

October 2004

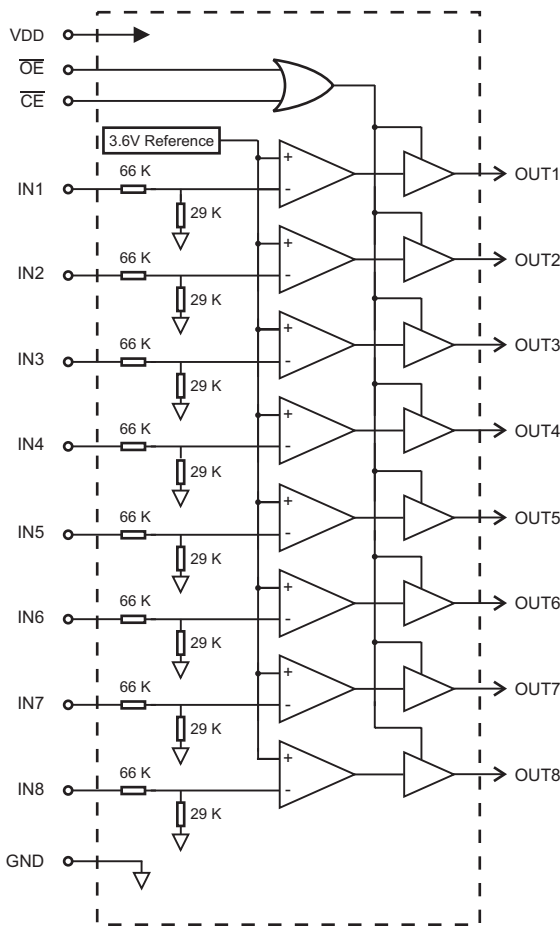
### DESCRIPTION

The HI-8421 is a six channel discrete-to-digital interface device. The HI-8424 has eight channels. Mixed-signal CMOS technology is used to provide superior low-power performance. The device inputs are configured to sense 28V / Open discrete signals. The device outputs are CMOS / TTL compatible and may be disabled (tri-state) using the  $\overline{CE}$  and  $\overline{OE}$  pins.

The HI-8421 is a drop-in replacement for the DE11054.

For added functionality, the Holt HI-8422 offers eight channels of Open / Ground sensing and eight channels of 28V / Ground sensing in a single device.

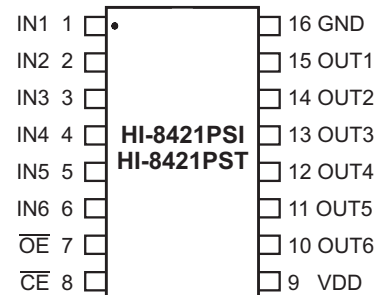
### BLOCK DIAGRAM



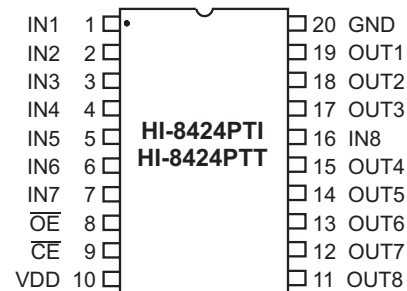
### FEATURES

- 6 or 8 independent 28V / Open sensing channels
- 5.0V single supply operation
- Low power CMOS technology
- Lightning protected inputs to DO-160D level 3
- HI-8421 is a drop in replacement for DE11054

### PIN CONFIGURATIONS



**16-Pin Plastic SOIC package  
(Narrow Body)**



**20 Pin TSSOP package**

### FUNCTION TABLE

Discrete Input	$\overline{CE}$	$\overline{OE}$	Output
Open	0	0	1
28 Volts	0	0	0
X	1	X	High Z
X	X	1	High Z

