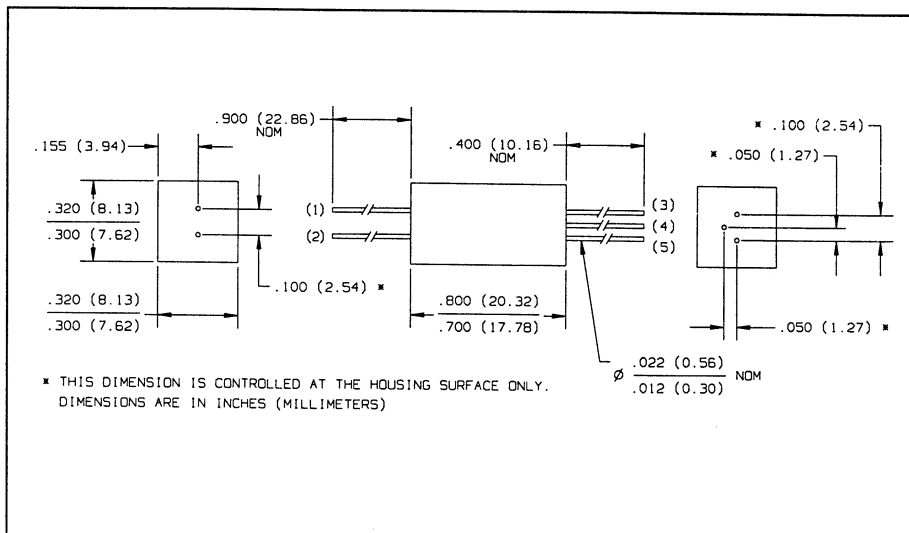
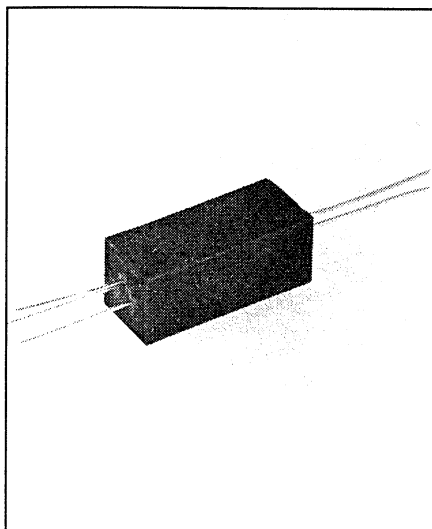


Photologic® Optically Coupled Isolators

Types OPI125, OPI126, OPI127, OPI128



Features

- Four output options
- 15kV input-to-output isolation voltage
- Direct TTL/STTL interface
- High noise immunity
- Data rates to 250 kBaud
- Hermetically sealed
- TX-TXV process available (see Hi-Rel section)
- UL recognized File No. E58730⁽⁵⁾

Description

The OPI125, OPI126, OPI127, and OPI128 each contain a gallium arsenide infrared emitting diode coupled to a monolithic integrated circuit which incorporates a photodiode, a linear amplifier, and a Schmitt trigger on a single silicon chip. The devices feature TTL/LSTTL compatible logic level output which can drive up to 8 TTL loads directly without additional circuitry. Also featured are medium speed data rates to 250 kBaud with typical rise and fall times of 25 ns. Both the infrared emitting diode and the Photologic® sensor are in hermetically sealed packages for maximum long term stability and are mounted in a high dielectric plastic housing.

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

Input-to-Output Isolation Voltage	$\pm 15\text{ kVDC}^{(1)(5)}$
Supply Voltage, V_{CC} (not to exceed 3 sec.)	+10 V
Storage Temperature Range	-55°C to $+100^\circ\text{C}$
Operating Temperature Range	-55°C to $+100^\circ\text{C}$
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	$240^\circ\text{C}^{(2)}$
Input Diode Power Dissipation	200 mW ⁽³⁾
Output Photologic® Power Dissipation	120 mW ⁽⁴⁾
Duration of Output Short to V_{CC} or Ground (OPI125, OPI127)	1.00 sec.
Duration of Output Short to V_{CC} (OPI126, OPI128)	1.00 sec.
Voltage at Output Lead (OPI126, OPI128)	35 V

