

H22L Series OPTOLOGIC® Optical Interrupter Switch

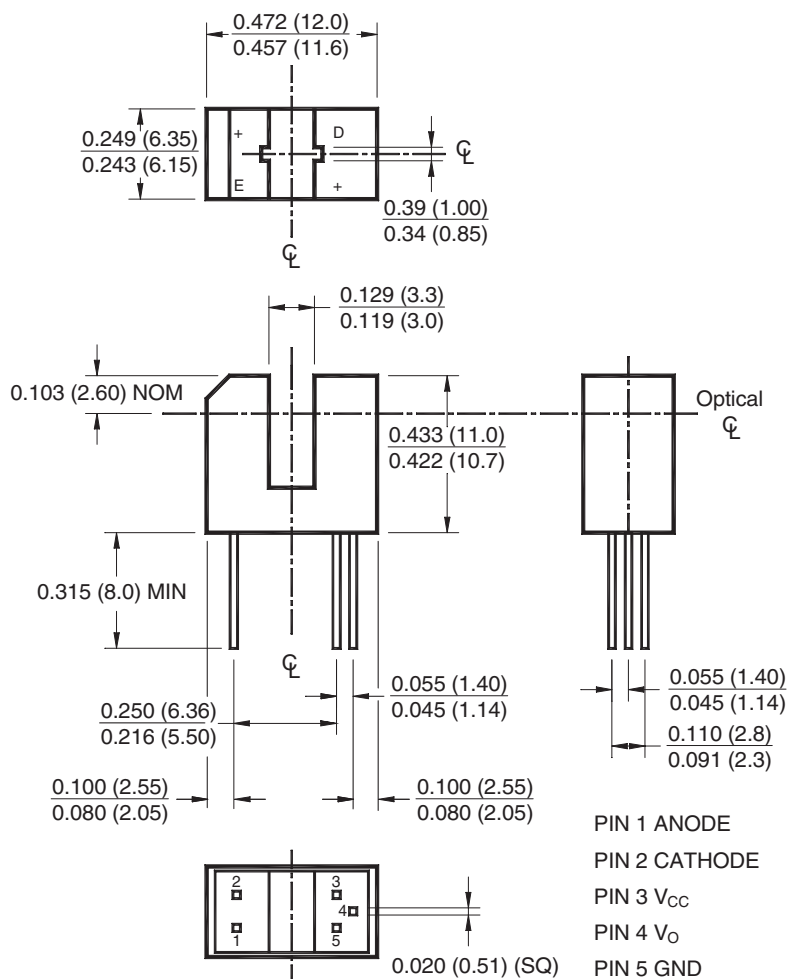
Features

- Black plastic housing
- Choice of inverter or buffer output functions
- Choice of open-collector or totem-pole output configuration
- No contact switching
- TTL/CMOS compatible output functions

Part Number Definitions

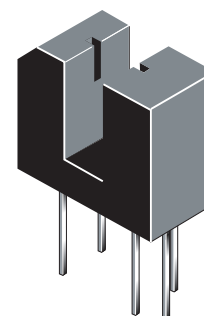
- H22LTB, Totem-pole, buffer output
H22LTI, Totem-pole, inverter output
H22LOB, Open-collector, buffer output
H22LOI, Open-collector, inverter output

Package Dimensions



Notes:

1. Dimensions for all drawings are in inches (millimeters).
2. Tolerance of $\pm .010$ (.25) on all non-nominal dimensions unless otherwise specified.
3. Lead cross section is controlled between .050 (1.27) from the seating plane and the end of the leads.



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless otherwise specified)

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating	Units
TOTAL DEVICE			
T_{OPR}	Operating Temperature	-40 to +85	$^\circ\text{C}$
T_{STG}	Storage Temperature	-40 to +85	$^\circ\text{C}$
T_{SOL-I}	Soldering Temperature (Iron) ⁽⁶⁾⁽⁷⁾⁽⁸⁾⁽⁹⁾	240 for 5 sec	$^\circ\text{C}$
T_{SOL-F}	Soldering Temperature (Flow) ⁽⁶⁾⁽⁷⁾⁽⁹⁾	260 for 10 sec	$^\circ\text{C}$
EMITTER			
I_F	Continuous Forward Current	50	mA
V_R	Reverse Voltage	5	V
P_D	Power Dissipation ⁽⁴⁾	100	mW
SENSOR			
I_F	Continuous Forward Current	50	mA
I_O	Output Current	50	mA
V_{CC}	Supply Voltage	4.0 to 16	V
V_O	Output Voltage	30	V
P_D	Power Dissipation ⁽⁵⁾	150	mW

