Radiation Tolerant High-Speed 1MHz Hybrid Surface Mount Optocoupler

IBI300

Features

- Hybrid 6-pin package
- 1500Vdc isolation voltage
- High Speed 1MHz
- Small package outline
- High reliability and rugged construction
- High reliability screening available
- Radiation tolerant
- Open collector output
- Operating temperature range -55℃ to +125℃

Applications

- Switch mode power supplies
- Computer peripheral interface
- Motor control
- Ground signal isolation

Description

The IBI300 consists of a phototransistor optically coupled to an AlGaAs infrared-emitting diode in a leadless hybrid surface mount package.

Schematic Diagram

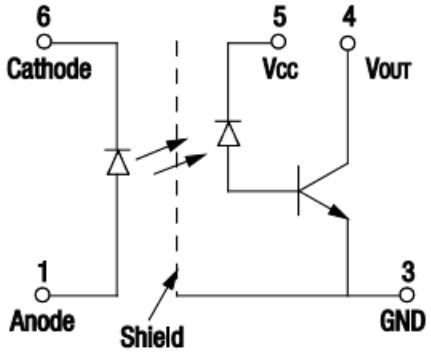

Figure 1. IBI300 Schematic Diagram

Package Dimensions in inches (mm)

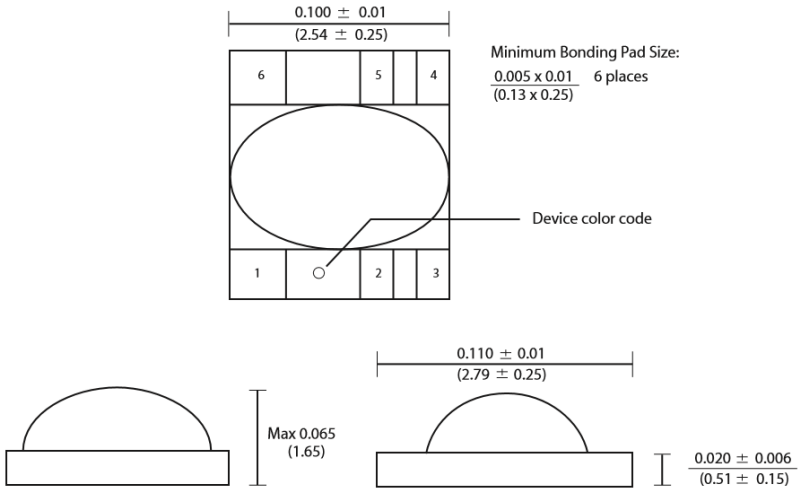

Figure 2. IBI300 Package Dimensions

Absolute Maximum Rating at 25°C (Note 1)

Symbol	*Parameters*	*Ratings*	*Units*	*Notes*
V_{DC}	Isolation voltage	-1500 to +1500	V	2
T_{OPR}	Operating temperature	-55 to +125	°C	
T_{STG}	Storage temperature	-65 to +150	°C	
T_{SOL}	Soldering temperature (10 seconds maximum)	240	°C	
Emitter				
P_D	Emitter power dissipation	36	mW	
I_F	Forward current	20	mA	
$I_{F(TRANS)}$	Peak transient current (≤1ms P.W.)	40	mA	
V_R	Reverse voltage	5	V	
Detector				
P_D	Detector power dissipation	50	mW	3
I_O	Output Current	8	mA	
$I_{O(PEAK)}$	Peak Output Current	16	mA	
V_{CC}	Supply Voltage	-0.5 to +18.0	V	
V_O	Output Voltage	-0.5 to +18.0	V	

Notes

1. When using this product, please observe the absolute maximum ratings. Only one parameter may be set at the limit to ensure no damage to the device. Exceeding any of the limits listed here may damage the device.
2. Measured between input pins 1 and 6 shorted together, and output pins 2, 3, 4, and 5 shorted together. T_A = 25°C and duration = 1sec.
3. Linear derating factor: 1.4 mW/°C above 100°C

ESD Precaution

Please be advised that normal static precautions should be taken in the handling and assembly of this device to prevent damage or degradation which may be induced by electrostatic discharge (ESD).

Electrical Characteristics *T_A = -55℃ to +125℃ (unless otherwise specified)* (Note 1)

Emitter Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
V_F	Forward Voltage	I_F=10mA	-	1.8	2.5	V	
B_{VR}	Input Breakdown Reverse Voltage	I_R=10μA	3	-	-	V	

Detector Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
V_{OL}	Logic Low Output Voltage	I_F=10mA,I_{OL}=1.5mA,V_{CC}=4.5V	-	0.15	0.4	V	
I_{OH}	Logic High Output Current	I_F=0mA, V_{CC}=15V, V_O=15V	-	0.05	100.0	μA	
I_{CCL}	Logic Low Supply Current	I_F=10mA, V_{CC}=15V, V_O=open	-	40	200	μA	
I_{CCH}	Logic High Supply Current	I_F=0mA, V_{CC}=15V, V_O=open	-	0.05	10	μA	

