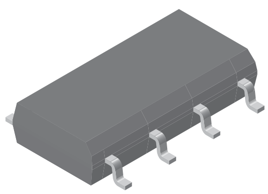
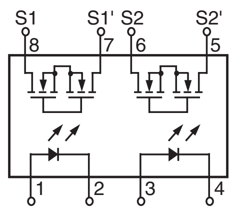
Dual 1 Form A Solid State Relay





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DESCRIPTION

The LH1532FP is a dual 1 form A (SPST) which can replace electromechanical relays in many applications. They are constructed using a GaAlAs LED for activation control and an integrated monolithic die for the switch output. The die is comprised of a photodiode array, switch control circuity and MOSFET switches. The SSR features low on-resistance, high breakdown voltage and current-limit circuitry that protects the relay from telephone line induced lightning surges.

AGENCY APPROVALS

UL1577: file no. E52744 system code O

FEATURES

- Solid-state relay (equivalent to AQW210S)
  - 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 receptor
- Two independent relays in a single package
- Package - flat pak
- Isolation test voltage, 3000 V_{RMS}
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

APPLICATIONS

- General telecom switching
  - On/off hook control
  - Ring relay
  - Ground start
- Industrial controls
  - Triac predriver
  - Output modules
- Peripherals
  - Transducer driver
- Instrumentation
  - Automatic tuning/balancing
  - Flying capacitor
  - Analog multiplexing

Note

See "solid state relays" (application note 56)

ORDER INFORMATION		
PART	**REMARKS**	**PACKAGE**
LH1532FP	Tubes	SOP-8
LH1532FPTR	Tape and reel	SOP-8

For technical questions, please contact: optocoupler.answers@vishay.com

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	t = 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
Total power dissipation		P_{tot}	600	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**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
LED forward current, switch turn-on	I_L = 100 mA, t = 10 ms	I_{Fon}		1.2	3.0	mA
LED forward current, switch turn-off	V_L = ± 300 V	I_{Foff}	0.2			mA
LED forward voltage	I_F = 10 mA	V_F	1.0	1.22	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	I_F = 0 mA, V_L = ± 1.0 V	C_O		55		pF
Pole-to-pole capacitance (S1 to S2)	I_F = 5.0 mA			0.5		pF
TRANSFER						
Turn-on time	I_F = 5.0 mA, I_L = 50 mA	t_{on}		1.1	2.5	ms
Turn-off time	I_F = 5.0 mA, I_L = 50 mA	t_{off}		0.06	2.5	ms
Switch offset	I_F = 5.0 mA	V_{OS}		0.15		µV

