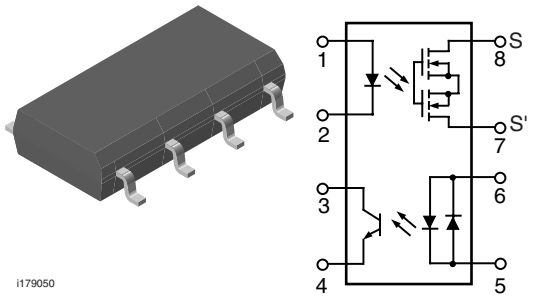
Telecom Switch - 1 Form A Solid State Relay



FEATURES

- Solid state relay and optocoupler in one package
- Surface mount package - new flat pak
- Isolation test voltage, 3000 V_{RMS}
- LH1529FP, CTR min. = 33 %
- LH1529GP, CTR min. = 100 %
- Optocoupler
  - Bidirectional current detection
- Solid-state relay (equivalent to TS117P)
  - Typical R_{ON} 20 Ω
  - Load voltage 350 V
  - Load current 120 mA
  - Current limit protection
  - High surge capability
  - Clean bounce free switching
  - Low power consumption
  - High reliability monolithic detetor
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

DESCRIPTION

The LH1529FP and LH1529GP telecom switches consist of an optically coupled solid state relay (SSR) and a bidirectional input optocoupler. The SSR is ideal for performing switch hook and dial-pulse switching while the optocoupler performs ring detection and loop current sensing functions. Both the SSR and optocoupler provide 3000 V_{RMS} of input to output isolation.

The SSR is integrated on a monolithic receptor die using high voltage technology. The SSR 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 GaAs infrared emitting diodes. The opto channel provides a minimum CTR of 33 % at 6.0 mA.

The LH1529FP and LH1529GP come in an 8 pin, 0.080" thick plastic flat pak, SMD.

APPLICATIONS

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

Note

See "solid state relays" (application note 56)

AGENCY APPROVALS

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

FIMKO: approval

ORDER INFORMATION		
PART	**REMARKS**	**PACKAGE**
LH1529FP	Tubes	SMD-8
LH1529FPTR	Tape and reel	SMD-8
LH1529GP	Tubes	SMD-8
LH1529GPTR	Tape and reel	SMD-8

ABSOLUTE MAXIMUM RATINGS (1)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
SSR				
LED continuous forward current		I_F	50	mA
LED reverse voltage	$I_R \leq 10$ µA	V_R	6.0	V
DC or peak AC load voltage	$I_L \leq 50$ µA	V_L	350	V
Continuous DC load current		I_L	120	mA
Ambient temperature range		T_{amb}	- 40 to + 85	°C
Storage temperature range		T_{stg}	- 40 to + 125	°C
Soldering temperature (2)	t = 10 s max.	T_{sld}	260	°C
Isolation test voltage (for 1.0 s)		V_{ISO}	3000	V_{RMS}
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	$\geq 10^{11}$	Ω
Power dissipation		P_{diss}	600	mW
OPTOCOUPLER				
LED continuous forward current		I_F	50	mA
LED reverse voltage	$I_R \leq 10$ µA	V_R	6.0	V
Collector emitter breakdown voltage		BV_{CEO}	30	V
Phototransistor power dissipation		P_{diss}	150	mW

Notes

(1) 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 the time can adversely affect reliability.

(2) Refer to reflow profile for soldering conditions for surface mounted devices.

ELECTRICAL CHARACTERISTICS							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
SSR							
INPUT							
LED forward current, switch turn-on	I_L = 100 mA, t = 10 ms		I_{Fon}		1.1	3.0	mA
LED forward current, switch turn-off	V_L = ± 300 V		I_{Foff}	0.2	1.0		mA
LED forward voltage	I_F = 10 mA		V_F	1.0	1.2	1.5	V
OUTPUT							
On-resistance	I_F = 5.0 mA, I_L = ± 50 mA		R_{ON}		20	25	Ω
Off-resistance	I_F = 0 mA, V_L = ± 100 V		R_{OFF}		5000		GΩ
Current limit	I_F = 5.0 mA, t = 5.0 ms		I_{Limit}	170	210	250	mA
Output off-state leakage current	I_F = 0 mA, V_L = ± 100 V		I_O		0.6	200	nA
	I_F = 0 mA, V_L = ± 350 V		I_O			1.0	µA
Output capacitance pin 7 to pin 8	I_F = 0 mA, V_L = 1.0 V		C_O		55		pF
	I_F = 0 mA, V_L = 50 V		C_O		10		pF
TRANSFER							
Turn-on time	I_F = 5.0 mA, I_L = 50 mA		t_{on}		1.3	2.5	ms
Turn-off time	I_F = 5.0 mA, I_L = 50 mA		t_{off}		0.1	2.5	ms

ELECTRICAL CHARACTERISTICS							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
OPTOCOUPLER							
LED forward current	I_F = 10 mA		V_F	0.9	1.2	1.5	V
Saturation voltage	I_F = 16 mA, I_C = 2.0 mA		V_{CEsat}		0.07	0.5	V
Dark current leakage	I_F = 0 mA, V_{CE} = 5.0 V		I_{CEO1}			500	nA
Trickle current leakage	I_F = 5.0 µA, V_{CE} = 5.0 V		I_{CEO2}			1.0	µA
DC current transfer ratio	I_F = 6.0 mA, V_{CE} = 0.5 V	LH1529FP	CTR_{DC}	33	150		%
		LH1529GP	CTR_{DC}	100	150		%

Note

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.

