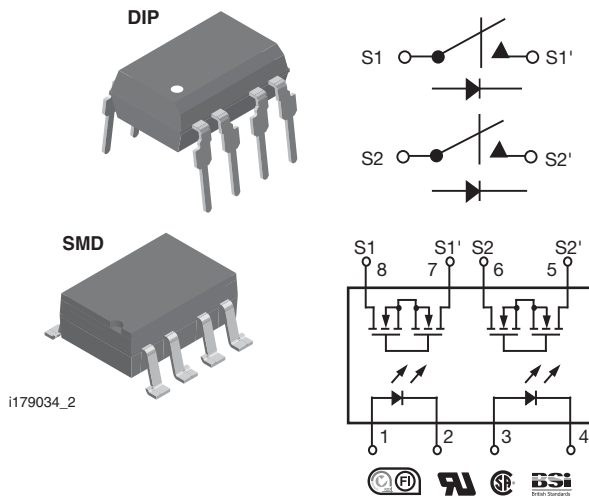


## Dual 1 Form A Solid-State Relay



i179034\_2

### DESCRIPTION

The LH1526 relay are 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 GaAlAs 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 lightning surge testing as per ANSI/TIA-968-B and other regulatory surge requirements when overvoltage protection is provided. The relay can be configured for AC/DC or DC-only operation.

### FEATURES

- Dual channel 1 form A
- Extremely low operating current
- High speed operation
- Isolation test voltage 5300 V<sub>RMS</sub>
- Current limit protection
- High surge capability
- DC only option
- Clean bounce free switching
- Low power consumption
- High reliability monolithic receptor
- Surface mountable
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC


**RoHS**  
COMPLIANT

### 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

### Note

- See "solid-state relays" (application note 56)

### AGENCY APPROVALS

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

CSA: certification no. 093751

BSI/BABT: certification no. 7980

FIMKO: 25419

ORDERING INFORMATION	
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<b>PACKAGE</b>	<b>UL, CSA, BSI, FIMKO</b>
SMD-8, tubes	LH1526AAC
SMD-8, tape and reel	LH1526AACTR
DIP-8, tubes	LH1526AB



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
LED input ratings: continuous forward current		$I_F$	50	mA
LED input ratings: reverse voltage		$V_R$	8	V
<b>OUTPUT</b>				
Output operation: DC or peak AC load voltage	$I_L \leq 50\text{ }\mu\text{A}$	$V_L$	400	V
Continuous DC load current, one pole operation		$I_L$	125	mA
Continuous DC load current, two poles operation		$I_L$	100	mA
<b>SSR</b>				
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 <sup>(1)</sup>	$t = 10\text{ s max.}$	$T_{sld}$	260	$^{\circ}\text{C}$
Input to output isolation test voltage	$t = 1\text{ s, } I_{ISO} = 10\text{ }\mu\text{A max.}$	$V_{ISO}$	5300	$V_{RMS}$
Power dissipation		$P_{diss}$	600	mW

**Notes**

- 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>(1)</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).

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
LED forward current, switch turn-on	$I_L = 70\text{ mA, } t = 10\text{ ms}$	$I_{Fon}$		0.3	0.5	mA
LED forward current, switch turn-off	$V_L = \pm 350\text{ V, } t = 100\text{ ms}$	$I_{Foff}$	0.001	0.1		mA
LED forward voltage	$I_F = 1.5\text{ mA}$	$V_F$	0.80	1.15	1.40	V
<b>OUTPUT</b>						
On-resistance: AC/DC, each pole	$I_F = 1.5\text{ mA, } I_L = \pm 50\text{ mA}$	$R_{ON}$	17	25	36	$\Omega$
Off-resistance	$I_F = 0\text{ mA, } V_L = \pm 100\text{ V}$	$R_{OFF}$		5000		$\text{G}\Omega$
Current limit	$I_F = 1.5\text{ mA, } t = 5\text{ ms, } V_L = \pm 7\text{ V}$	$I_{LMT}$	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	$\mu\text{A}$
Output capacitance	$I_F = 0\text{ mA, } V_L = 1\text{ V}$	$C_O$		37		pF
	$I_F = 0\text{ mA, } V_L = 50\text{ V}$	$C_O$		13		pF
Switch offset	$I_F = 5\text{ mA}$	$V_{OS}$		0.25		$\mu\text{V}$
<b>TRANSFER</b>						
Capacitance (input to output)	$V_{ISO} = 1\text{ V}$	$C_{IO}$		0.8		pF

**Note**

- 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.

