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# High Temperature Analog Multiplexers

## 16-Channel Single-Ended / 8-Channel Differential

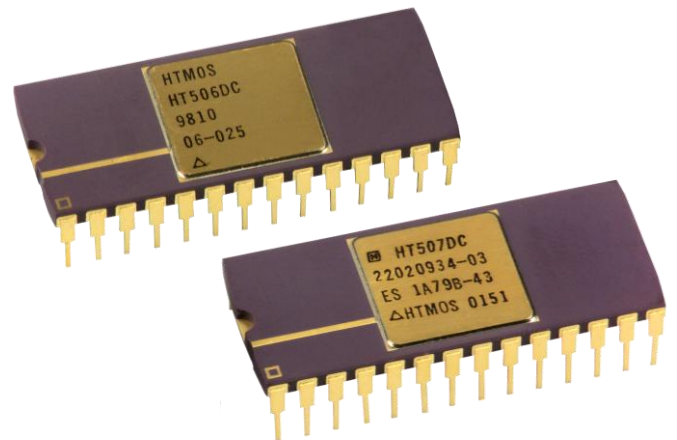
### HT506 / HT507

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The High Temperature HT506/HT507 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. 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 the sixteen single-ended inputs to a common output, while the HT507 switches one of the eight differential inputs to a differential output. These parts are available in standard pinout 28-pin DIP Ceramic Packages.

#### Applications

- Down-Hole Oil, Gas, and Geothermal Well
- Avionics
- Turbine Engine Control
- Industrial Process Control
- Electric Power Conversion
- Heavy Duty Internal Combustion Engine



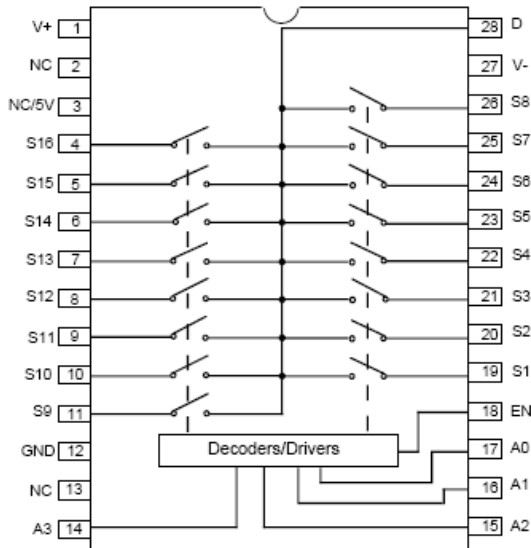
#### FEATURES AND BENEFITS

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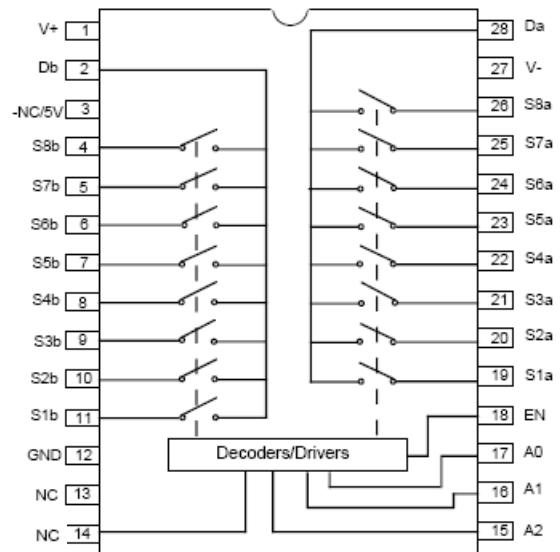
- ▶ Specified over -55 to +225°C
- ▶ 16:1 Single-Ended or 8:1 Differential Configuration
- ▶ No latch-up
- ▶ On resistance 400Ω at 225°C
- ▶ Output leakage less than 2.5μA at 225°C
- ▶ Designed to continuously operate for at least 5 years at 225°C
- ▶ Enable and address inputs compatible with TTL and/or 5V CMOS logic
- ▶ 10V analog input/output range (±5V or 0 to 10V)
- ▶ Split and single supply capability
- ▶ Break-Before-Make Switching

