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## NTE3097 Optoisolator Zero Crossing TRIAC Driver

**Description:**

The NTE3097 is 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  | $I_R$             | $V_R = 6\text{V}$   | –    | 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                    | $I_{\text{FT}}$   | Main Terminal Voltage = 3V, Note 3  | –    | –    | 15  | 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  $I_{F1}$  value less than or equal to max.  $I_{\text{FT}}$ . Therefore, recommended operating  $I_F$  lies between max.  $I_{\text{FT}}$  (15mA) 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.

