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NTE3097 and NTE3097-1 Optoisolator Zero Crossing TRIAC Driver

Description:

The NTE3097 and NTE3097-1 are an optoisolator in a 6-Lead DIP type package and contains a gallium arsenide IRED optically coupled to a monolithic silicon detector performing the function of a Zero Voltage Crossing bilateral TRIAC Driver. This device is designed for use with a TRIAC in the interface of logic systems to equipment powered from 240VAC lines such as solid-state relays, industrial controls, motors, solenoids, and consumer appliances, etc.

Features:

- Simplifies Logic Control of 240VAC Power
- Zero Voltage Crossing
- High Breakdown Voltage: $V_{DRM} = 400V$ Min
- High Isolation Voltage: $V_{ISO} = 7500V$ Guaranteed
- Small, Economical 6-Lead DIP Package
- dv/dt of $2000V/\mu s$ Typ., $1000V/\mu s$ Guaranteed

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

Infrared Emitting Diode

Reverse Voltage, V_R	6V
Continuous Forward Current, I_F	60mA
Total Power Dissipation ($T_A = +25^\circ C$, Negligible Power in Output Driver), P_D	120mW
Derate Above $25^\circ C$	1.41mW/ $^\circ C$

Output Driver

Off-State Output Terminal Voltage, V_{DRM}	400V
Peak Repetitive Surge Current ($PW = 100\mu s$, 120pps), I_{TSM}	1A
Total 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 1), V_{ISO}	7500V
Total Power Dissipation ($T_A = +25^\circ C$), P_D	250mW
Derate Above $25^\circ C$	2.94mW/ $^\circ C$
Junction Temperature Range, T_J	-40° to $+100^\circ C$
Ambient Operating Temperature Range, T_A	-40° to $+85^\circ C$
Storage Temperature Range, T_{stg}	-40° to $+150^\circ C$
Lead Temperature (During Soldering, 10sec), T_L	$+260^\circ C$

Note 1. 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: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input LED						
Reverse Leakage Current	I_R	$V_R = 6V$	-	0.05	10	μA
Forward Voltage	V_F	$I_F = 30\text{mA}$	-	1.3	1.5	V
Output Detector ($I_F = 0$ unless otherwise specified)						
Leakage With LED OFF	I_{DRM1}	Either Direction, $V_{\text{DRM}} = 400\text{V}$, Note 2	-	2	100	nA
Peak On-State Voltage	V_{TM}	Either Direction, $I_{\text{TM}} = 100\text{mA Peak}$	-	1.8	3.0	V
Critical Rate of Rise of Off-State Voltage	dv/dt	Note 4	1000	2000	-	V/ μs
Coupled						
LED Trigger Current, Current Required to Latch Output NTE3097	I_{FT}	Main Terminal Voltage = 3V, Note 3	-	-	15	mA
NTE3097-1			-	-	5	mA
Holding Current	I_H	Either Direction	-	100	-	μA
Isolation Voltage	V_{ISO}	$f = 60\text{Hz}$, $t = 1\text{sec}$	7500	-	-	VAC(pk)
Zero Crossing						
Inhibit Voltage	V_{IH}	$I_F = 15\text{mA}$, MT1-MT2 Voltage Above Which Device Will Not Trigger	-	5	20	V
Leakage in Inhibit State	I_{DRM2}	$I_F = 15\text{mA}$, $V_{\text{DRM}} = 400\text{V}$, Off-State	-	-	500	μA

Note 2. Test voltage must be applied within dv/dt rating.

Note 3. This device is guaranteed to trigger at an I_{FT} value less than or equal to max. I_{FT} . Therefore, recommended operating I_F lies between max. I_{FT} and absolute max. I_F (60mA).

Note 4. This is static dv/dt. Commutating dv/dt is a function of the load-driving thyristor only.

