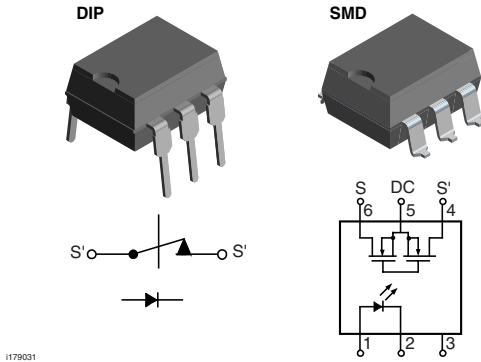


## 1 Form B Solid State Relay



### DESCRIPTION

The LH1501 relays are SPST normally closed switches (1 form B) that can replace electromechanical relays in many applications. The relays are constructed as a multi-chip hybrid device. Actuation control is via an infrared LED. The output switch is a combination of a photodiode array with MOSFET switches and control circuitry. The relays can be configured for AC/DC or DC only operation.

### FEATURES

- Isolation test voltage 3750 V<sub>RMS</sub>
- Typical R<sub>ON</sub> 20 Ω
- Load voltage 350 V
- Clean bounce free switching
- Low power consumption
- SMD lead available on tape and reel
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### APPLICATIONS

- General telecom switching
- Security equipment
- Instrumentation
- Industrial controls

### AGENCY APPROVALS

UL1577: file no. E52744 system code H or J, double protection

CSA: certification 093751

ORDER INFORMATION		
PART	REMARKS	PACKAGE
LH1501BAB	Tubes	SMD-6
LH1501BABTR	Tape and reel	SMD-6
LH1501BT	Tubes	DIP-6

ABSOLUTE MAXIMUM RATINGS <sup>(1)</sup>				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>SSR</b>				
LED continuous forward current		I <sub>F</sub>	50	mA
LED reverse voltage	I <sub>R</sub> ≤ 10 μA	V <sub>R</sub>	5	V
DC or peak AC load voltage	I <sub>L</sub> ≤ 50 μA	V <sub>L</sub>	350	V
Continuous DC load current - bidirectional		I <sub>L</sub>	150	mA
Continuous DC load current - unidirectional		I <sub>L</sub>	200	mA
Peak load current (single shot)	t = 100 ms	I <sub>P</sub>	350	mA
Ambient temperature range		T <sub>amb</sub>	- 40 to + 85	°C
Storage temperature range		T <sub>stg</sub>	- 40 to + 125	°C
Pin soldering temperature <sup>(2)</sup>	t = 10 s max.	T <sub>slid</sub>	260	°C
Input to output isolation voltage	t = 1 s, I <sub>ISO</sub> = 10 μA max.	V <sub>ISO</sub>	3750	V <sub>RMS</sub>
Output power dissipation (continuous)		P <sub>diss</sub>	550	mW

### Notes

<sup>(1)</sup> T<sub>amb</sub> = 25 °C, unless otherwise specified.

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

<sup>(2)</sup> Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).



ELECTRICAL CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
LED forward current, switch turn-on	$I_L = \pm 150 \text{ mA}$ , $t = 10 \text{ ms}$	$I_{Fon}$	0.2	0.9		mA
LED forward current, switch turn-off	$V_L = \pm 300 \text{ V}$	$I_{Foff}$		1	2	mA
LED forward voltage	$I_F = 10 \text{ mA}$	$V_F$	1.15	1.26	1.45	V
<b>OUTPUT</b>						
On-resistance, AC/DC: pin 4, 6 (+) to 5 (-)	$I_F = 0 \text{ mA}$ , $I_L = 50 \text{ mA}$	$R_{ON}$		20	25	$\Omega$
On-resistance, DC: pin 4, 6 (+) to 5 (-)	$I_F = 0 \text{ mA}$ , $I_L = 100 \text{ mA}$	$R_{ON}$		5	6.25	$\Omega$
Off-resistance	$I_F = 5 \text{ mA}$ , $V_L = \pm 100 \text{ V}$	$R_{OFF}$	0.1	1.4		$G\Omega$
Off-state leakage current	$I_F = 5 \text{ mA}$ , $V_L = \pm 350 \text{ V}$	$I_O$		0.08	1	$\mu\text{A}$
Output capacitance	$I_F = 5 \text{ mA}$ , $V_L = 50 \text{ V}$	$C_O$		35		pF
<b>TRANSFER</b>						
Capacitance (input to output)	$V_{ISO} = 1.0 \text{ V}$	$C_{IO}$		3		pF
Turn-on time	$I_F = 5 \text{ mA}$ , $I_L = 50 \text{ mA}$	$t_{on}$		2	3	ms
Turn-off time	$I_F = 5 \text{ mA}$ , $I_L = 50 \text{ mA}$	$t_{off}$		1	3	ms

**Note**

$T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified.

Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

**TYPICAL CHARACTERISTICS**

$T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified

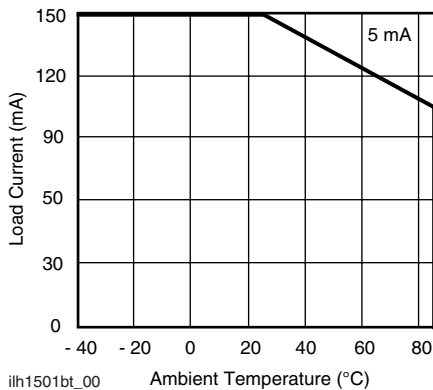


Fig. 1 - Recommended Operating Conditions

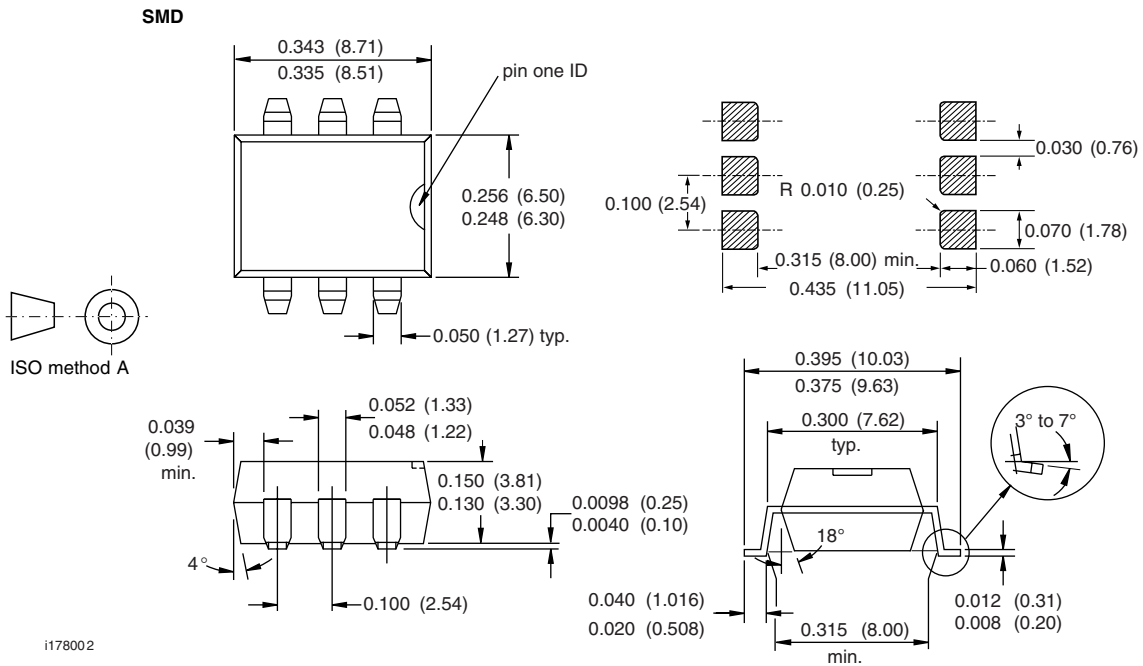
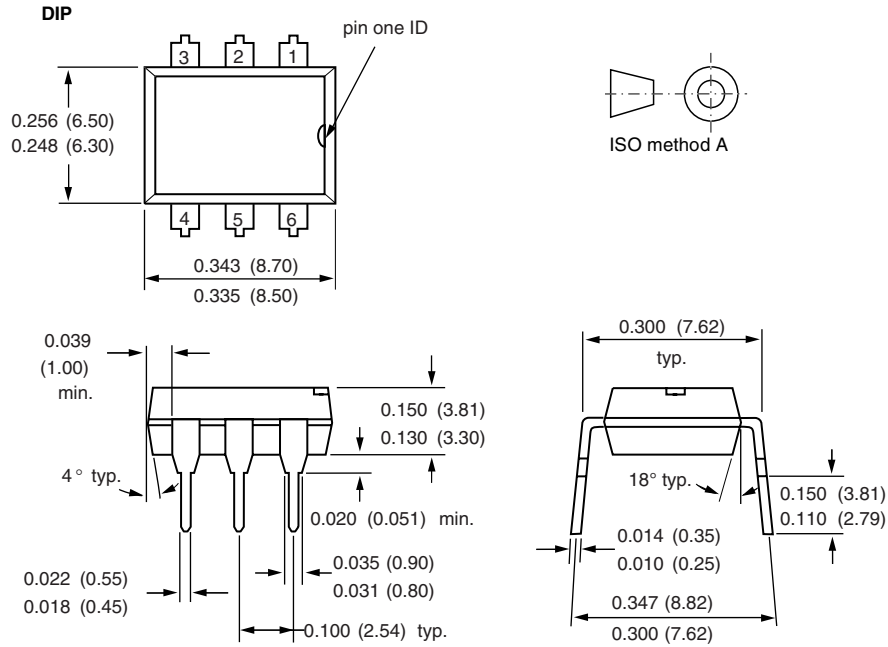
# LH1501BAB, LH1501BABTR, LH1501BT

Vishay Semiconductors

1 Form B Solid State Relay



## PACKAGE DIMENSIONS in inches (millimeters)





**OZONE DEPLETING SUBSTANCES POLICY STATEMENT**

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA.
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany



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