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## NTE3086 Optoisolator Dual NPN Transistor Output

**Description:**

The NTE3086 is a standard dual optocoupler consisting of a GaAs Infrared LED and a silicon photo-transistor per channel. This device is constructed with a high voltage insulation, double molded packaging process which offers 7.5KV withstand test capability.

**Features:**

- Two isolated Channels per Package
- 7500V Withstand Test Voltage
- CTR Minimum: 20%

**Absolute Maximum Ratings:**

**Gallium Arsenide LED (Each Channel)**

|  |                         |
|--|-------------------------|
| Power Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_D$ ..... | 100mW                   |
| Derate Above $25^\circ\text{C}$ .....                        | 1.3mW/ $^\circ\text{C}$ |
| Forward Current, $I_F$                                       |                         |
| Continuous .....   | 60mA                    |
| Peak (Pulse Width 1 $\mu$ s, 300pps) .....                   | 3A                      |

**Phototransistor (Each Channel)**

|  |                         |
|--|-------------------------|
| Power Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_D$ ..... | 150mW                   |
| Derate Above $25^\circ\text{C}$ .....                        | 2.0mW/ $^\circ\text{C}$ |
| Collector–Emitter Breakdown Voltage, $V_{(BR)CEO}$ .....     | 30V                     |
| Collector–Base Breakdown Voltage, $V_{(BR)CBO}$ .....        | 80V                     |
| Emitter–Collector Breakdown Voltage, $V_{(BR)ECO}$ .....     | 6V                      |

**Total Device**

|  |                                     |
|--|-------------------------------------|
| Power Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_D$ ..... | 400mW                               |
| Derate Above $25^\circ\text{C}$ .....                        | 5.33mW/ $^\circ\text{C}$            |
| Operating Temperature Range, $T_{opr}$ .....                 | $-55^\circ$ to $+100^\circ\text{C}$ |
| Storage Temperature Range, $T_{stg}$ .....                   | $-55^\circ$ to $+150^\circ\text{C}$ |
| Lead Temperature (During Soldering, 10sec Max), $T_L$ .....  | $+250^\circ\text{C}$                |

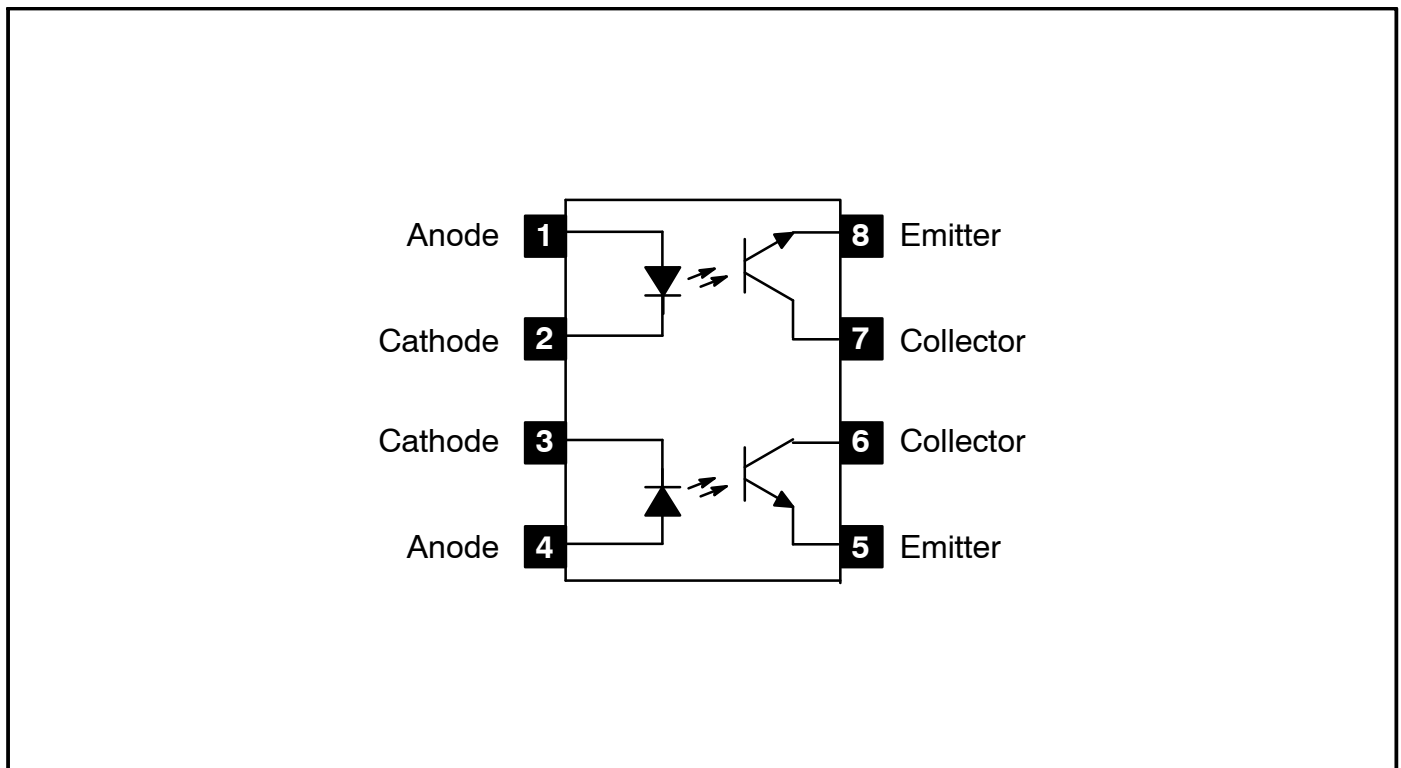
**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