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

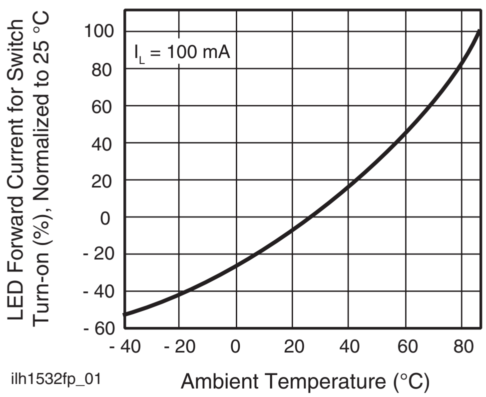


Fig. 1 - LED Current for Switch Turn-on vs. Temperature

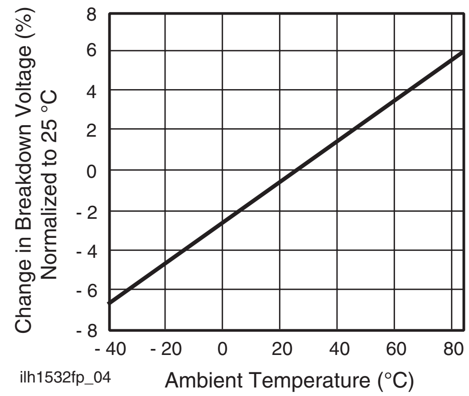


Fig. 4 - Switch Breakdown Voltage vs. Temperature

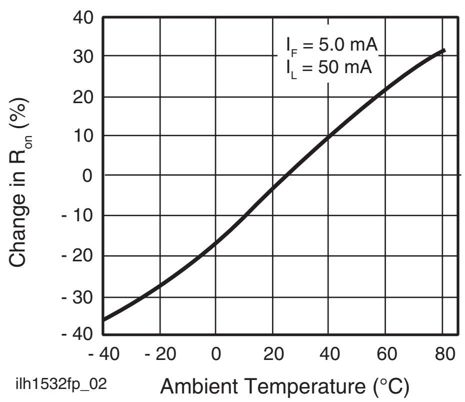


Fig. 2 - On-Resistance vs. Temperature

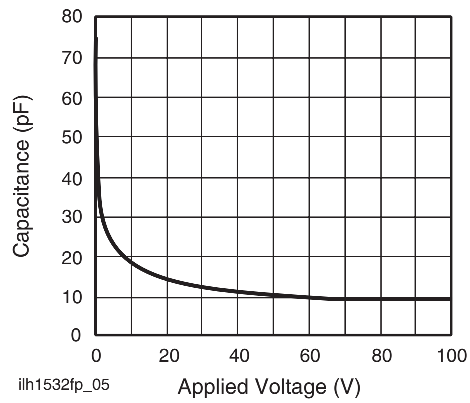


Fig. 5 - Switch Capacitance vs. Applied Voltage

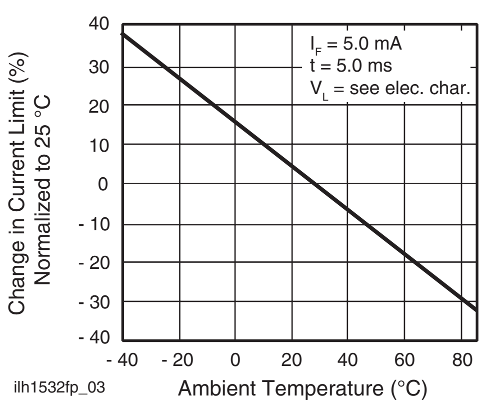


Fig. 3 - Current Limit vs. Temperature

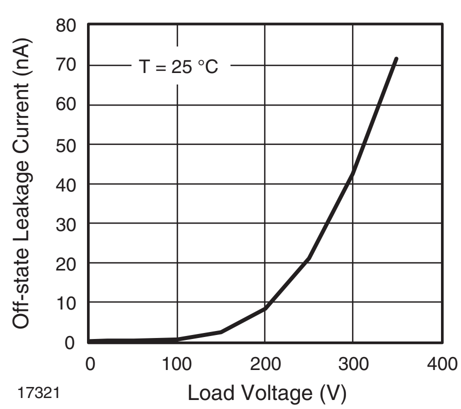