<b>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$I_F = 1.5\text{ mA, } I_L = 50\text{ mA}$	$t_{on}$		1		ms
	$I_F = 5\text{ mA, } I_L = 50\text{ mA}$	$t_{on}$		0.5	1	ms
Turn-off time	$I_F = 1.5\text{ mA, } I_L = 50\text{ mA}$	$t_{off}$		0.2		ms
	$I_F = 5\text{ mA, } I_L = 50\text{ mA}$	$t_{off}$		1.1	1.5	ms



## TYPICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

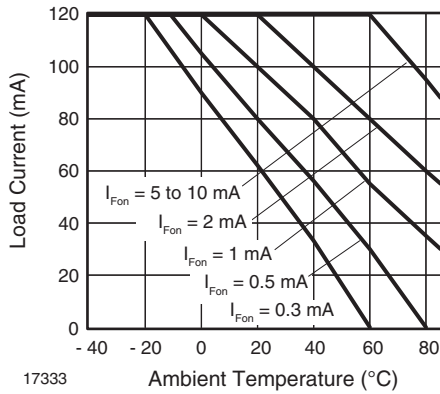


Fig. 1 - Recommended Operating Conditions

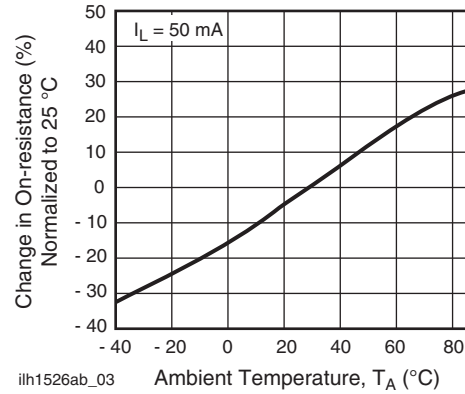


Fig. 4 - On-Resistance vs. Temperature

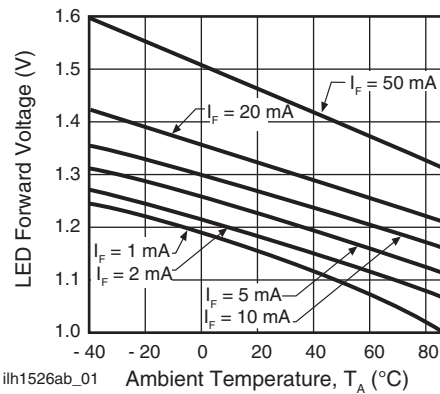


Fig. 2 - LED Voltage vs. Temperature

