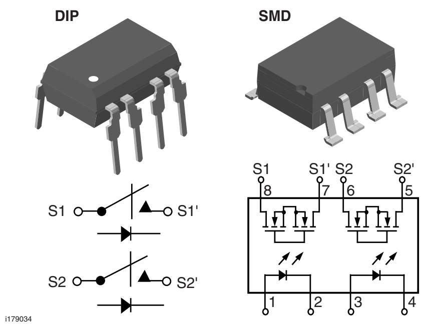
Dual 1 Form A Solid-State Relays



Features

- Dual Channel 1 Form A
- Extremely Low Operating Current
- High-speed Operation
- Isolation Test Voltage 5300 V_{RMS}
- Current-limit Protection
- High Surge Capability
- dc-only Option
- Clean, Bounce-free Switching
- Low Power Consumption
- High-reliability Monolithic Receptor
- Surface-mountable
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free
e3
RoHS
COMPLIANT

Agency Approvals

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

Applications

- General Telecom Switching
  - Telephone Line Interface
  - On/off Hook
  - Ring Relay
  - Break Switch
  - Ground Start
- Battery-powered Switch Applications
- Industrial Controls
  - Microprocessor Control of Solenoids, Lights, Motors, Heaters, etc.
- Instrumentation
- See "Solid State Relays" (Application Note 56)

Description

The LH1526 relay is two SPST normally open switches that can replace electromechanical relays in many applications. The relays require a minimal amount of LED drive current to operate, making it ideal for battery powered and power consumption sensitive applications. The relay is constructed using a GaAIAs LED for actuation control and an integrated monolithic die for the switch output. The die is, fabricated in a high-voltage dielectrically isolated technology, comprised of a photodiode array, switch-control circuitry, and MOSFET switches. In addition, the relay employs current-limiting circuitry, enabling it to pass FCC 68.302 and other regulatory surge requirements when overvoltage protection is provided. The relay can be configured for ac/dc or dc-only operation.

Order Information

Part	Remarks
LH1526AAC	Tubes, SMD-8
LH1526AACTR	Tape and Reel, SMD-8
LH1526AB	Tubes, DIP-8

Absolute Maximum Ratings

T_{amb} = 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 time can adversely affect reliability.

SSR

Parameter	Test condition	Symbol	Value	Unit
LED input ratings: continuous forward current		I_F	50	mA
LED input ratings: reverse voltage		V_R	8.0	V
Output operation: DC or peak AC load voltage	$I_L \leq 50$ µA	V_L	400	V
Continuous DC load current , one pole operation		I_L	125	mA
Continuous DC load current , two pole operation		I_L	100	mA
Ambient operating temperature range		T_{amb}	- 40 to + 85	°C
Storage temperature range		T_{stg}	- 40 to + 150	°C
Pin soldering temperature	t = 10 s max	T_{sld}	260	°C
Input/output isolation test voltage	t = 1.0 s, I_{ISO} = 10 µA max	V_{ISO}	5300	V_{RMS}
Power dissipation		P_{diss}	600	mW

Electrical Characteristics

T_{amb} = 25 °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 = 70 mA, t = 10 ms	I_{Fon}		0.3	0.5	mA
LED forward current, switch turn-off	V_L = ± 350 V, t = 100 ms	I_{Foff}	0.001	0.1		mA
LED forward voltage	I_F = 1.5 mA	V_F	0.80	1.15	1.40	V

Output

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
ON-resistance: ac/dc, each pole	I_F = 1.5 mA, I_L = ± 50 mA	R_{ON}	17	25	36	Ω
Off-resistance	I_F = 0 mA, V_L = ± 100 V	R_{OFF}		5000		GΩ
Current limit	I_F = 1.5 mA, t = 5.0 ms, V_L = 7.0 V	I_{LMT}	170	210	270	mA
Off-state leakage current	I_F = 0 mA, V_L = ± 100 V	I_O		0.04	200	nA
	I_F = 0 mA, V_L = ± 400 V	I_O			1.0	µA
Output capacitance	I_F = 0 mA, V_L = 1.0 V	C_O		37		pF
	I_F = 0 mA, V_L = 50 V	C_O		13		pF
Switch offset	I_F = 5.0 mA	V_{OS}		0.25		µV

Transfer

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Capacitance (input-output)	V_{ISO} = 1.0 V	C_{IO}		0.8		pF
Turn-on time	I_F = 1.5 mA, I_L = 50 mA	t_{on}		1.00		ms
	I_F = 5.0 mA, I_L = 50 mA	t_{on}		0.5	1.0	ms
Turn-off time	I_F = 1.5 mA, I_L = 50 mA	t_{off}		0.20		ms
	I_F = 5.0 mA, I_L = 50 mA	t_{off}		1.1	1.5	ms

