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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, $T_J$ .....	$-40^\circ$ to $+100^\circ C$
Ambient Operating Temperature Range, $T_A$ .....	$-40^\circ$ to $+85^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-40^\circ$ 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
<b>Input LED</b>						
Reverse Leakage Current	$I_R$	$V_R = 6V$	-	0.05	10	$\mu\text{A}$
Forward Voltage	$V_F$	$I_F = 30\text{mA}$	-	1.3	1.5	V
<b>Output Detector (<math>I_F = 0</math> unless otherwise specified)</b>						
Leakage With LED OFF	$I_{\text{DRM1}}$	Either Direction, $V_{\text{DRM}} = 400\text{V}$ , Note 2	-	2	100	nA
Peak On-State Voltage	$V_{\text{TM}}$	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/ $\mu\text{s}$
<b>Coupled</b>						
LED Trigger Current, Current Required to Latch Output NTE3097	$I_{\text{FT}}$	Main Terminal Voltage = 3V, Note 3	-	-	15	mA
NTE3097-1			-	-	5	mA
Holding Current	$I_H$	Either Direction	-	100	-	$\mu\text{A}$
Isolation Voltage	$V_{\text{ISO}}$	f = 60Hz, t = 1sec	7500	-	-	VAC(pk)
<b>Zero Crossing</b>						
Inhibit Voltage	$V_{\text{IH}}$	$I_F = 15\text{mA}$ , MT1-MT2 Voltage Above Which Device Will Not Trigger	-	5	20	V
Leakage in Inhibit State	$I_{\text{DRM2}}$	$I_F = 15\text{mA}$ , $V_{\text{DRM}} = 400\text{V}$ , Off-State	-	-	500	$\mu\text{A}$

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

Note 3. This device is guaranteed to trigger at an  $I_{\text{F1}}$  value less than or equal to max.  $I_{\text{FT}}$ . Therefore, recommended operating  $I_F$  lies between max.  $I_{\text{FT}}$  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.

