

NTE3041 Optoisolator NPN Transistor Output

Description:

The NTE3041 is an optoisolator in a 6-Lead DIP type package consisting of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon phototransistor detector.

Features:

- High Current Transfer Ratio: 100% Min @ Spec Conditions
- Guaranteed Switching Speeds

Applications:

- General Purpose Switching Circuits
- Interfacing and Coupling Systems of Different Potentials and Impedances
- Regulation Feedback Circuits
- Monitor & Detection Circuits
- Solid State Relays

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

Input LED

Reverse Voltage, V_R	6V
Continuous Forward Current, I_F	60mA
LED Power Dissipation (With Negligible Power in Output Detector), P_D	120mW
Derate Above 25°C	1.41mW/ $^\circ\text{C}$

Output Transistor

Collector–Emitter Voltage, V_{CEO}	30V
Emitter–Base Voltage, V_{EBO}	7V
Collector–Base Voltage, V_{CBO}	70V
Continuous Collector Current, I_C	150mA
Detector Power Dissipation (With Negligible Power in Output Detector), P_D	150mW
Derate Above 25°C	1.76mW/ $^\circ\text{C}$

Total Device

Isolation Source Voltage (Peak AC Voltage, 60Hz, 1sec Duration, Note 1), V_{ISO}	7500V
Total Device Power Dissipation, P_D	250mW
Derate Above 25°C	2.94mW/ $^\circ\text{C}$
Operating Ambient Temperature Range, T_A	-55° to $+100^\circ\text{C}$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ\text{C}$
Lead Temperature (During Soldering, 1/16" from case, 10sec), T_L	$+260^\circ\text{C}$

Note 1. Isolation Surge Voltage is an internal device dielectric breakdown rating. For this test, Pin1 and Pin2 are common, and Pin4, Pin5, and Pin6 are common.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input LED						
Forward Voltage	V_F	$I_F = 10\text{mA}$	0.8	1.15	1.5	V
		$I_F = 10\text{mA}, T_A = -55^\circ\text{C}$	0.9	1.3	1.7	V
		$I_F = 10\text{mA}, T_A = +100^\circ\text{C}$	0.7	1.05	1.4	V
Reverse Leakage Current	I_R	$V_R = 6\text{V}$	–	–	10	μA
Capacitance	C_J	$V = 0, f = 1\text{MHz}$	–	18	–	pF
Output Transistor						
Collector–Emitter Dark Current	I_{CEO}	$V_{CE} = 10\text{V}$	–	1	50	nA
		$V_{CE} = 30\text{V}, T_A = +100^\circ\text{C}$	–	–	500	μA
Collector–Base Dark Current	I_{CBO}	$V_{CB} = 10\text{V}$	–	0.2	20	nA
		$V_{CB} = 10\text{V}, T_A = +100^\circ\text{C}$	–	100	–	nA
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$	30	45	–	V
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$	70	100	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 100\mu\text{A}$	7.0	7.8	–	V
DC Current Gain	h_{FE}	$I_C = 2\text{mA}, V_{CE} = 5\text{V}$	–	400	–	
Collector–Emitter Capacitance	C_{CE}	$V_{CE} = 5\text{V}, f = 1\text{MHz}$	–	7	–	pF
Collector–Base Capacitance	C_{CB}	$V_{CB} = 0, f = 1\text{MHz}$	–	19	–	pF
Emitter–Base Capacitance	C_{EB}	$V_{EB} = 0, f = 1\text{MHz}$	–	9	–	pF
Coupled						
Output Collector Current	I_C	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	10	30	–	mA
		$I_F = 10\text{mA}, V_{CE} = 10\text{V}, T_A = -55^\circ\text{C}$	4	–	–	mA
		$I_F = 10\text{mA}, V_{CE} = 10\text{V}, T_A = +100^\circ\text{C}$	4	–	–	mA
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 0.5\text{mA}, I_F = 10\text{mA}$	–	0.14	0.3	V
Turn–On Time	t_{on}	$I_C = 2\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$	–	7.5	10	μs
Turn–Off Time	t_{off}		–	5.7	10	μs
Rise Time	t_r		–	3.2	–	μs
Fall Time	t_f		–	4.7	–	μs
Isolation Voltage	V_{ISO}	$f = 60\text{Hz}, t = 1\text{sec}$	7500	–	–	V
Isolation Current	I_{ISO}	$V_{I-O} = 3550V_{pk}$	–	–	100	μA
Isolation Resistance	R_{ISO}	$V = 500\text{V}$	10^{11}	–	–	Ω
Isolation Capacitance	C_{ISO}	$V = 0, f = 1\text{MHz}$	–	0.2	2.0	pF

Pin Connection Diagram

