ELECTRONICS, INC.
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NTE3095
Optoisolator

Description:

The NTE3095 is a dual photocoupler optoisolator in an 8–Lead DIP type package consisting of a pair of Gallium Aluminum Arsenide light emitting diodes and integrated photodetectors. Separate connections for the photodiode bias and output transistor collectors improve the speed up to a hundred times that of a conventional phototransistor coupler by reducing the base–collector capacitance.

Features:

- TTL Compatible
- High Switching Speed

Absolute Maximum Ratings:

LED

Forward Current (Each Channel), I_F 25mA
  Derate above +70°C . . . . . 0.8mA/°C
Pulse Forward Current (Each Channel, Note 1), I_{FP} 50mA
  Derate above +70°C . . . . . 1.6mA/°C
Total Pulse Forward Current (Each Channel, Note 2), I_{FPT} 1A
Reverse Voltage (Each Channel), V_R 5V
Diode Power Dissipation (Each Channel), P_D 45mW
  Derate above +70°C . . . . . 0.9mW/°C

DETECTOR

Output Current (Each Channel), I_O 8mA
Peak Output Current (Each Channel), I_{OP} 16mA
Supply Voltage, V_{CC} . . . . . –0.5 to +15V
Output Voltage (Each Channel), V_O . . . . . –0.5 to +15V
Output Power Dissipation (Each Channel), P_O 35mW
  Derate above +70°C . . . . . 1mW/°C

COUPLED

Operating Temperature Range, T_{opr} . . . . . –55° to +100°C
Storage Temperature Range, T_{stg} . . . . . –55° to +125°C
Lead Temperature (During Soldering, 1.6mm below seating plane, 10s), T_L . . . . . +260°C
Isolation Voltage (AC, 1min., R.H. ≤ 60%, Note 3), V_{ISO} . . . . . 2500V_{rms}

Note 1. Pulse Width = 1ms, Duty Cycle = 50%
Note 2. Pulse Width = 1μs, 300pps.
Note 3. Device considered a two terminal device. Pins 1, 2, 3, and 4 shorted together and Pins 5, 6, 7, and 8 shorted together.

Recommended Operation Conditions:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}		0	–	12	V
Forward Current, Each Channel	I_F		–	16	25	mA
Operating Temperature	T_{opr}		–25	–	+85	°C

Electrical Characteristics: (T_A = 0° to +70°C, Note 4 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Current Transfer Ratio (Each Channel)	CTR	I_F = 16mA, V_O = 0.4V, V_{CC} = 4.5V, T_A = +25°C, Note 5	19	30	–	%
		I_F = 16mA, V_O = 0.5V, V_{CC} = 4.5V, Note 5	15	–	–	%
Logic Low Output Voltage (Each Channel)	V_{OL}	I_F = 16mA, I_O = 2.4mA, V_{CC} = 4.5V	–	0.1	0.4	V
Logic High Output Current (Each Channel)	I_{OH}	I_F = 0mA, V_O = V_{CC} = 5.5V, T_A = +25°C	–	3	500	nA
		I_F = 0mA, V_O = V_{CC} = 15V	–	–	50	µA
Logic Low Supply Current	I_{CCL}	I_{F1} = I_{F2} = 16mA, V_{O1} = V_{O2} = Open, V_{CC} = 15V	–	160	–	µA
Logic High Supply Current	I_{CCH}	I_{F1} = I_{F2} = 0mA, V_{O1} = V_{O2} = Open, V_{CC} = 15V	–	0.05	4.0	µA
Input Forward Voltage (Each Channel)	V_F	I_F = 16mA, T_A = +25°C	–	1.66	1.7	V
Temperature Coefficient of Forward Voltage (Each Channel)	$\Delta V_F/\Delta T_A$	I_F = 16mA	–	–2	–	mV/°C
Input Reverse Breakdown Voltage (Each Channel)	BV_R	I_R = 10µA, T_A = +25°C	5	–	–	V
Input Capacitance (Each Channel)	C_{IN}	f = 1MHz, V_F = 0	–	60	–	pF
Input–Output Insulation Leakage Current	$I_{I–O}$	Relative Humidity = 45%, t = 5s, $V_{I–O}$ = 3000V, T_A = +25°C, Note 3	–	–	1.0	µA
Resistance (Input–Output)	$R_{I–O}$	$V_{I–O}$ = 500V, Note 3	–	10^{12}	–	W
Capacitance (Input–Output)	$C_{I–O}$	f = 1MHz, Note 3	–	0.6	–	pF
Input–Input Leakage Current	$I_{I–I}$	Relative Humidity = 45%, t = 5s, $V_{I–I}$ = 500V, Note 6	–	0.005	–	µA
Resistance (Input–Input)	$R_{I–I}$	$V_{I–I}$ = 500V, Note 6	–	10^{11}	–	W
Capacitance (Input–Input)	$C_{I–I}$	f = 1MHz, Note 6	–	0.25	–	pF

