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NTE3085 Optoisolator Photon Coupled Bilateral Analog FET

Description:

The NTE3085 consists of a gallium–aluminum–arsenide IRED emitting diode coupled to a symmetrical bilateral silicon photo–detector. The detector is electrically isolated from the input and performs like an ideal isolated FET designed for distortion–free control of low AC and DC analog signals.

Features:

As A Remote Variable Resistor

- $\leq 100\Omega$ to $\geq 300M\Omega$
- $\leq 15pF$ Shunt Capacitance
- $\geq 100G\Omega$ I/O Isolation Resistance

As An Analog Signal Switch

- Extremely Low Offset Voltage
- $60V_{P-P}$ Signal Capability
- No Charge Injection or Latch–up
- $t_{on}, t_{off} \leq 15\mu s$

Applications:

As A Remote Variable Resistor

- Isolated Variable Attenuator
- Automatic Gain Control
- Active Filter Fine Tuning/Band Switching

As An Analog Signal Switch

- Isolated Sample and Hold Circuit
- Multiplexed, Optically Isolated A/D Conversion

Absolute Maximum Ratings: ($T_A = +25^\circ C$, Note 1 unless otherwise specified)

Infrared Emitting Diode

Forward Current, I_F

Continuous 60mA

Peak (10 μs pulse, 1% duty cycle) 1A

Power Dissipation ($T_A = +25^\circ C$), P_D 100mW

Derate Above $25^\circ C$ 1.33mW/ $^\circ C$

Reverse Voltage, V_R 5V

Photo Detector

Power Dissipation ($T_A = +25^\circ C$), P_D 300mW

Derate Above $25^\circ C$ 4.0mW/ $^\circ C$

Breakdown Voltage, $V_{(BR)4-6}$ $\pm 30V$

Continuous Detector Current (either polarity, I_{4-6} $\pm 100mA$

Total Device

Storage Temperature Range, T_{stg} -40° to $+150^\circ C$

Operating Temperature Range, T_{opr} -40° to $+100^\circ C$

Lead Temperature (During Soldering, for 10sec max.), T_L $+260^\circ C$

Note 1. Stresses exceeding the “Absolute Maximum Ratings” may damage the device. The device may not function or be operated above the recommended operation conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operation conditions may affect device reliability. The “Absolute Maximum Ratings” are stress ratings only.

Electrical Characteristics: ($T_A = +25^\circ\text{C}$, Note 2 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Infrared Emitting Diode						
Input Forward Voltage	V_F	$I_F = 16\text{mA}$	-	1.3	1.75	V
Reverse Leakage Current	I_R	$V_R = 6\text{V}$	-	-	10	μA
Capacitance	C_J	$V = 0, f = 1\text{MHz}$	-	50	-	pF
Photo-Detector (Either Polarity)						
Breakdown Voltage	$V_{(BR)4-6}$	$I_{4-6} = 10\mu\text{A}, I_F = 0$	30	-	-	V
Off-State Dark Current	I_{4-6}	$V_{4-6} = 15\text{V}, I_F = 0$	-	-	50	nA
		$V_{4-6} = 15\text{V}, I_F = 0, T_A = +100^\circ\text{C}$	-	-	50	μA
Off-State Resistance	R_{4-6}	$V_{4-6} = 15\text{V}, I_F = 0$	300	-	-	$\text{M}\Omega$
Capacitance	C_{4-6}	$V_{4-6} = 0, I_F = 0, f = 1\text{MHz}$	-	-	15	pF
Coupled Electrical Characteristics						
On-State Resistance	R_{4-6}	$I_F = 16\text{mA}, I_{4-6} = 100\mu\text{A}$	-	-	200	W
	R_{6-4}	$I_F = 16\text{mA}, I_{6-4} = 100\mu\text{A}$	-	-	200	Ω
Resistance, Non-Linearity and Asymmetry		$I_F = 16\text{mA}, I_{4-6} = 25\mu\text{A}_{\text{RMS}}, f = 1\text{kHz}$	-	2	-	%
Turn-On Time	t_{on}	$I_F = 16\text{mA}, R_L = 50\Omega, V_{4-6} = 5\text{V}$	-	-	25	μs
Turn-Off Time	t_{off}		-	-	25	μs
Isolation Voltage	V_{ISO}	$f = 60\text{Hz}, f = 1\text{sec}$	7500	-	-	$V_{\text{AC PEAK}}$
Isolation Resistance	R_{ISO}	$V_{\text{I-O}} = 500\text{VDC}$	10^{11}	-	-	Ω
Isolation Capacitance	C_{ISO}	$f = 1\text{MHz}$	-	0.2	-	pF

Note 2. All Typical values at $T_A = +25^\circ\text{C}$.

