HOLT INTEGRATED CIRCUITS INC.

HI-8422

April 2002

16-Channel Discrete-to-Digital Interface Sensing 28 Volt / Open and Open / Ground Signals

DESCRIPTION

The HI-8422 is a sixteen channel discrete-to-digital interface device. The device has eight channels designed to sense 28 V / Open signals and eight channels that sense Open / Ground signals. Data is multiplexed from each bank of sensors to an eight bit digital databus. Mixed-signal CMOS technology is used to provide superior low-power performance. The device outputs are CMOS / TTL compatible and may be disabled (tri-state) using the $\overline{CE}$ and $\overline{OE}$ pins.

The HI-8422 is offered in a small footprint 32-pin Plastic Quad Flat Package (PQFP). Please contact the Holt sales department for other packaging options.

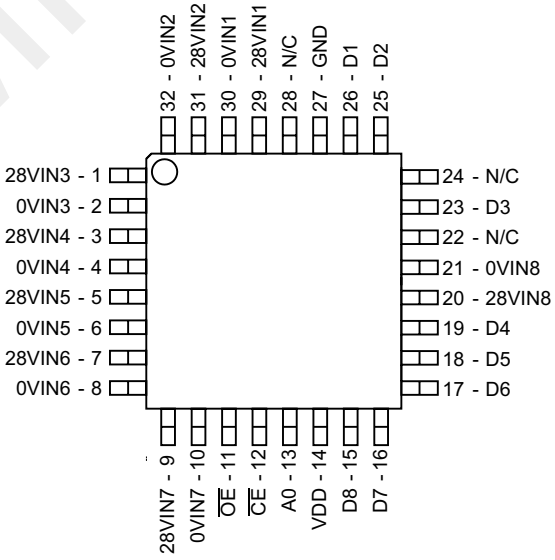
FEATURES

- 8 independent 28 Volt / Open sensing channels
- 8 independent Open / Ground sensing channels
- 5.0 V single supply operation
- Low power CMOS technology
- Sense inputs are internally lightning protected per DO-160D level 3
- Military processing options available

FUNCTION TABLE

28V Inputs	0 V Inputs	A0	$\overline{CE}$	$\overline{OE}$	Output
Open	X	1	0	0	1
28 Volts	X	1	0	0	0
X	Open	0	0	0	0
X	Ground	0	0	0	1
X	X	X	1	X	High Z
X	X	X	X	1	High Z

