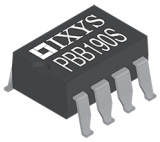
IXYS
INTEGRATED CIRCUITS DIVISION



PBB190
Dual Single-Pole, Normally Closed OptoMOS® Relay

Parameter	Ratings	Units
Blocking Voltage	400	V_P
Load Current	130	mA_{rms} / mA_{DC}
On-Resistance (max)	25	Ω

Features
- $5000V_{rms}$ Input/Output Isolation
- Low Drive Power Requirements
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Small 8-Pin Package
- Flammability Rating UL 94 V-0
- Surface Mount, Tape & Reel Versions Available

Applications
- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - Hook Switch
  - Dial Pulsing
  - Ground Start
  - Ringing Injection
- Instrumentation
- Multiplexers
- Data Acquisition
- Electronic Switching
- I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment-Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

Description
PBB190 is a dual single-pole, normally closed (1-Form-B) solid state relay with two independently controlled switches that use optically coupled MOSFET technology to provide $5000V_{rms}$ of input to output isolation.

Its optically coupled outputs, which use the patented OptoMOS architecture, are controlled by a highly efficient infrared LED.

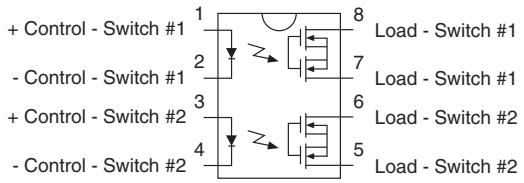
Dual single-pole OptoMOS relays provide a more compact design solution than discrete single-pole relays in a variety of applications by incorporating both relays in a single 8-pin package.

Approvals
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component: Certificate available on our website

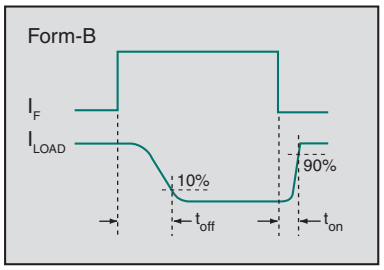
Ordering Information

Part #	Description
PBB190	8-Lead DIP (50/Tube)
PBB190S	8-Lead Surface Mount (50/Tube)
PBB190STR	8-Lead Surface Mount (1,000/Reel)

Pin Configuration



Switching Characteristics of Normally Closed Devices



ПРОМЭЛЕКТРОНИКА / sales@prom-elec.com

Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Blocking Voltage	400	V_P
Reverse Input Voltage	5	V
LED Forward Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation [1]	150	mW
Total Power Dissipation [2]	800	mW
Isolation Voltage, Input to Output (60 Seconds)	5000	V_{rms}
ESD Rating, Human Body Model	8	kV
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 1.33 mW / ºC
[2] Derate linearly 6.67 mW / ºC

Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

Typical values are characteristic of the device at +25°C, and are the result of engineering evaluations. They are provided for information purposes only, and are not part of the manufacturing testing requirements.

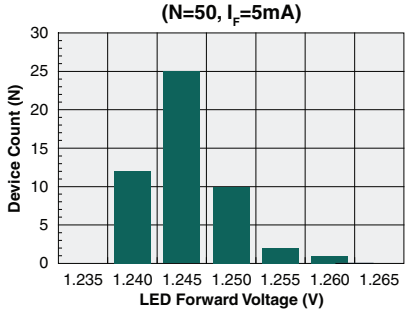
Electrical Characteristics @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current [1]						
Continuous	I_F=0mA	I_L	-	-	130	mA_{rms} / mA_{DC}
Peak	I_F=0mA, t=10ms	I_L	-	-	±400	mA_P
On-Resistance [2]	I_F=0mA, I_L=130mA	R_{ON}	-	-	25	Ω
Off-State Leakage Current	I_F=2mA, V_L=400V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5 mA, V_L=10V	t_{on}	-	-	1	ms
Turn-Off	I_F=5 mA, V_L=10V	t_{off}	-	-	2.5	ms
Output Capacitance	I_F=5mA, V_L=50V, f=1MHz	C_{OUT}	-	11	-	pF
Input Characteristics						
LED Forward Current						
To Activate [3]	I_L=130mA	I_F	-	0.38	2	mA
To Deactivate	-	I_F	0.2	0.35	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.5	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics						
Input to Output Capacitance	V_{IO}=0V, f=1MHz	C_{IO}	-	3	-	pF

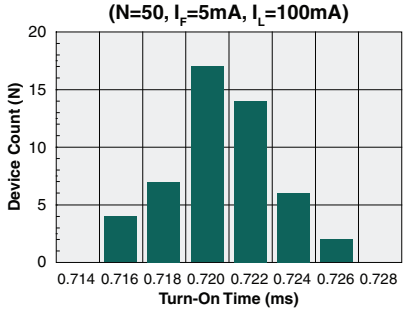
[1] If both poles operate simultaneously, then the load current must be derated so that the package power dissipation value is not exceeded.
[2] Measurement taken within 1 second of on-time.
[3] For high temperature operation (>60ºC), a minimum LED drive current of 4mA is recommended.

