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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 $25^\circ\text{C}$ .....	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 $25^\circ\text{C}$ .....	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, $T_J$ .....	$-55^\circ$ to $+100^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ 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
<b>Emitter Characteristics</b>						
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
<b>Detector Characteristics</b>						
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
<b>Coupled Characteristics</b>						
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	-	$\mu\text{s}$
Turn-Off Time	$t_{off}$		-	50	-	$\mu\text{s}$

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