PIN CONFIGURATION



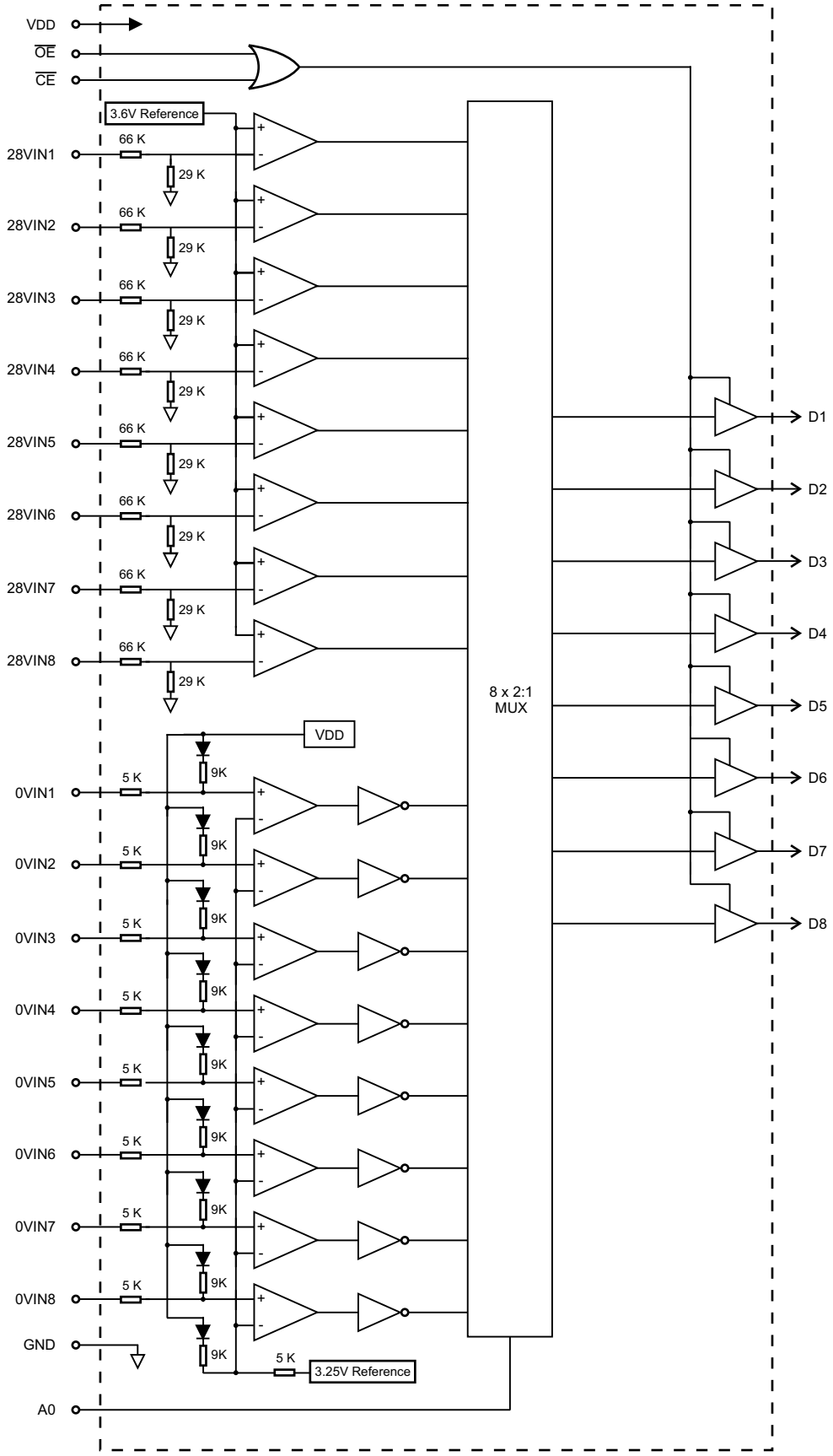
32 Pin TQFP package

PRELIMINARY

PIN DESCRIPTIONS

PIN	SYMBOL	FUNCTION	DESCRIPTION
1	28VIN3	Discrete Input	28 Volt / Open sensing input, channel 3
2	0VIN3	Discrete Input	Open / Ground sensing input, channel 3
3	28VIN4	Discrete Input	28 Volt / Open sensing input, channel 4
4	0VIN4	Discrete Input	Open / Ground sensing input, channel 4
5	28VIN5	Discrete Input	28 Volt / Open sensing input, channel 5
6	0VIN5	Discrete Input	Open / Ground sensing input, channel 5
7	28VIN6	Digital input	28 Volt / Open sensing input, channel 6
8	0VIN6	Discrete Input	Open / Ground sensing input, channel 6
9	28VIN7	Discrete Input	28 Volt / Open sensing input, channel 7
10	0VIN7	Discrete Input	Open / Ground sensing input, channel 7
11	$\overline{OE}$	Digital input	Output Enable. D1-D8 are high-impedance if $\overline{OE}$ is high
12	$\overline{CE}$	Digital input	Chip Enable. D1-D8 are high-impedance if $\overline{CE}$ is high
13	A0	Digital input	When A0 is high D1 - D8 outputs data from 28V comparators When A0 is low D1 - D8 show results from 0V comparators
14	VDD	Power	Positive supply voltage 5.0 V
15	D8	Tri-state output	Logic output, channel 8
16	D7	Tri-state output	Logic output, channel 7
17	D6	Tri-state output	Logic output, channel 6
18	D5	Tri-state output	Logic output, channel 5
19	D4	Tri-state output	Logic output, channel 4
20	28VIN8	Discrete Input	28 Volt / Open sensing input, channel 8
21	0VIN8	Discrete Input	Open / Ground sensing input, channel 8
22	N/C		Not connected
23	D3	Tri-state output	Logic output, channel 3
24	N/C		Not connected
25	D2	Tri-state output	Logic output, channel 2
26	D1	Tri-state output	Logic output, channel 1
27	GND	Power	Ground
28	N/C		Not connected
29	28VIN1	Discrete Input	28 Volt / Open sensing input, channel 1
30	0VIN1	Discrete Input	Open / Ground sensing input, channel 1
31	28VIN2	Discrete Input	28 Volt / Open sensing input, channel 2
32	0VIN2	Discrete Input	Open / Ground sensing input, channel 2

BLOCK DIAGRAM



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	-80 V to + 80 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

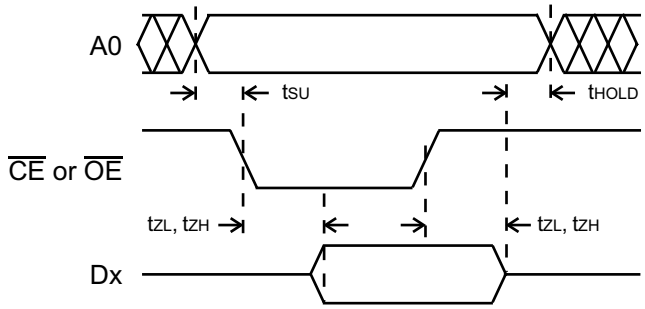
NOTE: Stresses above absolute maximum ratings or outside recommended operating conditions may cause permanent damage to the device. These are stress ratings only. Operation at the limits is not recommended.

ELECTRICAL CHARACTERISTICS

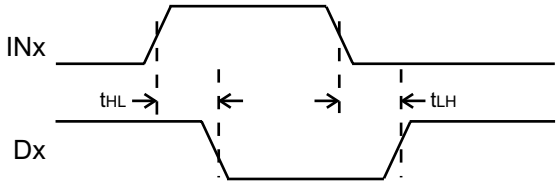
VDD = 5.0V ± 10%, GND = 0V, T_A = Operating Temperature Range (unless otherwise specified).

