

# MAXIM

## CMOS, TTL-Compatible Analog Multiplexers

DG506A/DG507A/883B

1

### 1.0 SCOPE

**1.1** This specification covers the detail requirements for two CMOS multiplexers with two configurations—16-channel and dual 8-channel. These circuits are processed in accordance with MIL-STD-883 and are fully compliant to paragraph 1.2.1.

It is highly recommended that this data sheet be used as a baseline for new military or aerospace source control drawings.

For typical applications and operating characteristics, consult Maxim's data books.

### 1.2 Part Numbers

Device	Part Number
-1	DG506AA(X)/883B
-2	DG507AA(X)/883B

### 1.3 Package

(X)	Package	Description
K	K-28	28-Pin Ceramic Dual-In-Line Package (CERDIP)
R	R-28	28-Pin Ceramic Sidebrazed (Ceramic SB)
Z	Z-28	28-Pin Leadless Chip Carrier (LCC)

**Note:** See *Package Information* section for package drawings and dimensions.

### 1.4 Absolute Maximum Ratings

( $T_A = +25^\circ\text{C}$ , unless otherwise noted.)

V+ to V-	44V
V+ to GND	25V
Digital Input Overvoltage Range	-2V to (V+ + 2V)
Current (any terminal except S or D)	30mA
Continuous Current (S or D)	20mA
Peak Current (pulsed at 1ms, 10% duty cycle max)	40mA
Power Dissipation ( $T_A = +70^\circ\text{C}$ , $T_j = +150^\circ\text{C}$ )	
CERDIP (derate 16.67mW/°C above +70°C)	1333mW
Ceramic SB (derate 20.00mW/°C above +70°C)	1600mW
LCC (derate 10.02mW/°C above +70°C)	802mW
Operating Temperature Range	-55°C to +125°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (soldering, 10 sec)	+300°C



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- 1.5 Thermal Resistance**
- $\Theta_{JC} = 25^{\circ}\text{C/W}$  for K-28
  - $\Theta_{JC} = 15^{\circ}\text{C/W}$  for R-28
  - $\Theta_{JC} = 50^{\circ}\text{C/W}$  for Z-28
  - $\Theta_{JA} = 60^{\circ}\text{C/W}$  for K-28
  - $\Theta_{JA} = 50^{\circ}\text{C/W}$  for R-28
  - $\Theta_{JA} = 98^{\circ}\text{C/W}$  for Z-28

## 2.0 REQUIREMENTS

**2.1** Electrical performance characteristics are specified in Table 1 and apply over the full ambient operating temperature range, unless otherwise specified.

**TABLE 1. ELECTRICAL PERFORMANCE CHARACTERISTICS (Note 1)**

CHARACTERISTICS	SYMBOL	CONDITIONS	DEVICE TYPES	GROUP A SUB-GROUPS	LIMITS		UNITS	
					MIN	MAX		
Analog-Signal Range	$V_{ANALOG}$	$V_S = \pm 15V$	All	1, 2, 3	-15	15	V	
Drain-Source On Resistance	$r_{DS(ON)}$	$V_D = \pm 10V, V_{AL} = 0.8V, V_{AH} = 2.4V, I_S = -200\mu A$	All	1, 3		400	$\Omega$	
				2		500		
Source-Off Leakage Current	$I_{S(OFF)}$	$V_{EN} = 0V$	All	$V_S = 10V, V_D = -10V$	1	-1	1	$\mu A$
				$V_S = -10V, V_D = 10V$	2	-50	50	
					1	-1	1	
					2	-50	50	
Drain-Off Leakage Current	$I_{D(OFF)}$	$V_{EN} = 0V$	$V_S = 10V, V_D = -10V$	-1	1	-10	10	$\mu A$
				-2	2	-300	300	
					1	-5	5	
					2	-200	200	
			$V_S = -10V, V_D = 10V$	-1	1	-10	10	
				-2	2	-300	300	
					1	-10	10	
					2	-200	200	
Drain-On Leakage Current	$I_{D(ON)}$	Sequence each channel on, $V_{AL} = 0.8V, V_{AH} = 2.4V$	$V_S = V_D = 10V$	-1	1	-10	10	$\mu A$
				-2	2	-300	300	
					1	-5	5	
					2	-200	200	
			$V_S = V_D = -10V$	-1	1	-10	10	
				-2	2	-300	300	
					1	-5	5	
					2	-200	200	
Input Current with Voltage High	$I_{AH}$	$V_{IN} = 2.4V$	All	1, 3	-10		$\mu A$	
				2	-30			
		$V_{IN} = 15V$		1, 3		10		
				2		30		

# CMOS, TTL-Compatible Analog Multiplexers

DG506A/DG507A/883B

**TABLE 1. ELECTRICAL PERFORMANCE CHARACTERISTICS (Note 1) (continued)**

CHARACTERISTICS	SYMBOL	CONDITIONS	DEVICE TYPES	GROUP A SUB-GROUPS	LIMITS		UNITS
					MIN	MAX	
Input Current With Voltage Low	$I_{AL}$	$V_{EN} = 0V, 2.4V; V_A = 0V$	All	1, 3	-10		$\mu A$
				2	-30		
Positive Supply Current	I+	$V_{EN} = V_A = 0V$	All	1		2.4	mA
Negative Supply Current	I-	$V_{EN} = V_A = 0V$	All	1	-1.5		mA
<b>DYNAMIC</b>							
Transition Time	$t_{TRANS}$	Figure 1	All	9		1	$\mu s$
				10, 11		1.5	

