

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
- Full lot traceability
- 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.NEO consists of a phototransistor optically coupled to an AlGaAs infrared-emitting diode in a leadless hermetic surface mount package, specifically screened and qualified for NewSpace, near earth orbit, and low earth orbit (LEO) applications.

Schematic Diagram

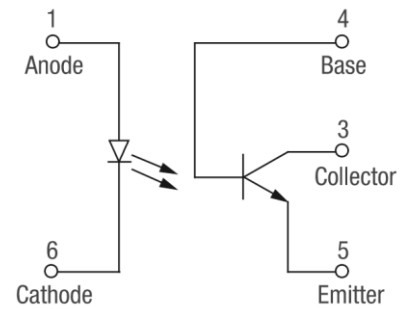


Figure 1. IBS249.NEO Schematic Diagram

Package Dimensions in inches (mm)

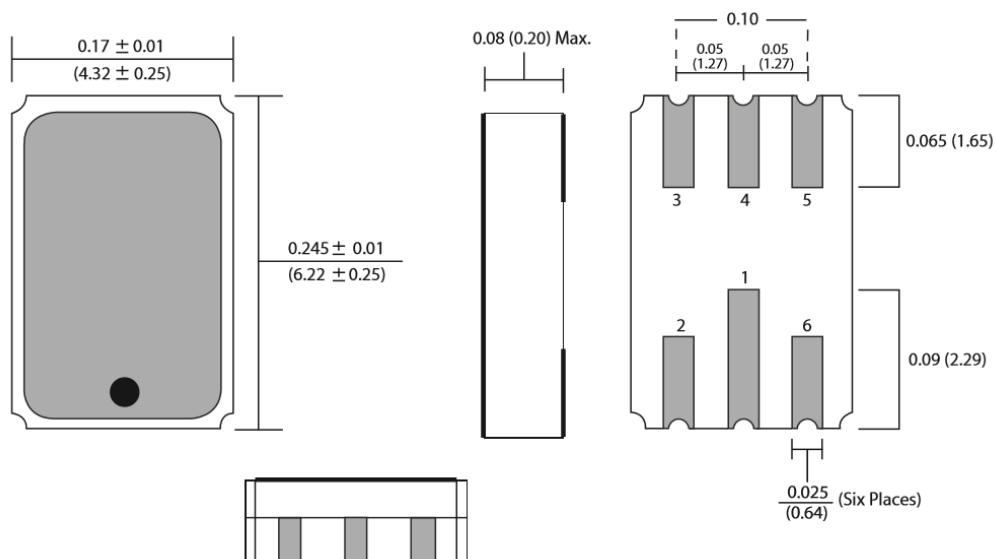


Figure 2. IBS249.NEO Package Dimensions

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	100	mW	
I _F	Forward current	40	mA	3
I _{F(TRANS)}	Peak transient current (≤1μs P.W., 300pps)	1	A	
V _R	Reverse voltage	2	V	
Detector				
P _D	Detector power dissipation	300	mW	4
V _{CE}	Collector-Emitter Voltage	40	V	
V _{EB}	Emitter-Base Voltage	7	V	
V _{CB}	Collector-Base Voltage	45	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 1, 2, and 6 shorted together, and output pins 3, 4, and 5 shorted together. T_A = 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	μA	

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	-	μA	
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	μA	
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}	-	Ω	3
C_{IO}	Isolation Capacitance	$f = 1\text{MHz}$, $V_{IO} = 0\text{V}_{DC}$	-	5	pF	3