Note 3. Device considered a two terminal device. Pins 1, 2, 3, and 4 shorted together and Pins 5, 6, 7, and 8 shorted together.

Note 4. All typicals at T_A = +25°C.

Note 5. DC Current Transfer Ratio is defined as the ratio of output collector current, I_O, to the forward LED input current, I_F, times 100%.

Note 6. Measured between Pins 1 and 2 shorted together, and Pins 3 and 4 shorted together.

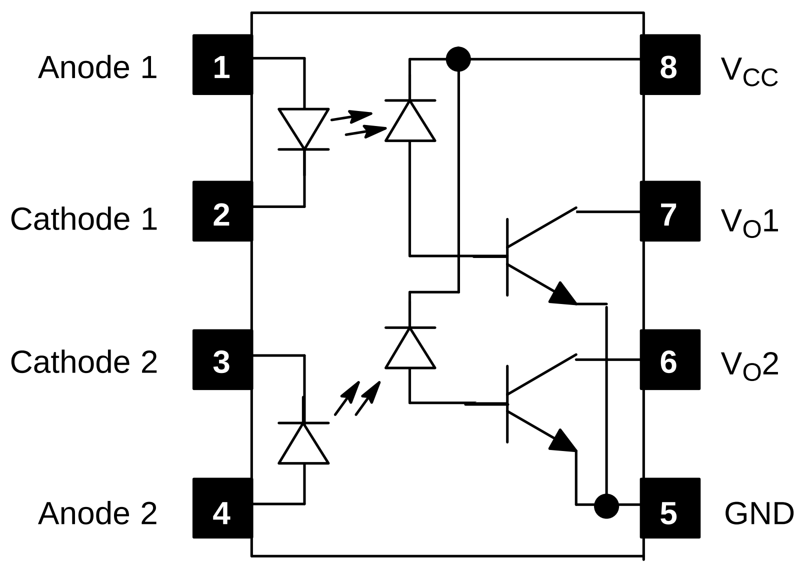
Switching Characteristics: (T_A = +25°C, V_{CC} = 5V, I_F = 16mA unless otherwise specified)

