



Parameter	Rating	Units
Blocking Voltage	400	V _p
Load Current	130	mA
Max On-resistance	25	Ω

Features

- 5000V_{rms} Input/Output Isolation
- Small 6-Pin Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Surface Mount Tape & Reel Version Available

Applications

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

Description

The PLB190 is a single-pole, normally closed (1-Form-B) solid state relay that uses optically coupled relay technology to provide an enhanced 5000V_{rms} isolation barrier between the input and output of the relay. The relay outputs are constructed with efficient MOSFET switches and photovoltaic die that use Clare's patented OptoMOS architecture while the input, a highly efficient GaAlAs infrared LED, provides the optically coupled control.

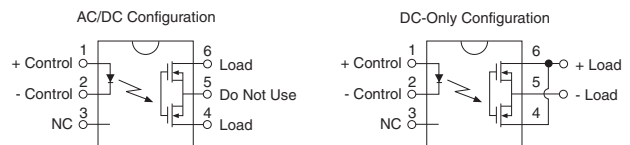
Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component: TUV Certificate B 09 07 49410 004

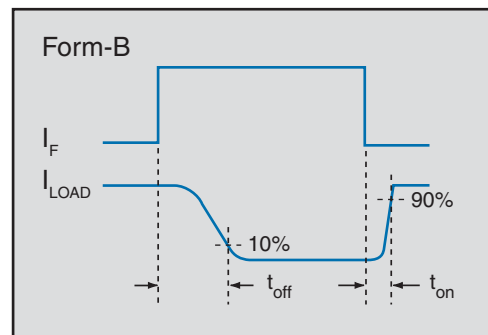
Ordering Information

Part Number	Description
PLB190	6-Pin DIP (50/Tube)
PLB190S	6-Pin Surface Mount (50/Tube)
PLB190STR	6-Pin Surface Mount (1,000/Reel)

Pin Configuration



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Blocking Voltage	400	V _p
Reverse Input Voltage	5	V
Input Control 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 sec.)	5000	V _{rms}
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

¹ Derate linearly 1.33 mW/°C

² Derate linearly 6.67 mW/°C

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.