Input Diode

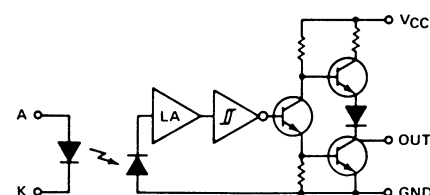
Forward D.C. Current	25 mA
Reverse D.C. Voltage	2.0 V

Notes:

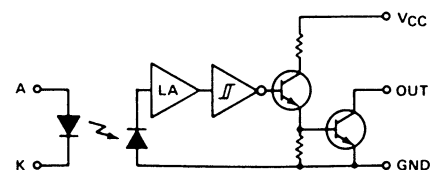
- (1) Measured with input and output leads shorted.
- (2) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (3) Derate linearly $1.33\text{ mW}/^\circ\text{C}$ above 25°C .
- (4) Derate linearly $3.40\text{ mW}/^\circ\text{C}$ above 90°C .
- (5) UL recognition is for 3750 VAC to 100°C .

Schematics

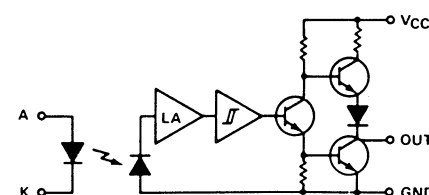
OPI125 (Totem-Pole Output) Buffer



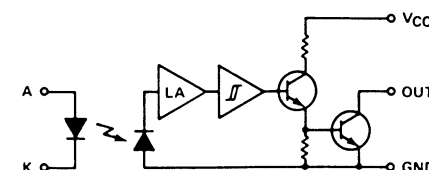
OPI126 (Open-Collector Output) Buffer



OPI127 (Totem-Pole Output) Inverter



OPI128 (Open-Collector Output) Inverter



Types OPI125, OPI126, OPI127, OPI128

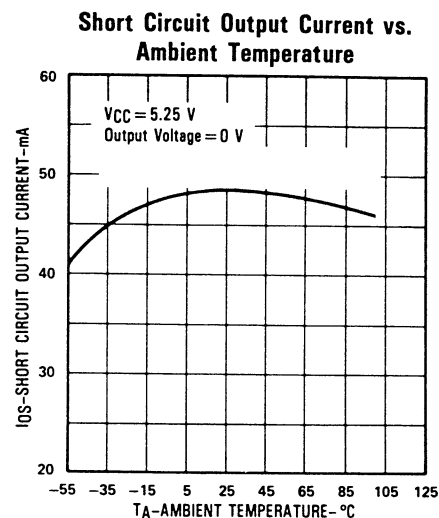
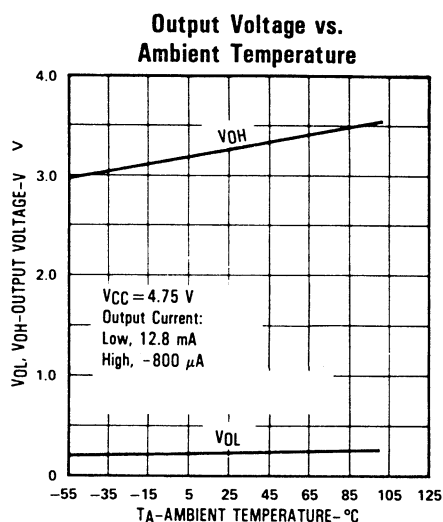
Electrical Characteristics (-40° C to +85° C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Diode Input						
V _F	Forward Voltage			1.50	V	I _F = 10 mA, T _A = 25° C
I _R	Reverse Current			100	μA	V _R = 2 V, T _A = 25° C
I _F (+)	LED Positive-Going Threshold Current			7.5	mA	V _{CC} = 5 V, T _A = 25° C
I _F (+)/I _F (-)	Hysteresis Ratio		2.0			
Photologic® Output						
V _{CC}	Operating Supply Voltage	45		5.5	V	
I _{CC}	Supply Current			20	mA	V _{CC} = 5.5 V, I _F = 0 or 7.5 mA
OPI125 (Buffer, Totem-Pole)						
V _{OL}	Low Level Output Voltage			0.40	V	V _{CC} = 4.5 V, I _{OL} = 13 mA, I _F = 0 mA
V _{OH}	High Level Output Voltage	2.4			V	V _{CC} = 4.5 V, I _{OH} = -800 μA, I _F = 7.5 mA
I _{OS}	Short Circuit Output Current	-20		-120	mA	V _{CC} = 5.5 V, I _F = 7.5 mA, Output = GND
OPI126 (Buffer, Open-Collector)						
V _{OL}	Low Level Output Voltage			0.40	V	V _{CC} = 4.5 V, I _{OL} = 13 mA, I _F = 0 mA
I _{OH}	High Level Output Current			100	μA	V _{CC} = 4.5 V, V _{OH} = 30 V, I _F = 7.5 mA
OPI127 (Inverter, Totem-Pole)						
V _{OL}	Low Level Output Voltage			0.40	V	V _{CC} = 4.5 V, I _{OL} = 13 mA, I _F = 7.5 mA
V _{OH}	High Level Output Voltage	2.4			V	V _{CC} = 4.5 V, I _{OH} = -800 μA, I _F = 0 mA
I _{OS}	Short Circuit Output Current	-20		-120	mA	V _{CC} = 5.5 V, I _F = 0 mA, Output = GND
OPI128 (Inverter, Open-Collector)						
V _{OL}	Low Level Output Voltage			0.40	V	V _{CC} = 4.5 V, I _{OL} = 13 mA, I _F = 7.5 mA
I _{OH}	High Level Output Current			100	μA	V _{CC} = 4.5 V, V _{OH} = 30 V, I _F = 0 mA
OPI125, OPI127						
t _r , t _f	Output Rise Time, Output Fall Time		70		ns	V _{CC} = 5 V, T _A = 25° C, I _F = 0 or 10 mA, f = 10 kHz, D.C. = 50%, R _L = 8 TTL Loads
t _{PLH} , t _{PHL}	Propagation Delay, Low-High, High-Low		5		μs	
OPI126, OPI128						
t _r , t _f	Output Rise Time, Output Fall Time		70		ns	V _{CC} = 5 V, T _A = 25° C, I _F = 0 or 10 mA, f = 10 kHz, D.C. = 50%, R _L = 360 Ω
t _{PLH} , t _{PHL}	Propagation Delay, Low-High, High-Low		5		μs	