PERFORMANCE DATA*

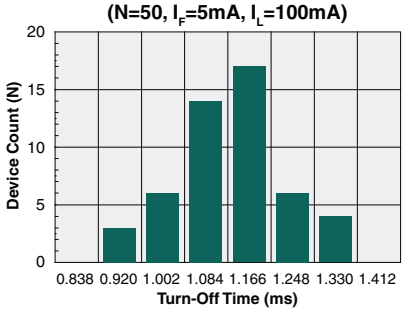
Typical LED Forward Voltage Drop (N=50, I_F=5mA)



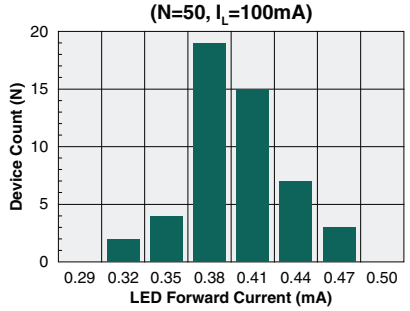
Typical Turn-On Time (N=50, I_F=5mA, I_L=100mA)



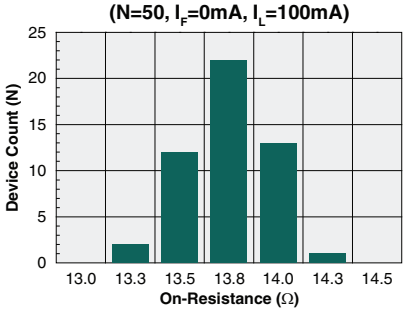
Typical Turn-Off Time (N=50, I_F=5mA, I_L=100mA)



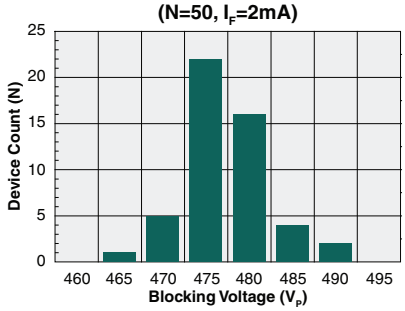
Typical LED Forward Current to Activate (N=50, I_L=100mA)



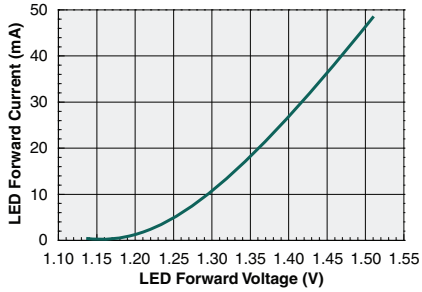
Typical On-Resistance Distribution (N=50, I_F=0mA, I_L=100mA)



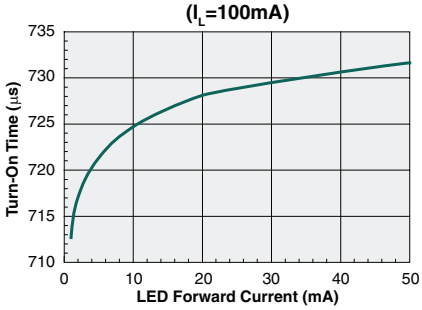
Typical Blocking Voltage Distribution (N=50, I_F=2mA)



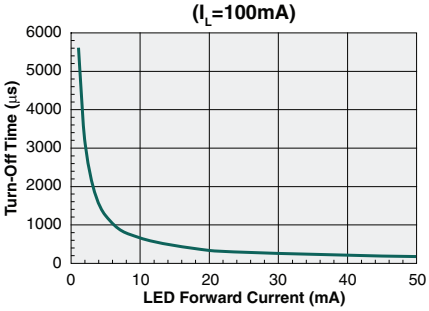
LED Forward Voltage vs. LED Forward Current