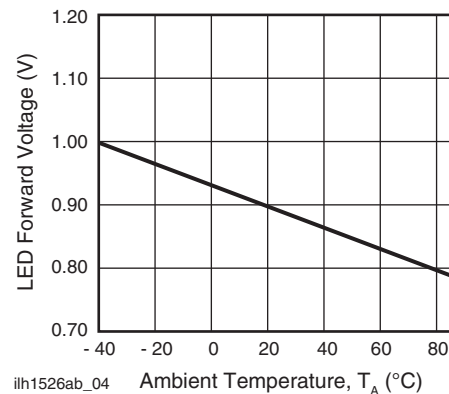


Fig. 5 - LED Dropout Voltage vs. Temperature

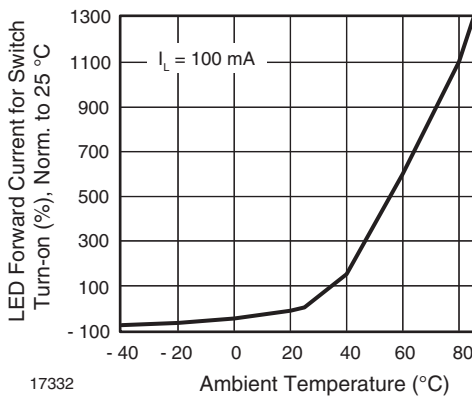


Fig. 3 - LED Current for Switch Turn-on vs. Temperature

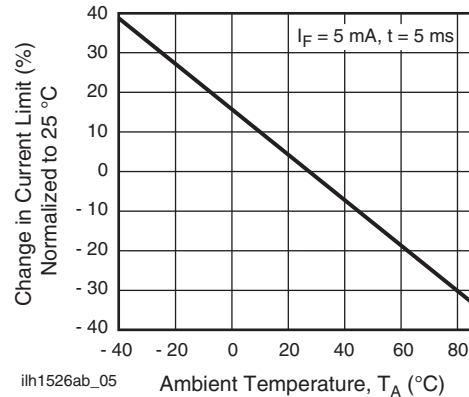


Fig. 6 - Current Limit vs. Temperature

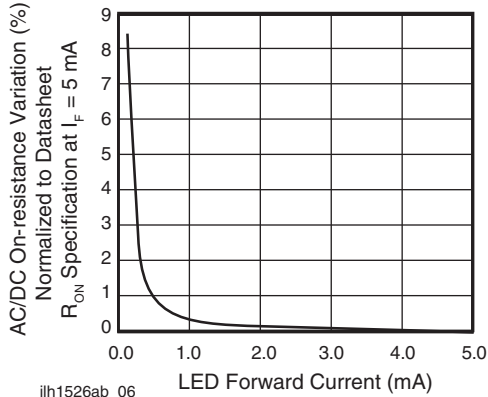


Fig. 7 - Variation in On-Resistance vs. LED Current

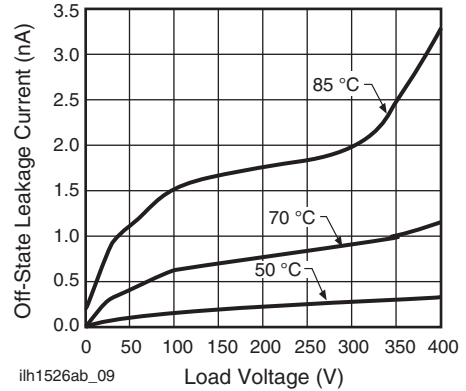


Fig. 10 - Leakage Current vs. Applied Voltage at Elevated Temperatures

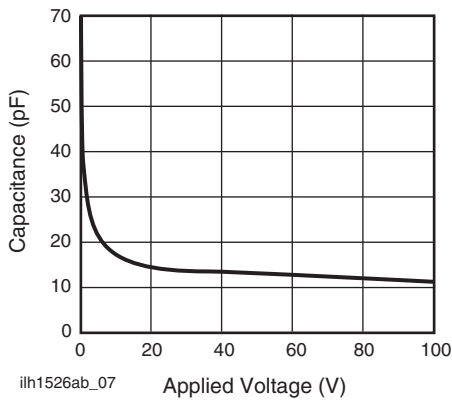


Fig. 8 - Switch Capacitance vs. Applied Voltage

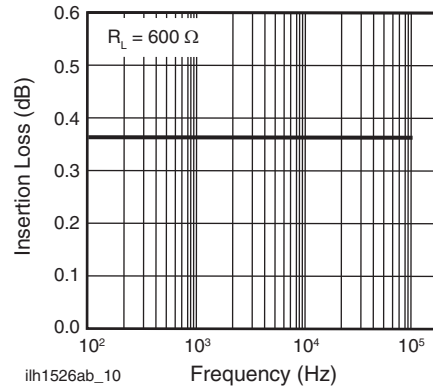