Notes:

4. Derate power dissipation linearly 1.67mW/ $^\circ\text{C}$ above 25°C .
5. Derate power dissipation linearly 2.50mW/ $^\circ\text{C}$ above 25°C .
6. RMA flux is recommended.
7. Methanol or isopropyl alcohols are recommended as cleaning agents.
8. Soldering iron 1/16" (1.6mm) from housing.
9. As long as leads are not under any stress or spring tension.

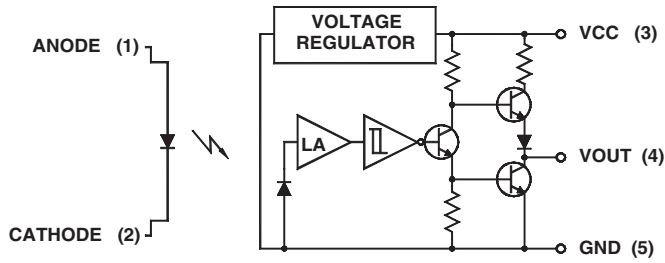
Electrical/Optical Characteristics (T_A = 25°C)

Symbol	Part Number	Test Conditions	Min.	Typ.	Max	Units
V _{CC}	Operating Supply Voltage	V _{CC}	4.5		16	V
INPUT DIODE						
V _F	Forward Voltage	I _F = 20mA			1.7	V
I _R	Reverse Leakage Current	V _R = 5V			10	μA
COUPLED						
I _{CC}	Operating Supply Current	I _F = 15mA or 0 mA, V _{CC} = 16V			5	mA
V _{OL}	Low Level Output Voltage H22LTB, H22LOB	I _F = 0mA, V _{CC} = 5V, I _{OL} = 16mA			0.4	V
	Low Level Output Voltage H22LTI, H22LOI	I _F = 15mA, V _{CC} = 5V, I _{OL} = 16mA			0.4	
V _{OH}	High Level Output Voltage H22LTB	I _F = 15mA, V _{CC} = 5 V, I _{OH} = -1mA	2.4			V
	High Level Output Voltage H22LTI	I _F = 0mA, V _{CC} = 5 V, I _{OH} = -1mA	2.4			
I _{OH}	High Level Output Current H22LOB	I _F = 15mA, V _{CC} = 5 V, V _{OH} = 30V			100	μA
	High Level Output Current H22LOI	I _F = 0mA, V _{CC} = 5V, V _{OH} = 30V	—		100	
I _F (+)	Turn on Threshold Current	V _{CC} = 5V	—		15	mA
I _F (-)	Turn off Threshold Current	V _{CC} = 5V	0.50			mA
I _F (+) / I _F (-)	Hysteresis Ratio			1.3		
t _{PLH} , t _{PHL}	Propagation Delay, H22LOI, H22LOB	V _{CC} = 5V, R _L = 300Ω		6		μs
	Propagation Delay, H22LTI, H22LTB	V _{CC} = 5V, R _L = 10 TTL Loads		6		
t _r , t _f	Output Rise and Fall Time, H22LOI, H22LOB	V _{CC} = 5V, R _L = 300Ω		100		ns
	Output Rise and Fall Time, H22LTI, H22LTB	V _{CC} = 5V, R _L = 10 TTL Loads		70		

Input/Output Table

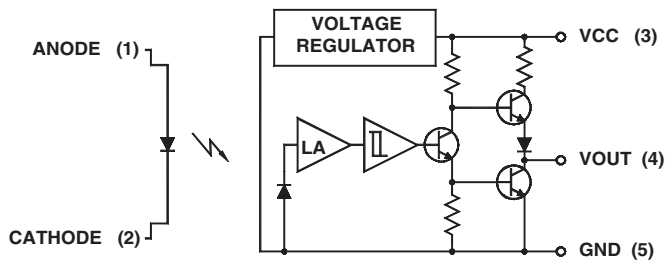
Part Number	LED	Output
H22LTB	On	High
H22LTB	Off	Low
H22LTI	On	Low
H22LTI	Off	High
H22LOB	On	High
H22LOB	Off	Low
H22LOI	On	Low
H22LOI	Off	High