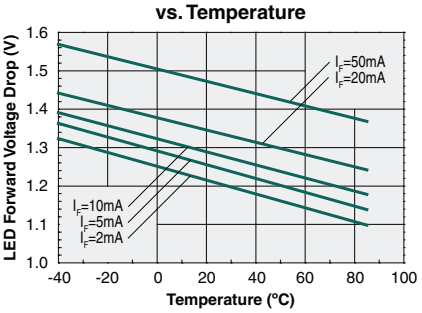
Typical Turn-On Time vs. LED Forward Current (I_L=100mA)



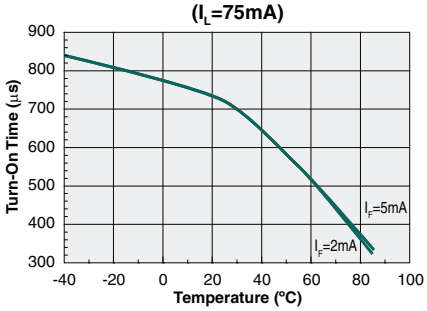
Typical Turn-Off Time vs. LED Forward Current (I_L=100mA)



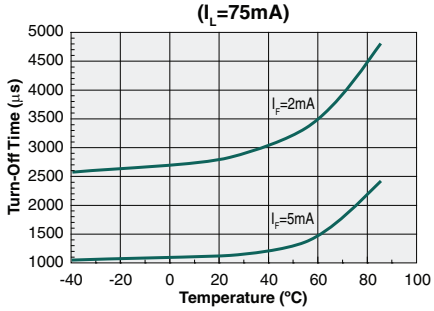
Typical LED Forward Voltage Drop vs. Temperature



Turn-On Time vs. Temperature (I_L=75mA)



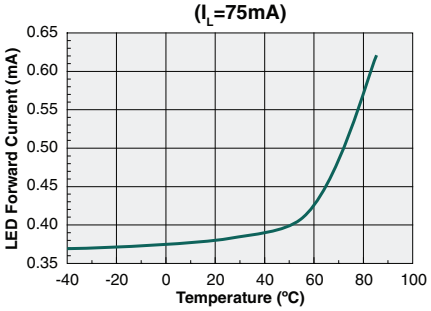
Turn-Off Time vs. Temperature (I_L=75mA)



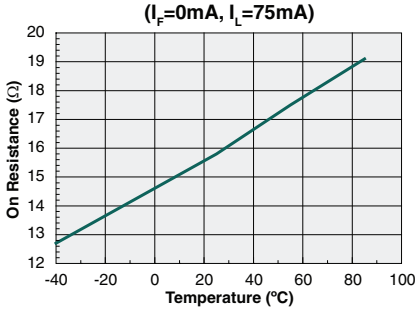
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

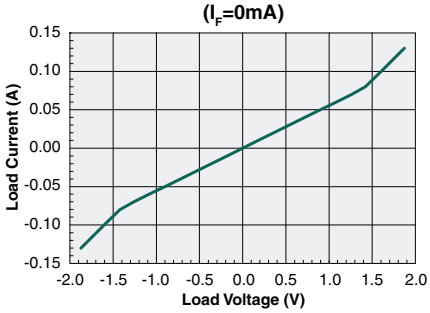
LED Forward Current to Activate vs. Temperature (I_L=75mA)



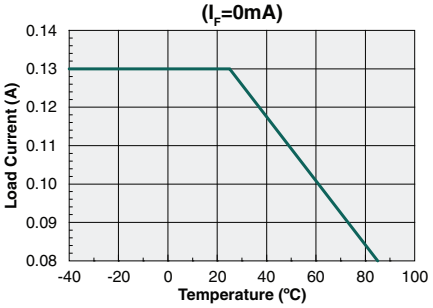
On-Resistance vs. Temperature (I_F=0mA, I_L=75mA)



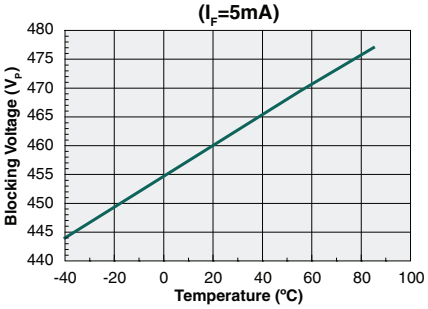
Typical Load Current vs. Load Voltage (I_F=0mA)



