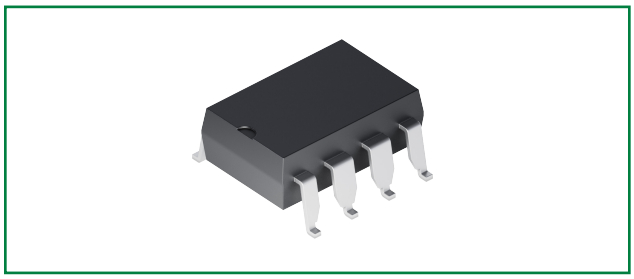
PBB190

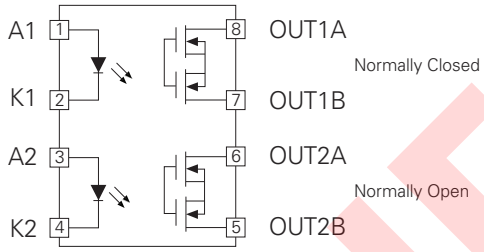
400V, 130 mA Dual Single-Pole Normally Closed Relay

Key Attributes

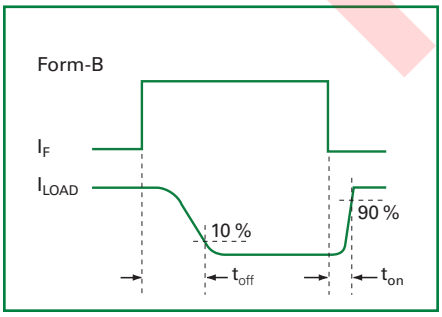
Characteristic	Rating	Unit
Blocking Voltage	400	V_P
Load Current	130	mA_{RMS}/mA_{DC}
On-Resistance (max.)	25	Ω



Pin Configuration



Switching Characteristics of Normally Closed Devices



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.

Features

- $5000V_{RMS}$ Input/Output Isolation
- Low Drive Power Requirements
- Greater Reliability than Electromechanical Relays
- 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
PBB190	8-Lead DIP (50/Tube)
PBB190S	8-Lead Surface Mount (50/Tube)
PBB190STR	8-Lead Surface Mount (1000/Reel)

NFND

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SC 3/26/2026
PBB190_R06

Specifications

Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage	400	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)	5000	V_{RMS}
ESD Rating, Human Body Model	8	kV
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}	400	—	—	V_P
Load current: [1]						
Continuous	$I_F = 0\,mA$	I_L	—	—	130	mA_{RMS}/mA_{DC}
Peak	$I_F = 0\,mA$, $t = 10\,ms$	I_{LPK}	—	—	±400	mA_P
On-resistance [2]	$I_F = 0\,mA$, $I_L = 130\,mA$	R_{ON}	—	—	25	Ω
Off-state leakage current	$I_F = 2\,mA$, $V_L = 400V_P$	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	$I_F = 5\,mA$, $V_L = 50V$, $f = 1\,MHz$	C_{OUT}	—	11	—	pF
Input Characteristics						
LED forward current to activate [3]	$I_L = 130\,mA$	I_F	—	0.38	2	mA
Input voltage drop to deactivate	—	V_F	0.8	—	—	V
Input voltage drop	$I_F = 5\,mA$	V_F	0.9	1.36	1.5	
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

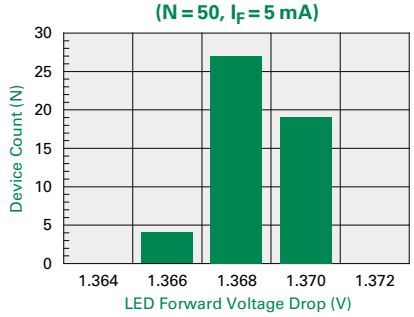
[1] *If both poles operate simultaneously, then the load current must be derated in order not to exceed the package power dissipation value.*
[2] *Measurement taken within 1 second of on-time.*
[3] *For high temperature operation (>60 °C), a minimum LED drive current of 4 mA is recommended.*

NRND

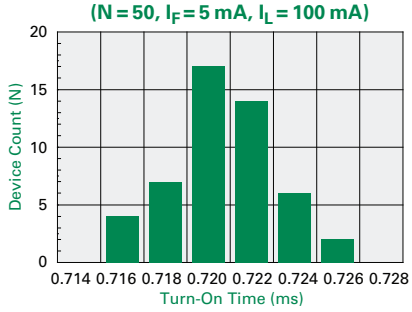
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Characteristic Curves

