ANALOG DEVICES

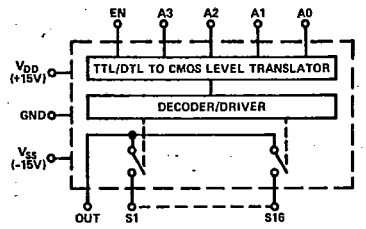
CMOS 8- and 16-Channel Analog Multiplexers

AD7506/AD7507

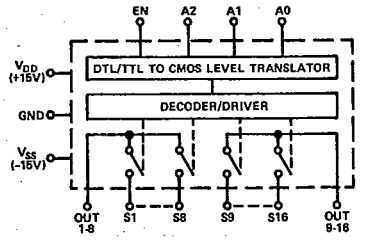
FEATURES

R_{ON}: 300Ω
Power Dissipation: 1.5mW
TTL/DTL/CMOS Direct Interface
Break-Before-Make Switching
Standard 28-Pin DIPs and 28-Terminal Surface Mount Packages

AD7506 FUNCTIONAL BLOCK DIAGRAM



AD7507 FUNCTIONAL BLOCK DIAGRAM

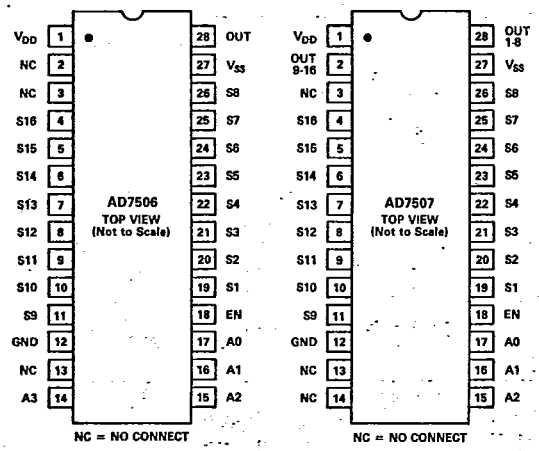


GENERAL DESCRIPTION

The AD7506 is a monolithic CMOS 16-channel analog multiplexer packaged in either a 28-pin DIP or a 28-terminal surface mount package. It switches a common output to one of 16 inputs, depending on the state of four address lines and an "enable". The AD7507 is identical to the AD7506 except it has two outputs switched to two of 16 inputs depending on three binary address states and an "enable".

PIN CONFIGURATIONS

DIP



PLCC AND LCCC (28-TERMINAL)

See expanded version of data sheet.

ABSOLUTE MAXIMUM RATINGS*

(T_A = +25°C unless otherwise noted)

V_{DD} – GND	+17V
V_{SS} – GND	–17V
V Between Any Switch Terminals (see Note 1)	25V
Digital Input Voltage Range	V_{DD} to GND
Overvoltage at V_{OUT} (V_S)	V_{SS}, V_{DD}
Switch Current (I_S, Continuous One Channel)	20mA
Switch Current (I_S, Surge One Channel) 1ms Duration, 10% Duty Cycle	35mA
Power Dissipation (Any Package)	
Up to +50°C	1000mW
Derates above +50°C by	10mW/°C
Operating Temperature	
Commercial (JN, KN, JP, KP Versions)	0 to +70°C
Industrial (JD, KD Versions)	–25°C to +85°C
Extended (SD, TD, SE, TE Versions)	–55°C to +125°C
Storage Temperature	–65°C to +150°C

CAUTION

1. Do not apply voltages higher than V_{DD} and V_{SS} to any other terminal, especially when $V_{SS} = V_{DD} = 0V$ all other pins should be at 0V.
2. The digital control inputs are diode protected; however, permanent damage may occur on unconnected units under high energy electrostatic fields. Keep unused units in conductive foam at all times.

*Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

CAUTION:

ESD (Electro-Static-Discharge) sensitive device. The digital control inputs are Zener protected; however, permanent damage may occur on unconnected devices subject to high energy electrostatic fields. Unused devices must be stored in conductive foam or shunts. The foam should be discharged to the destination socket before devices are removed.

SPECIFICATIONS (V_{DD} = +15V, V_{SS} = −15V unless otherwise noted)