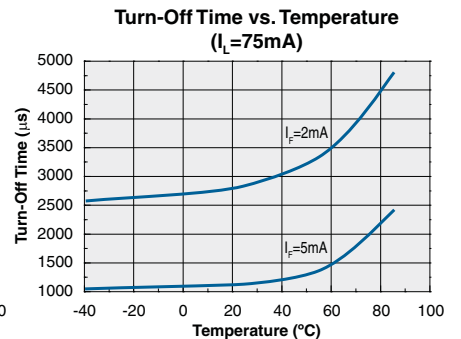
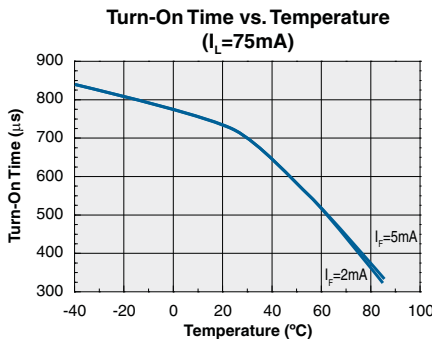
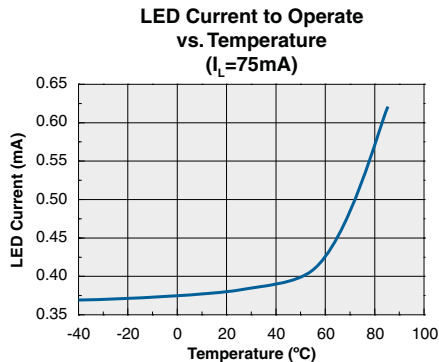
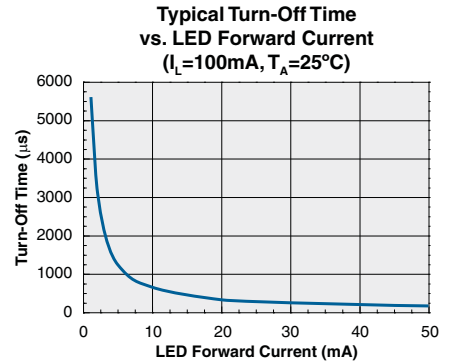
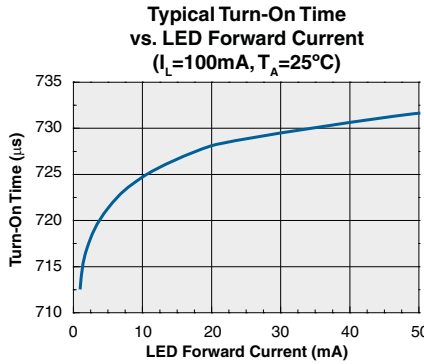
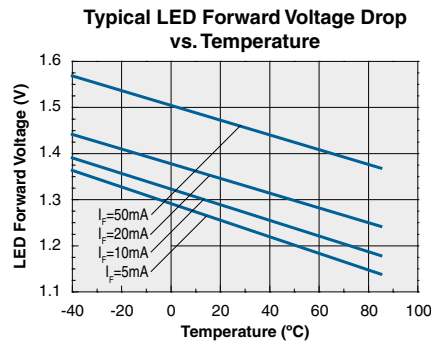
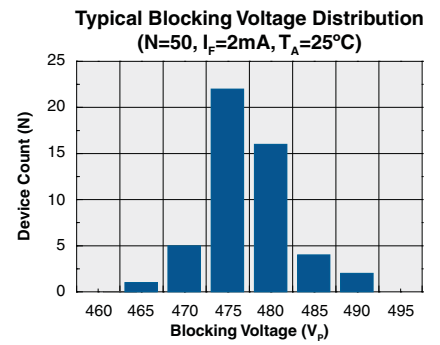
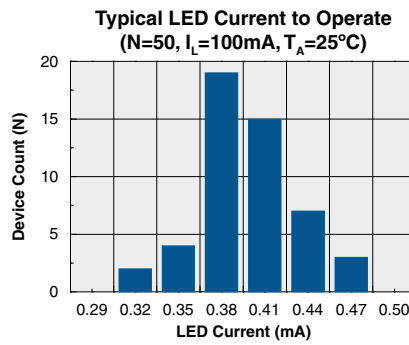
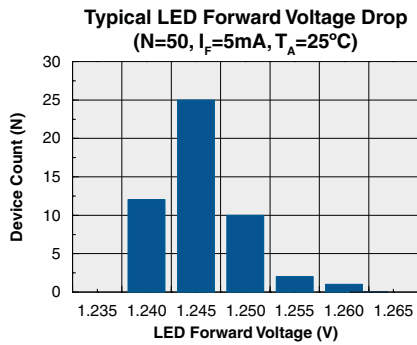
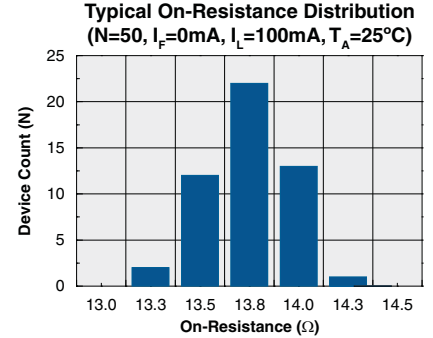
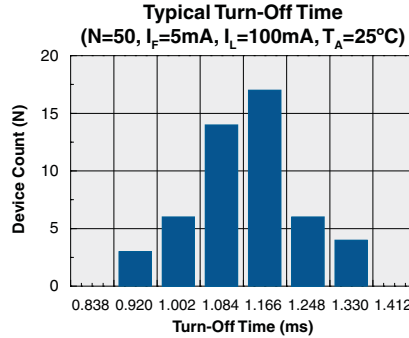
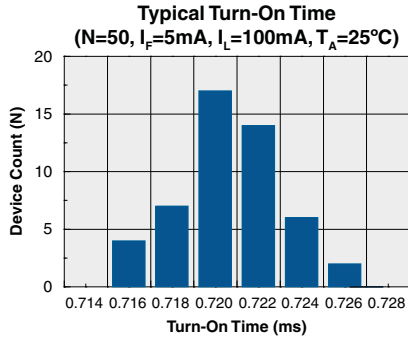
Electrical Characteristics @ 25°C

