

## NTE3044 Optoisolator NPN Darlington Transistor Output

**Description:**

The NTE3044 consists of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon photodarlington detector in an 8-Lead DIP type package. This device is designed for use in applications requiring high sensitivity at a low input current.

**Features:**

- High Sensitivity to Low Input Drive Current
- High Collector–Emitter Breakdown Voltage
- No Base Connction for Improved Noise Immunity

**Applications:**

- Appliances, Measuring Instruments
- I/O Interfaces for Computers
- Programmable Controllers
- Portable Electronics
- Interfacing and Coupling Systems of Different Potentials and Impedances
- Solid State Relays

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

**Input LED**

Reverse Voltage, $V_R$ .....	3V
Continuous Forward Current, $I_F$ .....	60mA
LED Power Dissipation (with Negligible Power in Output Detector, $T_A = +25^\circ\text{C}$ ), $P_D$ .....	120mW
Derate Above $25^\circ\text{C}$ .....	1.41mW/ $^\circ\text{C}$

**Output Detector**

Collector–Emitter Voltage, $V_{CEO}$ .....	80V
Emitter–Collector Voltage, $V_{ECO}$ .....	5V
Detector Power Dissipation (with Negligible Power in Output Detector, $T_A = +25^\circ\text{C}$ ), $P_D$ ..	150mW
Derate Above $25^\circ\text{C}$ .....	1.76mW/ $^\circ\text{C}$

**Total Device**

Isolation Surge Voltage (Peak AC Voltage, 60Hz, 1sec Duration, Note 1), $V_{ISO}$ .....	7500V
Total Device Power Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_D$ .....	250mW
Derate Above $25^\circ\text{C}$ .....	2.94mW/ $^\circ\text{C}$
Ambient Operating Temperature Range, $T_A$ .....	$-55^\circ$ to $+100^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ 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 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
<b>Input LED</b>						
Reverse Leakage Current	$I_R$	$V_R = 3\text{V}$	–	0.05	10	$\mu\text{A}$
Forward Voltage	$V_F$	$I_F = 10\text{mA}$	–	1.15	2.0	V
Capacitance	C	$V_R = 0, f = 1\text{MHz}$	–	18	–	pF
<b>Photodarlington (<math>I_F = 0</math>)</b>						
Collector–Emitter Dark Current	$I_{CEO}$	$V_{CE} = 60\text{V}$	–	–	1	$\mu\text{A}$
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$	80	–	–	V
Emitter–Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 100\mu\text{A}$	5	–	–	V
<b>Coupled</b>						
Collector Output Current	$I_C$	$V_{CE} = 1.5\text{V}, I_F = 10\text{mA}$	30	–	–	mA
Isolation Surge Voltage	$V_{ISO}$	60Hz Peak AC, 5sec, Note 2, Note 3	7500	–	–	V
Isolation Resistance	$R_{ISO}$	$V = 500\text{V}$ , Note 2	–	$10^{11}$	–	$\Omega$
Isolation Capacitance	$C_{ISO}$	$V = 0, f = 1\text{MHz}$ , Note 2	–	0.2	–	pF
<b>Switching</b>						
Turn–On Time	$t_{on}$	$V_{CC} = 10\text{V}, R_L = 100\Omega,$ $I_F = 5\text{mA}$	–	3.5	–	$\mu\text{s}$
Turn–Off Time	$t_{off}$		–	95	–	$\mu\text{s}$
Rise Time	$t_r$		–	1	–	$\mu\text{s}$
Fall Time	$t_f$		–	2	–	$\mu\text{s}$

Note 2. For this test, LED Pin1 and Pin2 are common and Phototransistor Pin4 and Pin5 are common.  
 Note 3. Isolation Surge Voltage,  $V_{ISO}$ , is an internal device dielectric breakdown rating.