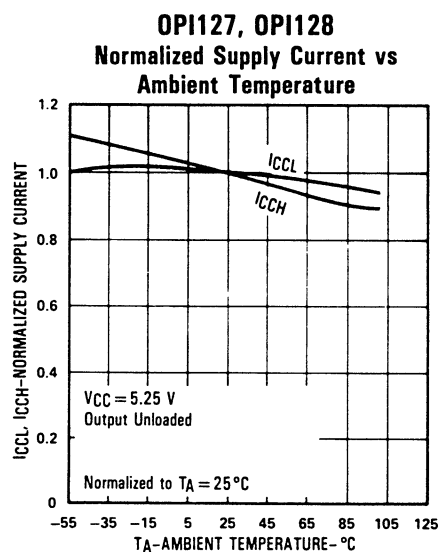
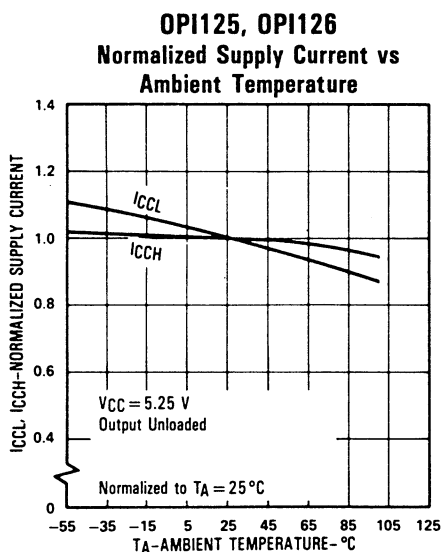
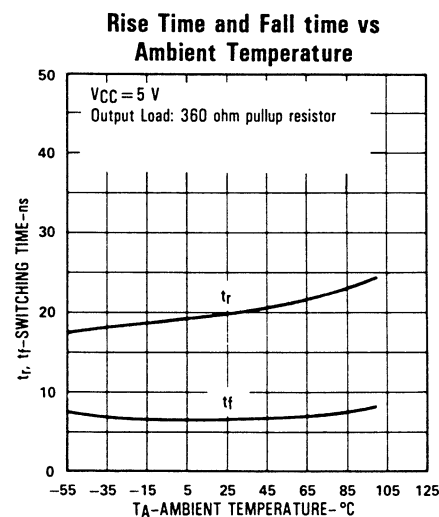
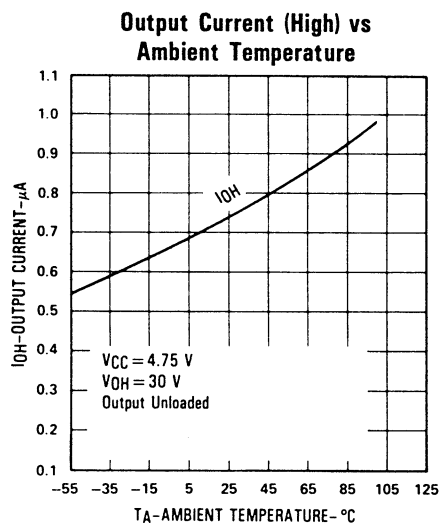
OPTICALLY
COUPLED
ISOLATORS

