



ELECTRONICS, INC.

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## NTE3081 Optoisolator NPN Transistor Output

### **Description:**

The NTE3081 consists of a gallium arsenide infrared emitting diode coupled with a silicon phototransistor in a low cost plastic package with lead spacing compatible with dual-in-line packages.

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

#### **Total Device**

Surge Isolation Voltage (Input to Output), $V_{ISO}$	
Peak .....	6000V
RMS .....	4242V
Steady-State Isolation Voltage (Input to Output), $V_{ISO}$	
Peak .....	4500V
RMS .....	3200V
Operating Temperature Range, $T_J$ .....	$-55^\circ$ to $+85^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+85^\circ\text{C}$
Lead Temperature (During Soldering, 5sec Max), $T_L$ .....	$+260^\circ\text{C}$

#### **Infrared Emitting Diode (Emitter)**

Forward Current, $I_F$	
Continuous .....	60mA
Peak (Pulse Width $\leq 1\mu\text{s}$ , PRR $\leq 300\text{pps}$ ) .....	3A
Reverse Voltage, $V_R$ .....	4V
Power Dissipation, $P_E$ .....	100mW
Derate Above $25^\circ\text{C}$ .....	1.67mW/ $^\circ\text{C}$

#### **Phototransistor (Detector)**

Continuous Collector Current, $I_C$ .....	100mA
Collector-Emitter Voltage, $V_{CEO}$ .....	30V
Emitter-Collector Voltage, $V_{ECO}$ .....	6V
Power Dissipation, $P_D$ .....	150mW
Derate Above $25^\circ\text{C}$ .....	2.5mW/ $^\circ\text{C}$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Infrared Emitting Diode</b>						
Reverse Breakdown Voltage	$V_{(BR)R}$	$I_R = 10\mu\text{A}$	4	–	–	V
Forward Voltage	$V_F$	$I_F = 60\text{mA}$	–	–	1.7	V
Reverse Current	$I_R$	$V_R = 3\text{V}$	–	–	1.0	$\mu\text{A}$
Capacitance	$C_i$	$V = 0, f = 1\text{MHz}$	–	30	–	pF
<b>Phototransistor</b>						
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}, I_F = 0$	30	–	–	V
Emitter–Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 100\mu\text{A}, I_F = 0$	6	–	–	V
Collector Dark Current	$I_{CEO}$	$V_{CE} = 10\text{V}, I_F = 0$	–	5	100	nA
Capacitance	$C_{ce}$	$V_{CE} = 5\text{V}, f = 1\text{MHz}$	–	3.3	–	pF
<b>Coupled Characteristics</b>						
DC Current Transfer Ratio	CTR	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	20	–	–	%
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 10\text{mA}, I_C = 500\text{mA}$	–	0.1	0.4	V
Isolation Resistance	$R_{IO}$	Input to Output Voltage = $500\text{V}_{DC}$ , Note 1	100	–	–	$\text{G}\Omega$
Input to Output Capacitance	$C_{io}$	Input to Output Voltage = 0, $f = 1\text{MHz}$ , Note 1	–	0.5	–	pF
Turn–On Time	$t_{on}$	$V_{CE} = 10\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$	–	9	–	$\mu\text{s}$
		$V_{CE} = 5\text{V}, I_F = 10\text{mA}, R_L = 10\text{k}\Omega$	–	4	–	$\mu\text{s}$
Turn–Off Time	$t_{off}$	$V_{CE} = 10\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$	–	6.5	–	$\mu\text{s}$
		$V_{CE} = 5\text{V}, I_F = 10\text{mA}, R_L = 10\text{k}\Omega$	–	165	–	$\mu\text{s}$

Note 1. Measured with input diode leads shorted together, and output detector leads shorted together.

