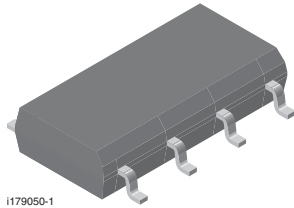
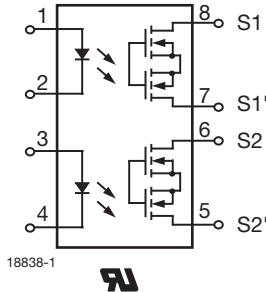


## Dual 1 Form A Solid State Relay



1179050-1



18838-1

### 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 circuitry 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  $\Omega$
  - 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  $V_{RMS}$
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



**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)

ORDERING INFORMATION	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px;">L</div> <div style="border: 1px solid black; padding: 2px 5px;">H</div> <div style="border: 1px solid black; padding: 2px 5px;">1</div> <div style="border: 1px solid black; padding: 2px 5px;">5</div> <div style="border: 1px solid black; padding: 2px 5px;">3</div> <div style="border: 1px solid black; padding: 2px 5px;">2</div> <div style="border: 1px solid black; padding: 2px 5px;">F</div> <div style="border: 1px solid black; padding: 2px 5px;">P</div> <div style="border: 1px solid black; padding: 2px 5px;">T</div> <div style="border: 1px solid black; padding: 2px 5px;">R</div> </div> <p style="text-align: center;">PART NUMBER      PACKAGE CONFIG.      TAPE AND REEL</p>	<p>SMD-# 7 mm</p>
<b>PACKAGE</b>	<b>UL</b>
SOP-8, tubes	LH1532FP
SOP-8, tape and reel	LH1532FPTR

<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 continuous forward current		$I_F$	50	mA
LED reverse voltage	$I_R \leq 10\text{ }\mu\text{A}$	$V_R$	6	V
<b>OUTPUT</b>				
DC or peak AC load voltage	$I_L \leq 50\text{ }\mu\text{A}$	$V_L$	350	V
Continuous DC load current		$I_L$	120	mA
<b>SSR</b>				
Ambient temperature range		$T_{amb}$	- 40 to + 85	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	- 40 to + 125	$^{\circ}\text{C}$
Soldering temperature <sup>(1)</sup>	$t = 10\text{ s max.}$	$T_{sld}$	260	$^{\circ}\text{C}$
Isolation test voltage	$t = 1\text{ s}$	$V_{ISO}$	3000	$V_{RMS}$
Isolation resistance	$V_{IO} = 500\text{ V}, T_{amb} = 25\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$V_{IO} = 500\text{ V}, T_{amb} = 100\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{11}$	$\Omega$
Total power dissipation		$P_{tot}$	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.

<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	$I_L = 100\text{ mA}, t = 10\text{ ms}$	$I_{Fon}$		1.2	3	mA
LED forward current, switch turn-off	$V_L = \pm 300\text{ V}$	$I_{Foff}$	0.2			mA
LED forward voltage	$I_F = 10\text{ mA}$	$V_F$	1	1.22	1.5	V
<b>OUTPUT</b>						
On-resistance	$I_F = 5\text{ mA}, I_L = \pm 50\text{ mA}$	$R_{ON}$		20	25	$\Omega$
Off-resistance	$I_F = 0\text{ mA}, V_L = \pm 100\text{ V}$	$R_{OFF}$		5000		$\text{G}\Omega$
Current limit	$I_F = 5\text{ mA}, t = 5\text{ ms}$	$I_{Limit}$	170	210	250	mA
Output off-state leakage current	$I_F = 0\text{ mA}, V_L = \pm 100\text{ V}$	$I_o$		0.6	200	nA
	$I_F = 0\text{ mA}, V_L = \pm 350\text{ V}$	$I_o$			1	$\mu\text{A}$
Output capacitance	$I_F = 0\text{ mA}, V_L = \pm 1\text{ V}$	$C_O$		55		pF
Pole-to-pole capacitance (S1 to S2)	$I_F = 5\text{ mA}$			0.5		pF
<b>TRANSFER</b>						
Switch offset	$I_F = 5\text{ mA}$	$V_{OS}$		0.15		$\mu\text{V}$

### 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	$I_F = 5\text{ mA}, I_L = 50\text{ mA}$	$t_{on}$		1.1	2.5	ms
Turn-off time	$I_F = 5\text{ mA}, I_L = 50\text{ mA}$	$t_{off}$		0.06	2.5	ms

### TYPICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

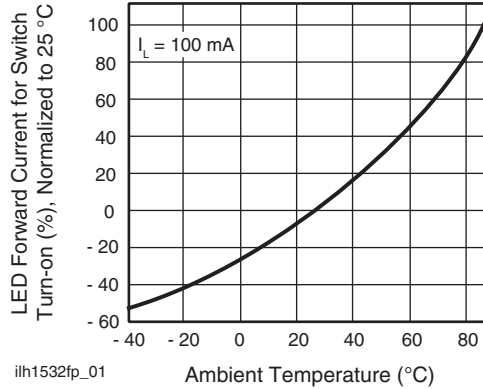


Fig. 1 - LED Current for Switch Turn-on vs. Temperature

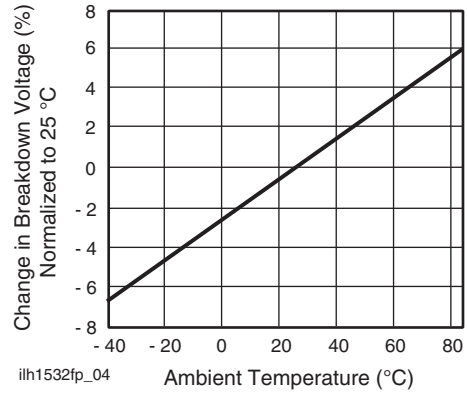


Fig. 4 - Switch Breakdown Voltage vs. Temperature

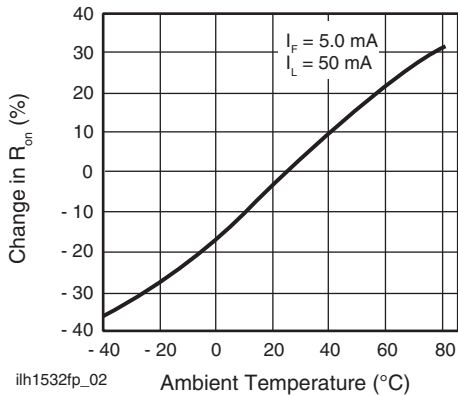


Fig. 2 - On-Resistance vs. Temperature

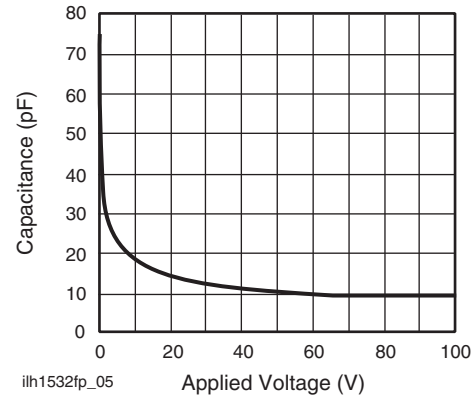


Fig. 5 - Switch Capacitance vs. Applied Voltage

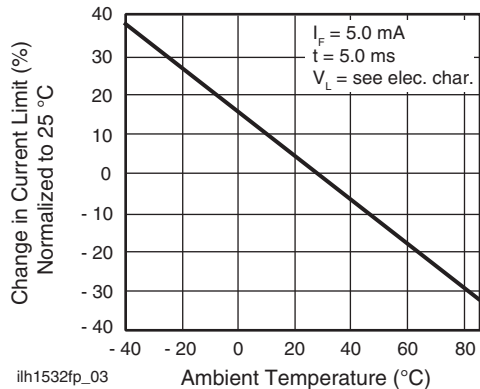


Fig. 3 - Current Limit vs. Temperature

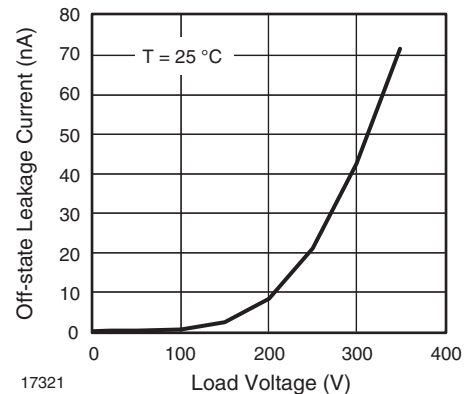


Fig. 6 - Leakage Current vs. Applied Voltage

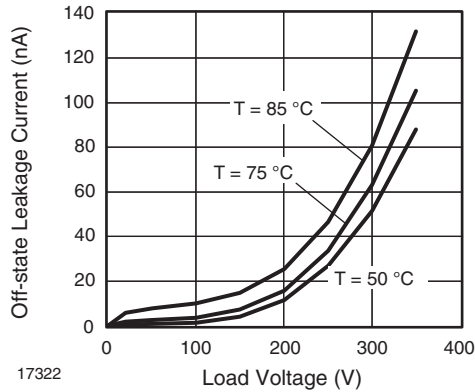