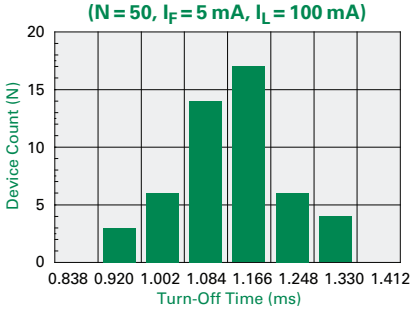
Typical LED Forward Voltage Drop (N = 50, I_F = 5 mA)



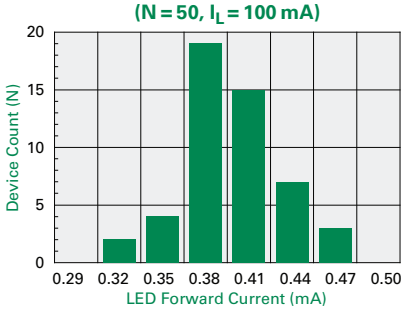
Typical Turn-On Time (N = 50, I_F = 5 mA, I_L = 100 mA)



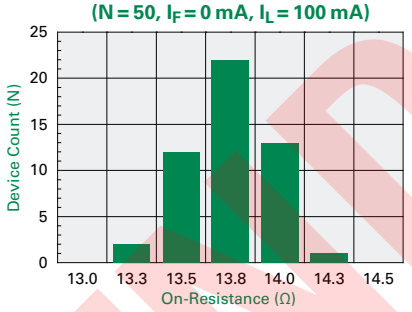
Typical Turn-Off Time (N = 50, I_F = 5 mA, I_L = 100 mA)



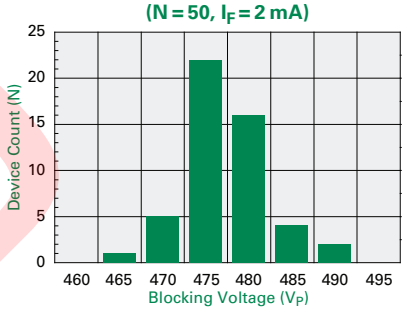
Typical LED Forward Current to Activate (N = 50, I_L = 100 mA)



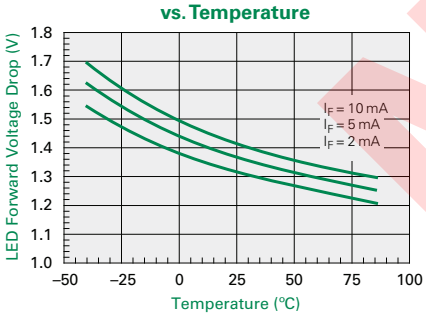
Typical On-Resistance Distribution (N = 50, I_F = 0 mA, I_L = 100 mA)



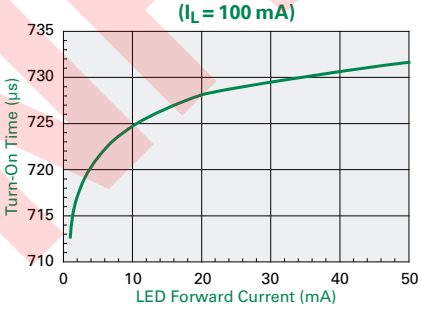
Typical Blocking Voltage Distribution (N = 50, I_F = 2 mA)



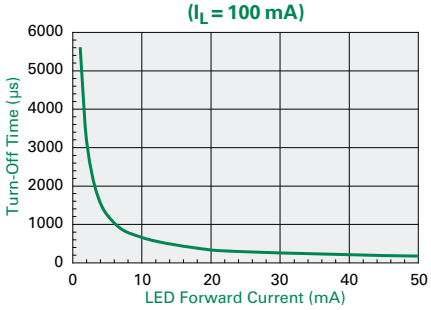
Typical LED Forward Voltage Drop vs. Temperature



