

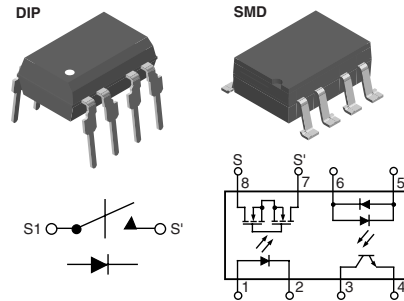
1 Form A Phototransistor Telecomswitch

Features

- Solid State Relay
 - 1 Form A (LH1525 Type)
 - Current-limit Protection
 - Clean, Bounce-free Switching
 - Low Power Consumption
- Solid State Relay and an Autopolarity Optocoupler in a Single Package
- Optocoupler
 - Bidirectional Current Detection
- Surface Mountable
- I/O Isolation Voltage, 5300 V_{RMS}
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



RoHS
COMPLIANT



1179049

Agency Approvals

- UL1577, File No. E52744 System Code H or J, Double Protection
- CSA - Certification 093751
- BSI/BABT Cert. No. 7980
- FIMKO Approval

Applications

- General Telecom Switching
 - On/off-hook Control
 - Dial Pulse
 - Ring-current Detection
 - Loop-current sensing

Description

A Telecom Switch consists of an optically isolated, SPST solid-state relay (SSR) and a bidirectional input optocoupler in a single package. The SSR is ideal for performing switch hook and dial-pulse switching while the optocoupler performs ring detect and loop current sensing functions.

The SSR is integrated on a monolithic receptor die. It features low ON-resistance, high breakdown voltage, and current-limit circuitry that protects the relay from telephone line induced lightning surges.

The optocoupler provides bidirectional current sensing via two anti parallel GaAlAs infrared emitting diodes. The optocoupler provides a minimum current transfer ratio (CTR) of 33 %.

Order Information

| Part | Remarks |
|-------------|--------------------------------|
| LH1549AB | Tubes, DIP-8 |
| LH1549AAC | Gullwing, Tubes, SMD-8 |
| LH1549AACTR | Gullwing, Tape and Reel, SMD-8 |

Absolute Maximum Ratings

$T_{amb} = 25\text{ }^{\circ}\text{C}$, 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 time can adversely affect reliability.

SSR

| Parameter | Test condition | Symbol | Value | Unit |
|--|----------------------------------|------------|---------------|--------------------|
| LED continuous forward current | | I_F | 50 | mA |
| LED reverse voltage | $I_R \leq 10\text{ }\mu\text{A}$ | V_R | 5.0 | V |
| DC or peak AC load voltage | $I_L \leq 50\text{ }\mu\text{A}$ | V_L | 400 | V |
| Continuous DC load current, unidirectional operation | | I_L | 120 | mA |
| Ambient operating temperature range | | T_{amb} | - 40 to + 85 | $^{\circ}\text{C}$ |
| Storage temperature range | | T_{stg} | - 40 to + 150 | $^{\circ}\text{C}$ |
| Pin soldering temperature | $t = 10\text{ s max}$ | T_{sld} | 260 | $^{\circ}\text{C}$ |
| Input/output isolation test voltage | | V_{ISO} | 5300 | V_{RMS} |
| Output power dissipation (continuous) | | P_{diss} | 600 | mW |

Electrical Characteristics

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

Input

| Parameter | Test condition | Symbol | Min | Typ. | Max | Unit |
|--------------------------------------|--|------------|-----|------|-----|------|
| LED forward current, switch turn-on | $I_L = 100\text{ mA}$, $t = 10\text{ ms}$ | I_{Fon} | | 0.3 | 0.5 | mA |
| LED forward current, switch turn-off | $V_L = \pm 350\text{ V}$ | I_{Foff} | 0.1 | 0.4 | | mA |
| LED forward voltage | $I_F = 3.0\text{ mA}$ | V_F | 0.8 | 1.2 | 1.4 | V |

Output

| Parameter | Test condition | Symbol | Min | Typ. | Max | Unit |
|--|---|-----------|-----|------|-----|---------------|
| ON-resistance ac/dc: Pin 4 (\pm) to 6 (\pm) | $I_F = 1.5\text{ mA}$, $I_L = 50\text{ mA}$ | R_{ON} | 17 | 25 | 36 | Ω |
| Current limit ac/dc: Pin 4 (\pm) to 6 (\pm) | $I_F = 5.0\text{ mA}$, $V_L = \pm 7.0\text{ V}$, $t = 5.0\text{ ms}$ | I_{LMT} | 170 | 210 | 270 | mA |
| Off-state leakage current | $I_F = 0\text{ mA}$, $V_L = \pm 100\text{ V}$ | I_O | | 0.04 | 200 | nA |
| | $I_F = 0\text{ mA}$, $V_L = \pm 400\text{ V}$ | I_O | | | 1.0 | μA |
| Output capacitance Pin 4 to 6 | $I_F = 0\text{ mA}$, $V_L = 1.0\text{ V}$ | C_O | | 50 | | pF |
| | $I_F = 0\text{ mA}$, $V_L = 50\text{ V}$ | C_O | | 9.0 | | pF |