Fig. 11 - Insertion Loss vs. Frequency

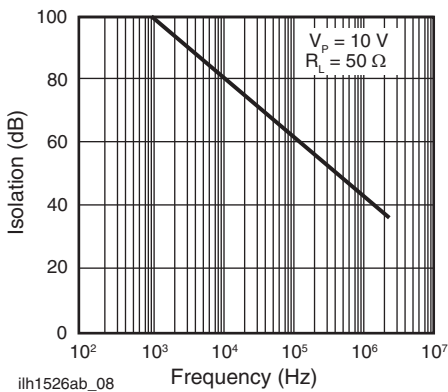


Fig. 9 - Output Isolation

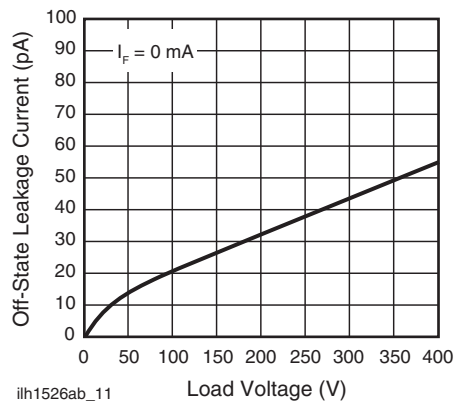
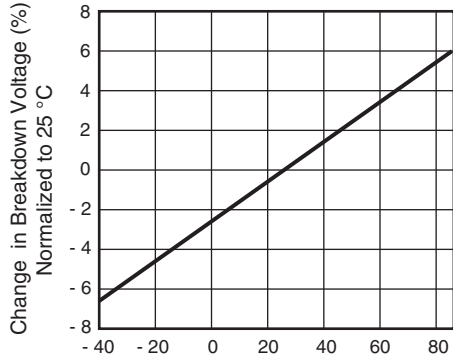


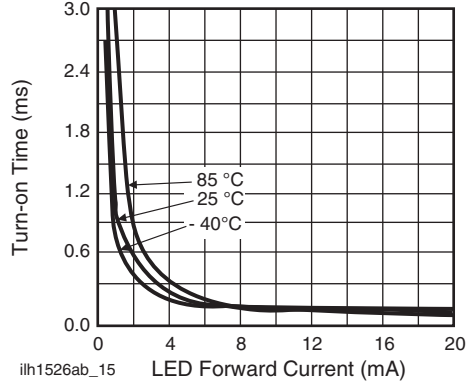
Fig. 12 - Leakage Current vs. Applied Voltage



ih1526ab\_12

Ambient Temperature,  $T_A$  (°C)

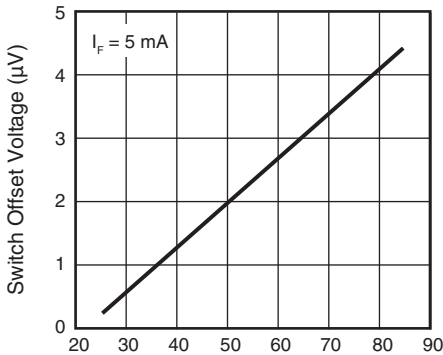
Fig. 13 - Switch Breakdown Voltage vs. Temperature



ih1526ab\_15

LED Forward Current (mA)

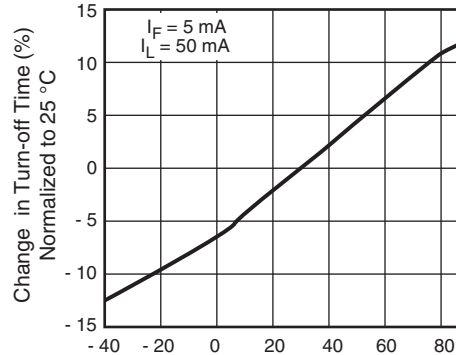
Fig. 16 - Turn-on Time vs. LED Current



ih1526ab\_13

Ambient Temperature,  $T_A$  (°C)

