

## Features

- Hermetic 6-pin LCC package
- 1500Vdc isolation voltage
- High CTR
- Small package outline
- High reliability and rugged construction
- High reliability screening available
- Radiation tolerant
- DC input with transistor output
- Operating temperature range -55°C to +125°C

## Applications

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

## Description

The IBS249 consists of a phototransistor optically coupled to an AlGaAs infrared-emitting diode in a leadless hermetic surface mount package.

## Schematic Diagram

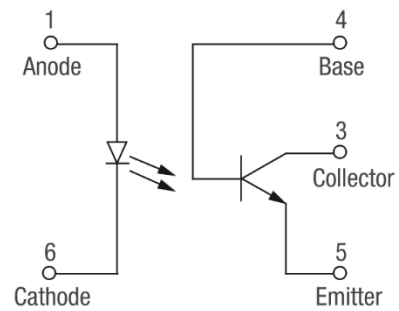


Figure 1. IBS249 Schematic Diagram

## Package Dimensions in inches (mm)

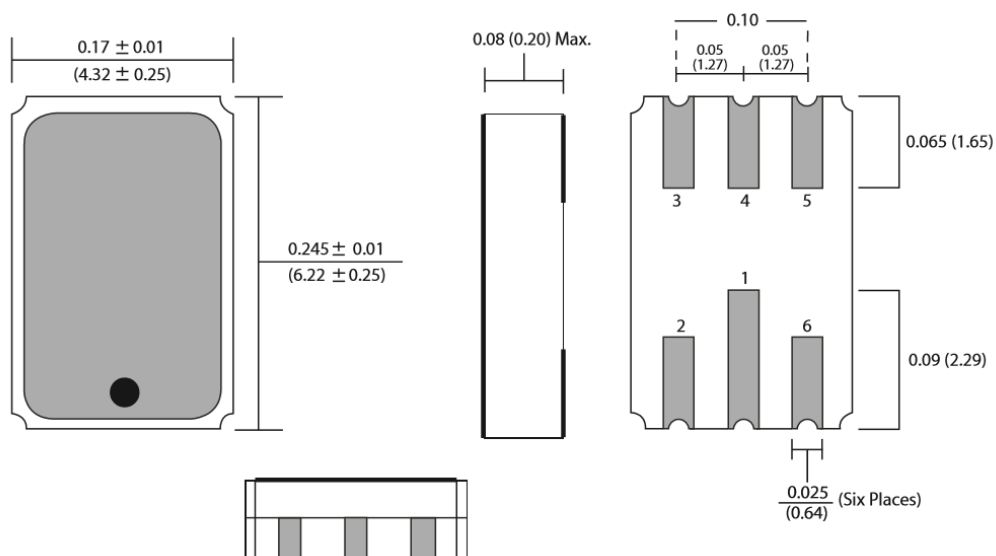


Figure 2. IBS249 Package Dimensions

**Absolute Maximum Rating at 25°C** (Note 1)

<b>Symbol</b>	<b>Parameters</b>	<b>Ratings</b>	<b>Units</b>	<b>Notes</b>
V <sub>DC</sub>	Isolation voltage	-1500 to +1500	V	2
T <sub>OPR</sub>	Operating temperature	-55 to +125	°C	
T <sub>STG</sub>	Storage temperature	-65 to +150	°C	
T <sub>SOL</sub>	Soldering temperature (10 seconds maximum)	240	°C	
<b>Emitter</b>				
P <sub>D</sub>	Emitter power dissipation	100	mW	
I <sub>F</sub>	Forward current	40	mA	3
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W., 300pps)	1	A	
V <sub>R</sub>	Reverse voltage	2	V	
<b>Detector</b>				
P <sub>D</sub>	Detector power dissipation	300	mW	4
V <sub>CE</sub>	Collector-Emitter Voltage	40	V	
V <sub>EB</sub>	Emitter-Base Voltage	7	V	
V <sub>CB</sub>	Collector-Base Voltage	45	V	
I <sub>CC</sub>	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 1, 2, and 6 shorted together, and output pins 3, 4, and 5 shorted together. T<sub>A</sub> = 25°C and duration = 1sec.
3. Linear derating factor: 0.67 mA/°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**  $T_A = 25^\circ\text{C}$  (unless otherwise specified) (Note 1)

**Emitter Characteristics**

Symbol	Parameters	Test Conditions	Min	Max	Units	Notes
$V_F$	Forward Voltage	$I_F=10\text{mA}$ , $T_A = -55^\circ\text{C}$	1.4	2.0	V	
		$I_F=10\text{mA}$	1.2	1.8	V	
		$I_F=10\text{mA}$ , $T_A = 125^\circ\text{C}$	1.1	1.7	V	
$I_R$	Reverse Current	$V_R = 2\text{V}$	-	100	$\mu\text{A}$	

**Detector Characteristics**

Symbol	Parameters	Test Conditions	Min	Max	Units	Notes
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_{CE}=1\text{mA}$	40	-	V	
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_{CB}=100\mu\text{A}$	45	-	V	
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_{EB}=100\mu\text{A}$	7	-	V	
$I_{C\_ON}$	Collector Current, On-state	$V_{CE}=5\text{V}$ , $I_F=1\text{mA}$	2.0	12.0	mA	
		$V_{CE}=5\text{V}$ , $I_F=2\text{mA}$ , $T_A = -55^\circ\text{C}$	2.8	-	mA	2
		$V_{CE}=5\text{V}$ , $I_F=2\text{mA}$ , $T_A = 125^\circ\text{C}$	2.0	-	mA	2
$I_{CB\_ON}$	Collector Base Current, On-state	$V_{CB}=5\text{V}$ , $I_F=10\text{mA}$	30	-	$\mu\text{A}$	
$I_{CE\_OFF}$	Collector-Emitter Dark Current, Off-state	$V_{CE}=20\text{V}$	-	100	nA	
		$V_{CE}=20\text{V}$ , $T_A = 125^\circ\text{C}$	-	100	$\mu\text{A}$	
$I_{CB\_OFF}$	Collector-Base Dark Current, Off-state	$V_{CB}=20\text{V}$	-	10	nA	

