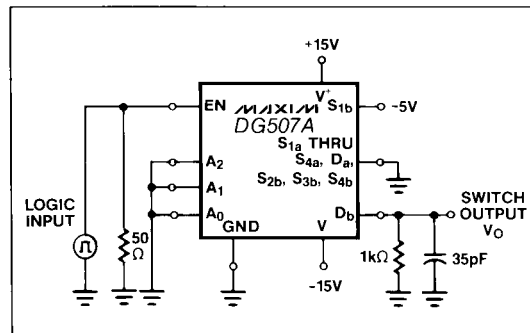


Figure 2B. Enable Switching Time

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Switching Time Test Circuit (continued)

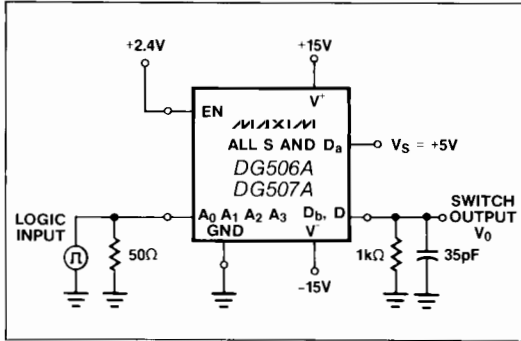


Figure 3. Break-Before-Make

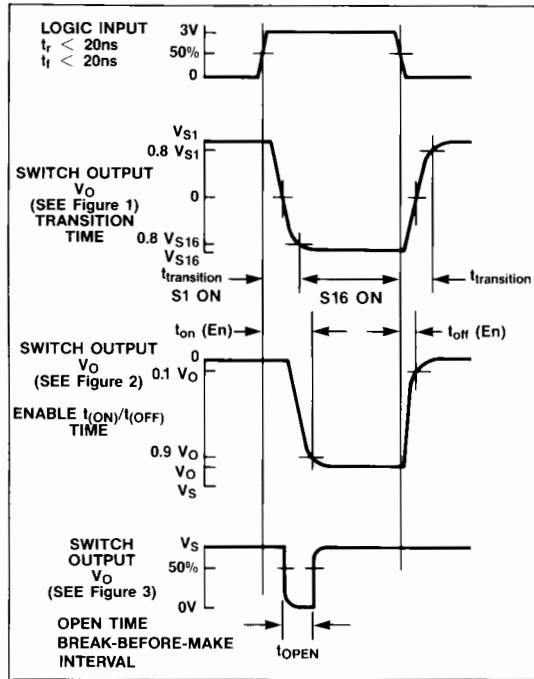
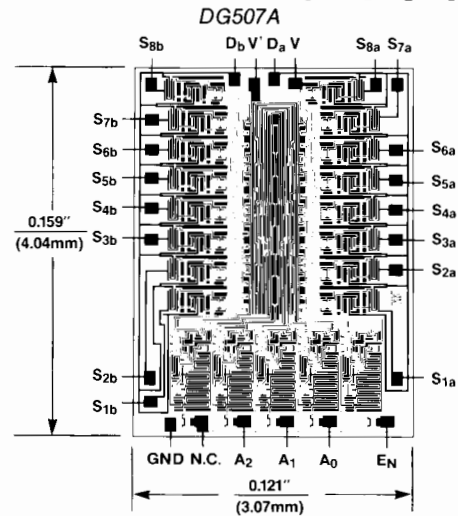
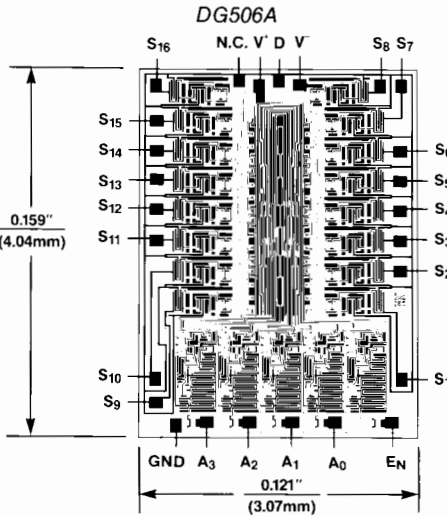


Figure 4. Timing Diagrams for Figures 1, 2, and 3

Chip Topography



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