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NTE3090 Optoisolator Schmitt Trigger Output

Description:

The NTE3090 is an optoisolator in a 6-Lead DIP type package and contains a gallium arsenide IRED optically coupled to a high-speed integrated detector with a Schmitt Trigger output. This device is designed for applications requiring electrical isolation, fast response time, noise immunity, and digital logic compatibility.

Features:

- Guaranteed Switching Times: $t_{on}, t_{off} < 4\mu s$
- Built-In ON/OFF Threshold Hysteresis
- High Data Rate: 1MHz Typical (NRZ)
- Wide Supply Voltage Capability
- Microprocessor Compatible Drive

Applications:

- Interfacing Computer Terminals to Peripheral Equipment
- Digital Control of Power Supplies
- Line Receiver – Eliminates Noise
- Digital Controls of Motors and Other Servo Machine Applications
- Logic to Logic Isolator
- Logic Level Shifter – Couples TTL to CMOS

Absolute Maximum Rating: ($T_A = +25^\circ C$ unless otherwise specified)

Input LED

Reverse Voltage, V_R	6V
Forward Current (Note 1), I_F	
Continuous	60mA
Peak	1.2A
LED Power Dissipation ($T_A = +25^\circ C$), P_D	120mW
Derate Above $25^\circ C$	1.41mW/ $^\circ C$

Output Detector

Output Voltage Range, V_O	0 to 16V
Supply Voltage Range, V_{CC}	3 to 16V
Output Current, I_O	50mA
Detector Power Dissipation ($T_A = +25^\circ C$), P_D	150mW
Derate Above $25^\circ C$	1.76mW/ $^\circ C$

Total Device

Isolation Surge Voltage (Peak AC Voltage, 60Hz, 1sec Duration, Note 2), V_{ISO}	7500V
Total Device Power Dissipation ($T_A = +25^\circ C$), P_D	250mW
Derate Above $25^\circ C$	2.94mW/ $^\circ C$
Maximum Operating Temperature Range, T_A	-40° to $+85^\circ C$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ C$
Lead Temperature (During Soldering, 10sec), T_L	$+260^\circ C$

Note 1. Pulse Width = 300 μs , Duty Cycle = 2%

Note 2. Isolation surge voltage is an internal dielectric breakdown rating. For this test, Pin1 and Pin2 are common, and Pin4, Pin5, and Pin6 are common.

Electrical Characteristics: ($T_A = 0$ to $+70^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input LED						
Reverse Leakage Current	I_R	$V_R = 3\text{V}, R_L = 1\text{M}\Omega$	–	0.05	10	μA
Forward Voltage	V_F	$I_F = 10\text{mA}$	–	1.2	1.5	V
		$I_F = 0.3\text{mA}$	0.75	0.95	–	V
Output Detector						
Operating Voltage	V_{CC}		3	–	15	V
Supply Current	$I_{CC(\text{off})}$	$I_F = 0, V_{CC} = 5\text{V}$	–	1	5	mA
Output Current, High	I_{OH}	$I_F = 0, V_{CC} = V_o = 15\text{V}$	–	–	100	μA
Coupled						
Supply Current	$I_{CC(\text{on})}$	$I_F = I_{F(\text{on})}, V_{CC} = 5\text{V}$	–	1.6	5.0	mA
Output Voltage, Low	V_{OL}	$R_L = 270\Omega, V_{CC} = 5\text{V}, I_F = I_{F(\text{on})}$	–	0.2	0.4	V
Threshold Current, ON	$I_{F(\text{on})}$	$R_L = 270\Omega, V_{CC} = 5\text{V}$	–	1.0	1.6	mA
Threshold Current, OFF	$I_{F(\text{off})}$	$R_L = 270\Omega, V_{CC} = 5\text{V}$	0.3	0.75	–	mA
Hysteresis Ratio	$\frac{I_{F(\text{on})}}{I_{F(\text{off})}}$	$R_L = 270\Omega, V_{CC} = 5\text{V}$	0.5	0.75	0.9	
Isolation Voltage	V_{ISO}	60Hz, AC Peak, 1sec, $T_A = +25^\circ\text{C}$, Note 3	7500	–	–	$V_{AC(\text{pk})}$
Turn-On Time	t_{on}	$R_L = 270\Omega,$ $V_{CC} = 5\text{V},$ $I_F = I_{F(\text{on})},$ $T_A = +25^\circ\text{C}$	–	1.2	4	μs
Fall Time	t_f		–	0.1	–	μs
Turn-Off Time	t_{off}		–	1.2	4	μs
Rise Time	t_r		–	0.1	–	μs

Note 3. For this test IRED Pin1 and Pin2 are common and Output Gate Pin4, Pin5, and Pin6 are common.

