

## HIGH TEMPERATURE ANALOG MULTIPLEXERS HT506/507 16-CHANNEL SINGLE / 8-CHANNEL DUAL

### FEATURES

- Specified Over -55 to +225°C
- Break-Before-Make Switching
- No Latch-up
- On Resistance 400Ω at 225°C
- 8-Channel Leakage 1.2μA at 225°C
- Split and Single Supply Capability

### APPLICATIONS

- Down-Hole Oil Well
- Avionics
- Turbine Engine Control
- Industrial Process Control
- Nuclear Reactor
- Electric Power Conversion
- Heavy Duty Internal Combustion Engines

### GENERAL DESCRIPTION

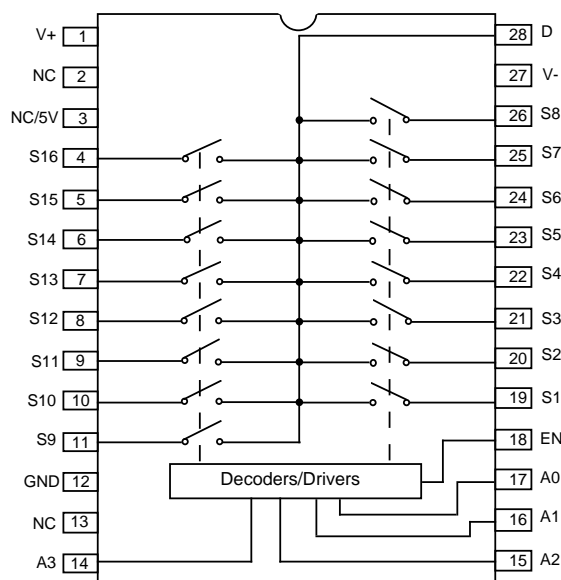
The HT506/507 monolithic multiplexers consist of sixteen analog switches, 4-bit decode for channel selection, reference for logic switching thresholds, and enable pin for device deactivation where applications require. These multiplexers are fabricated with Honeywell's dielectrically isolated latch-up free high temperature (HTMOS™) linear process.

Performance is specified over the full -55 to +225°C temperature range. Typically, parts will operate up to

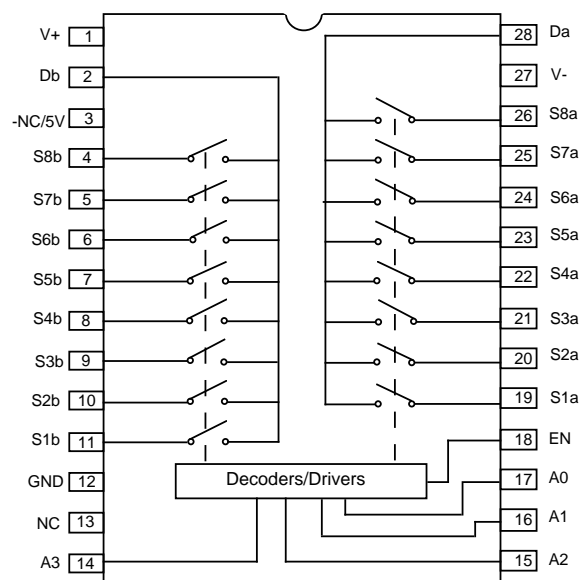
+300°C for a year, with derated performance. All parts are burned in at 250°C to eliminate infant mortality.

The input buffers are designed to operate from either TTL or CMOS levels while providing a break-before-make action. The HT506 switches one of sixteen inputs to a common output, while the HT507 switches one of eight differential inputs to a differential output. These parts are available in standard pinout 28-pin DIPs.

#### PACKAGE PINOUT HT506



#### PACKAGE PINOUT HT507



# HT506/507

## ELECTRICAL CHARACTERISTICS (Split Supply)

Temperature range -55 to +225°C, typical @ +25°C, V+ = +5V, V- = -5 V, V<sub>IL</sub> = 0.8 V, V<sub>IH</sub> = 2.4V, unless otherwise specified