**PIN DESCRIPTIONS**

PIN		SYMBOL	FUNCTION	DESCRIPTION
(HI-8421)	(HI-8424)			
1	1	IN1	Discrete Input	28 Volt / Open sensing input, channel 1
2	2	IN2	Discrete Input	28 Volt / Open sensing input, channel 2
3	3	IN3	Discrete Input	28 Volt / Open sensing input, channel 3
4	4	IN4	Discrete Input	28 Volt / Open sensing input, channel 4
5	5	IN5	Discrete Input	28 Volt / Open sensing input, channel 5
6	6	IN6	Discrete Input	28 Volt / Open sensing input, channel 6
-	7	IN7	Discrete Input	28 Volt / Open sensing input channel 7
7	8	$\overline{OE}$	Digital input	Output Enable. OUT1-OUT8 are high-impedance if $\overline{OE}$ is high
8	9	$\overline{CE}$	Digital input	Chip Enable. OUT1-OUT8 are high-impedance if $\overline{CE}$ is high
9	10	VDD	Power	Positive supply voltage 5.0 V
-	11	OUT8	Tri-state output	Logic output, channel 8
-	12	OUT7	Tri-state output	Logic output, channel 7
10	13	OUT6	Tri-state output	Logic output, channel 6
11	14	OUT5	Tri-state output	Logic output, channel 5
12	15	OUT4	Tri-state output	Logic output, channel 4
-	16	IN8	Discrete Input	28 Volt / Open sensing input, channel 8
13	17	OUT3	Tri-state output	Logic output, channel 3
14	18	OUT2	Tri-state output	Logic output, channel 2
15	19	OUT1	Tri-state output	Logic output, channel 1
16	20	GND	Power	Ground

**ABSOLUTE MAXIMUM RATINGS**

Supply voltage (VDD)	-0.3 V to +7 V
Logic input voltage range	-0.3 V to +5.5 V
Discrete input voltage range	-5 V to +35 V
Power dissipation at 25°C	350 mW
Solder temperature	275°C for 10 sec
Storage temperature	-65°C to +150°C

**RECOMMENDED OPERATING CONDITIONS**

Supply Voltage	
VDD .....	4.5 V to 5.5 V
Operating Temperature Range	
Industrial Screening .....	-40°C to +85°C
Hi-Temp Screening .....	-55°C to +125°C

NOTE: Stresses above absolute maximum ratings or outside recommended operating conditions may cause permanent damage to the device. These are stress ratings only. Operation at the limits is not recommended.

**ELECTRICAL CHARACTERISTICS**

VDD = 5.0V ± 10%, GND = 0V, TA = Operating Temperature Range (unless otherwise specified).

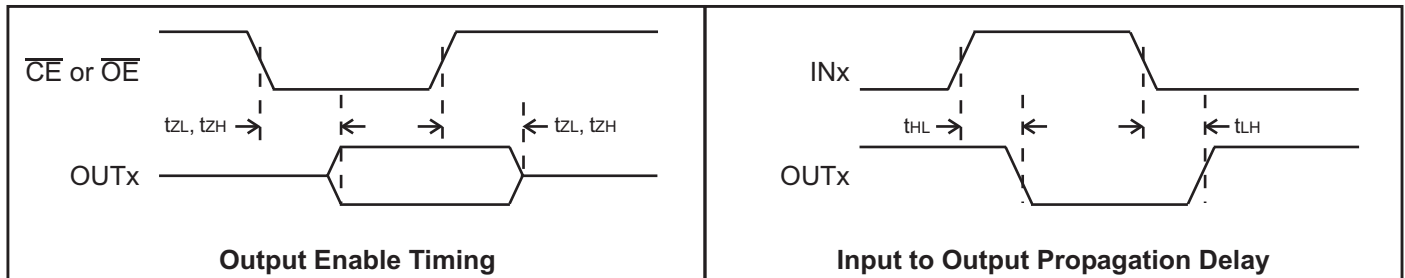
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNITS
DISCRETE INPUTS						
Open state input voltage	V <sub>SO</sub>	Input voltage to give high output	-5		10	V
28 V state input voltage	V <sub>S28</sub>	Input voltage to give low output	14			V
Open state input current	I <sub>SO</sub>	Maximum input current to give high output			84	µA
28 V state input current	I <sub>S28</sub>	Minimum input current to give low output	197			µA
Input resistance	R <sub>IN</sub>	0 V < V <sub>IN</sub> < 16 V	71		119	KΩ
Input current at 28 V	I <sub>IN28</sub>	V <sub>IN</sub> = 28 V			394	µA

## ELECTRICAL CHARACTERISTICS (Cont.)

VDD = 5.0V ± 10%, GND = 0V, TA = Operating Temperature Range (unless otherwise specified).