Typical Characteristics

T_{amb} = 25 °C, unless otherwise specified

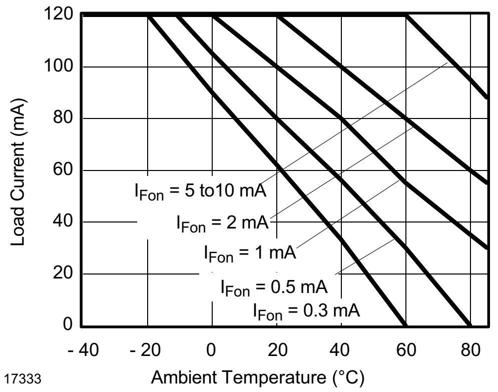


Figure 1. Recommended Operating Conditions

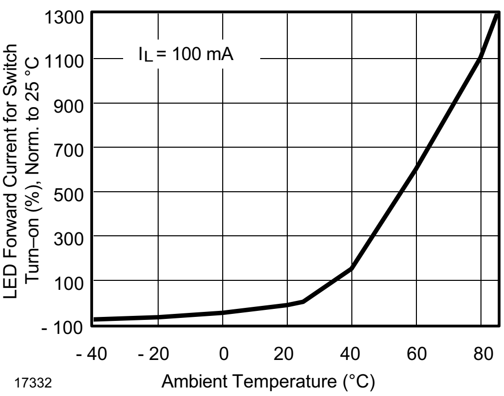


Figure 3. LED Current for Switch Turn-on vs. Temperature

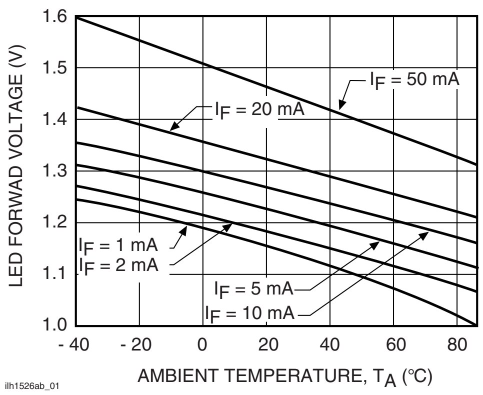


Figure 2. LED Voltage vs. Temperature

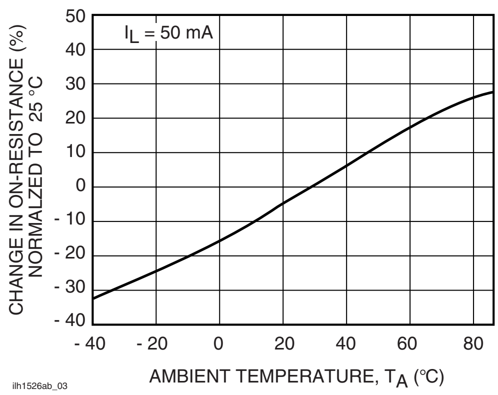


Figure 4. ON-Resistance vs. Temperature

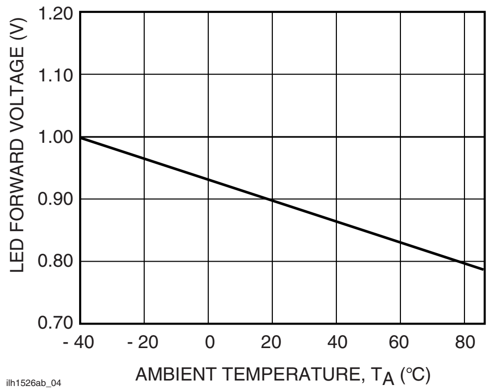


Figure 5. LED Dropout Voltage vs. Temperature

