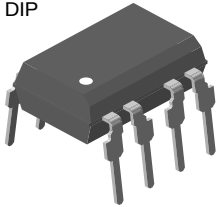


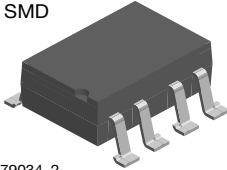


## Telecom Switch 1 Form A Solid-State Relay

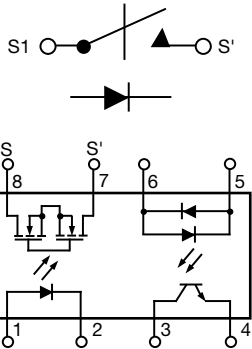
DIP



SMD



i179034\_2



### FEATURES

- Solid-state relay and optocoupler in one package
- Surface-mount package
- I/O isolation, 5300 V<sub>RMS</sub>
- LH1529A, CTR min. = 33 %
- LH1529B, CTR min. = 100 %
- Optocoupler
  - Bidirectional current detection
- Solid-state relay (equivalent to TS117P)
  - Typical R<sub>ON</sub> 20 Ω
  - Load voltage 350 V
  - Load current 120 mA
  - Current limit protection
  - High surge capability
  - Clean bounce free switching
  - Low power consumption
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS COMPLIANT

### DESCRIPTION

The LH1529A and LH1529B telecom switches consist of an optically coupled solid state relay (SSR) and bidirectional input optocoupler. The SSR is ideal for performing switch hook and dial-pulse switching whilst optocoupler performs ring detection and loop current sensing functions. Both the SSR and optocoupler have an isolation test voltage of 5300 V<sub>RMS</sub>.

### AGENCY APPROVALS

- UL1577 (pending)
- BSI / BABT (pending)
- FIMKO (pending)

### APPLICATIONS

- General telecom switching
  - On/off hook control
  - Dial pulse
  - Ring current detection
  - Loop current sensing

### Note

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

ORDERING INFORMATION												
L	H	1	5	2	9	#	#	#	T	R	 DIP	 SMD
PART NUMBER						ELECTR. VARIATION			PACKAGE CONFIG.		TAPE AND REEL	
<b>PACKAGE</b>												
SMD-8, tubes											LH1529AAC	
SMD-8, tape and reel											LH1529ACTR	
SMD-8, tubes											LH1529BAC	
SMD-8, tape and reel											LH1529BACTR	
DIP-8, tubes											LH1529BB	



ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>SSR</b>				
<b>INPUT</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
<b>OUTPUT</b>				
DC or peak AC load voltage	I <sub>L</sub> ≤ 50 μA	V <sub>L</sub>	350	V
Continuous DC load current		I <sub>L</sub>	120	mA
<b>SSR</b>				
Total power dissipation		P <sub>diss</sub>	600	mW
Ambient temperature range		T <sub>amb</sub>	-40 to +85	°C
Storage temperature range		T <sub>stg</sub>	-40 to +150	°C
Soldering temperature <sup>(1)</sup>	t = 10 s max.	T <sub>slid</sub>	260	°C
Isolation test voltage (for 60 s)		V <sub>ISO</sub>	5300	V <sub>RMS</sub>
Isolation resistance	V <sub>IO</sub> = 500 V, T <sub>amb</sub> = 25 °C	R <sub>IO</sub>	≥ 10 <sup>12</sup>	Ω
	V <sub>IO</sub> = 500 V, T <sub>amb</sub> = 100 °C	R <sub>IO</sub>	≥ 10 <sup>11</sup>	Ω
<b>OPTOCOUPLER</b>				
<b>INPUT</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
<b>OUTPUT</b>				
Collector emitter breakdown voltage		BV <sub>CEO</sub>	30	V
Phototransistor power dissipation		P <sub>diss</sub>	150	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)

ELECTRICAL CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>SSR</b>							
<b>INPUT</b>							
LED forward current switch turn-on	I <sub>L</sub> = 100 mA, t = 10 ms		I <sub>Fon</sub>	-	0.7	2	mA
LED forward current switch turn-off	V <sub>L</sub> = ± 300 V		I <sub>Foff</sub>	0.2	0.6	-	mA
LED forward voltage	I <sub>F</sub> = 10 mA		V <sub>F</sub>	1.15	1.26	1.45	V
<b>OUTPUT</b>							
On-resistance AC/DC, pins 4 (±) to 6 (±)	I <sub>F</sub> = 5 mA, I <sub>L</sub> = ± 50 mA		R <sub>ON</sub>	12	20	25	Ω
Current limit	I <sub>F</sub> = 5 mA, t = 5 ms, V <sub>L</sub> = ± 6 V	LH1529AAC, LH1529AACTR	I <sub>limit</sub>	230	260	370	mA
		LH1529BB	I <sub>limit</sub>	170	210	250	mA
		LH1529BAC, LH1529BACTR	I <sub>limit</sub>	170	210	250	mA
Off-state leakage current	I <sub>F</sub> = 0 mA, V <sub>L</sub> = ± 100 V		I <sub>O</sub>	-	0.02	200	nA
	I <sub>F</sub> = 0 mA, V <sub>L</sub> = ± 350 V		I <sub>O</sub>	-	-	1	μA
Output capacitance pin 7 to pin 8	I <sub>F</sub> = 0 mA, V <sub>L</sub> = 1 V		C <sub>O</sub>	-	55	-	pF
	I <sub>F</sub> = 0 mA, V <sub>L</sub> = 50 V		C <sub>O</sub>	-	10	-	pF
Capacitance (input to output)	V <sub>ISO</sub> = 1 V		C <sub>IO</sub>	-	1.3	-	pF



