Dual Optically-Coupled Darlington Isolator

FCD890

Optoelectronic Products

General Description

The FCD890 comprises two distinct optoisolators with transistor output, in a single 8-pin dual in-line package. Each channel consists of a GaAs emitter optically coupled to a photo-Darlington. The coupler was designed specifically as a high-sensitivity type for operation in the 1.0 mA input region.

High Current Transfer Ratio at Low Input Current
2500 V Minimum Isolation Input-to-Output
10^{11} Ω Isolation Resistance
Low Coupling Capacitance—Typically 1.0 pF
I/O Compatible With Integrated Circuits
Two Packages Fit Into a Standard 16-Pin DIP Socket

Absolute Maximum Ratings

Maximum Temperature and Humidity

Storage Temperature	−55°C to +150°C
Operating Temperature	−55°C to +100°C
Pin Temperature (Soldering, 5s)	260°C
Total Package Power Dissipation at T_A = 25°C	400 mW
Derate Linearly from 25°C	5.3 mW/°C

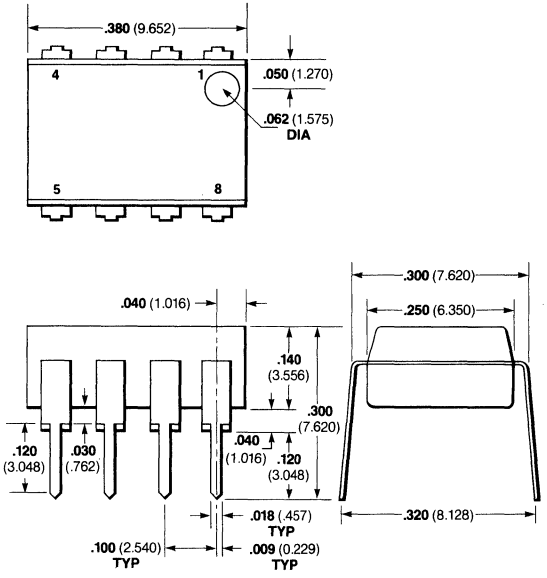
Input Diode (Each Channel)

V_R	Reverse Voltage	3.0 V
I_F	Forward dc Current	60 mA
I_{pk}	Peak Forward Current at 1 μs pulse, 300 pps	3.0 A
P_D	Power Dissipation at T_A = 25°C	150 mW
	Derate Linearly from 50°C	2 mW/°C

Output Transistor (Each Channel)

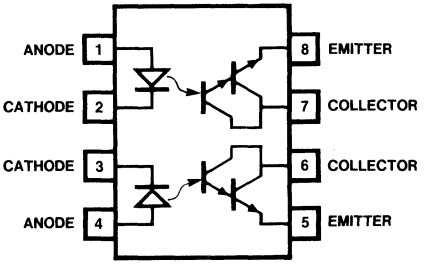
V_{CE}	Collector-to-Emitter Voltage	30 V
V_{EC}	Emitter-to-Collector Voltage	7.0 V
P_D	Power Dissipation at T_A = 25°C	150 mW
	Derate Linearly from 25°C	2 mW/°C
I_C	Collector Current	30 mA

Package Outline



Notes
All dimensions in inches **bold** and millimeters (parentheses)
Tolerance unless specified = ±.015 (±.381)
Package weight is 0.4 gram

Connection Diagram
DIP (Top View)



Pin		
1	Anode	
2	Cathode	Channel #1
3	Cathode	
4	Anode	Channel #2
5	Emitter	
6	Collector	Channel #2
7	Collector	
8	Emitter	Channel #1

Typical Electrical Characteristics

FCD890

Electrical Characteristics—Input Diode $T_A = 25°C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_F	Forward Voltage		1.25	1.5	V	$I_F = 20$ mA
V_R	Reverse Voltage	3.0	5.5		V	$I_R = 10\ \mu A$
C_J	Junction Capacitance		150		pF	$V_R = 0$ V, f = 1 MHz

Electrical Characteristics—Output Transistor $T_A = 25°C$ (Darlington)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{CEO}	Collector-to-Emitter Voltage	30	65		V	$I_C = 1.0$ mA, $I_F = 0$
V_{ECO}	Emitter-to-Collector Voltage	7.0	10		V	$I_C = 100\ \mu A$
I_{CEO}	Collector-to-Emitter Leakage Current		5.0	100	nA	$V_{CE} = 10$ V, $I_F = 0$
h_{FE}	Forward Current Gain		20 k			$V_{CE} = 5.0$ V, $I_C = 25$ mA

Electrical Characteristics—Coupled $T_A = 25°C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{IO}	Input-to-Output Voltage	2500	4000		V	
$V_{CE(sat)}$	Collector-to-Emitter Saturation Voltage			1.0	V	$I_C = 2.0$ mA, $I_F = 1.0$ mA
I_C/I_F(CTR)	Collector Current Transfer Ratio (Note 1)	200			%	$V_{CE} = 1.0$ V, $I_F = 1.0$ mA
R_{IO}	Input-to-Output Resistance		10^{11}		Ω	$V_{IO} = 500$ V
C_{IO}	Input-to-Output Capacitance		1.0		pF	f = 1.0 MHz, $V_{IO} = 0$
t_r, t_f	Collector Rise and Fall Times (Note 2)		80		μs	$I_C = 10$ mA, $V_{CE} = 10$ V, $R_L = 100\ \Omega$

Notes

1. Collector current transfer ratio is defined as the ratio of the collector current to the forward bias input current.
2. Rise time is defined as the time for the collector current to rise from 10% to 90% of peak value. Fall time is defined as the time required for the current to decrease from 90% to 10% of peak value.