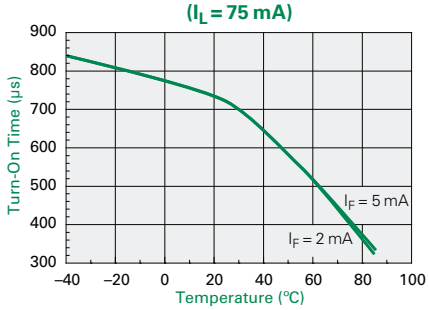
Typical Turn-On Time vs. LED Forward Current (I_L = 100 mA)



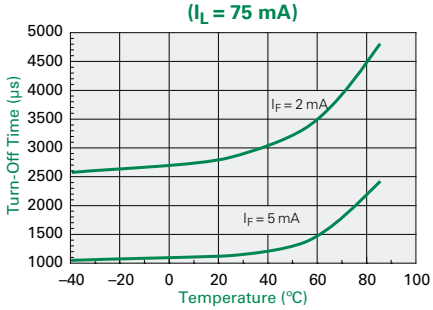
Typical Turn-Off Time vs. LED Forward Current (I_L = 100 mA)



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



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

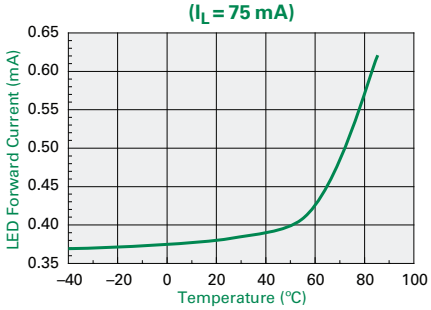


*Unless otherwise noted, data presented in these graphs is typical of device operation at T_A = 25°C.

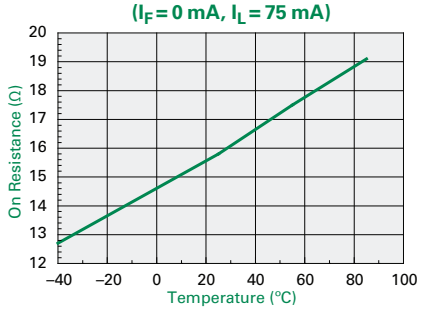
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Characteristic Curves

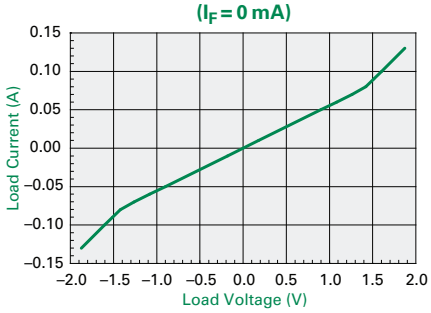
LED Forward Current to Activate vs. Temperature (I_L = 75 mA)



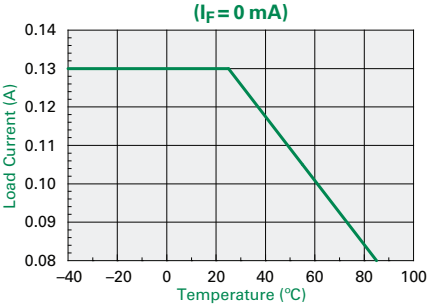
On-Resistance vs. Temperature (I_F = 0 mA, I_L = 75 mA)



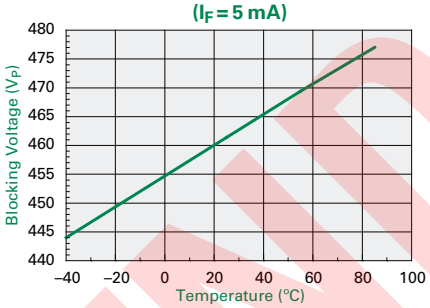
Typical Load Current vs. Load Voltage (I_F = 0 mA)



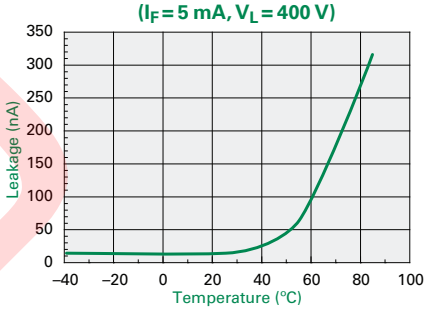
Maximum Load Current vs. Temperature (I_F = 0 mA)