Typical Performance Curves

OPI125, OPI127



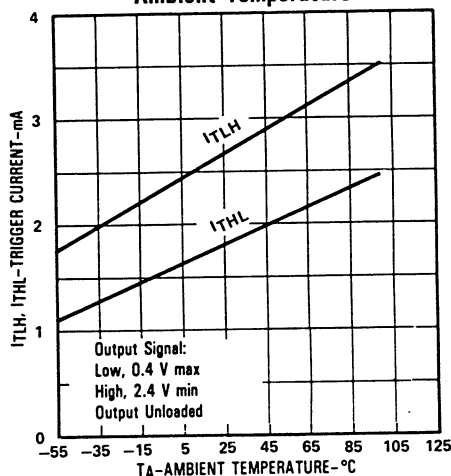
OPI126, OPI128



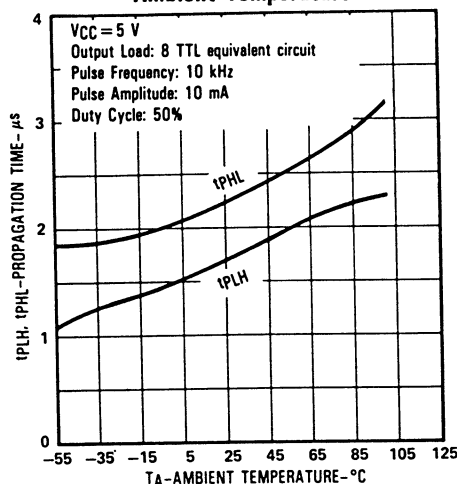
Types OPI125, OPI126, OPI127, OPI128

Typical Performance Curves

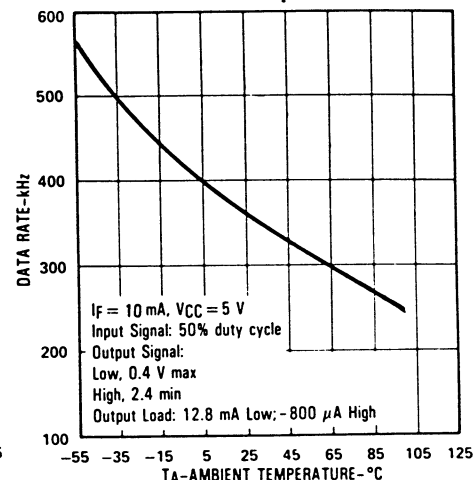
Trigger Current vs Ambient Temperature



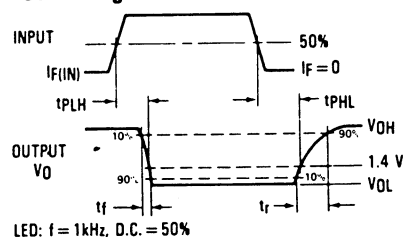
Propagation Time vs Ambient Temperature



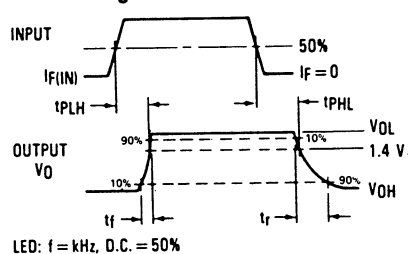
Data Rate vs Ambient Temperature



Switching Test Curve for Inverters



Switching Test Curve for Buffers



OPTICALLY
COUPLED
ISOLATORS