

NTE3103 Photon Coupled Interrupter Module NPN Darlington

Description:

The NTE3103 Interrupter Module is a gallium arsenide infrared emitting diode coupled to a silicon Darlington connected phototransistor in a plastic housing. The packaging 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 an "ON" into an "OFF" state.

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

Total Device

Operating 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 $+260^\circ\text{C}$

Infrared Emitting Diode

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
Power Dissipation, P_E 100mW
 Derate Above 25°C $1.33\text{mW}/^\circ\text{C}$

Darlington Connected Phototransistor

Power Dissipation, P_D 150mW
 Derate Above 25°C $2.0\text{mW}/^\circ\text{C}$
Continuous Collector Current, I_C 100mA
Collector–Emitter Voltage, V_{CEO} 55V
Emitter–Collector Voltage, V_{ECO} 7V

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Emitter						
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						
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$	55	–	–	V
Emitter–Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 100\mu\text{A}$	7	–	–	V
Collector Dark Current	I_{CEO}	$V_{CE} = 45\text{V}$	–	–	100	nA
Capacitance	C_{ce}	$V_{CE} = 5\text{V}, f = 1\text{MHz}$	–	5	8	pF
Coupled						
Photodiode Current	$I_{CE(on)}$	$V_{CE} = 1.5\text{V}, I_F = 2\text{mA}$	0.5	–	–	mA
		$V_{CE} = 1.5\text{V}, I_F = 5\text{mA}$	2.5	–	–	mA
		$V_{CE} = 1.5\text{V}, I_F = 10\text{mA}$	7.5	–	–	mA
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 1.8\text{mA}, I_F = 10\text{mA}$	–	–	1.0	V
Turn–On Time	t_{on}	$V_{CC} = 5\text{V}, I_F = 10\text{mA}, R_L = 750\Omega$	–	45	–	μs
Turn–Off Time	t_{off}		–	250	–	μs

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

