Optically-Coupled Isolator

Optoelectronic Products

TIL112
TIL115
TIL118

General Description

The TIL112, TIL115 and TIL118 series of optical isolators are electrical and mechanical replacements for the Texas Instrument series. Optical intercoupling provides a high degree of ac and dc isolation. Connection to the base is also provided for design flexibility.

Glassolated™
High Current Transfer Ratio
High-Speed Switching—Typically 2 μs
10^{11} Ω Isolation Resistance
Low Coupling Capacitance—Typically 1.0 pF

Absolute Maximum Ratings

Maximum Temperature

Storage Temperature	−55°C to +150°
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

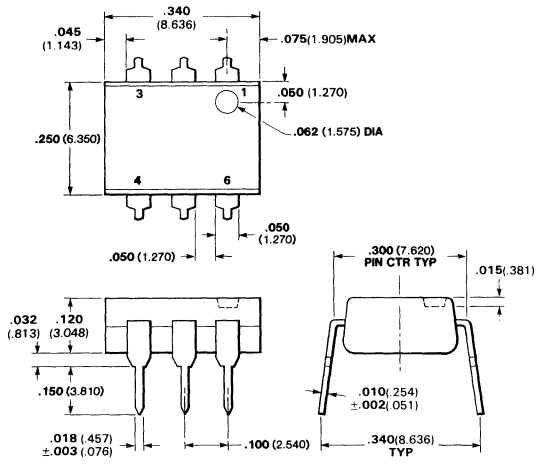
Input Diode

V_R	Reverse Voltage	3.0 V
I_F	Forward dc Current	100 mA
I_{pk}	Peak Forward Current at 1 μs pulse width, 300 pps	3.0 A
P_D	Power Dissipation at T_A = 25°C	150 mW
	Derate Linearly from 25°C	2.0 mW/°C

Output Transistor

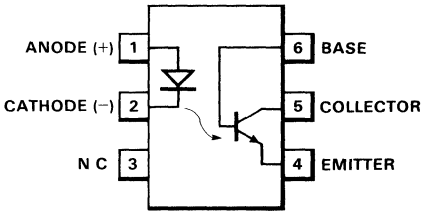
V_{CE}	Collector-to-Emitter Voltage	20 V
V_{CB}	Collector-to-Base Voltage	30 V
P_D	Power Dissipation at T_A = 25°C	150 mW
	Derate Linearly from 25°C	2.0 mW/°C

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

TIL112
TIL115
TIL118

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

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_F	Forward Voltage		1.2	1.5	V	$I_F = 10$ mA
BV_R	Reverse Breakdown Voltage	3.0	5.0		V	$I_R = 10\ \mu A$

Electrical Characteristics—Output Transistor $T_A = 25°C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{CEO}	Collector-to-Emitter Voltage	20			V	$I_C = 1.0$ mA, $I_F = 0$
V_{CBO}	Collector-to-Base Voltage	30			V	$I_C = 10\ \mu A$, $I_F = 0$
V_{EBO}	Emitter-to-Collector Voltage (V_{ECO} on TIL118)	4.0			V	$I_E = 10\ \mu A$, $I_F = 0$
I_{CEO}	Collector-to-Emitter Leakage Current		1.0	100	nA	$V_{CE} = 5.0$ V, $I_F = 0$
I_{CBO}	Collector-to-Base Leakage Current		0.1	50	nA	$V_{CB} = 5.0$ V, $I_F = 0$
h_{FE}	Forward Current Gain	50	200			$V_{CE} = 5.0$ V, $I_C = 10\ \mu A$

Electrical Characteristics—Coupled $T_A = 25°C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_C	Collector Output Current					
	TIL112, TIL115	0.2	2.0		mA	$V_{CE} = 5.0$ V, $I_F = 10$ mA
	TIL118	1.0	2.0		mA	$V_{CE} = 5.0$ V, $I_F = 10$ mA
I_B	Collector-to-Base Current					
	TIL112, TIL115	2.0	10		μA	$V_{CB} = 5.0$ V, $I_F = 10$ mA
V_{ISO}	Isolation Voltage					
	TIL112, TIL118	1500			V	
	TIL115	2500			V	
R_{ISO}	Isolation Resistance		10^{11}		Ω	V = 500 V
C_{ISO}	Isolation Capacitance			2.0	pF	f = 1 MHz
$V_{CE(sat)}$	Collector-to-Emitter Saturation Voltage			0.5	V	$I_C = 2.0$ mA, $I_F = 50$ mA
t_r	Rise Time		2.0	15	μs	$I_C = 2.0$ mA, $V_{CC} = 10$ V, $R_L = 100\ \Omega$
t_f	Fall Time (See Note)		2.0	15	μs	$I_C = 2.0$ mA, $V_{CC} = 10$ V, $R_L = 100\ \Omega$

Note
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.