

Optically-Coupled Isolator

Optoelectronic Products

FCD836/C/D

General Description

The FCD836 series of optoisolators combines a GaAs infrared-emitting diode and a silicon npn phototransistor in close proximity. Optical intercoupling provides a high degree of ac and dc isolation. A capability for continuous operation of the input diode results in a frequency response extending to dc. Connection to the transistor base is also provided for design flexibility.

Glassolated™

1500 V to 6000 V Minimum Isolation

Input-to-Output

10¹¹ Ω Isolation Resistance

Low Coupling Capacitance—Typically 1.0 pF

High Speed

Absolute Maximum Ratings

Maximum Temperature and Humidity

Storage Temperature	−55°C to +150°C
Operating Temperature	−55°C to +100°C
Pin Temperature (Soldering, 5 s)	260°C
Total Package Power Dissipation at T _A = 25°C	
(LED plus Detector)	250 mW
Derate Linearly from 25°C	3.3 mW/°C

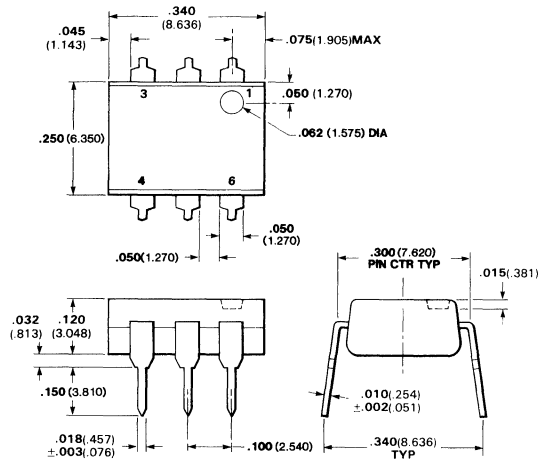
Input Diode

V _R	Reverse Voltage	3.0 V
I _F	Forward dc Current	60 mA
I _{pk}	Peak Forward Current (1 μs pulse width, 300 pps)	3.0 A
P _D	Power Dissipation at T _A = 25°C	100 mW
	Derate Linearly from 25°C	1.33 mW/°C

Output Transistor

V _{CE}	Collector-to-Emitter Voltage	20 V
V _{CB}	Collector-to-Base Voltage	30 V
I _C	Collector Current	20 mA
P _D	Power Dissipation at T _A = 25°C	150 mW
	Derate Linearly from 25°C	2.0 mW/°C

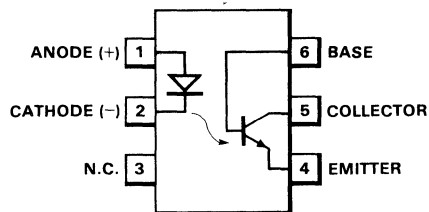
Package Outline



Notes

All dimensions in inches **bold** and millimeters (parentheses)
Tolerance unless specified = ±.015 (±.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

FCD836/C/D

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

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_F	Forward Voltage		1.3	1.5	V	$I_F = 10\text{ mA}$
BV_R	Reverse Breakdown Voltage	3.0	8.0		V	$I_R = 10\text{ }\mu\text{A}$

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

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{CEO}	Collector-to-Emitter Voltage	20	50		V	$I_C = 1.0\text{ mA}$, $I_F = 0$
V_{CBO}	Collector-to-Base Voltage	30	60		V	$I_C = 10\text{ }\mu\text{A}$, $I_F = 0$
I_{CEO}	Collector-to-Emitter Leakage Current		2.0	100	nA	$V_{CE} = 10\text{ V}$, $I_F = 0$
I_{CBO}	Collector-to-Base Leakage Current		0.1	20	nA	$V_{CB} = 10\text{ V}$, $I_F = 0$
h_{FE}	Forward Current Gain	50	250			$V_{CE} = 5.0\text{ V}$, $I_C = 100\text{ }\mu\text{A}$
C_{cb}	Collector-to-Base Capacitance		7.5		pF	$V_{CB} = 10\text{ V}$
C_{eb}	Emitter-to-Base Capacitance		10		pF	$V_{EB} = 0$

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

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{IO}	Input-to-Output Voltage FCD836 FCD836C FCD836D	1500 5000 6000			V_{rms} V_{pk} V_{pk} V	
$V_{CE(sat)}$	Collector-to-Emitter Saturation Voltage		0.35	0.7		$I_C = 2.0\text{ mA}$, $I_F = 50\text{ mA}$
$I_C/I_F(CTR)$	Collector Current Transfer Ratio (Note 1)	6.0	10		%	$V_{CE} = 10\text{ V}$, $I_F = 10\text{ mA}$
R_{IO}	Input-to-Output Resistance	10^{11}			Ω	$V_{IO} = 500\text{ V}$
C_{IO}	Input-to-Output Capacitance		1.0		pF	$f = 1.0\text{ MHz}$
t_r, t_f	Collector Rise and Fall Times (Note 2)		1.6	2.0	μs	$I_C = 2.0\text{ mA}$, $V_{CE} = 10\text{ V}$, $R_L = 100\text{ }\Omega$

Notes

- Collector current transfer ratio is defined as the ratio of the collector current to the forward bias input current.
- 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.