Transfer

| Parameter | Test condition | Symbol | Min | Typ. | Max | Unit |
|----------------------------|--|-----------|-----|------|-----|------|
| Capacitance (input-output) | $V_{ISO} = 1.0\text{ V}$ | C_{IO} | | 1.3 | | pF |
| Turn-on time | $I_F = 5.0\text{ mA}$, $I_L = 50\text{ mA}$ | t_{on} | | 0.5 | 1.0 | ms |
| Turn-off time | $I_F = 5.0\text{ mA}$, $I_L = 50\text{ mA}$ | t_{off} | | 1.1 | 1.5 | ms |

Optocoupler Input

| Parameter | Test condition | Symbol | Min | Typ. | Max | Unit |
|---------------------|-----------------------|--------|-----|------|-----|------|
| LED forward voltage | $I_F = 10 \text{ mA}$ | V_F | 0.9 | 1.2 | 1.5 | V |

Optocoupler Output

| Parameter | Test condition | Symbol | Min | Typ. | Max | Unit |
|-----------------------------------|--|---------------|-----|------|-----|---------------|
| Saturation voltage | $I_F = 16 \text{ mA}$, $I_C = 2.0 \text{ mA}$ | $V_{CE(sat)}$ | | 0.7 | 0.5 | V |
| Collector-emitter leakage current | $I_F = 0 \text{ mA}$, $I_C = 5.0 \text{ mA}$ | I_{CEO} | | | 500 | nA |
| Trickle current leakage | $I_F = 5.0 \mu\text{A}$, $I_C = 5.0 \text{ mA}$ | I_{CEO} | | | 1.0 | μA |

Optocoupler Transfer

| Parameter | Test condition | Symbol | Min | Typ. | Max | Unit |
|---------------------------|---|------------|-----|------|-----|------|
| DC Current Transfer Ratio | $I_F = 6.0 \text{ mA}$, $V_{CE} = 0.5 \text{ V}$ | CTR_{DC} | 33 | 165 | | % |

