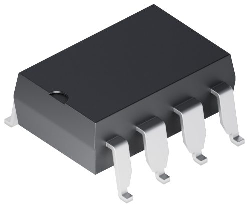
PBA150

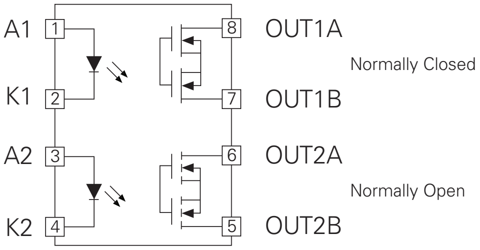
250V, 250mA Dual Single-Pole Relay:
1-Form-A (NO) and 1-Form-B (NC)

Key Attributes

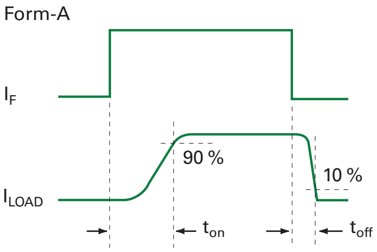
Characteristic	Rating	Unit
Blocking Voltage	250	V_P
Load Current	250	mA_{RMS}/mA_{DC}
On-Resistance (max.)	7	Ω



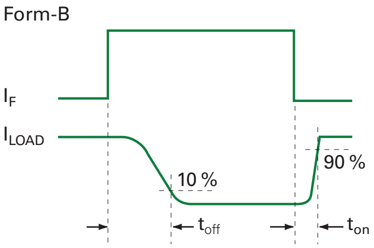
Pin Configuration



Switching Characteristics of Normally Open Devices



Switching Characteristics of Normally Closed Devices



Description

PBA150 comprises two independent 250V, 250 mA, 7 Ω solid state relays: one single-pole, normally open (1-Form-A) relay and one single-pole, normally closed (1-Form-B) relay.

Featuring low on-resistance, the PBA150 is designed to provide an ideal solution where a complementary Form-A/Form-B relay pair is required.

Features

- $3750V_{RMS}$ Input/Output Isolation
- Low Drive Power Requirements
- Greater Reliability than Electromechanical Relays
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Small 8-Pin Package
- Surface Mount, Tape and Reel Version 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
- Industrial Controls

Approvals

- UL Recognized Component: File E76270
- UV EN 62368-1: Certificate # B 082667 0008

Ordering Information

Part Number	Description
PBA150	8-Lead DIP (50/Tube)
PBA150S	8-Lead Surface Mount (50/Tube)
PBA150STR	8-Lead Surface Mount (1000/Reel)

Specifications

Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage	250	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10 ms)	1	A
Input Power Dissipation [1]	150	mW
Total Power Dissipation [2]	800	
Isolation Voltage, Input to Output (60 s)	3750	V_{RMS}
Operating Temperature, Ambient	–40 to +85	°C
Storage Temperature	–40 to +125	

[1] *Derate linearly 1.33 mW/°C*

[2] *Derate output power 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.

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 @ 25°C

Parameter	Conditions	Symbol	Value			Units
			Minimum	Typical	Maximum	
Output Characteristics						
Blocking voltage	$I_L = 1\ \mu A$	V_{DRM}	250	—	—	V_P
Load current: [1]						
Continuous	—	I_L	—	—	250	mA_{RMS} / mA_{DC}
Peak	t = 10 ms	I_{LPK}	—	—	±500	mA_P
On-resistance [2]	$I_L = 250\ mA$	R_{ON}	—	—	7	Ω
Off-state leakage current	$V_L = 250 V_P$	I_{LEAK}	—	—	1	µA
Switching speeds:						
Turn-on	$I_F = 5\ mA$, $V_L = 10V$	t_{on}	—	—	2.5	ms
Turn-off		t_{off}	—	—	2.5	
Output capacitance	$V_L = 50V$, f = 1 MHz	C_{OUT}	—	110	—	pF
Input Characteristics						
Input control current to activate	$I_L = 250\ mA$	I_F	—	—	5	mA
Input control current to deactivate	—	I_F	0.1	0.7	—	
Input control voltage to deactivate	—	V_F	0.8	—	—	V
Input voltage drop	$I_F = 5\ mA$	V_F	0.9	1.36	1.5	V
Reverse input current	$V_R = 5V$	I_R	—	—	10	µA
Common Characteristics						
Capacitance, input to output	$V_{IO} = 0V$, f = 1 MHz	C_{IO}	—	3	—	pF