PARAMETER		VERSION[1]	SWITCH CONDITION	@ +25°C	OVER SPECIFIED TEMP. RANGE	TEST CONDITIONS
ANALOG SWITCH						
R_{ON}		J, K	ON	300Ω typ, 450Ω max	550Ω max	V_S = −10V to +10V, I_S = 1mA
		S, T	ON	400Ω max	500Ω max	
R_{ON} vs. V_S		All	ON	15% typ		
R_{ON} vs. Temperature		All	ON	0.5%/°C typ		V_S = 0V, I_S = 1mA
ΔR_{ON} Between Switches		All	ON	4% typ		
R_{ON} vs. Temperature Between Switches		All	ON	0.05%/°C typ		
I_S (OFF)		J, K	OFF	0.05nA typ, 5nA max	50nA max	V_S = −10V, V_{OUT} = +10V
		S, T	OFF	0.05nA typ, 1nA max	50nA max	and
I_{OUT} (OFF)	AD7506	J, K	OFF	0.3nA typ, 20nA max	500nA max	V_S = +10V, V_{OUT} = −10V
		S, T	OFF	0.3nA typ, 10nA max	500nA max	"Enable" Low
	AD7507	J, K	OFF	0.3nA typ, 10nA max	250nA max	
		S, T	OFF	0.3nA typ, 5nA max	250nA max	
$I_{OUT} - I_S$ (Any Switch ON)	AD7506	J, K	ON	0.3nA typ, 20nA max	500nA max	V_S = 0
		S, T	ON	0.3nA typ, 10nA max	500nA max	
	AD7507	J, K	ON	0.3nA typ, 10nA max	250nA max	
		S, T	ON	0.3nA typ, 5nA max	250nA max	
DIGITAL CONTROL						
V_{INL}		J, S			0.8V max	Note 2
		K, T			3.0V min	
V_{INH}					2.4V min	
I_{INL} or I_{INH}		All		10μA max	30μA max	
C_{IN}		All		3pF typ		
DYNAMIC CHARACTERISTICS[3]						
$t_{TRANSITION}$		J, S		700ns typ		V_{IN}: 0 to 3.0V
		K, T		700ns typ, 1000ns max		
t_{OPEN}		All		100ns typ		
t_{ON} (En)		J, S		0.8μs typ		V_{EN}: 0 to 3.0V
		K, T		1.5μs max		
t_{OFF} (En)		J, S		0.8μs typ		
		K, T		1μs max		
"OFF" Isolation		All		70dB typ		V_{EN} = 0, R_L = 200Ω, C_L = 3.0pF, V_S = 3.0V rms, f = 50kHz
C_S		All	OFF	5pF typ		
C_{OUT}	AD7506	All	OFF	40pF typ		
	AD7507	All	OFF	20pF typ		
C_{S-OUT}		All	OFF	0.5pF typ		
C_{SS} Between Any Two Switches		All	OFF	0.5pF typ		
POWER SUPPLY						
I_{DD}		J, K	OFF	0.05mA typ, 1mA max	2mA max	All Digital Inputs Low
		S, T	OFF	0.05mA typ, 1mA max		
I_{SS}		J, K	OFF	0.05mA typ, 1mA max	2mA max	
		S, T	OFF	0.05mA typ, 1mA max		
I_{DD}		J, K	ON	0.3mA typ, 1mA max	2mA max	All Digital Inputs High
		S, T	ON	0.3mA typ, 1mA max		
I_{SS}		J, K	ON	0.05mA typ, 1mA max	2mA max	
		S, T	ON	0.05mA typ, 1mA max		

NOTES
[1] JN, KN, JP and KP versions specified for 0 to +70°C; JD and KD versions for −25°C to +85°C; and SE, TE, SD and TD versions for −55°C to +125°C.
[2] A pullup resistor, typically 1-2kΩ is required to make the J and S versions compatible with TTL/DTL. The maximum value is determined by the output leakage current of the driver gate when in the high state.
[3] AC parameters are sample tested to ensure conformance to specifications.

Specifications subject to change without notice.

TRUTH TABLES

AD7506

A_3	A_2	A_1	A_0	E_N	"ON"
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
X	X	X	X	0	None

AD7507

A_2	A_1	A_0	E_N	"ON"
0	0	0	1	1 & 9
0	0	1	1	2 & 10
0	1	0	1	3 & 11
0	1	1	1	4 & 12
1	0	0	1	5 & 13
1	0	1	1	6 & 14
1	1	0	1	7 & 15
1	1	1	1	8 & 16
X	X	X	0	None

ORDERING INFORMATION[1]

Temperature Range and Package Options[2]

0 to +70°C	−25°C to +85°C	−55°C to +125°C
Plastic DIP (N-28)	Hermetic (N-28)	Hermetic (D-28)
AD7506JN	AD7506JD	AD7506SD
AD7506KN	AD7501KD	AD7506TD
AD7507JN	AD7507JD	AD7507SD
AD7507KN	AD7507KD	AD7507TD
PLCC[3] (P-28A)		LCCC[4] (E-28A)
AD7506JP		AD7506SE
AD7506KP		AD7506TE
AD7507JP		AD7507SE
AD7507KP		AD7507TE

NOTES
[1] To order MIL-STD-883, Class B processed parts, add/883B to part number. Contact your local sales office for military data sheet.
[2] See Section 13 for package outline information.
[3] PLCC: Plastic Leaded Chip Carrier.
[4] LCCC: Leadless Ceramic Chip Carrier.