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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

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