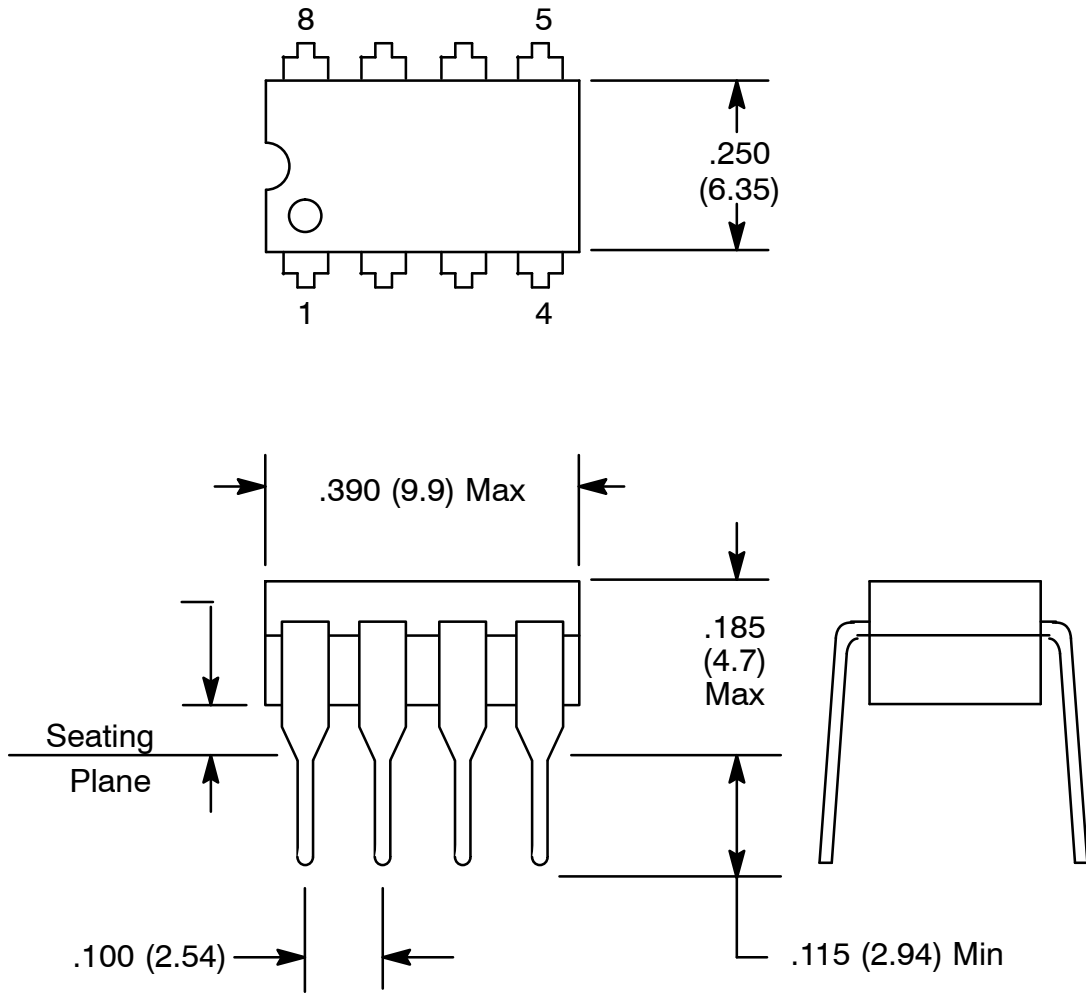
| Parameter                   | Symbol | Test Conditions          | Min | Typ | Max | Unit |
|-----------------------------|--------|--------------------------|-----|-----|-----|------|
| <b>Gallium Arsenide LED</b> |        |                          |     |     |     |      |
| Forward Voltage             | $V_F$  | $I_F = 20\text{mA}$      | –   | 1.1 | 1.5 | V    |
| Reverse Voltage             | $V_R$  | $I_R = 10 \text{ A}$     | 3   | 25  | –   | V    |
| Reverse Current             | $I_R$  | $V_R = 3\text{V}$        | –   | –   | 10  | A    |
| Junction Capacitance        |        | $V = 0, f = 1\text{MHz}$ | –   | 80  | –   | pF   |

