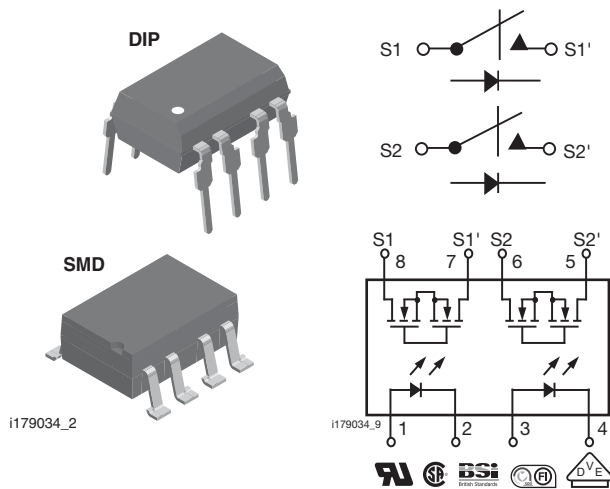


Dual 1 Form A Solid State Relay



DESCRIPTION

The LH1532 dual 1 form A relays are SPST normally open switches that can replace electromechanical relays in many applications. They are constructed using a GaAlAs LED for actuation control and an integrated monolithic die for the switch output.

The die, fabricated in a high-voltage dielectrically isolated technology is comprised of a photodiode array, switch control circuitry, and MOSFET switches. In addition, the LH1532 SSRs employ current-limiting circuitry, enabling them to pass FCC 68.302 and other regulatory surge requirements when overvoltage protection is provided.

FEATURES

- Dual channel (LH1540)
- Current limit protection
- Isolation test voltage 5300 V_{RMS}
- Typical R_{ON} 20 Ω
- Load voltage 350 V
- High surge capability
- Clean bounce free switching
- Low power consumption
- SMD lead available on tape and reel
- 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 delay
 - Dial pulse
 - Ground start
 - Ground fault protection
- Instrumentation
- Industrial controls

AGENCY APPROVALS

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

CSA: certification no. 093751

BSI/BABT: certification no. 7980

DIN EN: 60747-5-2 (VDE 0884)/60747-5-5 (pending), available with option 1

FIMKO: approval

ORDERING INFORMATION												
L	H	1	5	3	2	A	#	#	T	R		
PART NUMBER						ELECTR. VARIATION	PACKAGE CONFIG.	TAPE AND REEL		7.62 mm	> 0.1 mm	
PACKAGE						UL, CSA, BSI, VDE, FIMKO						
SMD-8, tubes						LH1532AAC						
SMD-8, tape and reel						LH1532AACTR						
DIP-8, tubes						LH1532AB						

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
LED continuous forward current		I_F	50	mA
LED reverse voltage	$I_R \leq 10\text{ }\mu\text{A}$	V_R	8	V
OUTPUT				
DC or peak AC load voltage	$I_L \leq 50\text{ }\mu\text{A}$	V_L	350	V
Continuous DC load current, one pole operating		I_L	120	mA
Continuous DC load current, two poles operating		I_L	110	mA
Peak load current (single shot)	$t = 100\text{ ms}$	I_P	(1)	
SSR				
Ambient temperature range		T_{amb}	- 40 to + 85	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	- 40 to + 150	$^{\circ}\text{C}$
Pin soldering temperature (2)	$t = 10\text{ s max.}$	T_{sld}	260	$^{\circ}\text{C}$
Input to output isolation test voltage	$t = 1\text{ s}$	V_{ISO}	5300	V_{RMS}
Pole-to-pole isolation voltage (S1 to S2), (3) (dry air, dust free, at sea level)			1600	V
Output power dissipation (continuous)		P_{diss}	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 current limit performance application note for a discussion on relay operation during transient currents.
- (2) Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).
- (3) Breakdown occurs between the output pins external to the package.