Circuit Schematics



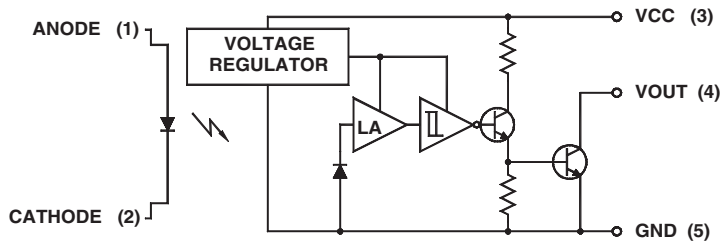
H22LTB

Totem-Pole Output Buffer



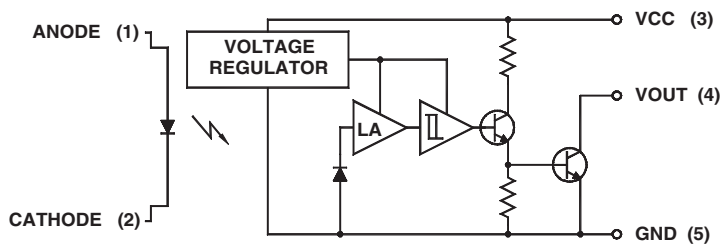
H22LTI

Totem-Pole Output Inverter



H22LOB

Open-Collector Output Buffer



H22LOI

Open-Collector Output Inverter

Typical Performance Characteristics

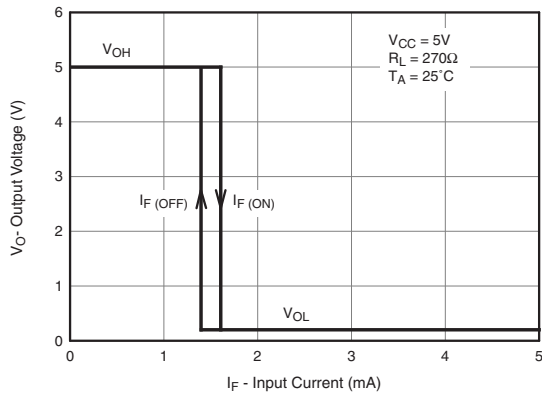


Figure 1. Output Voltage vs. Input Current (Inverters)

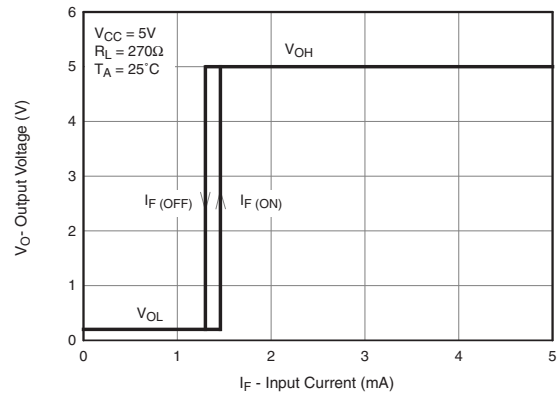


Figure 2. Output Voltage vs. Input Current (Buffers)

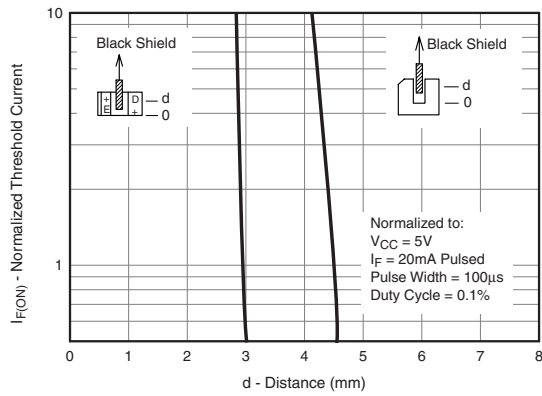


Figure 3. Normalized Threshold Current vs. Shield Distance

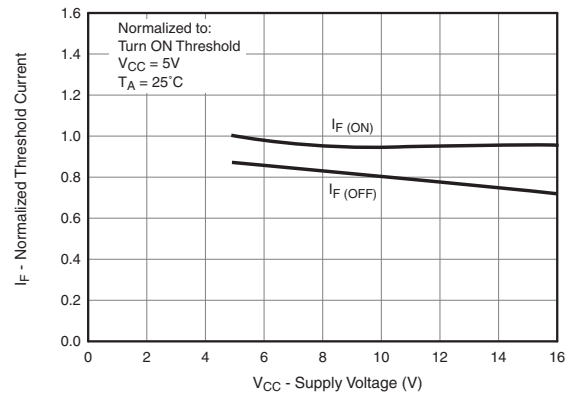


Figure 3. Normalized Threshold Current vs. Supply Voltage

Typical Performance Characteristics (Continued)