**Note 1:**  $V_+ = 15V, V_- = -15V, GND = 0V, V_{AH} = 2.4V, V_{AL} = 0.8V$ , unless otherwise noted.

### 3.0 QUALITY ASSURANCE

- 3.1** Sampling and inspection procedures shall be in accordance with MIL-M-38510 and, to the extent specified, with MIL-STD-883.
- 3.2** Screening shall be in accordance with Method 5004 of MIL-STD-883. Burn-in test (Method 1015):
- (1) Test condition A, B, C, or D.
  - (2)  $T_A = +125^\circ C$ , minimum.
  - (3) Interim and final electrical test requirements shall be as specified in Table 2.
- 3.3** Quality conformance inspection shall be in accordance with Method 5005 of MIL-STD-883 including Groups A, B, C, and D inspection.
- Group A inspection:
- (1) Tests as specified in Table 2.
  - (2) Selected subgroups in Table 1, Method 5005 of MIL-STD-883 shall be omitted.
- 3.4** Groups C and D inspections:
- a. End-point electrical parameters shall be specified in Table 1.
  - b. Steady-state life test (Method 1005 of MIL-STD-883):
    - (1) Test condition A, B, C, or D.
    - (2)  $T_A = +125^\circ C$ , minimum.
    - (3) Test duration, 1000 hours, except as permitted by Method 1005 of MIL-STD-883.

# CMOS, TTL-Compatible Analog Multiplexers

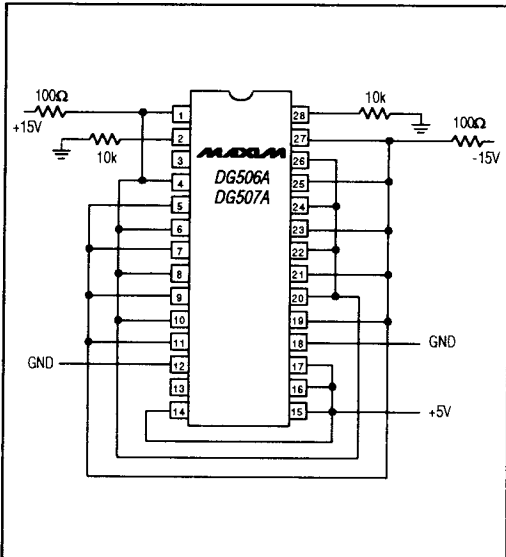
**TABLE 2. ELECTRICAL TEST REQUIREMENTS**

MIL-STD-883 Test Requirements	Subgroups (per Method 5005, Table 1)
Interim Electrical Parameters (Method 5004)	1
Final Electrical Parameters (Method 5004)	1,* 2, 3, 9
Group A Test Requirements (Method 5005)	1, 2, 3, 9, 10,** 11**
Groups C and D End-Point Electrical Parameters (Method 5005)	1

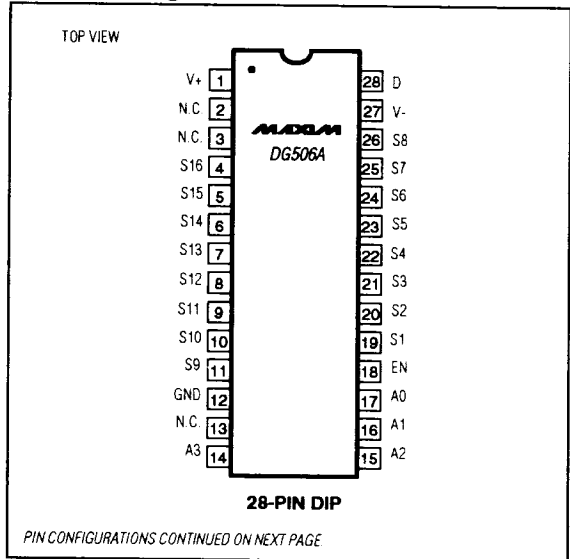
\* PDA applies to Subgroup 1 only.

\*\* Subgroups 10 and 11, if not tested, shall be guaranteed to the limits in Table 1.