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
LED forward current, switch turn-on	$I_L = 100\text{ mA}$, $t = 10\text{ ms}$	I_{Fon}		1	2	mA
LED forward current, switch turn-off	$V_L = \pm 300\text{ V}$	I_{Foff}	0.2	0.9		mA
LED forward voltage	$I_F = 10\text{ mA}$	V_F	1.15	1.26	1.45	V
OUTPUT						
On-resistance	$I_F = 5\text{ mA}$, $I_L = 50\text{ mA}$	R_{ON}	12	20	25	Ω
Off-resistance	$I_F = 0\text{ mA}$, $V_L = \pm 100\text{ V}$	R_{OFF}	0.5	5000		G Ω
Current limit	$I_F = 5\text{ mA}$, $t = 5\text{ ms}$, $V_L = \pm 6\text{ V}$	I_{LMT}	170	210	250	mA
Off-state leakage current	$I_F = 0\text{ mA}$, $V_L = \pm 100\text{ V}$	I_O		0.02	200	nA
	$I_F = 0\text{ mA}$, $V_L = \pm 350\text{ V}$	I_O			1	μA
Output capacitance	$I_F = 0\text{ mA}$, $V_L = 1\text{ V}$	C_O		55		pF
	$I_F = 0\text{ mA}$, $V_L = 50\text{ V}$	C_O		10		pF
Pole-to-pole capacitance (S1 to S2)	$I_F = 5\text{ mA}$			0.5		pF
Switch offset	$I_F = 5\text{ mA}$	V_{OS}		0.15		μV
TRANSFER						
Capacitance (input to output)	$V_{ISO} = 1\text{ V}$	C_{IO}		1.1		pF

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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, 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}		1.4	2.5	ms
Turn-off time	$I_F = 5\text{ mA}$, $I_L = 50\text{ mA}$	t_{off}		0.7	2.5	ms