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNITS
<b>LOGIC INPUTS (<math>\overline{CE}</math>, <math>\overline{OE}</math>)</b>						
Input Voltage	Input voltage HI	$V_{IH}$	2.0			V
	Input voltage LO	$V_{IL}$			0.8	V
Input current	Input sink	$I_{IH}$	$V_{IH} = V_{DD}$		1.0	$\mu A$
	Input source	$I_{IL}$	$V_{IL} = 0 V$	-1.0		$\mu A$
<b>OUTPUTS</b>						
Logic output voltage	High	$V_{OH}$	$I_{OH} = -5 mA$	2.4		V
	Low	$V_{OL}$	$I_{OL} = 5 mA$		0.4	V
Logic output voltage (CMOS)	High	$V_{OH}$	$I_{OH} = -100 \mu A$	$V_{DD} - 0.2$		V
	Low	$V_{OL}$	$I_{OL} = 100 \mu A$		0.2	V
Tri-state output current		$I_{OZ}$	$V_{OUT} = 0 V \text{ or } V_{DD}$		±10	$\mu A$
<b>SUPPLY CURRENT</b>						
VDD current		$I_{DD}$	$V_{IN} = 0 V \text{ (all inputs)}$		5	10 mA
<b>SWITCHING CHARACTERISTICS</b>						
Propagation delay	IN to OUT	$t_{LH}, t_{HL}$			500	ns
Output enable time		$t_{ZL}, t_{ZH}$	From $\overline{CE}$ or $\overline{OE}$		25	ns
Output disable time		$t_{LZ}, t_{HZ}$	From $\overline{CE}$ or $\overline{OE}$		25	ns

## TIMING DIAGRAMS



## ORDERING INFORMATION

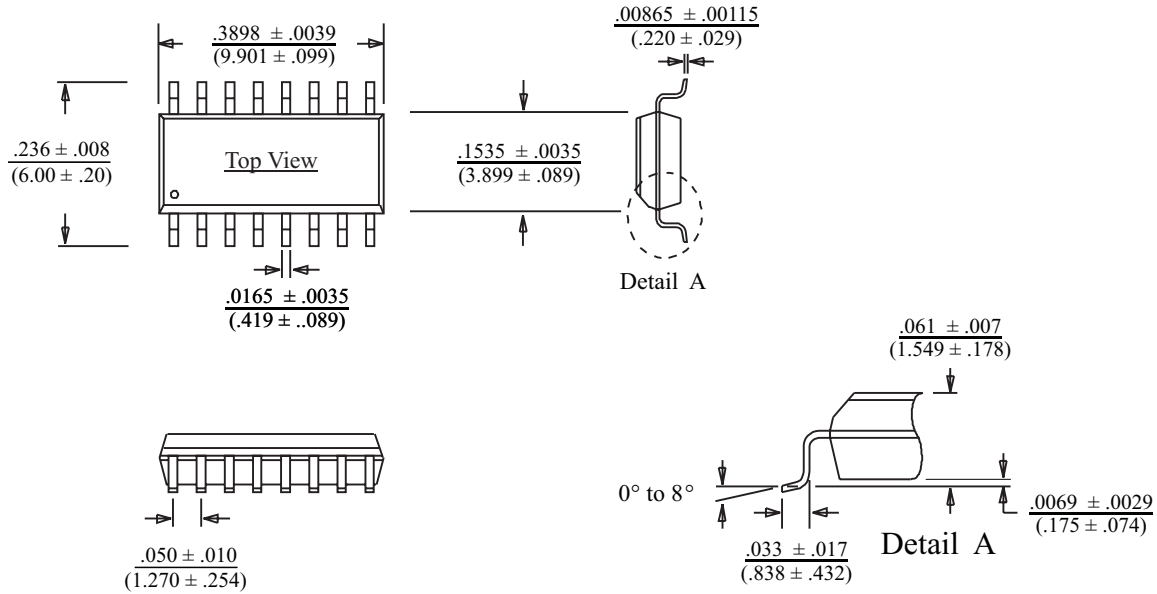
PART NUMBER	PACKAGE DESCRIPTION	TEMPERATURE RANGE	PROCESS FLOW	BURN IN	LEAD FINISH
HI-8421PSI	16 PIN PLASTIC SOIC (NARROW BODY)	-40°C TO +85°C	I	NO	SOLDER
HI-8421PST	16 PIN PLASTIC SOIC (NARROW BODY)	-55°C TO +125°C	T	NO	SOLDER
HI-8424PTI	20 PIN PLASTIC TSSOP	-40°C TO +85°C	I	NO	SOLDER
HI-8424PTT	20 PIN PLASTIC TSSOP	-55°C TO +125°C	T	NO	SOLDER

## LIGHTNING PROTECTION

The 28V / Open inputs will survive DO-160D level 3, waveforms 3, 4 and 5A without external components.

**16-PIN PLASTIC SMALL OUTLINE (SOIC) - NB**  
(Narrow Body)

Package Type: 16HN



**20-PIN PLASTIC TSSOP**

Package Type: 20HS