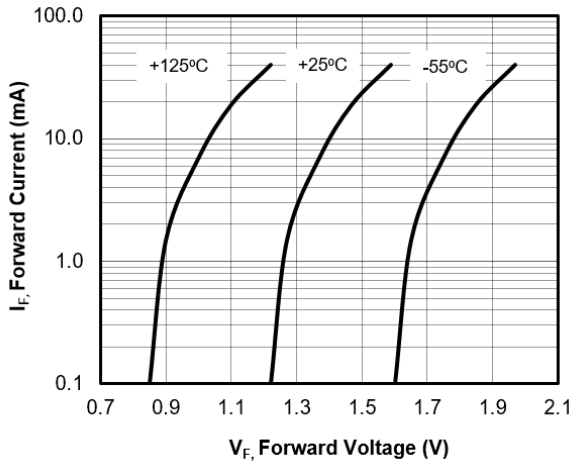
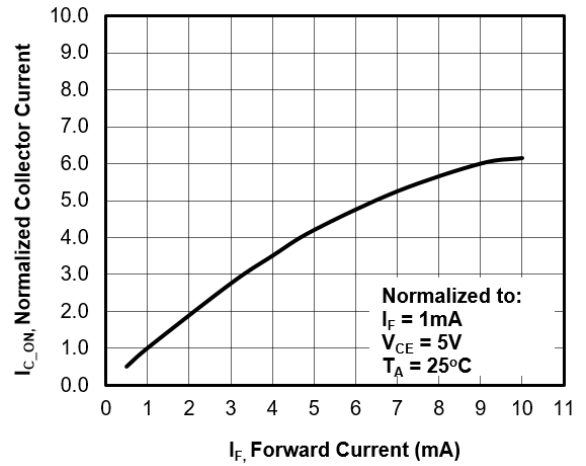
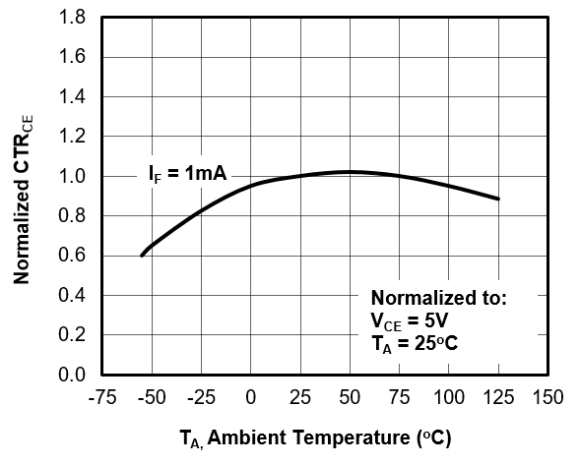
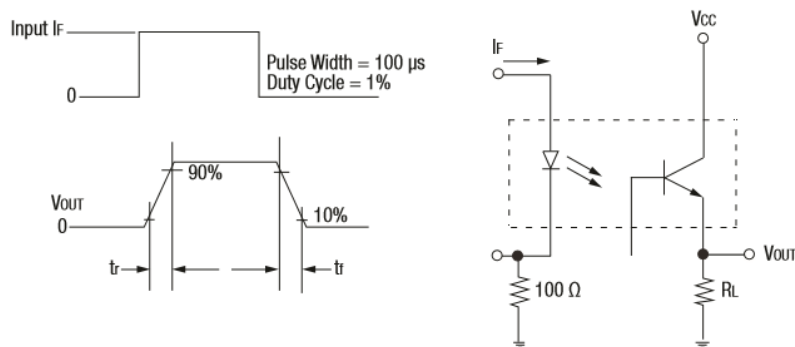
Switching Characteristics

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	μs	
t_f	Fall Time		-	25		

Notes

- Performance guaranteed only under conditions listed in above tables.
- Testing at 25°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_{CE} vs Temperature

Figure 6. IBS249.NEO Switching Test Circuit

Ordering Information

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

Screening Information $T_A = 25^\circ\text{C}$ (unless otherwise specified) (Note 1)

<i>Screening Test</i>	<i>Test Condition Description</i>	<i>Notes</i>
Constant Acceleration	100% per MIL-STD-750 Method 2006	
Gross leak	100% per MIL-STD-750 Method 1071, Condition C	
Fine leak	100% per MIL-STD-750 Method 1071, Condition H	
Electrical test at $T_A = 25^\circ\text{C}$	100%	2, 5
Electrical test at $T_A = -55^\circ\text{C}$	Sample size based on lot size	3, 6
Electrical test at $T_A = 125^\circ\text{C}$	Sample size based on lot size	3, 6
Steady State Op Life	Per MIL STD-750 Method 1026. Sample size based on lot size	3
Radiation tolerance	Typical wafer lot data	4

Notes

- Performance guaranteed only under conditions listed in above tables
- Testing at 25°C guarantees full temperature operating range
- Small Lot sample size = 12 units. Large Lot sample size = 22 units
- Data provided upon request
- 100% Test at $T_A = 25^\circ\text{C}$. No R&R data
- R&R data provided on samples tested at $T_A = 25^\circ\text{C}$, -55°C , 125°C

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