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

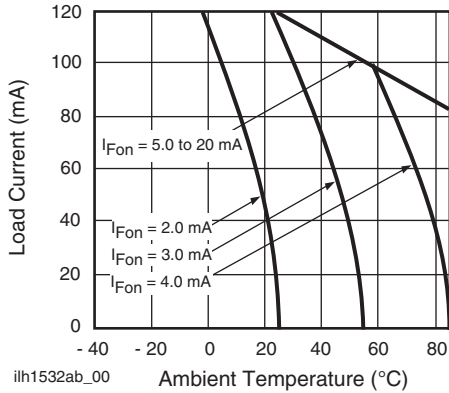


Fig. 1 - Recommended Operating Conditions

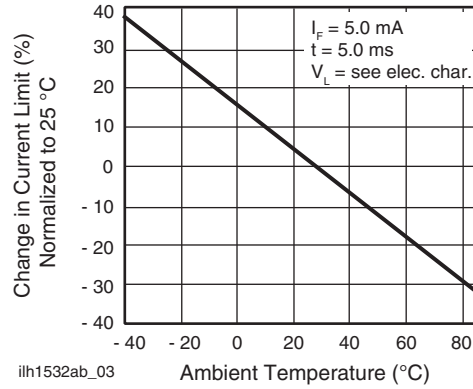


Fig. 4 - Current Limit vs. Temperature

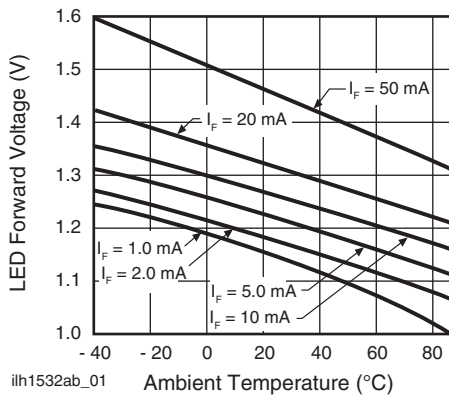


Fig. 2 - LED Voltage vs. Temperature

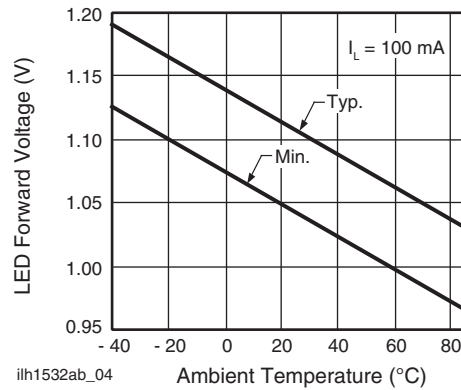


Fig. 5 - LED Dropout Voltage vs. Temperature

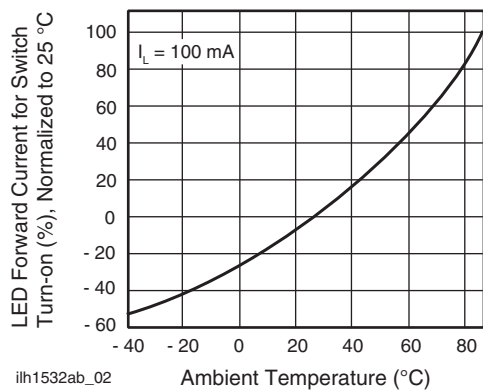


Fig. 3 - LED Current for Switch Turn-on vs. Temperature

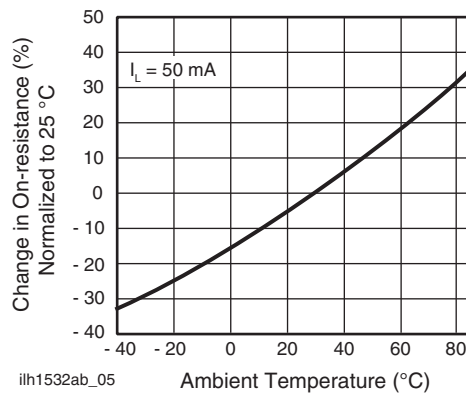


Fig. 6 - On-Resistance vs. Temperature

LH1532AAC, LH1532AACTR, LH1532AB



Vishay Semiconductors Dual 1 Form A Solid State Relay

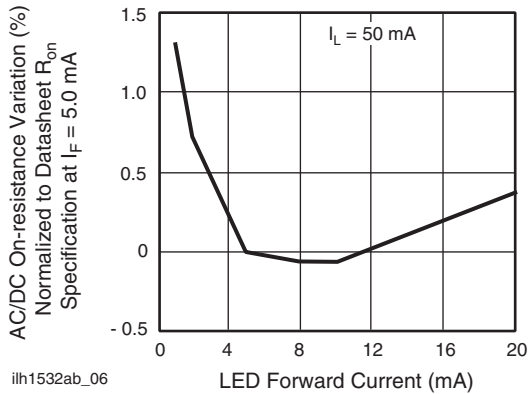


Fig. 7 - Variation in On-Resistance vs. LED Current

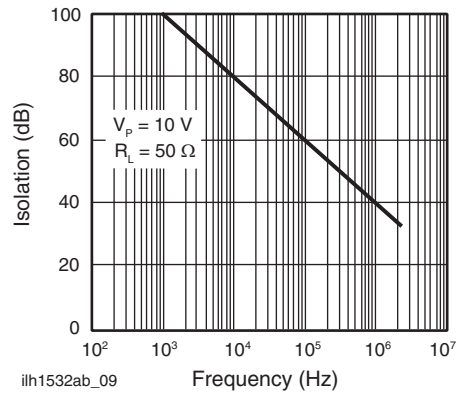


Fig. 10 - Output Isolation

