

Optically-Coupled Darlington Isolator

Optoelectronic Products

FCD850/C/D FCD855/C/D

General Description

The FCD850, FCD855 series of optoisolators have a silicon npn Planar Darlington phototransistor coupled to a GaAs diode. Each is mounted in a 6-pin plastic dual in-line package. The FCD850/FCD850C has a minimum collector-emitter breakdown voltage of 30 V; the FCD855/FCD855C has a minimum collector-emitter breakdown voltage of 55 V.

Giassolated™

High Current Transfer Ratio

1500 V to 6000 V Minimum Isolation

Input-to-Output

$10^{11} \Omega$ Isolation Resistance

Low Coupling Capacitance—Typically 1.0 pF

Absolute Maximum Ratings

Storage Temperature	-55°C to +150°C
Operating Temperature	-55°C to +100°C
Pin Temperature (Soldering, 10 s)	260°C
Total Package Power Dissipation at $T_A = 25^\circ\text{C}$,	
LED plus Detector	250 mW
Derate Linearly from 25°C	3.3 mW/°C

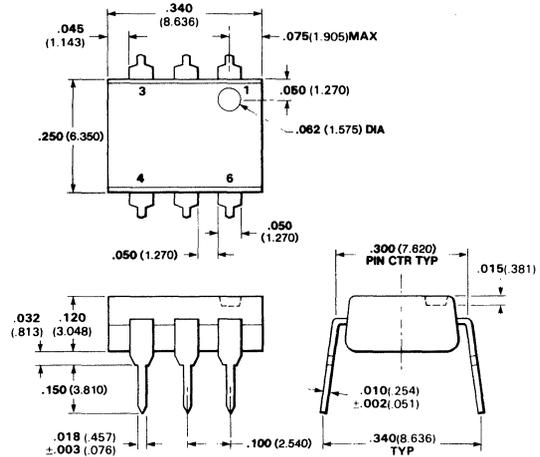
Input Diode

V_R Reverse Voltage	3.0 V
I_F Forward Current	60 mA
I_{pk} Peak Forward Current at 1 μs pulse width, 300 pps	3.0 A
P_D Power Dissipation at $T_A = 25^\circ\text{C}$	150 mW
Derate Linearly from 25°C	1.33 mW/°C

Output Transistor (Darlington)

V_{CE} Collector-to-Emitter Voltage	
FCD850	30 V
FCD855	55 V
V_{CB} Collector-to-Base Voltage	
FCD850	30 V
FCD855	55 V
V_{EC} Emitter-to-Collector Voltage	
FCD850	7.0 V
I_C Collector Current	125 mA
P_D Power Dissipation at $T_A = 25^\circ\text{C}$	150 mW
Derate Linearly from 25°C	2.0 mW/°C

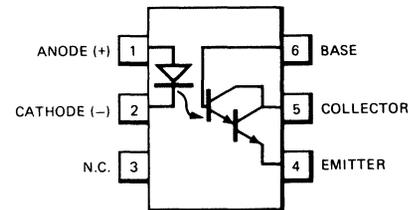
Package Outline



Notes

All dimensions in inches bold and millimeters (parentheses) Tolerance unless specified = $\pm .015$ ($\pm .381$)

Connection Diagram DIP (Top View)



Pin

1	Anode (+)	} Input Diode
2	Cathode (-)	
3	NC	
4	Emitter	} Output npn Phototransistor
5	Collector	
6	Base	

Typical Electrical Characteristics

FCD850/C/D FCD855/C/D

Electrical Characteristics—Input Diode $T_A = 25^\circ\text{C}$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_F	Forward Voltage		1.25	1.5	V	$I_F = 20\text{ mA}$
BV_R	Reverse Breakdown Voltage	3.0	5.0		V	$I_R = 10\text{ }\mu\text{A}$
C	Capacitance		150		pF	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$

Electrical Characteristics—Output Transistor $T_A = 25^\circ\text{C}$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{CEO}	Collector-to-Emitter Voltage FCD850, FCD850C	30			V	$I_C = 100\text{ }\mu\text{A}$, $I_F = 0$
	FCD855, FCD855C	55			V	$I_C = 100\text{ }\mu\text{A}$, $I_F = 0$
V_{ECO}	Emitter-to-Collector Voltage	7.0			V	$I_E = 100\text{ }\mu\text{A}$, $I_F = 0$
V_{EBO}	Emitter-to-Base Voltage	8.0			V	$I_E = 100\text{ }\mu\text{A}$, $I_F = 0$
I_{CEO}	Collector-to-Emitter Leakage Current			100	nA	$V_{CE} = 10\text{ V}$, $I_F = 0$
h_{FE}	Forward Current Gain		7000			$V_{CE} = 5.0\text{ V}$, $I_C = 25\text{ mA}$
C_{cb}	Collector-to-Base Capacitance		25		pF	$V_{CB} = 10\text{ V}$

Electrical Characteristics—Coupled $T_A = 25^\circ\text{C}$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{IO}	Input-to-Output Voltage (Note 1) FCD850, FCD855 FCD850C, FCD855C FCD850D, FCD855D	1500 5000 6000			V_{rms} V_{pk} V_{pk} V	
$V_{CE(sat)}$	Collector-to-Emitter Saturation Voltage			1.0	V	$I_C = 50\text{ mA}$, $I_F = 50\text{ mA}$
I_C	Collector Output Current	10	150		mA	$V_{CE} = 5.0\text{ V}$, $I_F = 10\text{ mA}$
R_{IO}	Input-to-Output Resistance		10^{11}		Ω	$V_{IO} = 500\text{ V}$
C_{IO}	Input-to-Output Capacitance		1.5		pF	$V_{IO} = 0$, $f = 1.0\text{ MHz}$
t_r	Rise Time (Note 2)		15		μs	$I_C = 125\text{ mA}$, $V_{CC} = 13.5\text{ V}$, $R_L = 100\text{ }\Omega$
t_f	Fall Time (Note 2)		150		μs	$I_C = 125\text{ mA}$, $V_{CC} = 13.5\text{ V}$, $R_L = 100\text{ }\Omega$

Notes

1. Isolation voltage defined as minimum of 5 s continuous application
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.