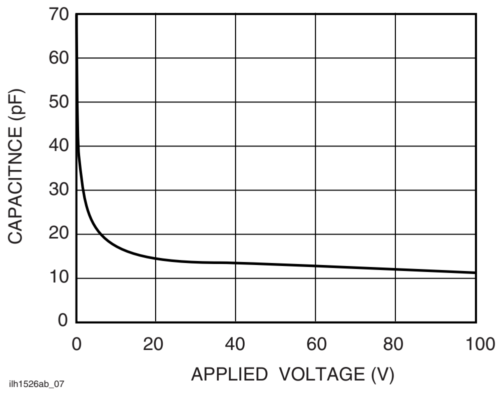


Figure 8. Switch Capacitance vs. Applied Voltage

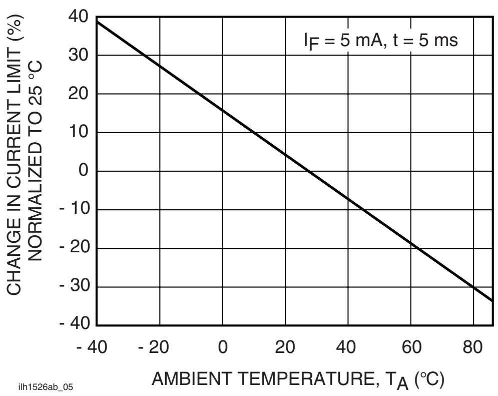


Figure 6. Current Limit vs. Temperature

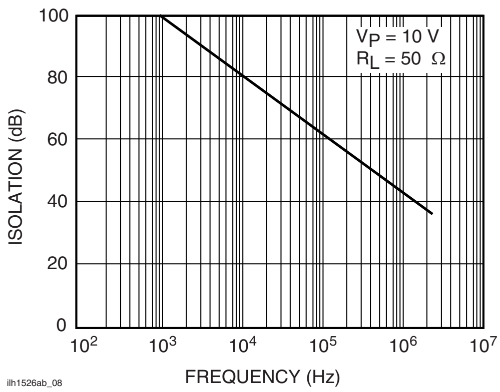


Figure 9. Output Isolation

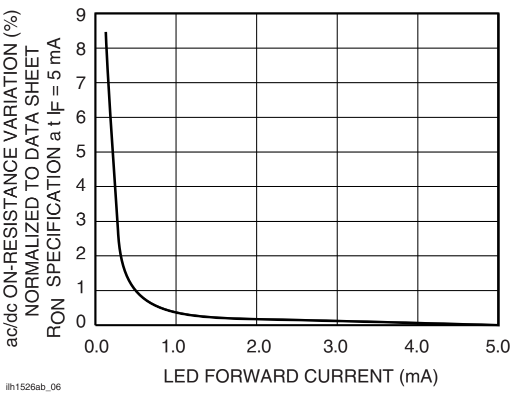


Figure 7. Variation in ON-Resistance vs. LED Current

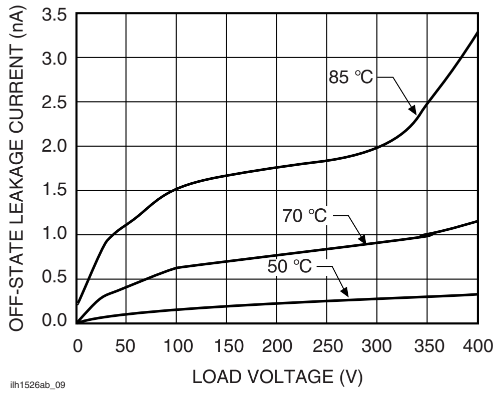


Figure 10. Leakage Current vs. Applied Voltage at Elevated Temperatures

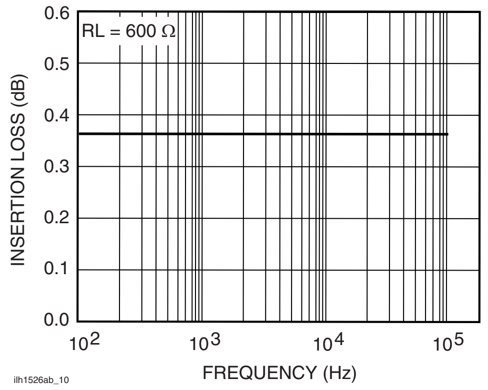