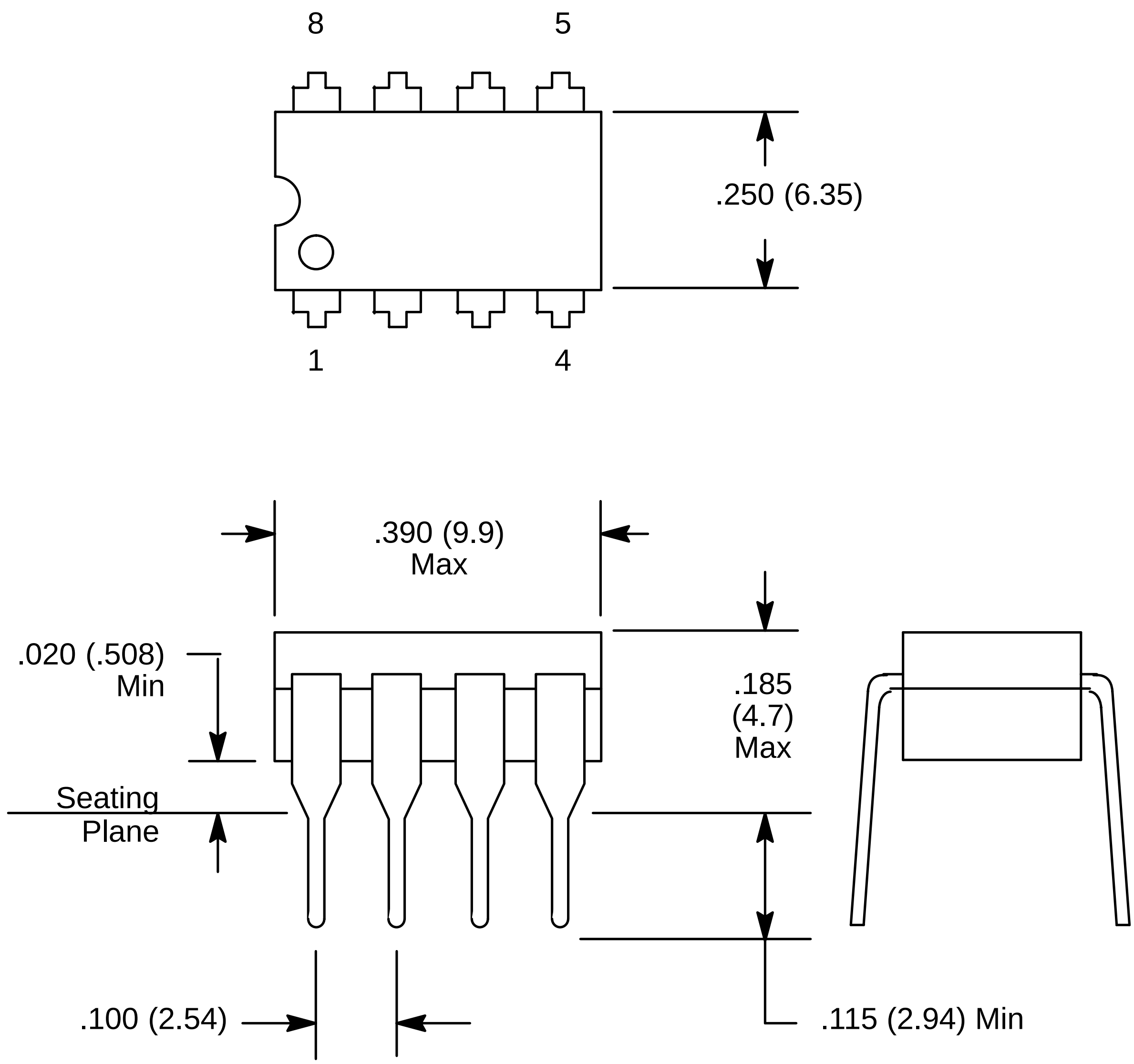
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Propagation Delay Time to Logic Low at Output (Each Channel)	t_{pHL}	R_L = 1.9kΩ	–	0.2	0.8	µs
Propagation Delay Time to Logic High at Output (Each Channel)	t_{pLH}	R_L = 1.9kΩ	–	0.3	0.8	µs
Common Mode Transient Immunity at Logic High Level Output (Each Channel)	CM_H	I_F = 0mA, V_{CM} = 400V_{P-P}, R_L = 1.9kΩ, Note 7	–	1000	–	V/µs
Common Mode Transient Immunity at Logic Low Level Output (Each Channel)	CM_L	I_F = 16mA, V_{CM} = 400V_{P-P}, R_L = 1.9kΩ, Note 7	–	–1000	–	V/µs
Bandwidth (Each Channel)	BW	R_L = 100Ω, Note 8	–	2	–	MHz

Note 7. Common mode transient immunity in Logic High level is the maximum tolerable (positive) dVcm/dt on the leading edge of the common mode pulse, Vcm, to assure that the output will remain in a Logic High state (i.e., V_O > 2V). Common mode transient immunity in Logic Low level is the maximum tolerable (negative) dVcm/dt on the trailing edge of the common mode pulse signal, Vcm, to assure that the output will remain in a Logic Low state (i.e., V_O > 0.8V).

Note 8. The frequency at which the AC output voltage is 3dB below the low frequency asymptote.

Pin Connection Diagram




8
5
.250 (6.35)
1
4
.390 (9.9)
Max
.020 (.508)
Min
.185
(4.7)
Max
Seating
Plane
.100 (2.54)
.115 (2.94) Min