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NTE3096 Optoisolator Low LED Drive NPN Transistor Output

Description:

The NTE3096 is a gallium arsenide, infrared emitting diode optically coupled to a silicon phototransistor in a 6-Lead DIP type package. This device is designed for applications requiring low LED drive current, high electrical isolation, small package size and low cost such as interfacing and coupling systems, phase feedback controls, solid-state relays and general purpose switching circuits.

Features:

- High Transfer Ratio with Low LED Drive
- High Electrical Isolation
- Low Collector-Emitter Saturation Voltage

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

Infrared Emitting Diode

Reverse Voltage, V_R	6V
Forward Current, I_C	
Continuous	60mA
Peak (Pulse Width 1 μ sec, 2% Duty Cycle)	3A
Power Dissipation (Negligible Power in Transistor), P_D	100mW
Derate above 25 $^{\circ}\text{C}$ ambient	1.3mW/ $^{\circ}\text{C}$

Phototransistor

Collector-Emitter Voltage, V_{CEO}	30V
Collector-Base Voltage, V_{CBO}	70V
Emitter-Base Voltage, V_{EBO}	7V
Collector Current (Continuous), I_C	100mA
Power Dissipation (Negligible Power in Transistor), P_D	300mW
Derate above 25 $^{\circ}\text{C}$ ambient	4.0mW/ $^{\circ}\text{C}$

Total Device

Power Dissipation (Negligible Power in Transistor), P_D	300mW
Derate above 25 $^{\circ}\text{C}$ ambient	4.0mW/ $^{\circ}\text{C}$
Surge Isolation Voltage (60Hz, Peak AC, 5sec)	7500V
Operating Junction Temperature Range, T_J	-55 $^{\circ}$ to +100 $^{\circ}\text{C}$
Storage Temperature Range, T_{stg}	-55 $^{\circ}$ to +150 $^{\circ}\text{C}$
Lead Temperature (During Soldering, 10sec), T_L	+260 $^{\circ}\text{C}$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Infrared Emitting Diode							
Forward Voltage	V_F	$I_F = 1\text{mA}$, $T_A = 0^\circ$ to $+70^\circ\text{C}$	0.7	1.1	1.4	V	
Reverse Leakage Current	I_R	$V_R = 6\text{V}$	–	0.05	10	μA	
Capacitance	C_J	$V = 0$, $f = 1\text{MHz}$	–	150	–	pf	
Phototransistor ($I_F = 0$ unless otherwise specified)							
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$	30	–	–	V	
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$	70	–	–	V	
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 100\mu\text{A}$	7	–	–	V	
Collector–Emitter Dark Current	I_{CEO}	$V_{CE} = 5\text{V}$, Base Open	–	1.0	25	nA	
		$V_{CE} = 30\text{V}$, Base Open, $T_A = +70^\circ\text{C}$	–	–	50	μA	
Collector–Base Dark Current	I_{CBO}	$V_{CB} = 5\text{V}$, Emitter Open	–	–	10	nA	
Coupled Characteristics							
DC Current Transfer Ratio	I_C/I_F	$I_F = 1\text{mA}$, $V_{CE} = 5\text{V}$		50	–	–	%
			$T_A = 0^\circ$ to $+70^\circ\text{C}$	30	–	–	%
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 1\text{mA}$, $I_C = 100\mu\text{A}$	–	–	0.5	V	
Isolation Resistance	$R_{(I-O)}$	$V_{(I-O)} = 500\text{V}_{DC}$, Note 1	10^{11}	–	–	Ω	
Isolation Surge Voltage	V_{ISO}	60Hz, Peak AC, 5sec, Note 1	7500	–	–	V	
Isolation Capacitance	$C_{(I-O)}$	$V_{(I-O)} = 0$, $f = 1\text{MHz}$	–	1.3	2.5	pF	
Switching Characteristics							
Turn–On Time	t_{on}	$V_{CE} = 10\text{V}$, V , $R_L = 100\Omega$	–	–	20	μs	
Turn–Off Time	t_{off}		–	–	20	μs	

Note 1. For this test, LED Pin1 and Pin2 are common and phototransistor Pin4, Pin5, and Pin6 are common.