Typical Characteristics

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

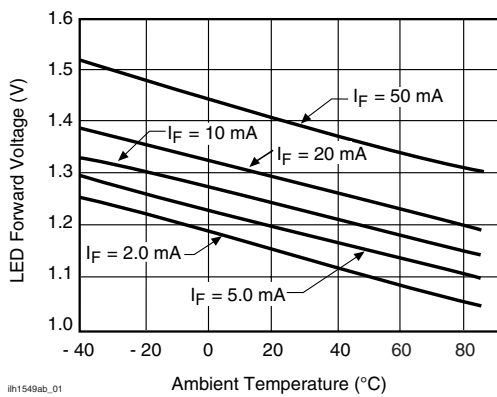


Figure 1. LED Voltage vs. Temperature

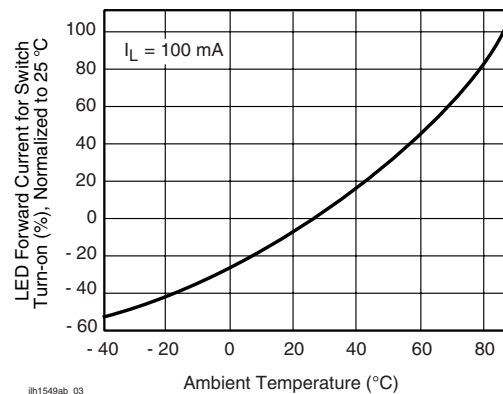


Figure 3. LED Current for Switch Turn-on vs. Temperature

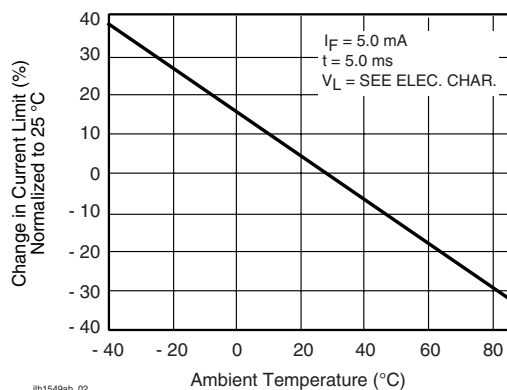


Figure 2. Current Limit vs. Temperature

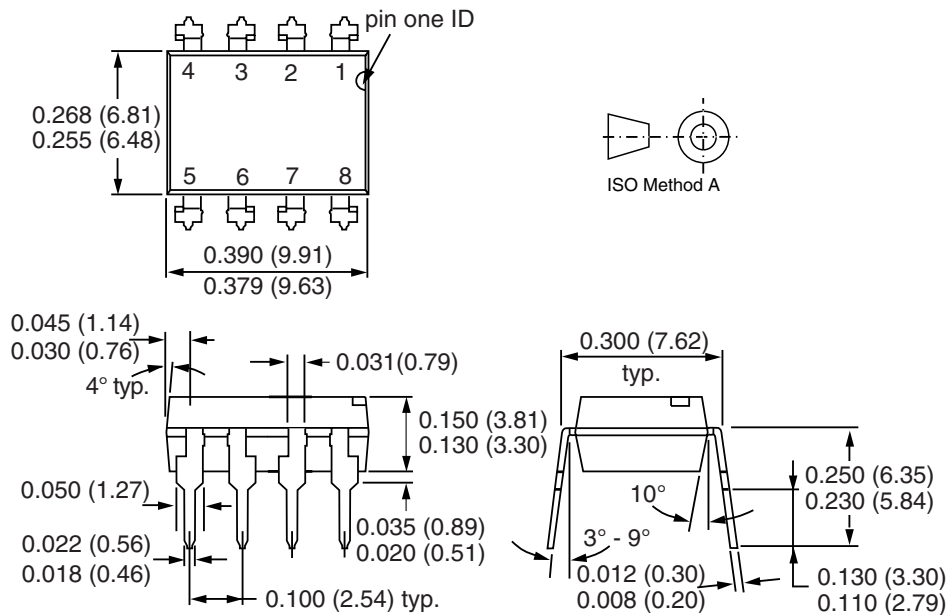
LH1549AB/AAC/AACTR



Vishay Semiconductors

Package Dimensions in Inches (mm)

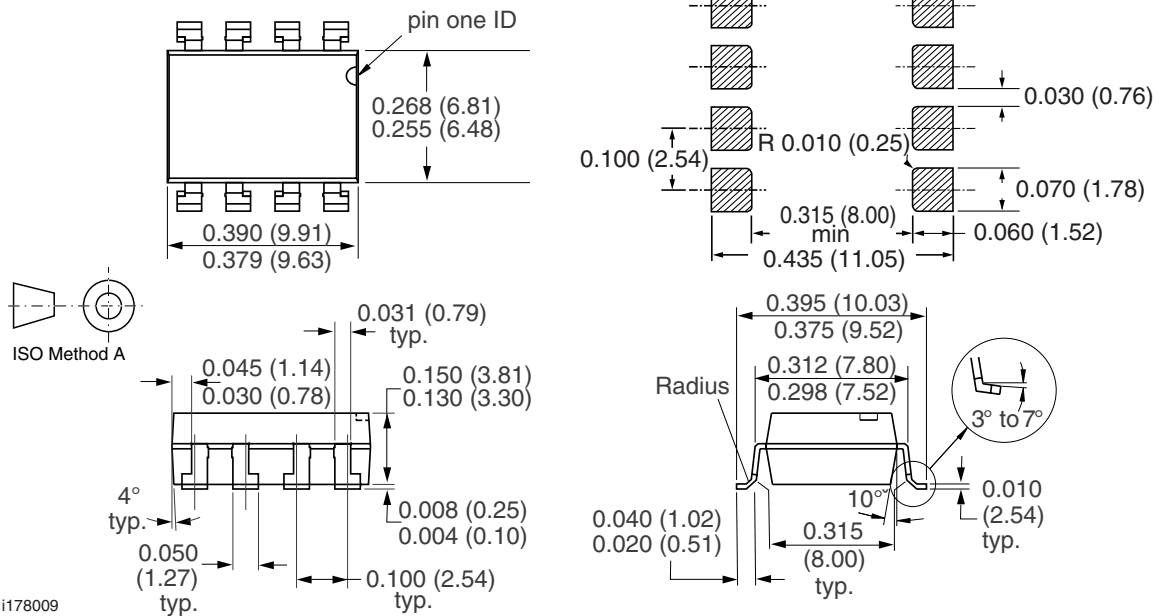
DIP



i178008

Package Dimensions in Inches (mm)

SMD



i178009



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.

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