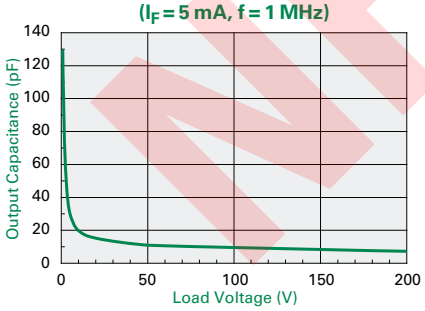
Typical Blocking Voltage vs. Temperature (I_F = 5 mA)



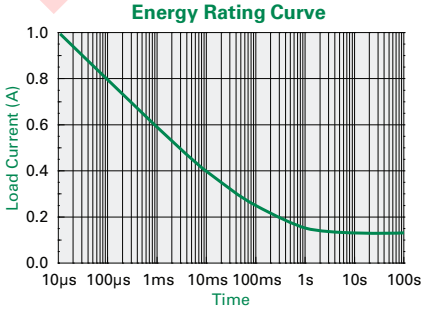
Typical Leakage vs. Temperature Measured Across Pins 5&6, 7&8 (I_F = 5 mA, V_L = 400 V)



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



Energy Rating Curve



*Unless otherwise noted, data presented in these graphs is typical of device operation at T_A = 25°C.

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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
PBB190	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 **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
PBB190S	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
PBB190	260 °C	250 °C	10 seconds*	1

*Total cumulative duration of all waves.

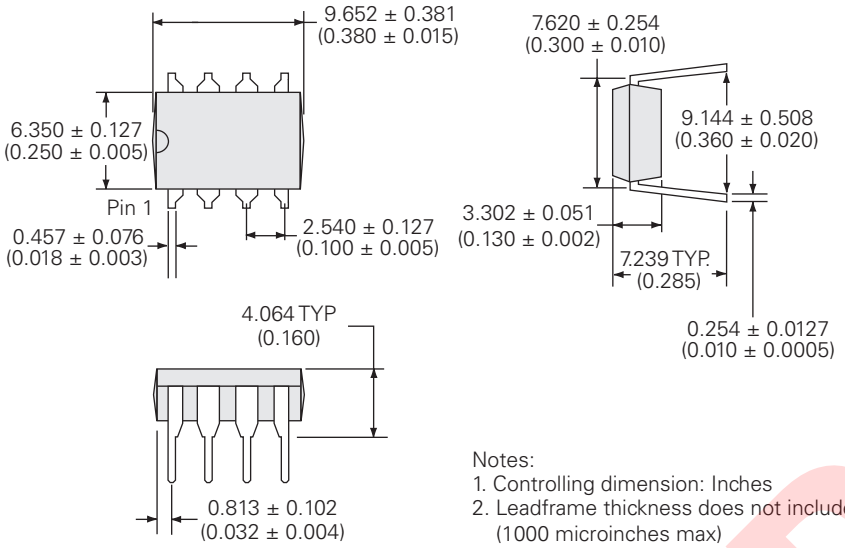
Board Wash

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.

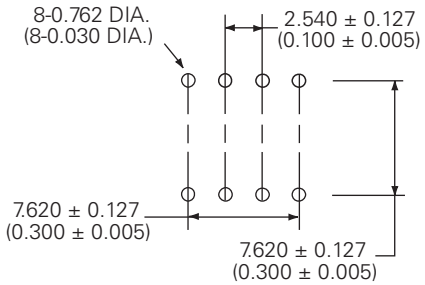
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Mechanical Dimensions