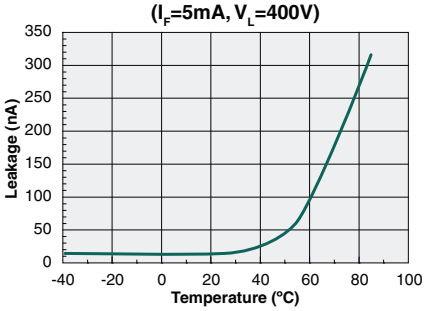
Maximum Load Current vs. Temperature (I_F=0mA)



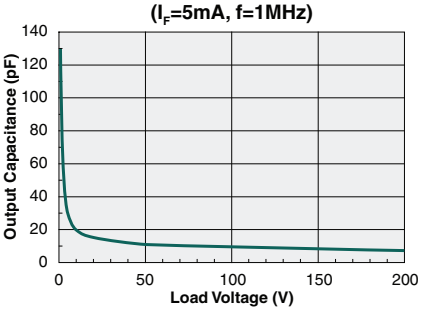
Typical Blocking Voltage vs. Temperature (I_F=5mA)



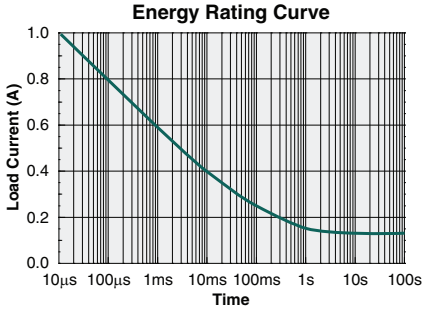
Typical Leakage vs. Temperature Measured Across Pins 5&6, 7&8 (I_F=5mA, V_L=400V)



Output Capacitance vs. Load Voltage (I_F=5mA, f=1MHz)



Energy Rating Curve



*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. IXYS Integrated Circuits classifies its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a Moisture Sensitivity Level (MSL) classification as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Classification
PBB190 / PBB190S	MSL 1

ESD Sensitivity

This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

Soldering Profile

Provided in the table below is the Classification Temperature (T_C) of this product and the maximum dwell time the body temperature of this device may be (T_C - 5)°C or greater. The classification temperature sets the Maximum Body Temperature allowed for this device during lead-free reflow processes. For through-hole devices, and any other processes, the guidelines of **J-STD-020** must be observed.

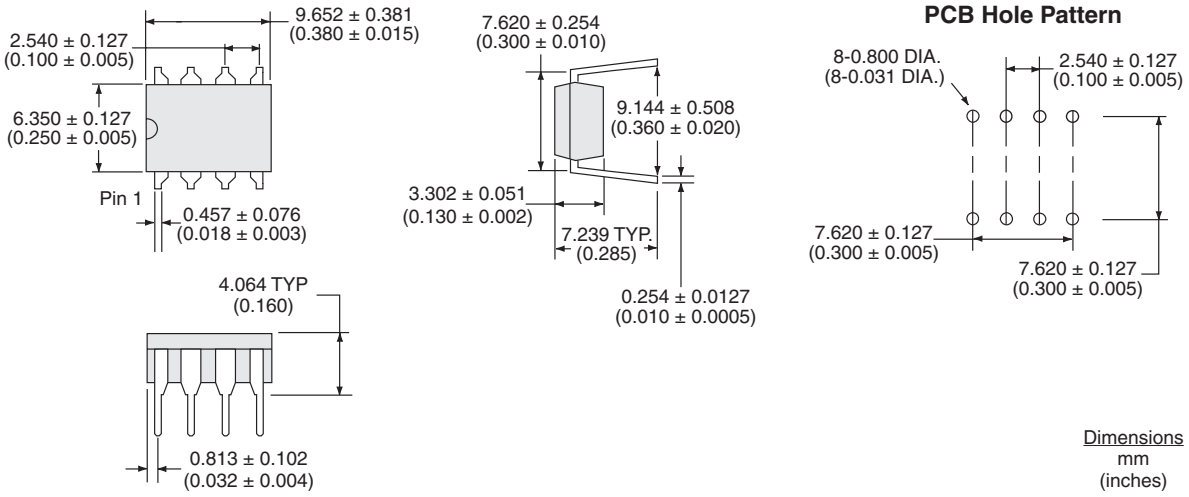
Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
PBB190	250°C	30 seconds	1
PBB190S	250°C	30 seconds	3

