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## NTE3045 Optoisolator Silicon NPN Darlington Phototransistor Output

### **Description:**

The NTE3045 is a gallium arsenide LED optically coupled to a Silicon Photo Darlington transistor in a 6-Lead DIP type package designed for applications requiring electrical isolation, high breakdown voltage, and high current transfer ratios. Characterized for use as telephone relay drivers but provides excellent performance in interfacing and coupling systems, phase and feedback controls, solid state relays, and general purpose switching circuits.

### **Features:**

- High Sensitivity to Low Input Drive Current
- High Collector–Emitter Breakdown Voltage:  $V_{(BR)CEO} = 80V$  (Min)
- High Input–Output Isolation Guaranteed:  $V_{ISO} = 7500V$  (Peak)

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

#### **Input LED**

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

#### **Output Detector**

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

#### **Total Device**

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

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
<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</b> ( $T_A = +25^\circ\text{C}, I_F = 0$ unless otherwise specified)						
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> ( $T_A = +25^\circ\text{C}$ unless otherwise specified)						
Collector Output Current	$I_C$	$V_{CE} = 1.5\text{V}, I_F = 10\text{mA}$	50	–	–	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.

