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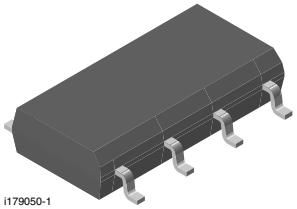
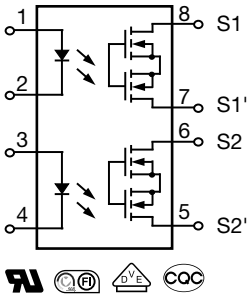
Dual 1 Form A Solid-State Relay





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}
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

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
- DIN EN 60747-5-5 (VDE 0884)
- FIMKO approval
- CQC GB4943.1-2011 (suitable for installation altitude below 2000 m)

APPLICATIONS

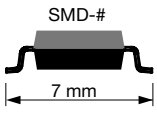
- General telecom switching
  - On/off hook control
  - Ring relay
  - Ground start
- Industrial controls
  - Triac predriver
  - Output modules
- Peripherals
  - Transducer driver
- Instrumentation
  - Automatic tuning/balancing
  - Flying capacitor
  - Analog multiplexing

Note

- See “solid-state relays” (application note 56)

ORDERING INFORMATION

L	H	1	5	3	2	F	P	T	R
PART NUMBER						PACKAGE CONFIG.		TAPE AND REEL	



PACKAGE	UL, FIMKO
SOP-8, tubes	LH1532FP
SOP-8, tape and reel	LH1532FPTR

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
LED continuous forward current		I_F	50	mA
LED reverse voltage	$I_R \leq 10$ µA	V_R	6	V
OUTPUT				
DC or peak AC load voltage	$I_L \leq 50$ µA	V_L	350	V
Continuous DC load current		I_L	120	mA
SSR				
Ambient temperature range		T_{amb}	- 40 to + 85	°C
Storage temperature range		T_{stg}	- 40 to + 125	°C
Soldering temperature (1)	t = 10 s max.	T_{sld}	260	°C
Isolation test voltage	t = 1 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

- 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.

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

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
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	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	1.22	1.5	V
OUTPUT						
On-resistance	I_F = 5 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 mA, t = 5 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	µA
Output capacitance	I_F = 0 mA, V_L = ± 1 V	C_O		55		pF
Pole-to-pole capacitance (S1 to S2)	I_F = 5 mA			0.5		pF
TRANSFER						
Switch offset	I_F = 5 mA	V_{OS}		0.15		µV

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.

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Turn-on time	I_F = 5 mA, I_L = 50 mA	t_{on}		1.1	2.5	ms
Turn-off time	I_F = 5 mA, I_L = 50 mA	t_{off}		0.06	2.5	ms