Fig. 7 - Leakage Current vs. Applied Voltage at Elevated Temperatures

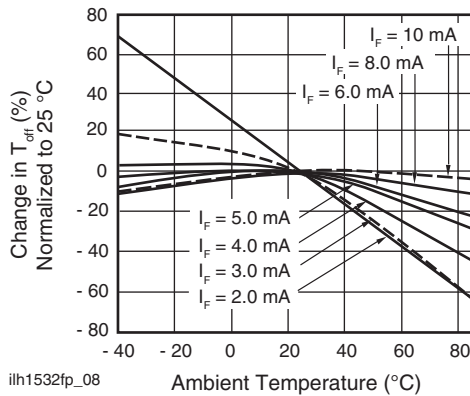


Fig. 8 - Turn-off Time vs. Temperature

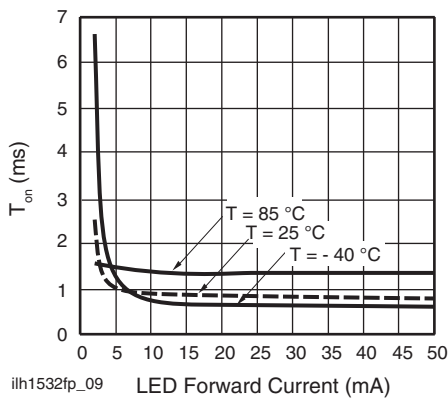


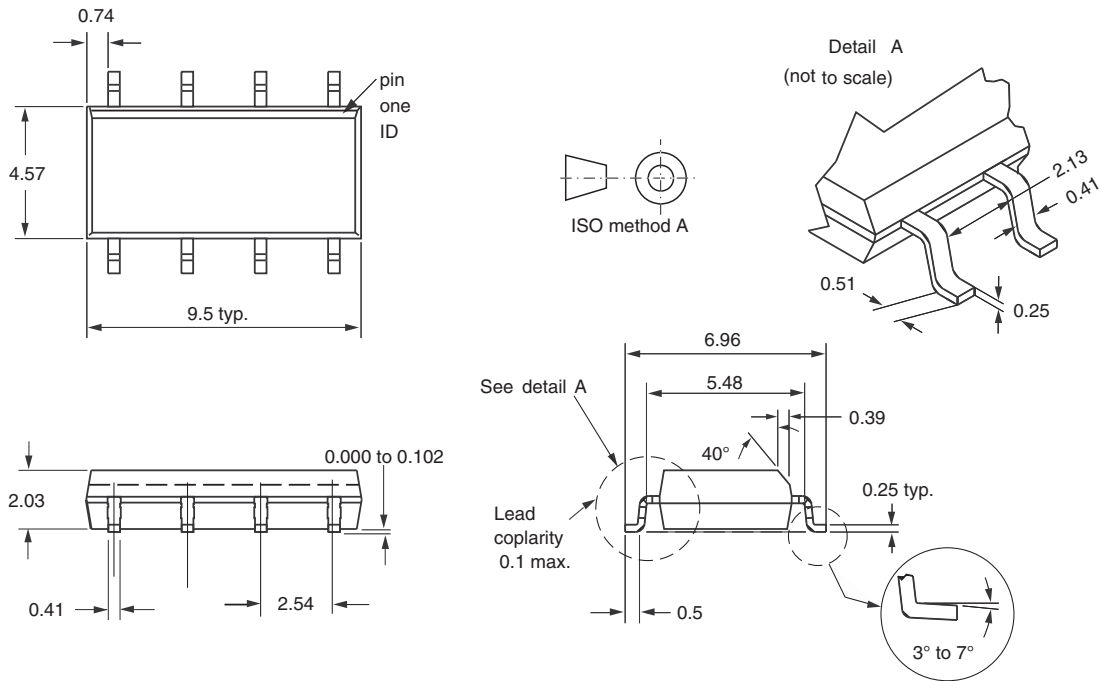
Fig. 9 - Turn-on Time vs. LED Current



# LH1532FP, LH1532FPTR

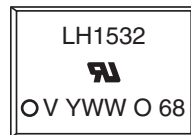
Dual 1 Form A Solid State Relay Vishay Semiconductors

## PACKAGE DIMENSIONS in millimeters



i178024

## PACKAGE MARKING (example)



### Note

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



## Disclaimer

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