Transfer Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
CTR	Current Transfer Ratio	I_F=10mA, V_{CC}=4.5V, V_O=0.4V	15	25	-	%	2
I_{IO}	Input to Output Leakage Current	V_{IO}= 1500V_{DC} Relative Humidity ≤ 50% T_A=25°C	-	-	1	μA	3

Propagation Delay Time

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
t_{PHL}	Logic High to Low	I_F= 10mA, V_{CC}= 5V,	-	0.3	1.0	μs	4
t_{PLH}	Logic Low to High	R_L= 4.1kΩ, T_A=25°C	-	0.5	2.0		4

Notes

1. Performance guaranteed only under conditions listed in above tables.
2. CTR is the ratio of the output collector current I_{C_ON} to the forward LED current I_F multiplied by 100%
3. Measured between input pins 1 and 6 shorted together, and output pins 2, 3, 4, and 5 shorted together. T_A = 25°C and duration = 1sec.
4. A ceramic bypass capacitor (0.01μF to 0.1μF) between pins 3 and 5 is required to stabilize the operation of the amplifier.

Typical Characteristic Curves

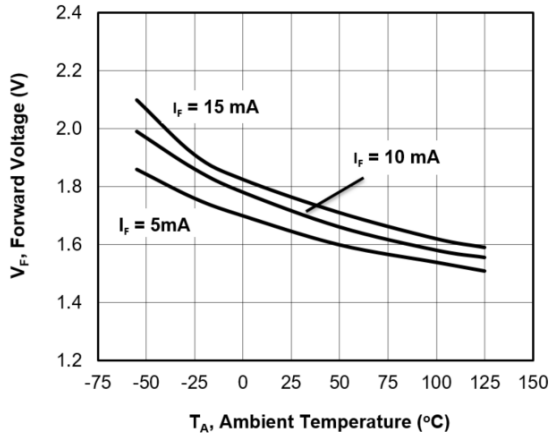

Figure 3. Forward Voltage vs Temperature

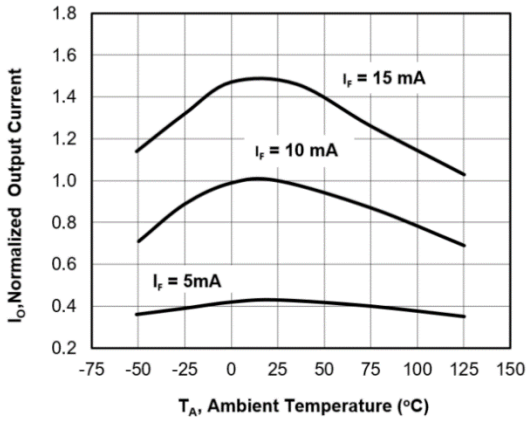

Figure 4. Output Current vs Temperature

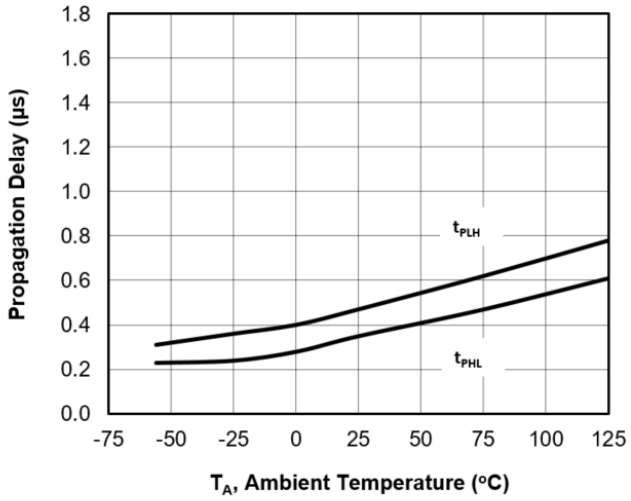

Figure 5. Propagation Delay vs Temperature

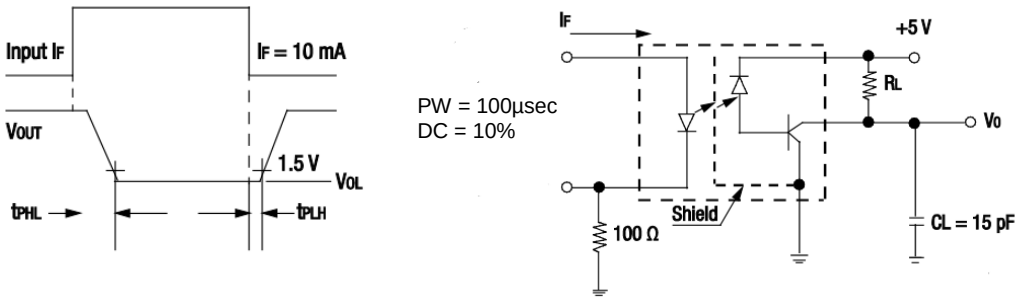

Figure 6. IBI300 Switching Test Circuit

Ordering Information

Manufacturing Part Number	*Part Description*
IBI300	Radiation Tolerant High-Speed 1MHz 6-pin Hybrid Package

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