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

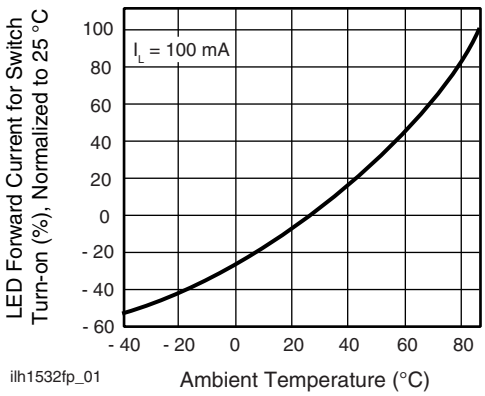


Fig. 1 - LED Current for Switch Turn-on vs. Temperature

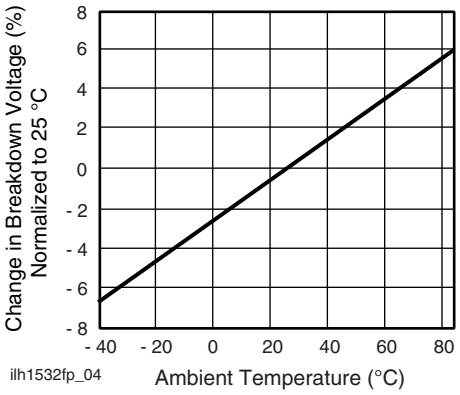


Fig. 4 - Switch Breakdown Voltage vs. Temperature

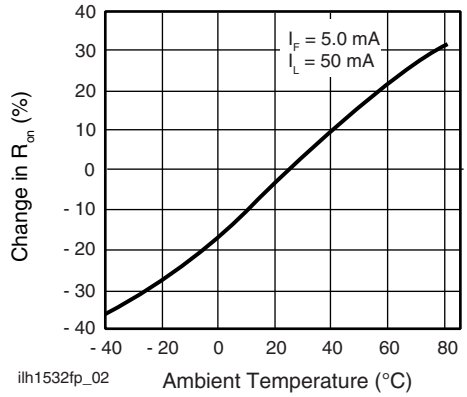


Fig. 2 - On-Resistance vs. Temperature

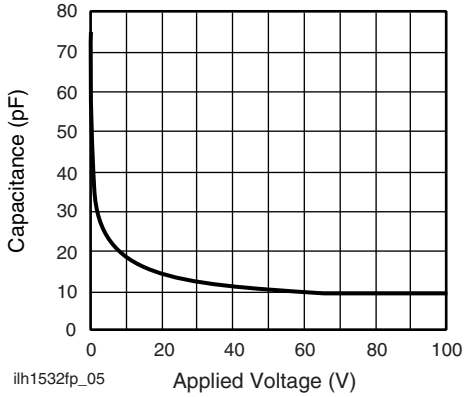


Fig. 5 - Switch Capacitance vs. Applied Voltage

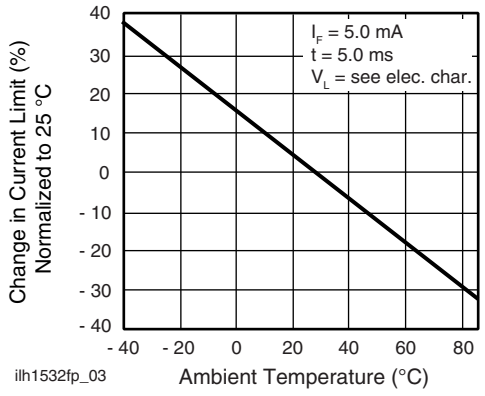


Fig. 3 - Current Limit vs. Temperature

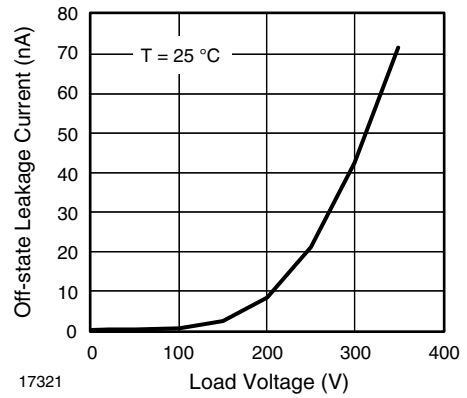