Symbol	Parameter	Test Conditions	Typ (1)	Worst Case (2)		Unit
				Min	Max	
<b>Analog Switch</b>						
V <sub>ANALOG</sub>	Analog Signal Range			-5	5	V
r <sub>DS(ON)</sub>	Drain-Source On-Resistance	V <sub>D</sub> ±5 V, I <sub>S</sub> = -10 mA Sequence Each Switch On	100		400	Ω
Δr <sub>DS(ON)</sub>	r <sub>DS(ON)</sub> Matching between Channels	V <sub>D</sub> = ±5 V	2			%
I <sub>S(OFF)</sub>	Source Off Leakage Current	V <sub>EN</sub> = 0 V	0.01		125	nA
I <sub>D(OFF)</sub>	Drain Off Leakage Current	V <sub>D</sub> = ±0.5 V, V <sub>EN</sub> = 0 V, V <sub>S</sub> = ±5 V	0.04	-2500	2500	nA
I <sub>D(ON)</sub>	Drain On Leakage Current	Sequence Each Switch On	0.04	-2500	2500	nA
<b>Digital Control</b>						
V <sub>IH</sub>	Logic High Input Voltage			2.4		V
V <sub>IL</sub>	Logic Low Input Voltage		0.8			V
I <sub>IH</sub>	Logic High Input Current	V <sub>A</sub> = 2.4 V, 10 V		-1	1	μA
I <sub>IL</sub>	Logic Low Input Current	V <sub>EN</sub> = 0 V, 2.4 V, V <sub>A</sub> = 0 V		-1	1	μA
C <sub>IN</sub>	Logic input Capacitance	f = 1MHz	7			pF
<b>Dynamic Characteristics</b>						
t <sub>ON</sub>	Address/Enable Turn-On Time	trise/tfall<50ns		100	400	ns
t <sub>OFF</sub>	Address/Enable Turn-Off Time	trise/tfall<50ns		30	200	ns
Q	Charge Injection	C <sub>L</sub> = 1 nF, V <sub>S</sub> = 0 V, R <sub>S</sub> = 0Ω	TBD			pC
O <sub>IS</sub>	Off Isolation	V <sub>EN</sub> = 0 V, R <sub>L</sub> = 1kΩ, f = 100kHz	TBD			dB
C <sub>S(OFF)</sub>	Source Off Capacitance	V <sub>EN</sub> = 0 V, V <sub>S</sub> = 0 V, f = 1MHz	TBD			pF
C <sub>D(OFF)</sub>	Drain Off Capacitance	V <sub>EN</sub> = 0 V, V <sub>D</sub> = 0 V f = 1MHz	HT506 HT507	TBD		pF
C <sub>D(ON)</sub>	Drain On Capacitance	V <sub>EN</sub> = 0 V, V <sub>D</sub> = 0 V f = 1MHz	HT506 HT507	TBD		pF
<b>Power Supplies</b>						
I+	Positive Supply Current	V <sub>EN</sub> = V <sub>A</sub> = 0 or 5 V	50		250	μA
I-	Negative Supply Current		-0.01	-20		μA

(1) Typical operating conditions: VDD=5.0 V +10%, TA=25°C, pre-radiation.

(2) Worst case operating conditions: VDD=4.5 V to 5.5 V, -55 to 125°C, post total dose at 25°C.

## ELECTRICAL CHARACTERISTICS (Single Supply)

Temperature range -55 to +225°C, typical @ +25°C,  $V_+ = 10V$ ,  
 $V_- = 0V$ ,  $V_{IL} = 0.8V$ ,  $V_{IH} = 2.4V$ , unless otherwise specified

Symbol	Parameter	Test Conditions	Typ (1)	Worst Case (2)		Unit
				Min	Max	
<b>Analog Switch</b>						
$V_{ANALOG}$	Analog Signal Range		11			V
$r_{DS(ON)}$	Drain-Source On-Resistance	$V_D = 3V, 10V, I_S = 1mA$ Sequence Each Switch On	80		400	$\Omega$
$\Delta r_{DS(ON)}$	$r_{DS(ON)}$ Matching between Channels		2			%
$I_{S(OFF)}$	Source Off Leakage Current	$V_{EN} = 0V$	0.01		200	nA
$I_{D(OFF)}$	Drain Off Leakage Current	$V_S = 0.5V$ or $10V$	0.04	-2000	2000	nA
$I_{D(ON)}$	Drain On Leakage Current	$V_S = V_D = \pm 10V$ equence Each Switch On	0.04	-2500	2500	nA
<b>Dynamic Characteristics</b>						
$t_{TRANS}$	Switching Time of Multiplexer	$V_{S1} = 10V, V_{S8} = 0V, V_{IN} = 2.4V$			400	ns
$t_{ON(EN)}$	Address/Enable Turn-On	trise/tfall<50ns		100	400	ns
$t_{OFF(EN)}$	Address/Enable Turn-Off Time			30	200	
Q	Charge Injection	$C_L = 1nF, V_S = 6V, R_S = 0$	TBD			pC
<b>Power Supplies</b>						
I+	Positive Supply Current	$V_{EN} = 0V$ or $5V, V_A = 0V$ or $5V$	50		250	$\mu A$
I-	Negative Supply Current		-0.01	-20		$\mu A$