TYPICAL CHARACTERISTICS

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

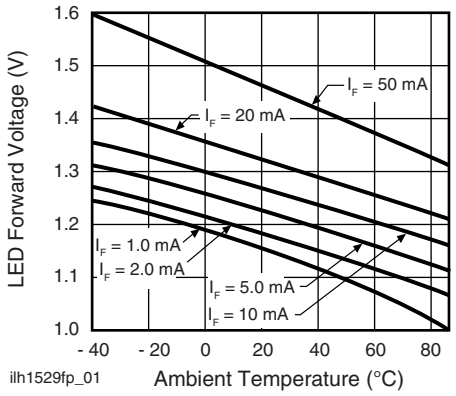


Fig. 1 - LED Voltage vs. Temperature

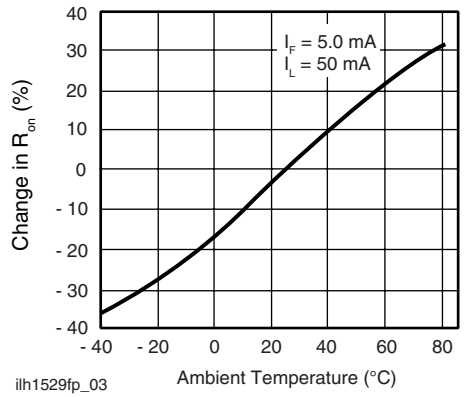


Fig. 3 - On-Resistance vs. Temperature

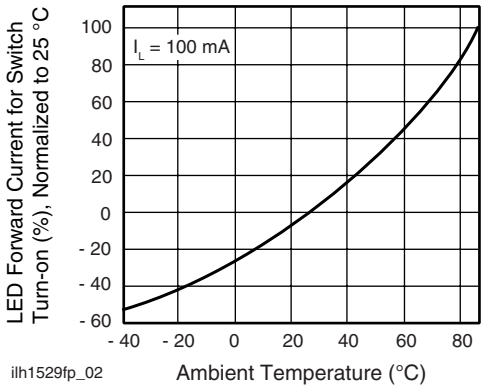


Fig. 2 - LED Current for Switch Turn-on vs. Temperature

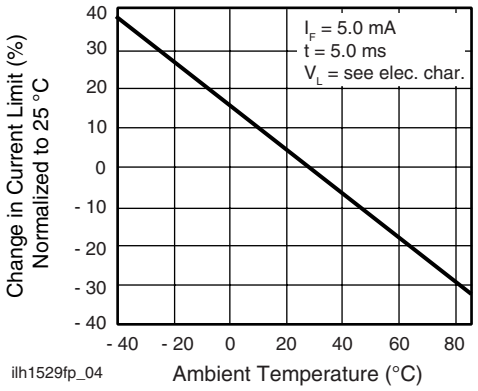


Fig. 4 - Current Limit vs. Temperature

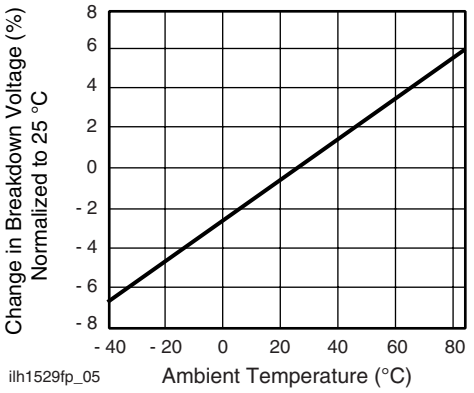


Fig. 5 - Switch Breakdown Voltage vs. Temperature

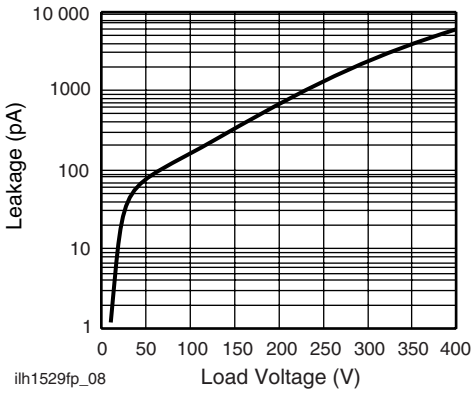