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>OPTOCOUPLER</b>							
LED forward current	$I_F = 10\text{ mA}$		$V_F$	0.9	1.2	1.5	V
Saturation voltage	$I_F = 16\text{ mA}$ , $I_C = 2\text{ mA}$		$V_{CEsat}$	-	0.7	0.5	V
Collector emitter dark current	$I_F = 0\text{ mA}$ , $V_{CE} = 5\text{ V}$		$I_{CEO}$	-	-	500	nA
Trickle current leakage	$I_F = 5\text{ }\mu\text{A}$ , $V_{CE} = 5\text{ V}$		$I_{CEO}$	-	-	1	$\mu\text{A}$
DC current transfer ratio	$I_F = 6\text{ mA}$ , $V_{CE} = 0.5\text{ V}$	LH1529AAC, LH1529AACTR	$CTR_{DC}$	33	100	-	%
		LH1529BB	$CTR_{DC}$	100	165	-	%
		LH1529BAC, LH1529BACTR	$CTR_{DC}$	100	165	-	%

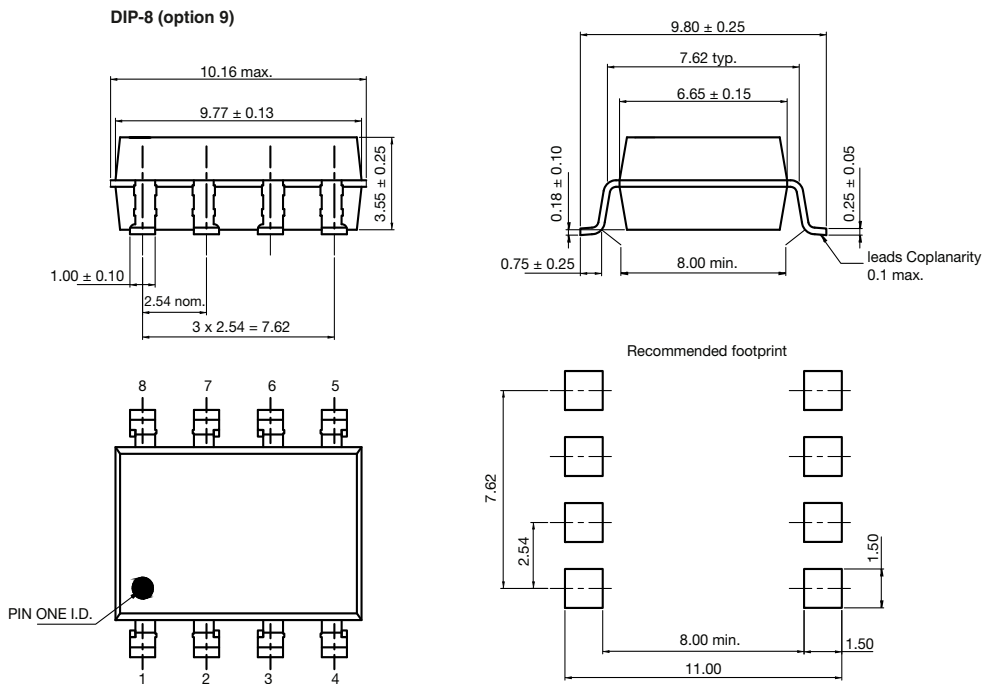
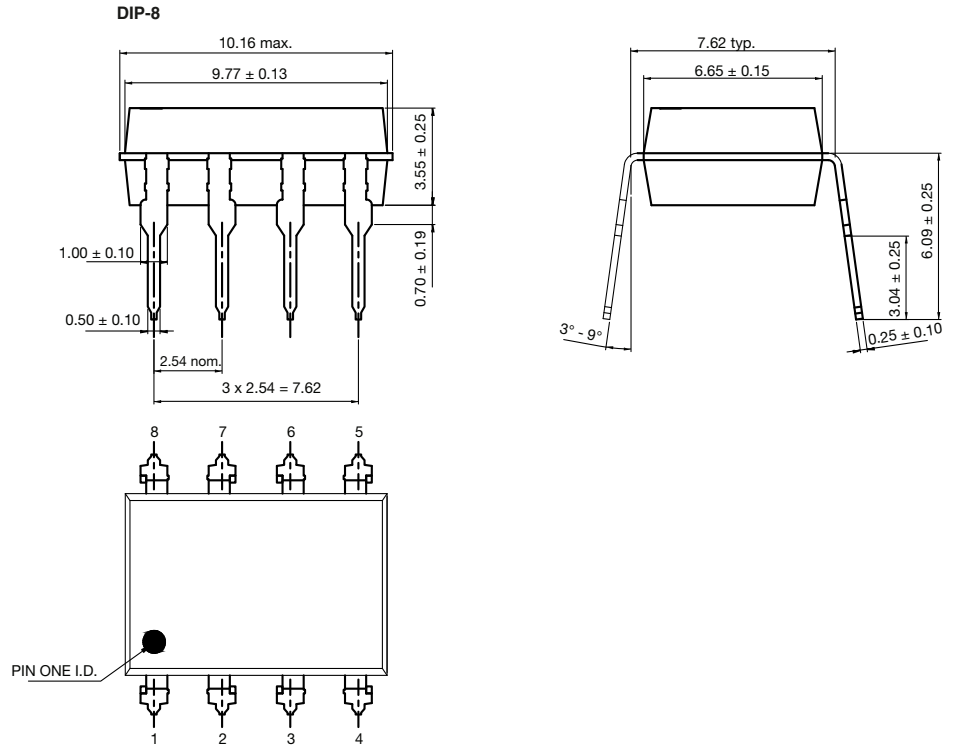
**Note**