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current (Continuous)						
AC/DC Configuration	I _F =0mA	I _L	-	-	130	mA
DC Configuration			-	-	250	
Peak Load Current	t=10ms	I _{LPK}	-	-	400	mA
On-Resistance ¹						
AC/DC Configuration	I _F =0mA, I _L =130mA	R _{ON}	-	-	25	Ω
DC Configuration			I _F =0mA, I _L =250mA	-	-	
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		t _{off}	-	-	2.5	
Output Capacitance	I _F =5mA, V _L =50V, f=1MHz	C _{OUT}	-	11	-	pF
Input Characteristics						
Input Control Current ²	I _L =130mA	I _F	-	0.38	2	mA
Input Dropout Current	-	I _F	0.2	0.35	-	mA
Input Voltage Drop	I _F =5mA	V _F	0.9	1.2	1.4	V
Reverse Input Current	V _R =5V	I _R	-	-	10	μA
Common Characteristics						
Input to Output Capacitance	-	C _{IO}	-	3	-	pF

¹ Measurement taken within 1 second of on-time.

² For high temperature operation (>60°C), a LED current of 4mA is recommended.

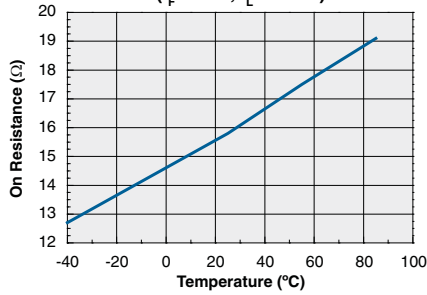
PERFORMANCE DATA*



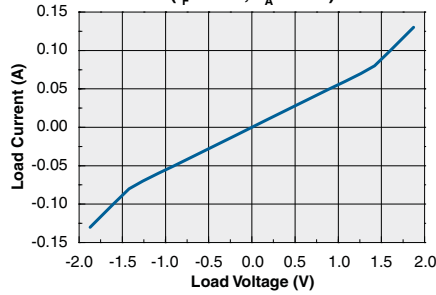
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA *

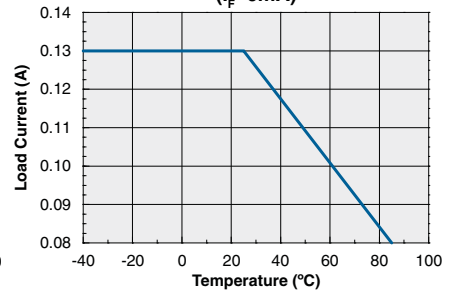
**On-Resistance vs. Temperature
AC/DC Configuration
($I_F=0\text{mA}$, $I_L=75\text{mA}$)**



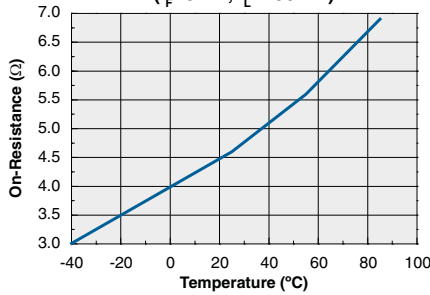
**Typical Load Current vs. Load Voltage
AC/DC Configuration
($I_F=0\text{mA}$, $T_A=25^\circ\text{C}$)**



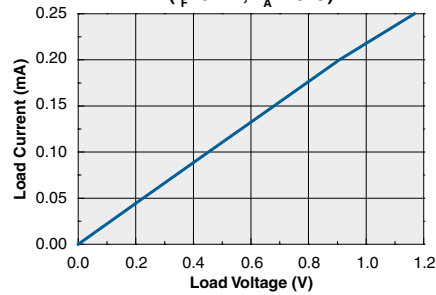
**Maximum Load Current vs. Temperature - AC/DC Configuration
($I_F=0\text{mA}$)**