[1] *If both poles operate simultaneously, then the load current must be derated in order not to exceed the package power dissipation value.*

[2] *Measurement taken within 1 second of on-time.*

Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. Littelfuse classifies its plastic encapsulated devices for moisture sensitivity according to the latest revision 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 revision of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Classification
PBA150	MSL 1
PBA150S	MSL 3

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 **IPC/JEDEC J-STD-020** Classification Temperature (T_C) and the maximum dwell time the body temperature of these surface mount devices may be (T_C – 5)°C or higher. The Classification Temperature sets the Maximum Body Temperature allowed for these devices during reflow soldering processes.

Device	Classification Temperature (T_C)	Dwell Time (T_P)	Max Reflow Cycles
PBA150S	250°C	30 seconds	3

For through-hole devices, the maximum pin temperature and maximum dwell time through all solder waves is provided in the table below. Dwell time is the interval beginning when the pins are initially immersed into the solder wave until they exit the solder wave. For multiple waves, the dwell time is from entering the first wave until exiting the last wave. During this time, pin temperatures must not exceed the maximum temperature given in the table below. Body temperature of the device must not exceed the limit shown in the table below at any time during the soldering process.

Device	Maximum Pin Temperature	Maximum Body Temperature	Maximum Dwell Time	Wave Cycles
PBA150	260°C	250°C	10 seconds*	1

*Total cumulative duration of all waves.

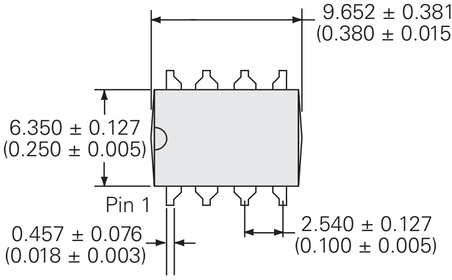
Board Wash

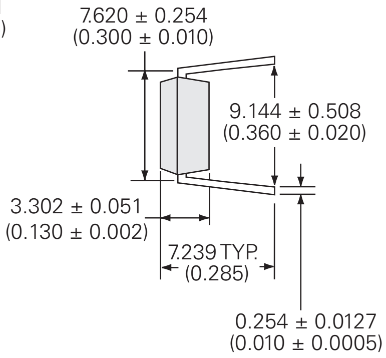
Littelfuse recommends the use of no-clean flux formulations. Board washing to reduce or remove flux residue following the solder reflow process is acceptable provided proper precautions are taken to prevent damage to the device. These precautions include but are not limited to: Using a low pressure wash 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 halide flux or solvents.