Fig. 8 - Leakage Current vs. Applied Voltage

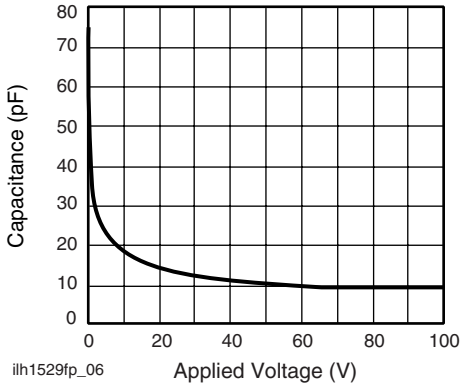


Fig. 6 - Switch Capacitance vs. Applied Voltage

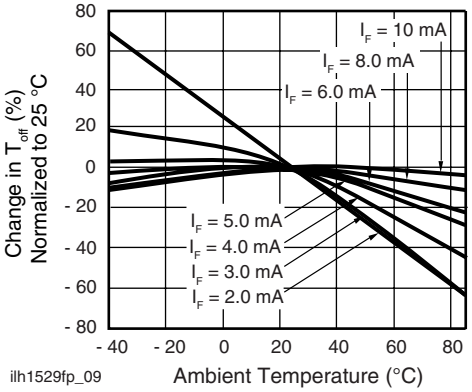


Fig. 9 - Turn-off Time vs. Temperature

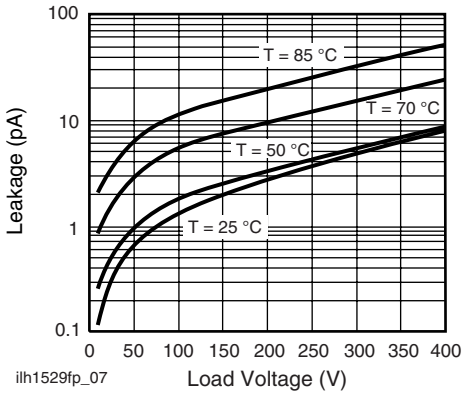


Fig. 7 - Leakage Current vs. Applied Voltage

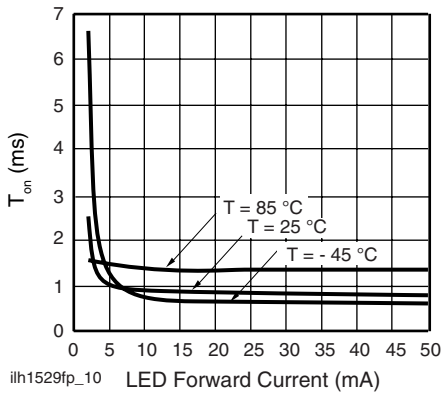
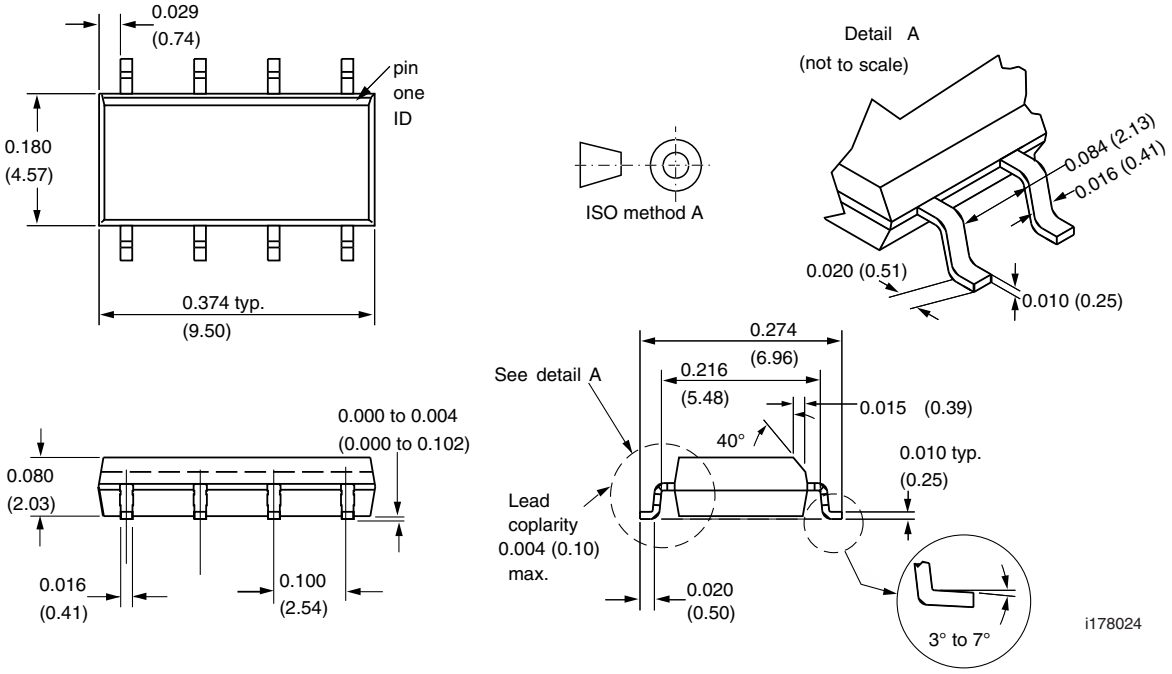


Fig. 10 - Turn-on Time vs. LED Current

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.
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