Miniature Phototransistor Hermetic Surface Mount Optocoupler

IBS010

Features

- Hermetic 4-pin LCC package
- 1000Vdc isolation voltage
- High CTR
- Small package outline
- High reliability and rugged construction
- High reliability screening available
- DC input with transistor output
- Operating temperature range -55℃ to +125℃

Applications

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

Description

The IBS010 consists of a phototransistor optically coupled to an AlGaAs infrared-emitting diode in a leadless hermetic surface mount package.

Schematic Diagram

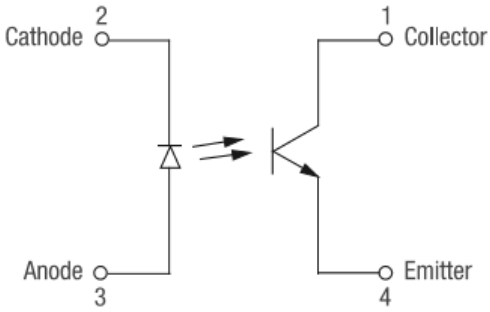

Figure 1. IBS010 Schematic Diagram

Package Dimensions in inches (mm)

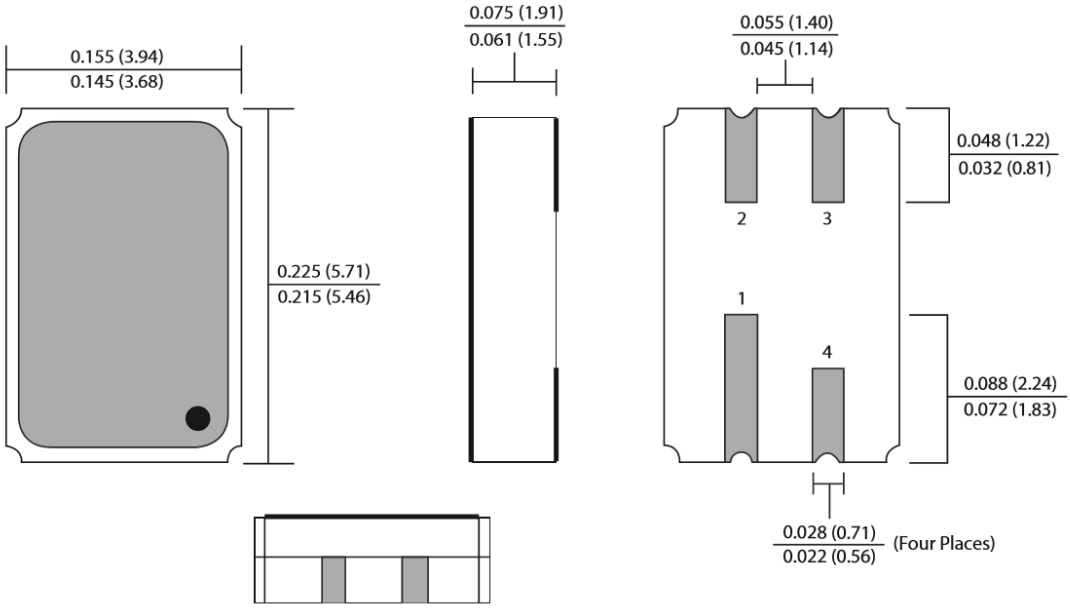

Figure 2. IBS010 Package Dimensions

Absolute Maximum Rating at 25°C (Note 1)

Symbol	*Parameters*	*Ratings*	*Units*	*Notes*
V_{DC}	Isolation voltage	-1000 to +1000	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	60	mW	3
I_F	Forward current	40	mA	
$I_{F(TRANS)}$	Peak transient current (≤1ms)	1	A	
V_R	Reverse voltage	2	V	
Detector				
P_D	Detector power dissipation	300	mW	4
V_{CE}	Collector-Emitter Voltage	60	V	
V_{EC}	Emitter-Collector Voltage	5	V	
I_{CC}	Continuous Collector Current	50	mA	

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 2 and 3 shorted together, and output pins 1 and 4 shorted together. T_A = 25°C and duration = 1sec.
3. Linear derating factor: 1.0 mW/°C above 65°C
4. Linear derating factor: 3.0 mW/°C above 25°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*	*Max*	*Units*	*Notes*
V_F	Forward Voltage	I_F=10mA, T_A = -55°C	1.1	1.8	V	
		I_F=10mA, T_A= 25°C	0.9	1.6	V	
		I_F=10mA, T_A = 100°C	0.7	1.3	V	
I_R	Reverse Current	V_R = 2V	-	100	µA	

Detector Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Max*	*Units*	*Notes*
BV_{CEO}	Collector-Emitter Breakdown Voltage	I_{CE}= 1mA, T_A= 25°C	60	-	V	
BV_{ECO}	Emitter-Collector Breakdown Voltage	I_{EC}= 100µA, T_A= 25°C	5	-	V	
I_{C_ON}	Collector Current, On-state	V_{CE}= 5V, I_F=1mA	1.0	-	mA	
		V_{CE}= 5V, I_F=10mA	1.0	-	mA	
I_{CE_OFF}	Collector-Emitter Dark Current, Off-state	V_{CE}= 20V, T_A= 25°C	-	100	nA	
		V_{CE}= 20V, T_A= 100°C	-	100	µA	