Board Wash

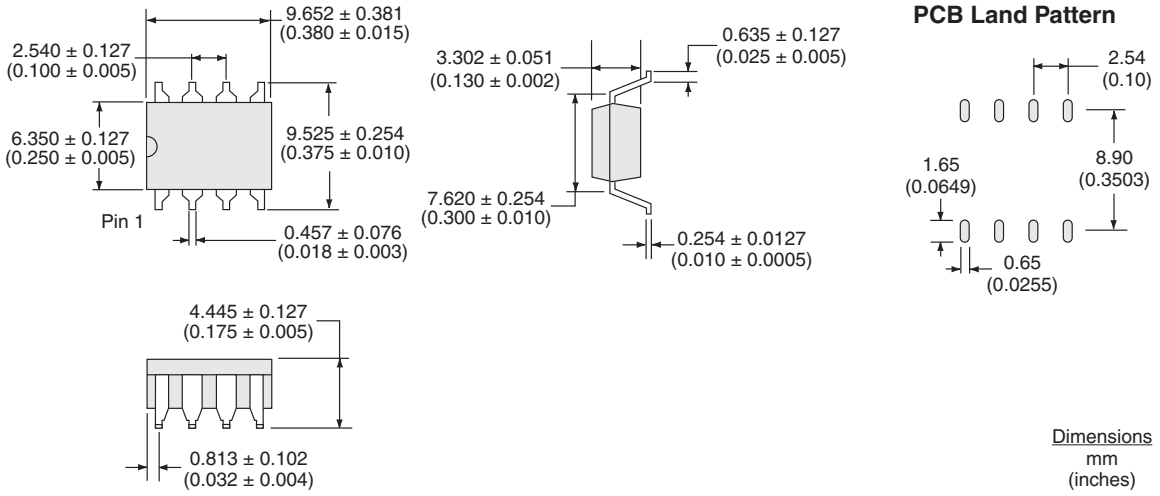
IXYS Integrated Circuits recommends the use of no-clean flux formulations. Board washing to reduce or remove flux residue following the solder reflow process is acceptable provided proper precautions are taken to prevent damage to the device. These precautions include, but are not limited to: using a low pressure wash and providing a follow up bake cycle sufficient to remove any moisture trapped within the device due to the washing process. Due to the variability of the wash parameters used to clean the board, determination of the bake temperature and duration necessary to remove the moisture trapped within the package is the responsibility of the user (assembler). Cleaning or drying methods that employ ultrasonic energy may damage the device and should not be used. Additionally, the device must not be exposed to flux or solvents that are Chlorine- or Fluorine-based.

Mechanical Dimensions

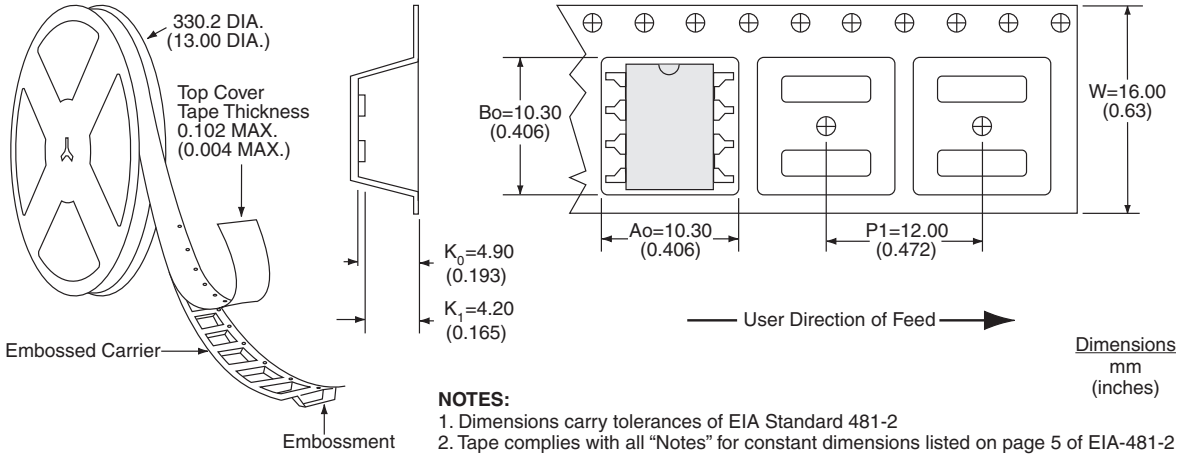
PBB190



PBB190S



PBB190STR Tape & Reel



NOTES:
1. Dimensions carry tolerances of EIA Standard 481-2
2. Tape complies with all "Notes" for constant dimensions listed on page 5 of EIA-481-2

For additional information please visit our website at: www.ixysic.com

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