PARAMETER		SYMBOL	CONDITION	MIN	TYP	MAX	UNITS
28 V / OPEN DISCRETE INPUTS							
Open state input voltage		V_{SO}	Input voltage to give high output	-5		10	V
28 V state input voltage		V_{S28}	Input voltage to give low output	14			V
Open state input current		I_{SO}	Maximum input current to give high output			84	µA
28 V state input current		I_{S28}	Minimum input current to give low output	197			µA
Input resistance		R_{IN}	0 V < V_{IN} < 16 V	71		119	KΩ
Input current at 28 V		I_{IN28}	V_{IN} = 28 V			394	µA
OPEN / GROUND DISCRETE INPUTS							
Ground state input voltage		V_{SG}	Input voltage to give high output			3.0	V
Open state input voltage		V_{SO}	Input voltage to give low output	3.5			V
Ground state input resistor		R_{IG}	Resistor from input to ground to give high output	0		100	Ω
Open state input resistor		R_{IO}	Resistor from input to ground to give low output	100			KΩ
Input source current		I_{IO}	Current sourced into 100Ω to ground	-100	-330		µA
Reverse leakage current		I_{IR}	V_{IN} = 35 V, V_{DD} = 0 V			5.0	mA
LOGIC INPUTS ($\overline{CE}$, $\overline{OE}$)							
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	µA
	Input source	I_{IL}	V_{IL} = 0 V	-1.0			µA
OUTPUTS							
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 uA	V_{DD} - 0.2			V
	Low	V_{OL}	IOL = 100 uA			0.2	V
Tri-state output current		I_{OZ}	V_{OUT} = 0 V or V_{DD}			±10	µA
SUPPLY CURRENT							
V_{DD} current		I_{DD}	VIN = 0 V (28V inputs) V_{IN} = V_{DD} (other inputs)		10	20	mA
SWITCHING CHARACTERISTICS							
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
A0 Set-up time		t_{SU}		0			ns
A0 Hold time		t_{HOLD}		0			ns

TIMING DIAGRAMS



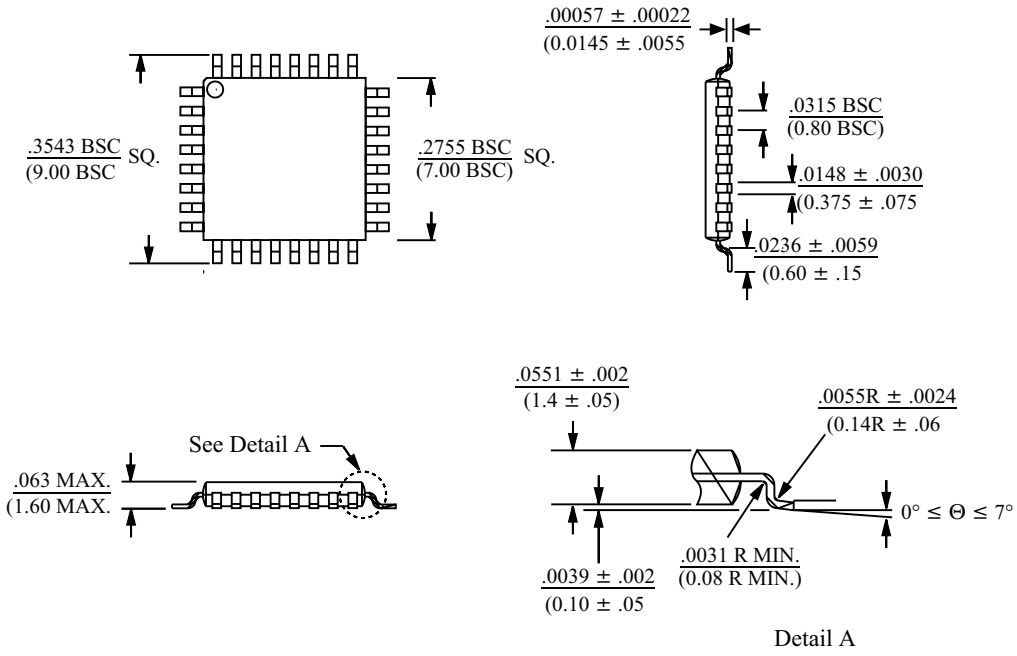
Output Enable Timing



Input to Output Propagation Delay

ORDERING INFORMATION

PART NUMBER	PACKAGE DESCRIPTION	TEMPERATURE RANGE	PROCESS FLOW	BURN IN	LEAD FINISH
HI-8422PQI	32 PIN PLASTIC QUAD FLATPACK (PQFP)	-40°C TO +85°C	I	NO	SOLDER
HI-8422PQT	32 PIN PLASTIC QUAD FLATPACK (PQFP)	-55°C TO +125°C	T	NO	SOLDER

32 PIN PLASTIC THIN QUAD FLAT PACK (TQFP)

Package Type: 32PTQS