Transfer Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Max*	*Units*	*Notes*
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	I_F= 10mA, I_C= 2mA	-	0.3	V	
R_{IO}	Isolation Resistance	V_{IO}= ±1000V_{DC}	10^{11}	-	Ω	2
C_{IO}	Isolation Capacitance	f= 1MHz, V_{IO}= 0V	-	5	pF	2

Switching Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Max*	*Units*	*Notes*
t_r	Rise Time	I_F= 10mA, V_{CC}= 10V, R_L= 100Ω	-	20	µs	3
t_f	Fall Time		-	20		3

Notes

1. Performance guaranteed only under conditions listed in above tables.
2. Measured between input pins 2 and 3 shorted together, and output pins 1 and 4 shorted together. T_A = 25°C and duration = 1sec.
3. Value applies for PW ≤1 µs, 300 pps.

Typical Characteristic Curves

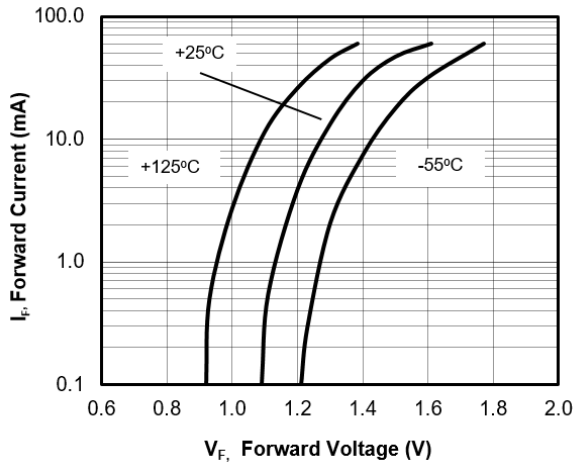

Figure 3. Forward Current vs Forward Voltage

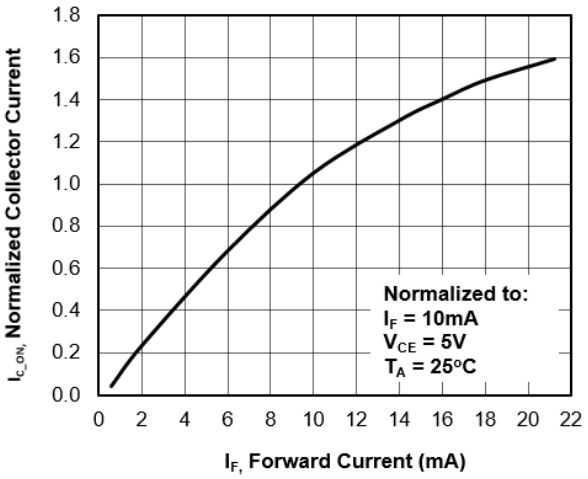

Figure 4. Collector Current vs Forward Current

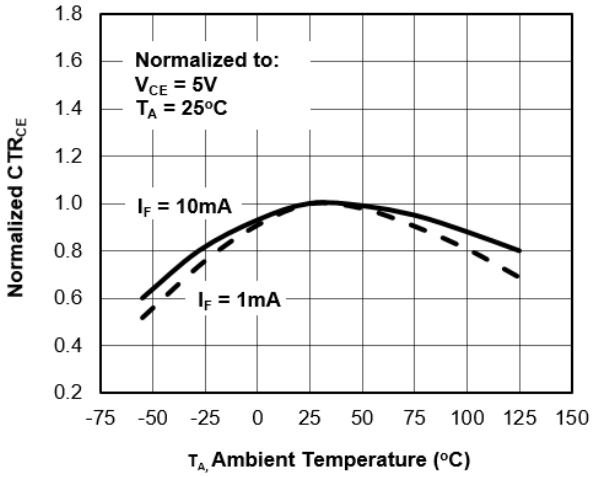

Figure 5. Normalized CTR_{CE} vs Temperature

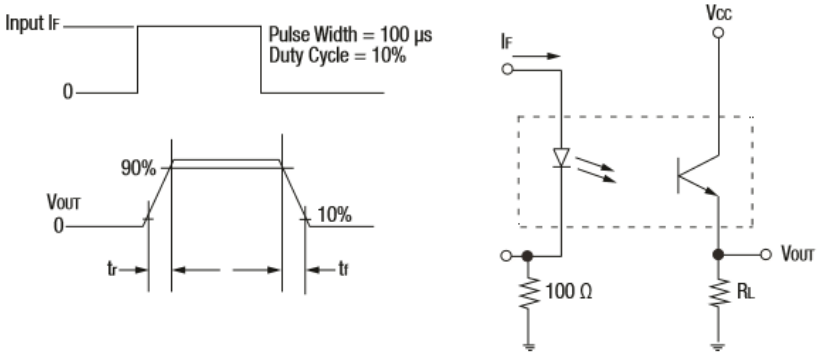

Figure 6. IBS010 Switching Test Circuit

Ordering Information

Manufacturing Part Number	***Part Description***
IBS010	Miniature Phototransistor Hermetic 4-pin LCC Package

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