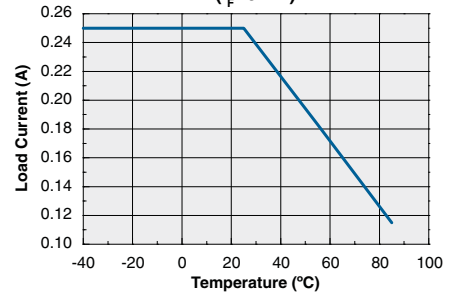
**On-Resistance vs. Temperature
DC-Only Configuration
($I_F=0\text{mA}$, $I_L=100\text{mA}$)**



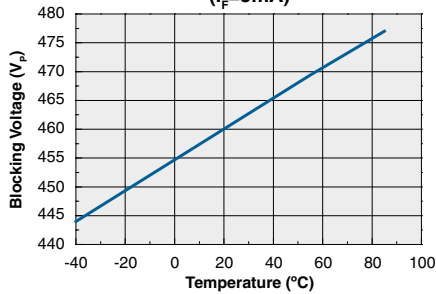
**Typical Load Current vs. Load Voltage
DC-Only Configuration
($I_F=0\text{mA}$, $T_A=25^\circ\text{C}$)**



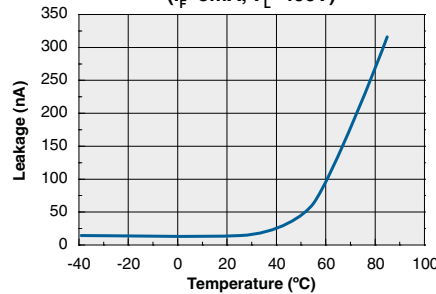
**Maximum Load Current vs. Temperature - DC Configuration
($I_F=0\text{mA}$)**



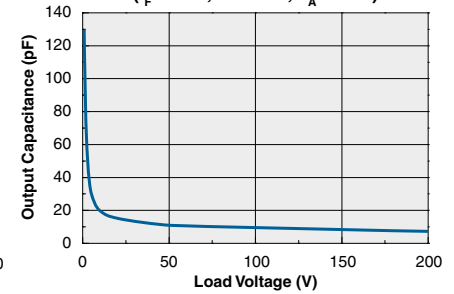
**Typical Blocking Voltage vs. Temperature
($I_F=5\text{mA}$)**



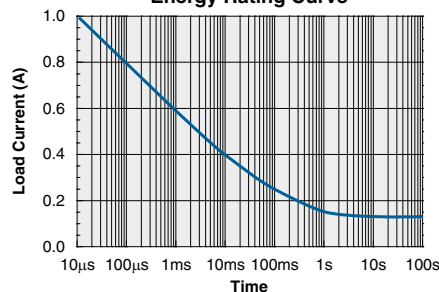
**Typical Leakage vs. Temperature
Measured Across Pins 4&6
($I_F=5\text{mA}$, $V_L=400\text{V}$)**



**Output Capacitance vs. Load Voltage
($I_F=5\text{mA}$, $f=1\text{MHz}$, $T_A=25^\circ\text{C}$)**



Energy Rating Curve



*The Performance data shown in the graphs above is typical of device performance. 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 ingress. Clare classified all of 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) rating** 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) Rating
PLB190 / PLB190S	MSL 1

ESD Sensitivity



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

Reflow Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

Device	Maximum Temperature x Time
PLB190 / PLB190S	250°C for 30 seconds

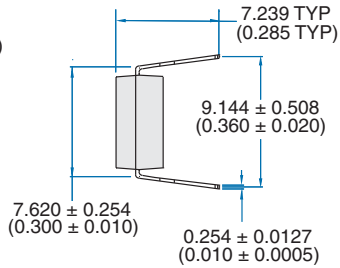
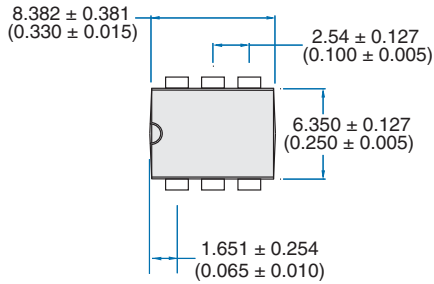
Board Wash

Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used after solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

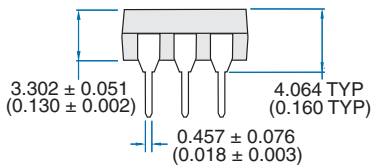
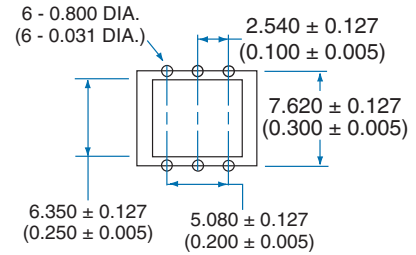


MECHANICAL DIMENSIONS

PLB190

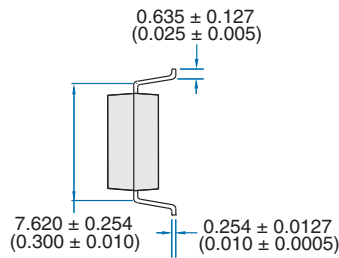
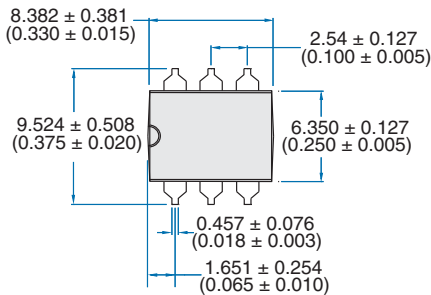


PCB Hole Pattern

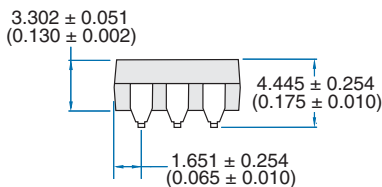
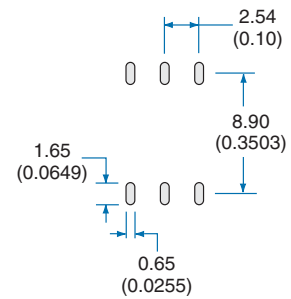


Dimensions
mm
(inches)

PLB190S

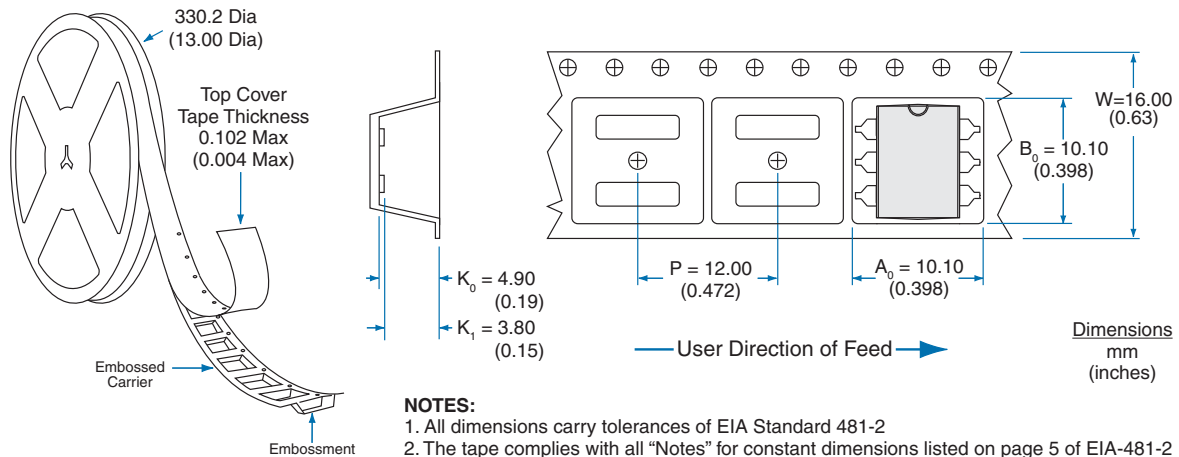


PCB Land Pattern



Dimensions
mm
(inches)

PLB190S Tape & Reel



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