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## NTE3089 Optoisolator AC Input, Silicon NPN Phototransistor Output

**Description:**

The NTE3089 consists of two gallium arsenide LEDs connected in inverse parallel and coupled with a silicon phototransistor in a 6-Lead DIP type package.

**Features:**

- AC or Polarity Insensitive Inputs
- Fast Switching Speeds
- Built-In Reverse Polarity Input Protection
- High Isolation Voltage
- High Isolation Resistance
- I/O Compatible with Integrated Circuits

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

**Infrared Emitting Diode (LED)**

Continuous Forward Current, $I_F$ .....	60mA
Peak Forward Current (Pulse Width = $1\mu\text{s}$ , 330pps), $I_F$ .....	$\pm 1\text{A}$
Power Dissipation ( $T_A = +25^\circ\text{C}$ , Note 1), $P_D$ .....	100mW
Derate Above $25^\circ\text{C}$ .....	1.33mW/ $^\circ\text{C}$

**Phototransistor**

Collector-Emitter Voltage, $V_{CEO}$ .....	30V
Collector-Base Voltage, $V_{CBO}$ .....	70V
Emitter-Base Voltage, $V_{EBO}$ .....	5V
Continuous Collector Current, $I_C$ .....	100mA
Power Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_D$ .....	300mW
Derate Above $25^\circ\text{C}$ .....	4.0mW/ $^\circ\text{C}$
Power Dissipation ( $T_A = +25^\circ\text{C}$ , Note 1), $P_D$ .....	500mW
Derate Above $25^\circ\text{C}$ .....	6.7mW/ $^\circ\text{C}$

**Total Device**

Steady-State Isolation Voltage (Input-to-Output)	
Peak .....	1500V
RMS .....	1060V
Surge Isolation Voltage (Input-to-Output)	
Peak .....	2500V
RMS .....	1770V
Operating Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Lead Temperature (During Soldering for 10sec), $T_L$ .....	$+250^\circ\text{C}$

Note 1.  $T_C$  indicates Collector lead temperature 1/32" from case.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Infrared Emitting Diode (LED)</b>						
Forward Voltage	$V_F$	$I_F = \pm 10\text{mA}$	-	-	1.5	V
Capacitance	$C_J$	$V_R = 0, f = 1\text{MHz}$	-	-	100	pF
<b>Phototransistor</b>						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}, I_F = 0$	70	-	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}, I_F = 0$	30	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 100\mu\text{A}, I_F = 0$	5	-	-	V
Collector Dark Current	$I_{CEO}$	$V_{CE} = 10\text{V}, I_F = 0$	-	-	100	nA
<b>Coupled</b>						
DC Current Transfer Ratio	CTR	$V_{CE} = 10\text{V}, I_F = \pm 10\text{mA}$	20	-	-	%
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 0.5\text{mA}, I_F = \pm 10\text{mA}$	-	-	0.4	V
Isolation Resistance	$R_{(I-O)}$	$V_{(I-O)} = 500\text{V}, \text{Note 2}$	100	-	-	$\text{G}\Omega$

Note 2. Tests of Input-to-Output isolation current resistance, and capacitance are performed with the input terminals (diode) shorted together and the output terminals (transistors) shorted together.