Fig. 6 - Leakage Current vs. Applied Voltage

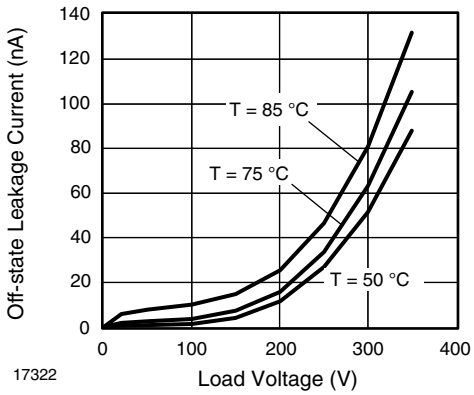


Fig. 7 - Leakage Current vs.
Applied Voltage at Elevated Temperatures

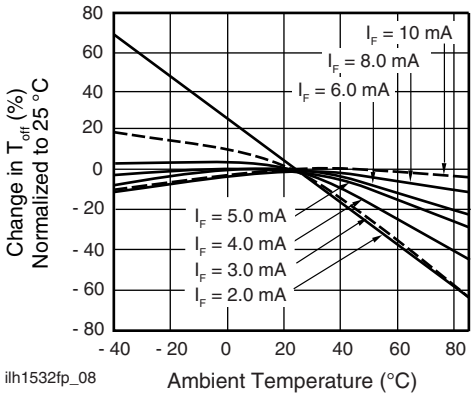


Fig. 8 - Turn-off Time vs. Temperature

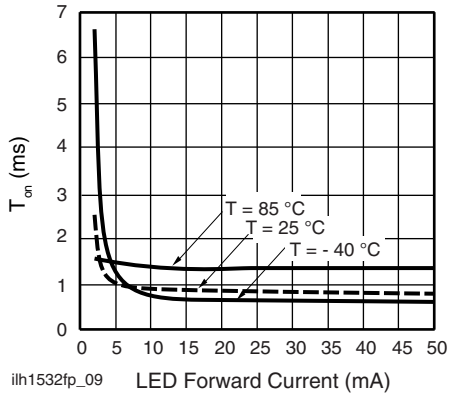
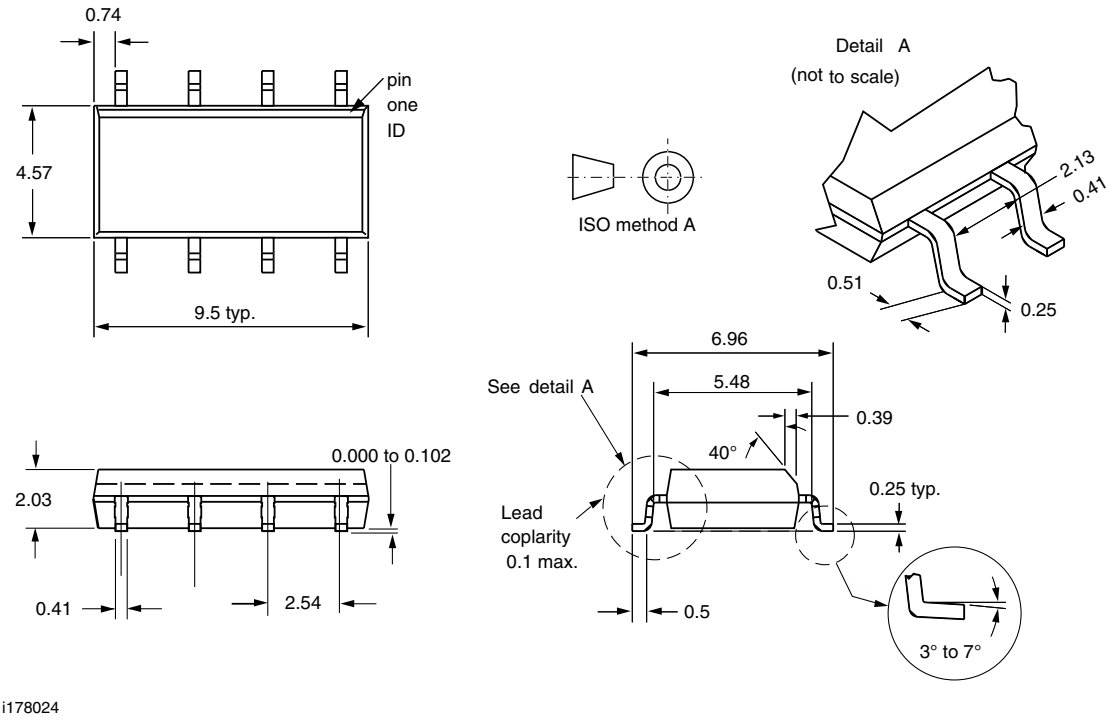
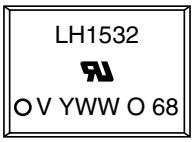


Fig. 9 - Turn-on Time vs. LED Current

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



Note

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

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