Figure 11. Insertion Loss vs. Frequency

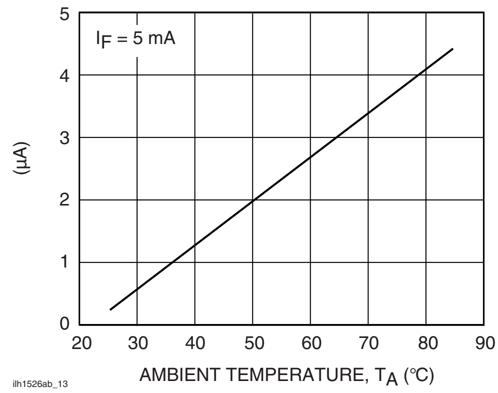


Figure 14. Switch Offset Voltage vs. Temperature

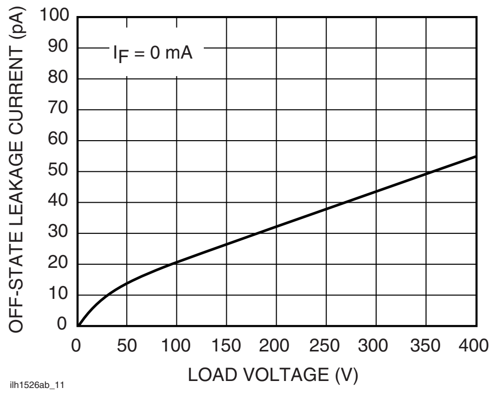


Figure 12. Leakage Current vs. Applied Voltage

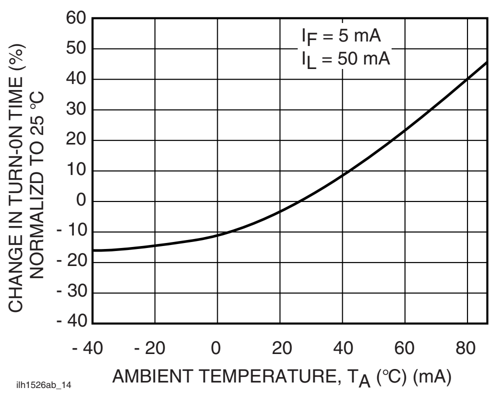


Figure 15. Turn-on Time vs. Temperature

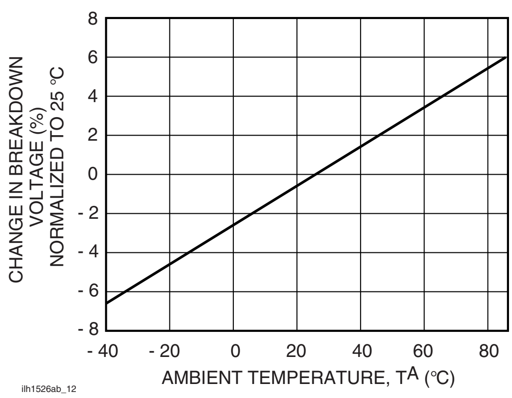


Figure 13. Switch Breakdown Voltage vs. Temperature

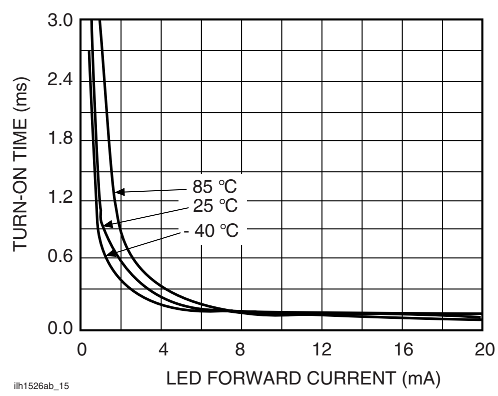


Figure 16. Turn-on Time vs. LED Current