## PACKAGE PINOUTS

### PACKAGE PINOUT HT506



### PACKAGE PINOUT HT507



## ELECTRICAL CHARACTERISTICS (Split Supply)

Temperature range -55 to +225°C, typical @ +25°C, V+ = +5V, V- = -5V, GND=0V, V<sub>IL</sub>=0.8, V<sub>IH</sub> = 2.4V, unless otherwise specified

Symbol	Parameters	Test Conditions	Typical (1)	Worst Case (2)		Units
				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> ±5V, I <sub>S</sub> = -10mA Sequence Each Switch On	100		400	Ω
Δr <sub>DS(ON)</sub>	r <sub>DS(ON)</sub> Matching between Channels	V <sub>D</sub> = ±5V	2			%
I <sub>S(OFF)</sub>	Source Off Leakage Current	V <sub>EN</sub> = 0V	0.01		200	nA
I <sub>D(OFF)</sub>	Drain Off Leakage Current	V <sub>D</sub> = ±5V, V <sub>EN</sub> = 0V, V <sub>S</sub> = ±5V	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> = 2.4V, 10V		-1	1	μA
I <sub>IL</sub>	Logic Low Input Current	V <sub>EN</sub> = 0V, 2.4V, V <sub>A</sub> = 0V		-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> =1nF, V <sub>S</sub> =0V, R <sub>S</sub> =0Ω	TBD			pC
O <sub>IS</sub>	Off Isolation	V <sub>EN</sub> =0V, R <sub>L</sub> =1kΩ, f=100kHz	TBD			dB
<b>Power Supplies</b>						
I+	Positive Supply Current	V <sub>EN</sub> = V <sub>A</sub> = 0V or 5V	50		250	μA
I-	Negative Supply Current		-0.01	-20		μA

(1) Typical operating conditions: V+ = 5V, V- = -5V, TA= 25°C.

(2) Worst case operating conditions: V+ = +5V ±10%, V- = -5V ±10%, TA = -55 to 125°C.

# HT506/HT507

## ELECTRICAL CHARACTERISTICS (Single Supply)

Temperature range -55 to +225°C, typical @ +25°C, V+ = +10V, GND=V- = 0V, V<sub>IL</sub>=0.8, V<sub>IH</sub> = 2.4V, unless otherwise specified

Symbol	Parameters	Test Conditions	Typical (1)	Worst Case (2)		Units
				MIN	MAX	
<b>Analog Switch</b>						
V <sub>ANALOG</sub>	Analog Signal Range		11			V
r <sub>DS(ON)</sub>	Drain-Source On-Resistance	V <sub>D</sub> = 3V, 10V, I <sub>S</sub> = 1mA Sequence Each Switch On	80		400	Ω
Δr <sub>DS(ON)</sub>	r <sub>DS(ON)</sub> Matching between Channels		2			%
I <sub>S(OFF)</sub>	Source Off Leakage Current	V <sub>EN</sub> = 0V	0.01		200	nA
I <sub>D(OFF)</sub>	Drain Off Leakage Current	V <sub>S</sub> =0.5V or 10V	0.04	-2500	2500	nA
I <sub>D(ON)</sub>	Drain On Leakage Current	V <sub>S</sub> = V <sub>D</sub> = +10V 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> = 2.4V, 10V		-1	1	μA
I <sub>IL</sub>	Logic Low Input Current	V <sub>EN</sub> = 0V, 2.4V, V <sub>A</sub> = 0V		-1	1	μA
C <sub>IN</sub>	Logic Input Capacitance	f=1MHz	7			pF
<b>Dynamic Characteristics</b>						
t <sub>ON(EN)</sub>	Address/Enable Turn-On Time	trise/tfall<50ns		100	400	ns
t <sub>OFF(EN)</sub>	Address/Enable Turn-Off Time			30	200	
Q	Charge Injection	C <sub>L</sub> =1nF, V <sub>S</sub> =6, R <sub>S</sub> =0	TBD			pC
<b>Power Supplies</b>						
I+	Positive Supply Current	V <sub>EN</sub> = 0V or 5V, V <sub>A</sub> = 0V or 5V	50		250	μA
I-	Negative Supply Current		-0.01	-20		μA

(1) Typical operating conditions: V+ = 10V, V- = GND = 0V, TA = 25°C.