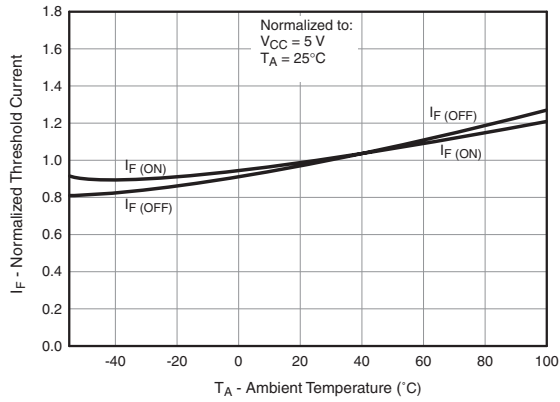


Figure 5. Normalized Threshold Current vs. Ambient Temperature

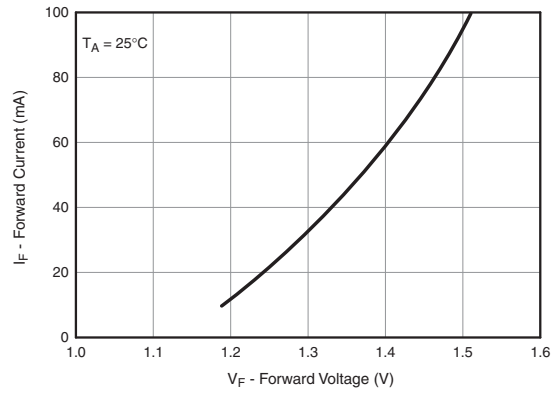


Figure 6. Forward Current vs. Forward Voltage

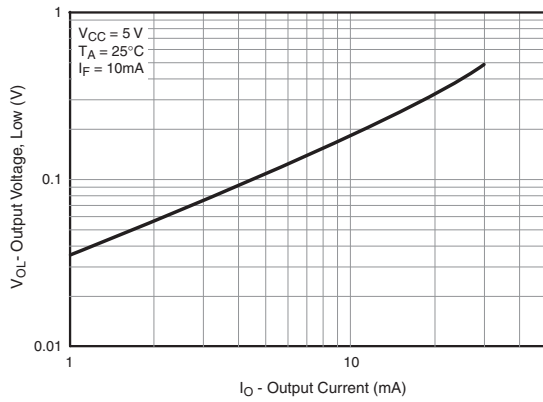


Figure 7. Low Output Voltage vs. Output Current

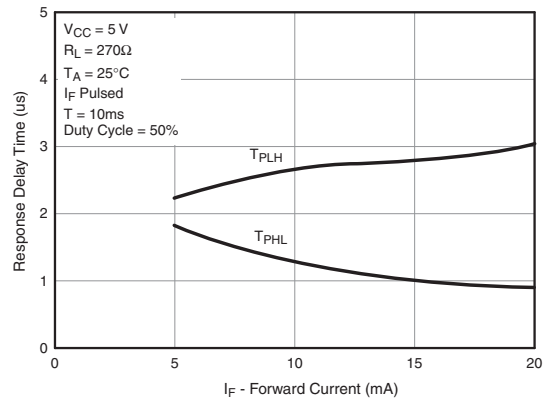
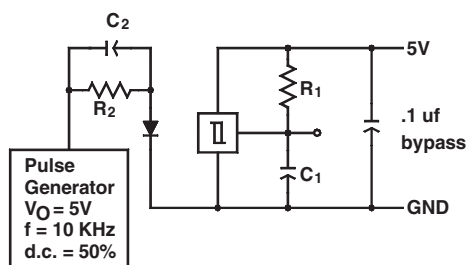