**Transfer Characteristics**

Symbol	Parameters	Test Conditions	Min	Max	Units	Notes
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F=2\text{mA}$ , $I_C=2\text{mA}$	-	0.3	V	
$R_{IO}$	Isolation Resistance	$V_{IO} = \pm 1000\text{V}_{DC}$	$10^{11}$	-	$\Omega$	3
$C_{IO}$	Isolation Capacitance	$f = 1\text{MHz}$ , $V_{IO} = 0\text{V}_{DC}$	-	5	pF	3

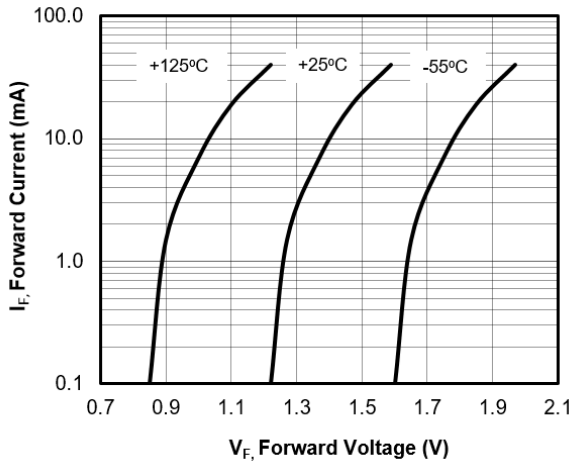
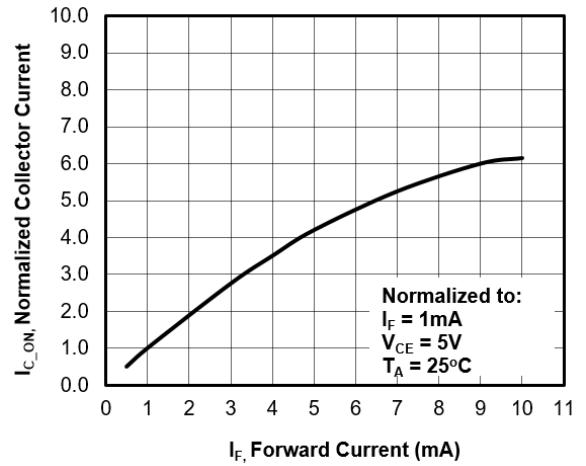
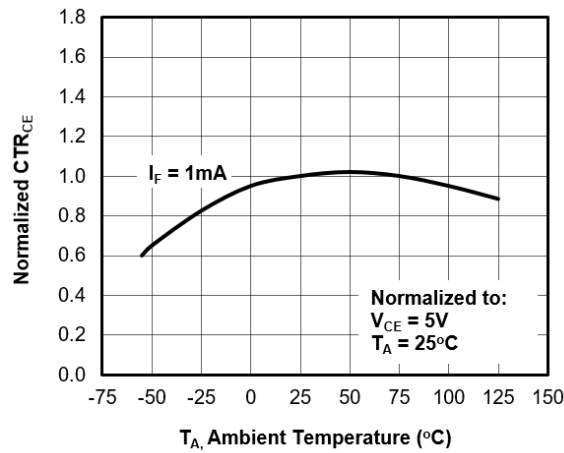
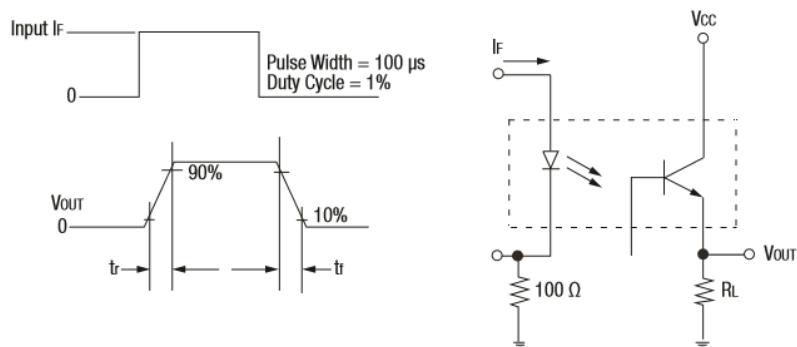
**Switching Characteristics**

Symbol	Parameters	Test Conditions	Min	Max	Units	Notes
$t_r$	Rise Time	$I_F=5\text{mA}$ , $V_{CC}=10\text{V}$ , $R_L=100\Omega$	-	25	$\mu\text{s}$	
$t_f$	Fall Time		-	25		

**Notes**

- Performance guaranteed only under conditions listed in above tables.
- Testing at  $25^\circ\text{C}$  guarantees full temperature operating range.
- Measured between input pins 1, 2, and 6 shorted together, and output pins 3, 4, and 5 shorted together.  $T_A = 25^\circ\text{C}$  and duration = 1sec.

### Typical Characteristic Curves


**Figure 3. Forward Current vs Forward Voltage**

**Figure 4. Collector Current vs Forward Current**

**Figure 5. Normalized CTR<sub>CE</sub> vs Temperature**

**Figure 6. IBS249 Switching Test Circuit**



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## Ordering Information

<i>Manufacturing Part Number</i>	<i>Part Description</i>
IBS249	Radiation Tolerant Phototransistor Hermetic 6-pin LCC Package

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