(1) Typical operating conditions:  $V_{DD} = 5.0V, T_A = 25^\circ C$ .

(2) Worst case operating conditions:  $V_{DD} = 10V$  to  $\pm 10\%, T_A = -55^\circ C$  to  $+225^\circ C$ .

### TRUTH TABLE—HT506

A3	A2	A1	AO	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

### TRUTH TABLE—HT507

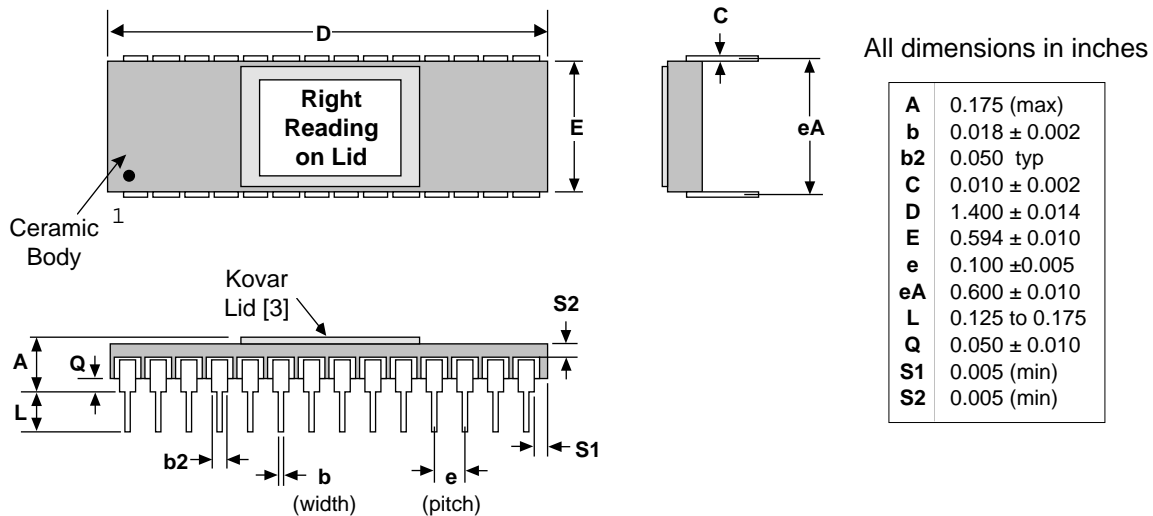
A2	A1	A0	EN	On Switch Pair
X	X	X	0	None
0	0	0	1	1
0	0	1	1	2
0	1	0	1	3
0	1	1	1	4
1	0	0	1	5
1	0	1	1	6
1	1	0	1	7
1	1	1	1	8

Logic "0" =  $V_{AL} \leq 0.8V$   
 Logic "0" =  $V_{AH} \geq 2.4V$   
 X = Don't care

## ABSOLUTE MAXIMUM RATINGS

Voltages Referenced to V-, V+ .....	+15V
Digital Inputs VS, VD .....	-0.5 to VDD +0.5V
Current (any terminal) .....	10 mA
Peak Current, S or D, (Pulsed at 1 ms, 10% Duty Cycle Max) .....	15mA
Storage Temperature .....	-65 to +325°C
Power Dissipation (Package) .....	500 mW
ESD Protection .....	1000V

## 28-LEAD PACKAGE



## ORDERING INFORMATION

### HT506DC

D—Indicates package type  
 D = Standard DIP\*  
 \*For packaging information, call Honeywell

C—Indicates screening level  
 C = Commercial  
 B = High Temperature Class B

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