PBB190



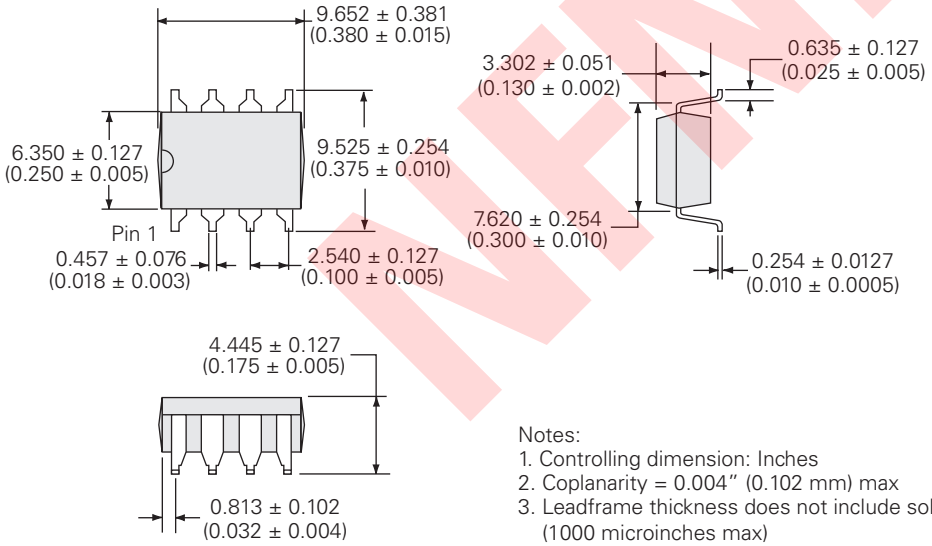
PCB Hole Pattern



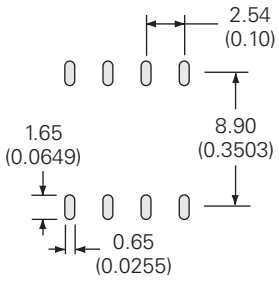
Notes:
1. Controlling dimension: Inches
2. Leadframe thickness does not include solder plating (1000 microinches max)

Dimensions
mm
(inches)

PBB190S



PCB Land Pattern



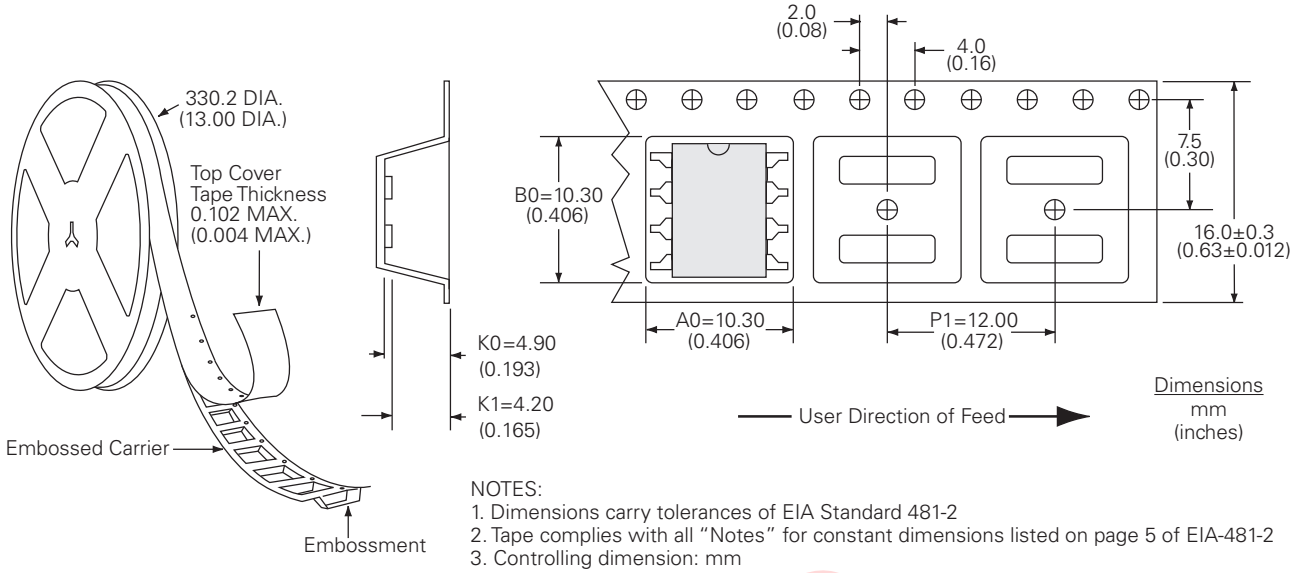
Notes:
1. Controlling dimension: Inches
2. Coplanarity = 0.004" (0.102 mm) max
3. Leadframe thickness does not include solder plating (1000 microinches max)

Dimensions
mm
(inches)

NEND

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PBB190STR 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

NFND

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