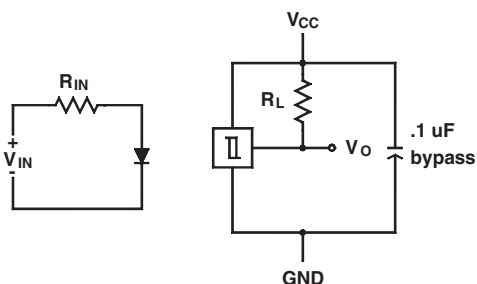
Figure 8. Response Time vs. Forward Current

Switching Speed Test Circuit

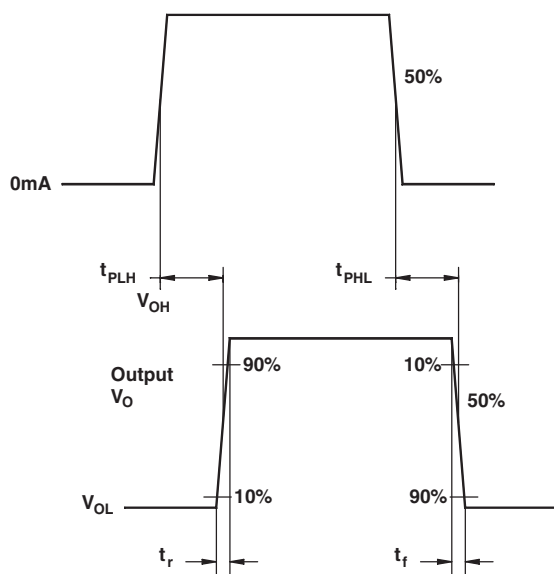


$R_1 = 300\Omega$	$C_1 = 15\text{pF}$	C_1 and C_2 include probe and
$R_2 = 360\Omega$	$C_2 = 20\text{pF}$	stray wire capacitance

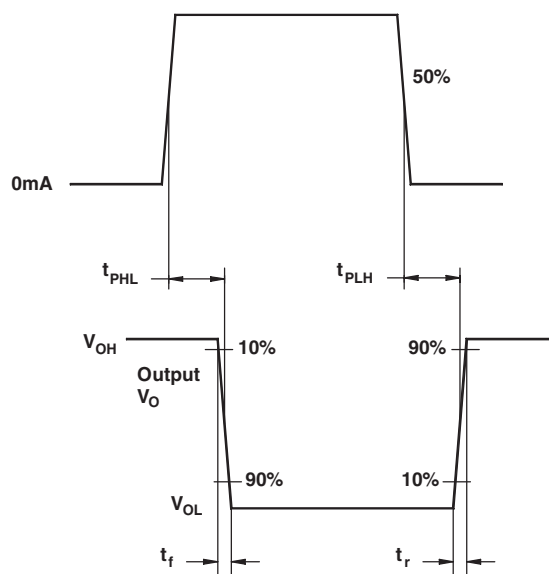
Typical Operating Circuit



Switching Test Curve for Buffers



Switching Test Curve for Inverters



TRADEMARKS

The following are registered and unregistered trademarks and service marks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks

ACE ^x	Green FPST [™] e-Series [™]	Power-SPM [™]	SyncFET [™]
Build it Now [™]	GTO [™]	PowerTrench [®]	The Power Franchise [®]
CorePLUS [™]	<i>i-Lo</i> [™]	Programmable Active Droop [™]	 [™]
CROSSVOLT [™]	IntelliMAX [™]	QFET [®]	TinyBoost [™]
CTL [™]	ISOPLANAR [™]	QS [™]	TinyBuck [™]
Current Transfer Logic [™]	MegaBuck [™]	QT Optoelectronics [™]	TinyLogic [®]
EcoSPARK [®]	MICROCOUPLER [™]	Quiet Series [™]	TINYOPTO [™]
FACT Quiet Series [™]	MicroPak [™]	RapidConfigure [™]	TinyPower [™]
FACT [®]	Motion-SPM [™]	SMART START [™]	TinyPWM [™]
FAST [®]	OPTOLOGIC [®]	SPM [®]	TinyWire [™]
FastvCore [™]	OPTOPLANAR [®]	STEALTH [™]	∞SerDes [™]
FPS [™]	PDP-SPM [™]	SuperFET [™]	UHC [®]
FRFET [®]	Power220 [®]	SuperSOT [™] -3	UniFET [™]
Global Power Resource SM	Power247 [®]	SuperSOT [™] -6	VCX [™]
Green FPS [™]	POWEREDGE [®]	SuperSOT [™] -8	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.

Rev. I28