Fig. 6 - Leakage Current vs. Applied Voltage

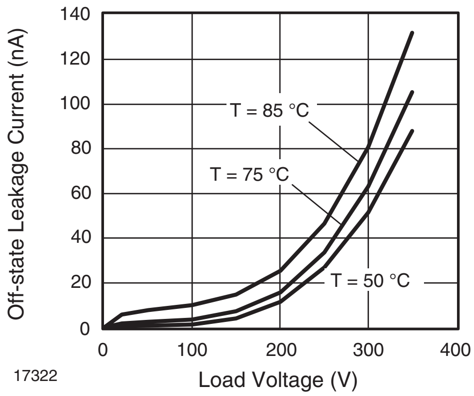


Fig. 7 - Leakage Current vs.
Applied Voltage at Elevated Temperatures

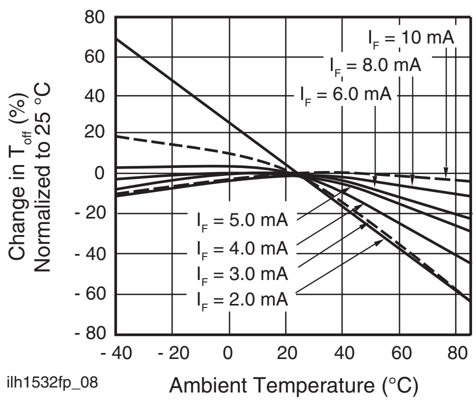


Fig. 8 - Turn-off Time vs. Temperature

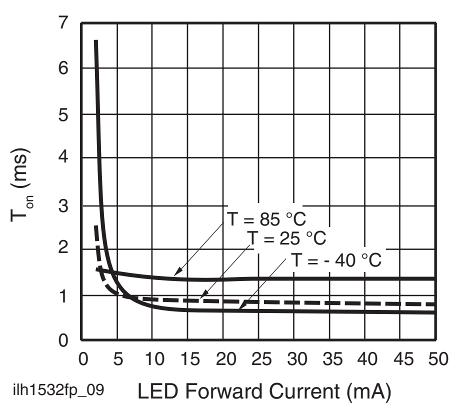
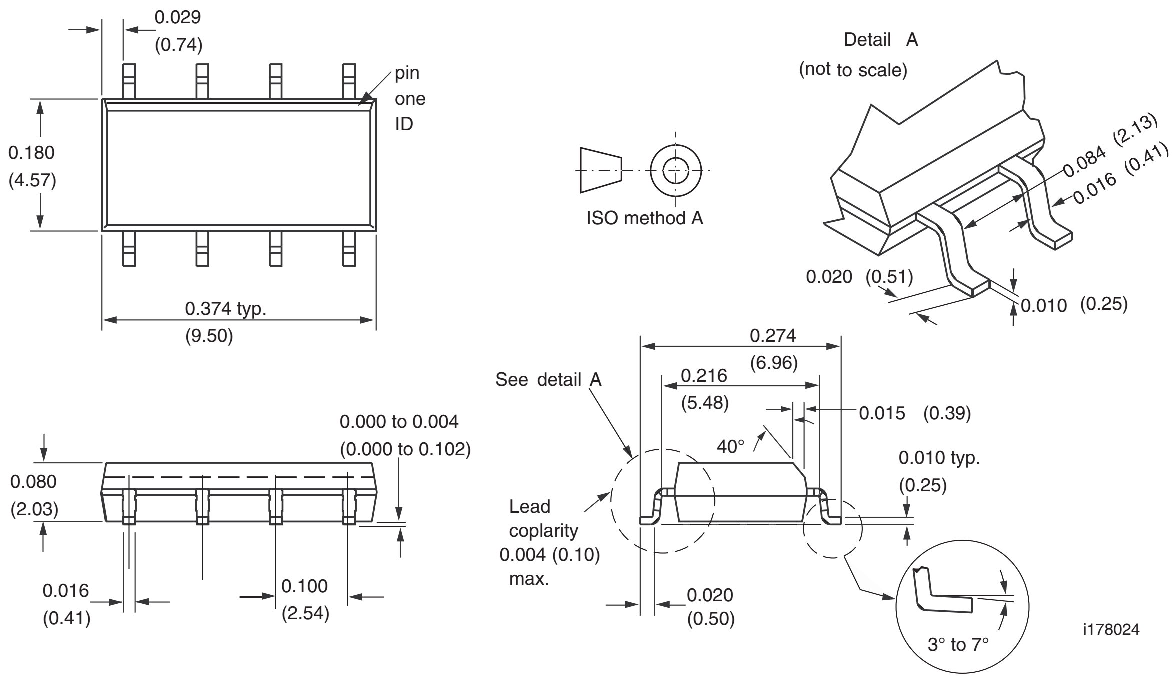


Fig. 9 - Turn-on Time vs. LED Current

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.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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