**Electrical Characteristics (Cont'd):** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

| Parameter  | Symbol          | Test Conditions  | Min       | Typ       | Max | Unit     |
|--|-----------------|--|-----------|-----------|-----|----------|
| <b>Phototransistor Detector</b>                    |                 |  |           |           |     |          |
| Collector–Emitter Breakdown Voltage                | $V_{(BR)CEO}$   | $I_C = 100\text{ A}, I_F = 0$  | 30        | 85        | –   | V        |
| Emitter–Collector Breakdown Voltage                | $V_{(BR)ECO}$   | $I_E = 100\text{ A}, I_F = 0$  | 6         | 13        | –   | V        |
| Collector–Base Breakdown Voltage                   | $V_{(BR)CBO}$   | $I_C = 10\text{ A}, I_F = 0$   | 80        | –         | –   | V        |
| Collector–Emitter Leakage Current                  | $I_{CEO}$       | $V_{CE} = 10\text{V}, I_F = 0$   | –         | 5         | 100 | nA       |
| Collector–Emitter Capacitance                      | $C_{CE}$        | $V_{CE} = 0, I_F = 0$  | –         | 8         | –   | pF       |
| <b>Coupled Electrical Characteristics</b>          |                 |  |           |           |     |          |
| Collector–Emitter Saturation Voltage               | $V_{CE(sat)}$   | $I_C = 2\text{mA}, I_F = 16\text{mA}$                                      | –         | 0.2       | 0.4 | V        |
| DC Current Transfer Ratio                          | CTR             | $V_{CE} = 10\text{V}, I_F = 10\text{mA}$                                   | 20        | 50        | –   | %        |
| Isolation Voltage                                  | $V_{(BR)(I-O)}$ | $t = 1\text{sec}$  | 1500      | 2500      | –   | V        |
| Isolation Resistance                               | $R_{(I-O)}$     | $V_{I-O} = 500\text{V}$  | $10^{11}$ | $10^{12}$ | –   | $^\circ$ |
| Input to Output Capacitance                        |                 | $f = 1\text{MHz}$  | –         | 0.4       | –   | pF       |
| Bandwidth  | BW              | $I_C = 2\text{mA}, V_{CC} = 10\text{V}, R_L = 100^\circ$                   | –         | 150       | –   | kHz      |
| <b>Switching Times</b>                             |                 |  |           |           |     |          |
| Non–Saturated Rise Time, Fall Time                 | $t_r, t_f$      | $V_{CC} = 10\text{V}, I_C = 2\text{mA}, R_L = 100^\circ$ ,<br>Note 1       | –         | 2.4       | –   | s        |
| Non–Saturated Rise Time, Fall Time                 | $t_r, t_f$      | $V_{CC} = 10\text{V}, I_C = 2\text{mA}, R_L = 1\text{k}^\circ$ ,<br>Note 1 | –         | 15        | –   | s        |
| Saturated Turn–On Time<br>(From 5V to 0.8V)        | $t_{on(sat)}$   | $R_L = 2\text{k}^\circ, I_F = 40\text{mA}$                                 | –         | 5         | –   | s        |
| Saturated Turn–Off Time<br>(From Saturation to 2V) | $t_{off(sat)}$  | $R_L = 2\text{k}^\circ, I_F = 40\text{mA}$                                 | –         | 25        | –   | s        |

Note 1. The frequency at which  $I_C$  is 3dB down from the 1kHz value.





**NOTE:** Pin1 locator dot is for reference ONLY.  
For additional Pin1 location options, [click here](#).