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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 Computor 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°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°C),P_D 120mW
Derate Above 25°C . . . . . 1.41mW/°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°C),P_D 150mW
Derate Above 25°C . . . . . 1.76mW/°C

Total Device

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

Note 1. Pulse Width = 300μs, 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°C unless otherwise specified)

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

Pin Connection Diagram