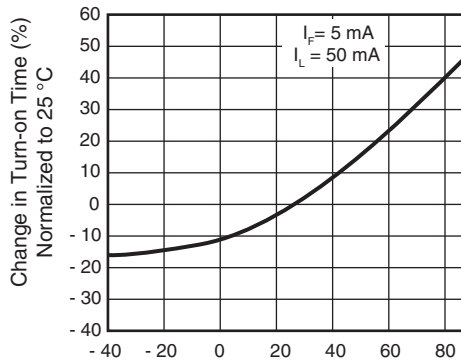
Fig. 14 - Switch Offset Voltage vs. Temperature



ih1526ab\_17

Ambient Temperature,  $T_A$  (°C)

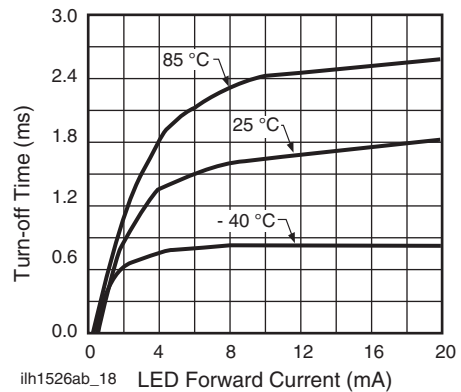
Fig. 17 - Turn-off Time vs. Temperature



ih1526ab\_14

Ambient Temperature,  $T_A$  (°C)

Fig. 15 - Turn-on Time vs. Temperature



ih1526ab\_18

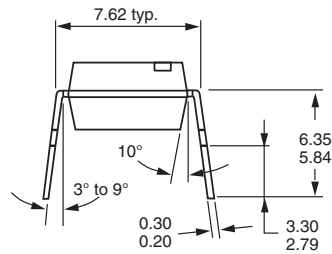
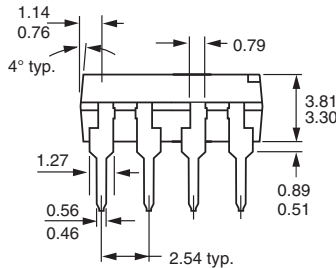
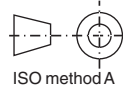
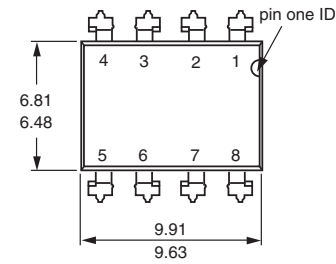
LED Forward Current (mA)

Fig. 18 - Turn-off Time vs. LED Current



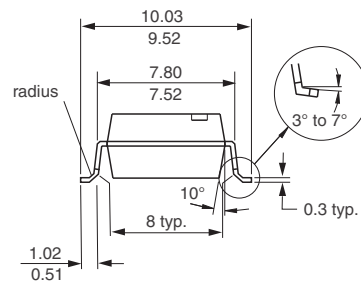
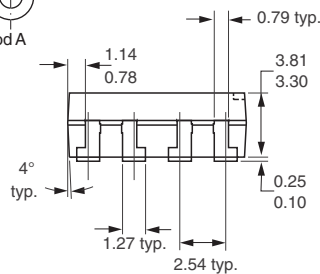
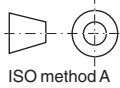
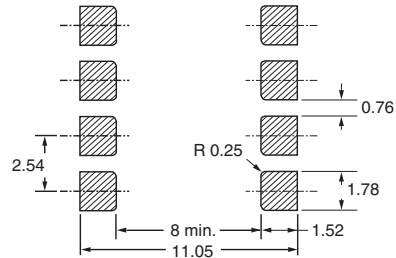
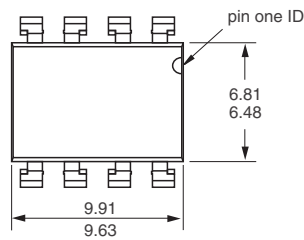
## PACKAGE DIMENSIONS in millimeters

### DIP



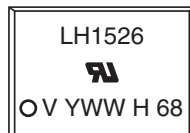
i178008

### SMD



i178009

## PACKAGE MARKING (example)



### Note

- Tape and reel suffix (TR) is not part of the package marking.



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