Pb RoHS e3

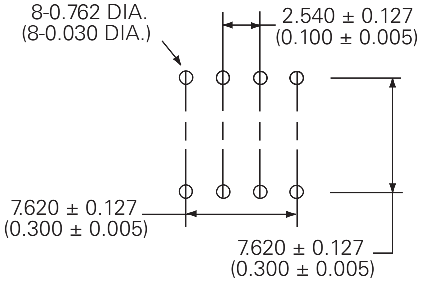
Mechanical Dimensions

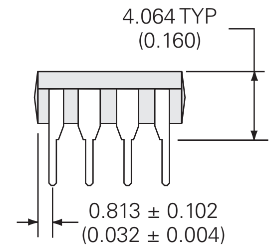
PBA150





PCB Hole Pattern

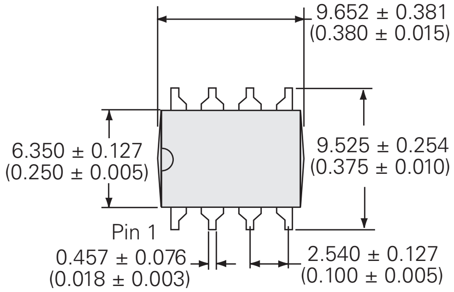


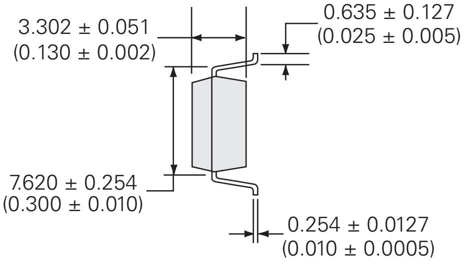


Notes:
1. Controlling dimension: Inches
2. Leadframe thickness does not include solder plating
   (1000 microinches max)

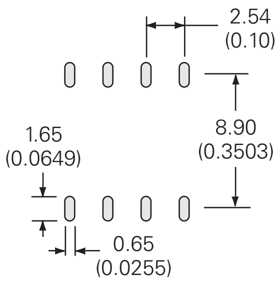
Dimensions
mm
(inches)

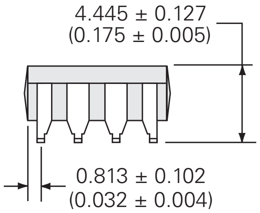
PBA150S





PCB Land Pattern

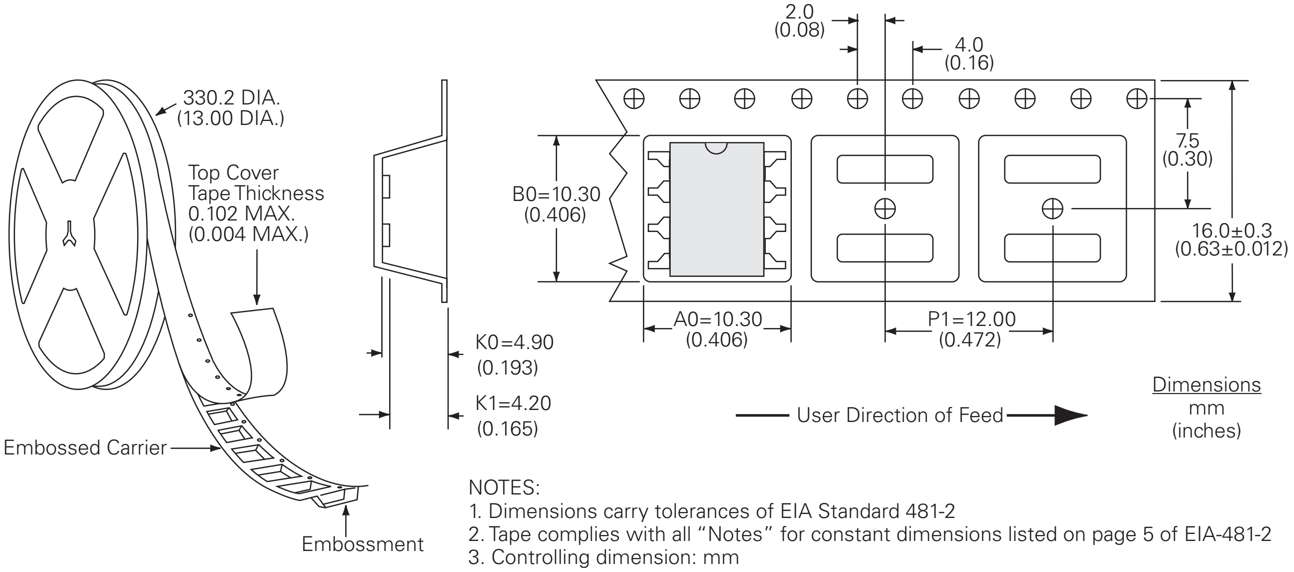




Notes:
1. Controlling dimension: Inches
2. Coplanarity = 0.004” (0.102 mm) max
3. Leadframe thickness does not include solder plating
   (1000 microinches max)

Dimensions
mm
(inches)

PBA150STR Tape and 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
3. Controlling dimension: mm