## 4.0 Life Test/Burn-In Circuit



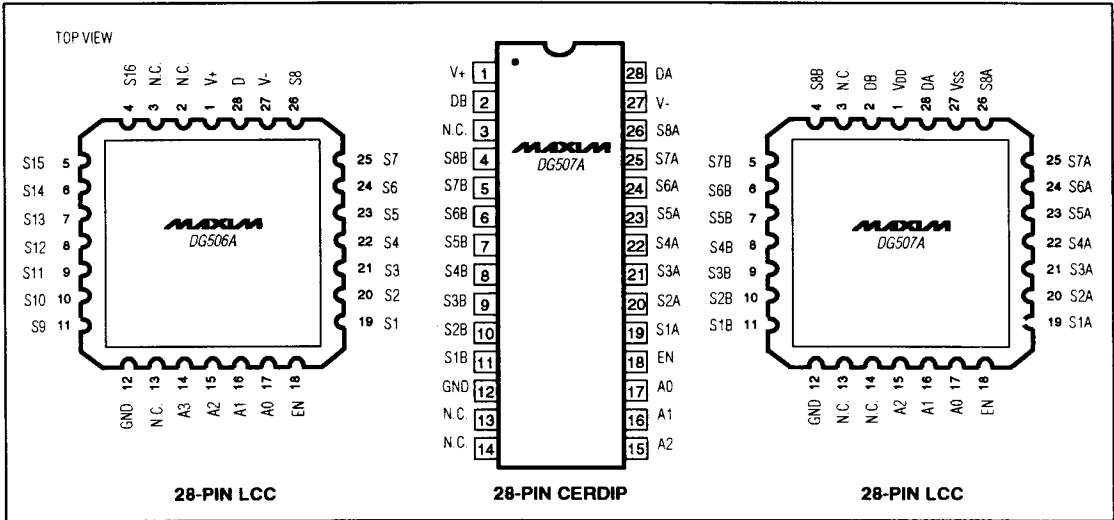
## 4.1 Pin Configurations



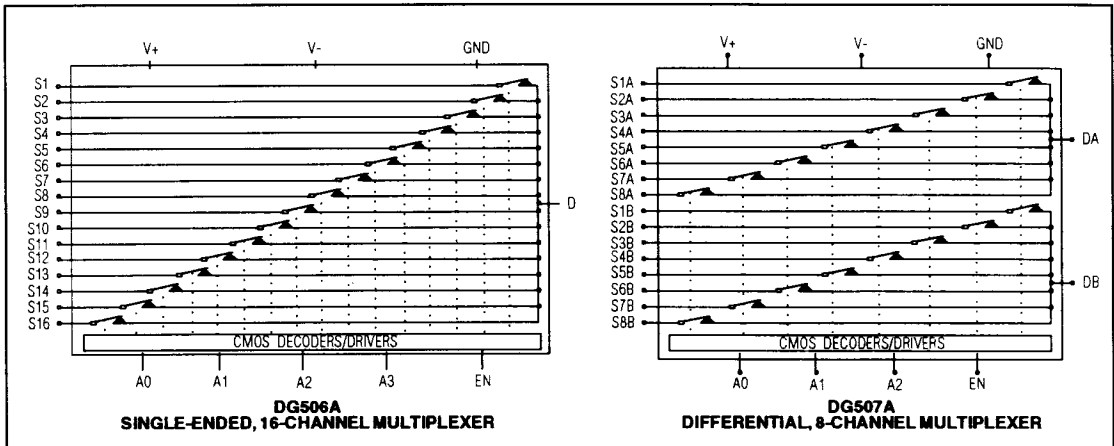
# CMOS, TTL-Compatible Analog Multiplexers

DG506A/DG507A/883B

## 4.1 Pin Configurations (continued)



## 4.2 Functional Diagrams



# CMOS, TTL-Compatible Analog Multiplexers

## 4.3 Truth Tables

DG506A					
A3	A2	A1	A0	EN	On Switch
X	X	X	X	X	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				
A2	A1	A0	EN	On Switch
X	X	X	X	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

## 4.4 Timing Diagram/Test Circuits

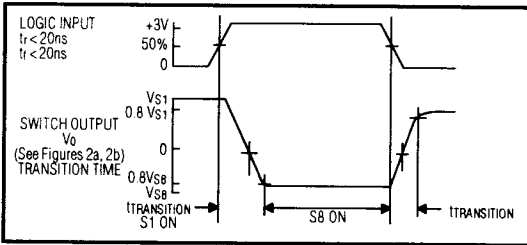


Figure 1. Timing Diagram

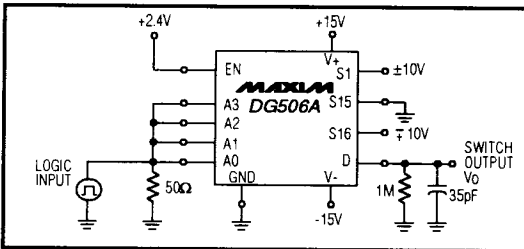


Figure 2a. DG506A Transition Switching Time

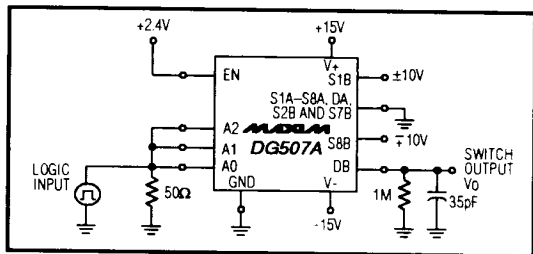


Figure 2b. DG507A Transition Switching Time

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1-128 Maxim Integrated Products, 120 San Gabriel Drive, Sunnyvale, CA 94086 (408) 737-7600

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