(2) Worst case operating conditions: V+ = +10V ±10%, V- = GND = 0V, TA = -55 to 125°C.

### TRUTH TABLE – HT506

A3	A2	A1	A0	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
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

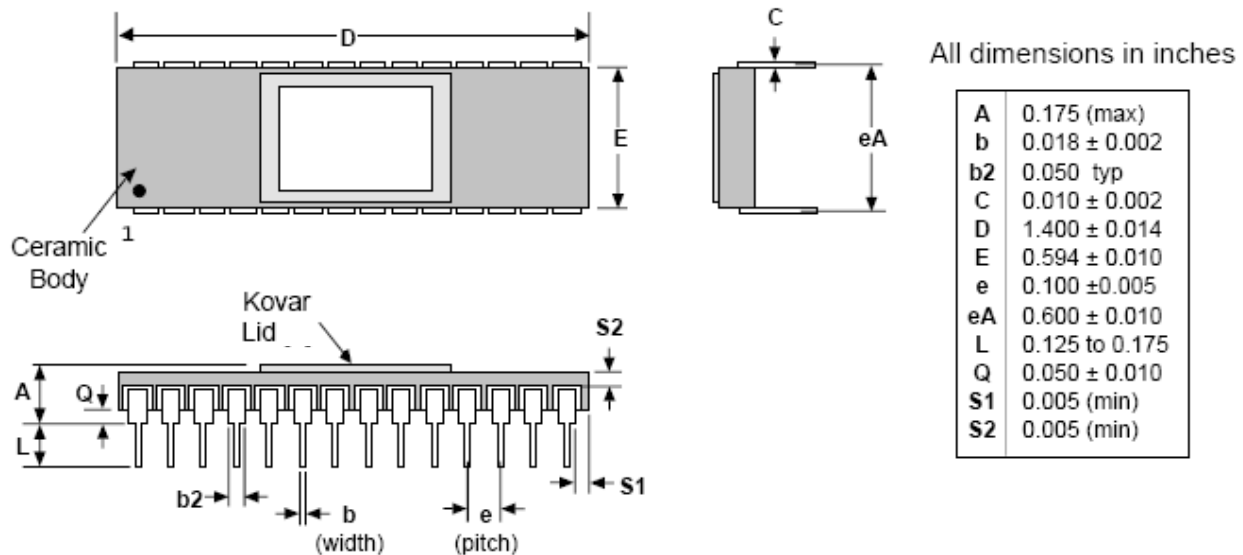
Logic "0" = V<sub>AL</sub> ≤ 0.8V  
 Logic "1" = V<sub>AH</sub> ≥ 2.4V  
 X = Irrelevant

# HT506/HT507

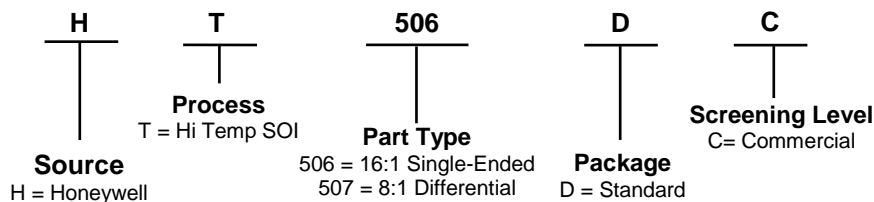
## ABSOLUTE MAXIMUM RATINGS

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

## 28-LEAD PACKAGE



## ORDERING INFORMATION



## Find out more

For more information on Honeywell's High Temperature Electronics visit us online at [www.honeywell.com/hightemp](http://www.honeywell.com/hightemp) or contact us at 800-323-8295 or 763-954-2474. Customer Service Email: [ps.customer.support@honeywell.com](mailto:ps.customer.support@honeywell.com).

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