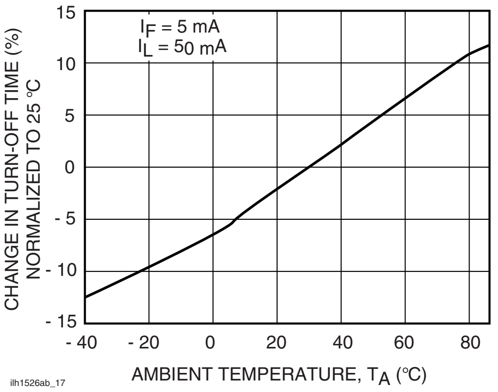


Figure 17. Turn-off Time vs. Temperature

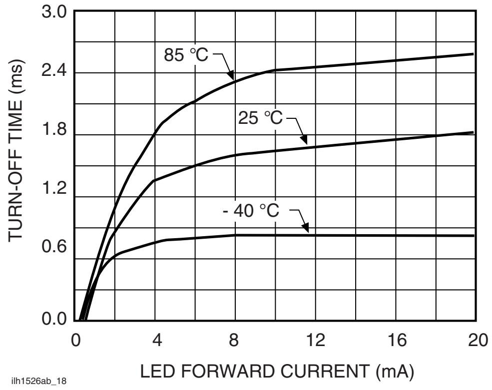
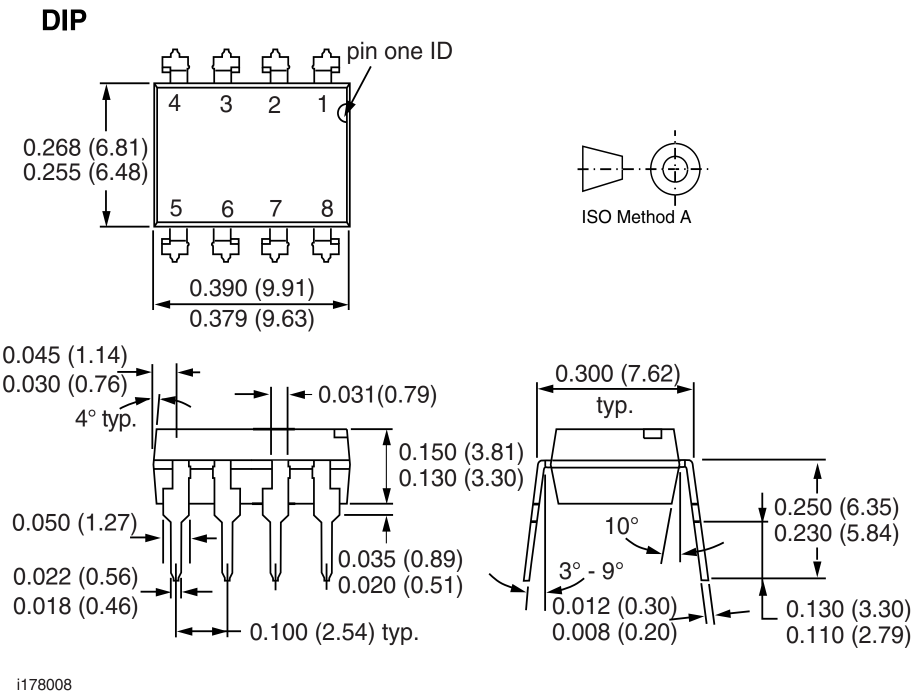


Figure 18. Turn-off Time vs. LED Current

Package Dimensions in Inches (mm)



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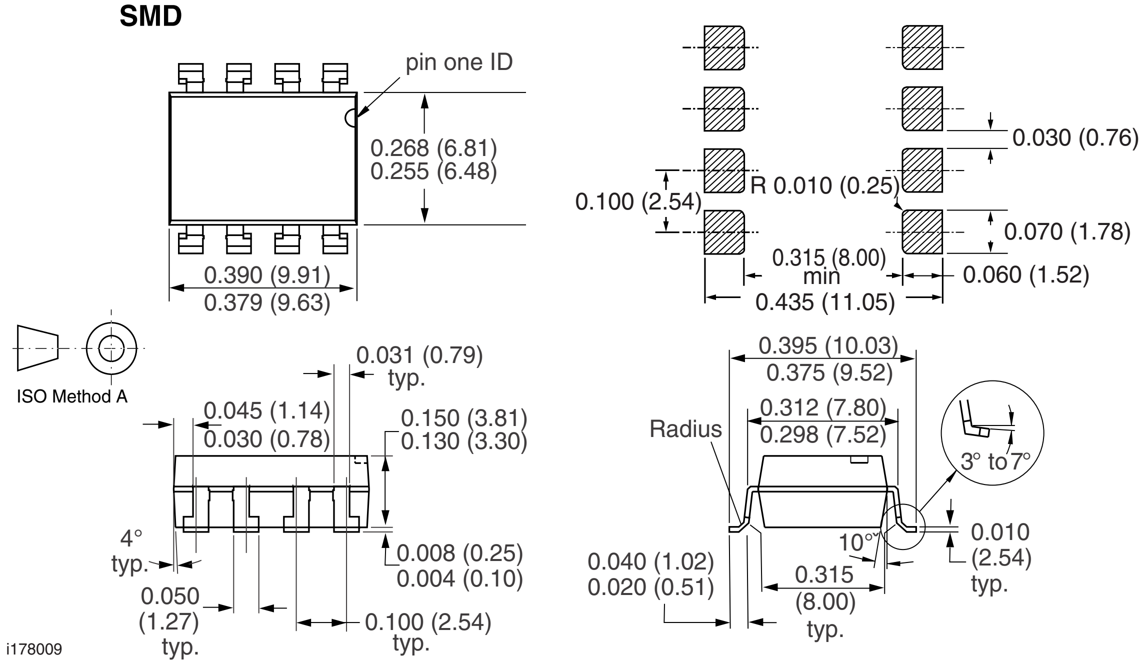

Ozone Depleting Substances Policy Statement

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.

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