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NTE3101 Photon Coupled Interrupter Module NPN Darlington Output

Description:

The NTE3101 Interrupter Module is a gallium arsenide infrared emitting diode coupled to a silicon Darlington connected phototransistor in a plastic housing. The package system is designed to optimize the mechanical resolution, coupling efficiency, ambient light rejection, cost, and reliability. The gap in the housing provides a means of interrupting the signal with an opaque material, switching the output from “ON” into an “OFF” state.

Absolute Maximum Ratings: ($T_A = +25^{\circ}\text{C}$ unless otherwise specified)

Infrared Emitting Diode

| | |
|--|----------------------------|
| Power Dissipation, P_E | 100mW |
| Derate Above 25°C | 1.33mW/ $^{\circ}\text{C}$ |
| Forward Current, I_F | |
| Continuous | 60mA |
| Peak (Pulse Width $\leq 1\mu\text{s}$, PRR $\leq 300\text{pps}$) | 3A |
| Reverse Voltage, V_R | 6V |

Phototransistor

| | |
|--|---------------------------|
| Power Dissipation, P_D | 150mW |
| Derate Above 25°C | 2.0mW/ $^{\circ}\text{C}$ |
| Continuous Collector Current, I_C | 100mA |
| Collector–Emitter Voltage, V_{CEO} | 55V |
| Emitter–Collector Voltage, V_{ECO} | 6V |

Total Device

| | |
|--|---|
| Operating Junction Temperature Range, T_J | -55° to $+100^{\circ}\text{C}$ |
| Storage Temperature Range, T_{stg} | -55° to $+100^{\circ}\text{C}$ |
| Lead Temperature (During Soldering, 5sec max), T_L | $+260^{\circ}\text{C}$ |

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

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------|--------------------------|-----|-----|-----|------|
| Emitter Characteristics | | | | | | |
| Reverse Breakdown Voltage | $V_{(BR)R}$ | $I_R = 10\mu\text{A}$ | 6 | – | – | V |
| Forward Voltage | V_F | $I_F = 60\text{mA}$ | – | – | 1.7 | V |
| Reverse Current | I_R | $V_R = 5\text{V}$ | – | – | 100 | nA |
| Capacitance | C_i | $V = 0, f = 1\text{MHz}$ | – | 30 | – | pF |

Note 1. Stray irradiation can alter values of characteristics. Adequate shielding should be provided.

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$, Note 1 unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--------------------------------------|---------------|--|------|-----|-----|---------------|
| Detector Characteristics | | | | | | |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = 1\text{mA}$ | 55 | - | - | V |
| Emitter-Collector Breakdown Voltage | $V_{(BR)ECO}$ | $I_E = 100\mu\text{A}$ | 6 | - | - | V |
| Collector Dark Current | I_{CEO} | $V_{CE} = 45\text{V}$ | - | - | 100 | nA |
| Capacitance | C_{ce} | $V_{CE} = 5\text{V}, f = 1\text{MHz}$ | - | 3.3 | 5.0 | pF |
| Coupled Characteristics | | | | | | |
| Collector ON Current | $I_{CE(on)}$ | $V_{CE} = 5\text{V}, I_F = 5\text{mA}$ | 0.15 | - | - | mA |
| | | $V_{CE} = 5\text{V}, I_F = 20\text{mA}$ | 1.0 | - | - | mA |
| | | $V_{CE} = 5\text{V}, I_F = 30\text{mA}$ | 1.9 | - | - | mA |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 1.8\text{mA}, I_F = 30\text{mA}$ | - | - | 0.4 | V |
| Turn-On Time | t_{on} | $V_{CC} = 5\text{V}, I_F = 30\text{mA}, R_L = 2.5\text{k}\Omega$ | - | 8 | - | μs |
| Turn-Off Time | t_{off} | | - | 50 | - | μs |

Note 1. Stray irradiation can alter values of characteristics. Adequate shielding should be provided.