- 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

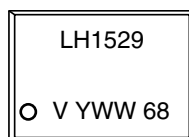
<b>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$I_F = 5\text{ mA}$ , $I_L = 50\text{ mA}$	LH1529AAC, LH1529AACTR	$t_{on}$	-	2	3	ms
		LH1529BB	$t_{on}$	-	1.3	2.5	ms
		LH1529BAC, LH1529BACTR	$t_{on}$	-	1.3	2.5	ms
Turn-off time	$I_F = 5\text{ mA}$ , $I_L = 50\text{ mA}$	LH1529AAC, LH1529AACTR	$t_{off}$	-	0.6	3	ms
		LH1529BB	$t_{off}$	-	0.6	2.5	ms
		LH1529BAC, LH1529BACTR	$t_{off}$	-	0.6	2.5	ms



**PACKAGE DIMENSIONS** in millimeters



**PACKAGE MARKING** (example)



**Note**

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



## Footprint and Schematic Information for LH1529

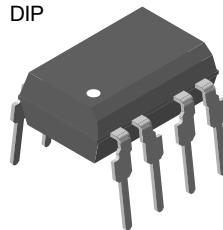
The footprint and schematic symbols for the following parts can be accessed using the associated links. They are available in Eagle, Altium, KiCad, OrCAD / Allegro, Pulsonix, and PADS.

Note that the 3D models for these parts can be found on the Vishay product page.

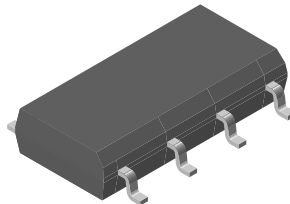
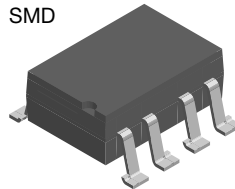
PART NUMBER	FOOTPRINT / SCHEMATIC
LH1529AAC	<a href="http://www.snapeda.com/parts/LH1529AAC/Vishay/view-part">www.snapeda.com/parts/LH1529AAC/Vishay/view-part</a>
LH1529AACTR	<a href="http://www.snapeda.com/parts/LH1529AACTR/Vishay/view-part">www.snapeda.com/parts/LH1529AACTR/Vishay/view-part</a>
LH1529BAC	<a href="http://www.snapeda.com/parts/LH1529BAC/Vishay/view-part">www.snapeda.com/parts/LH1529BAC/Vishay/view-part</a>
LH1529BACTR	<a href="http://www.snapeda.com/parts/LH1529BACTR/Vishay/view-part">www.snapeda.com/parts/LH1529BACTR/Vishay/view-part</a>
LH1529BB	<a href="http://www.snapeda.com/parts/LH1529BB/Vishay/view-part">www.snapeda.com/parts/LH1529BB/Vishay/view-part</a>
LH1529FPTR	<a href="http://www.snapeda.com/parts/LH1529FPTR/Vishay/view-part">www.snapeda.com/parts/LH1529FPTR/Vishay/view-part</a>
LH1529GP	<a href="http://www.snapeda.com/parts/LH1529GP/Vishay/view-part">www.snapeda.com/parts/LH1529GP/Vishay/view-part</a>
LH1529GPTR	<a href="http://www.snapeda.com/parts/LH1529GPTR/Vishay/view-part">www.snapeda.com/parts/LH1529GPTR/Vishay/view-part</a>

For technical issues and product support, please contact [optocoupleranswers@vishay.com](mailto:optocoupleranswers@vishay.com).

DIP



SMD





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