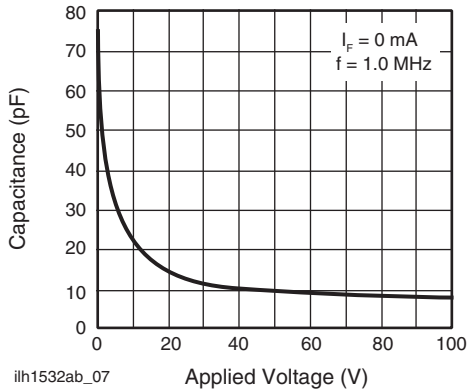


Fig. 8 - Switch Capacitance vs. Applied Voltage

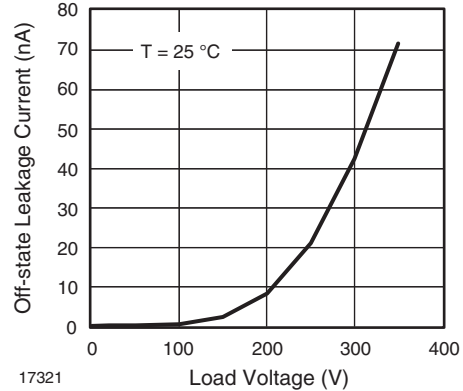


Fig. 11 - Leakage Current vs. Applied Voltage

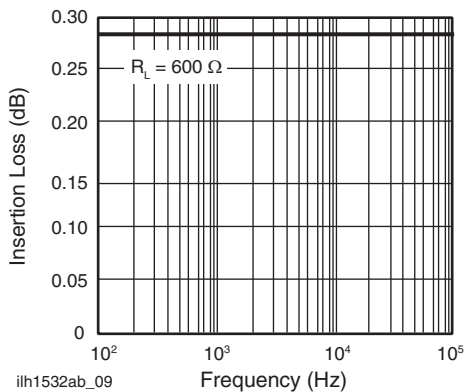


Fig. 9 - Insertion Loss vs. Frequency

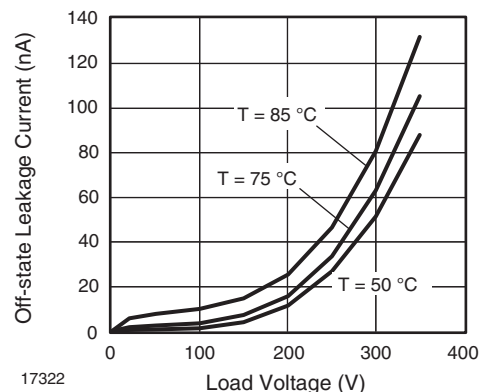


Fig. 12 - Leakage Current vs. Applied Voltage at Elevated Temperatures



LH1532AAC, LH1532AACTR, LH1532AB

Dual 1 Form A Solid State Relay Vishay Semiconductors

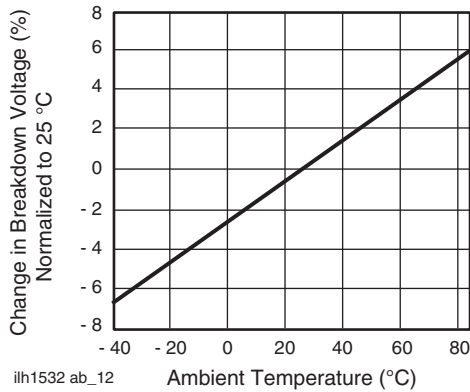


Fig. 13 - Switch Breakdown Voltage vs. Temperature

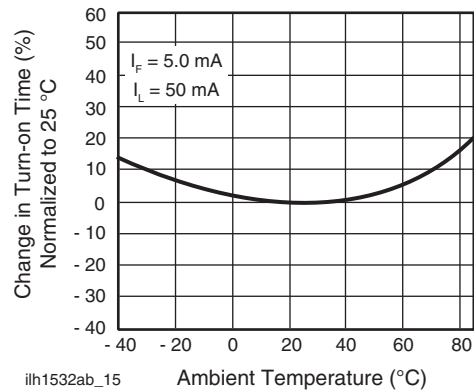


Fig. 16 - Turn-on Time vs. Temperature

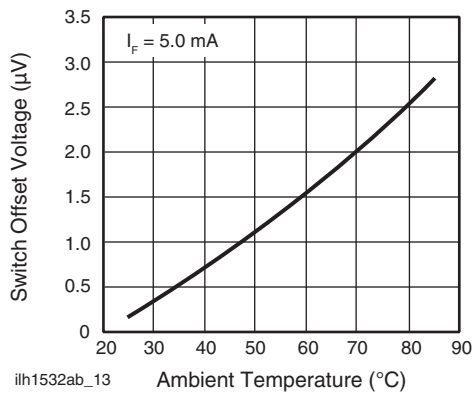


Fig. 14 - Switch Offset Voltage vs. Temperature

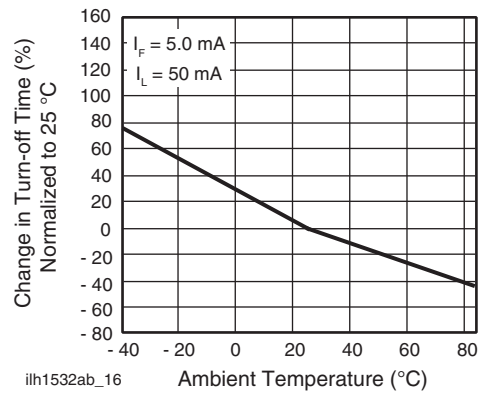


Fig. 17 - Turn-off Time vs. Temperature

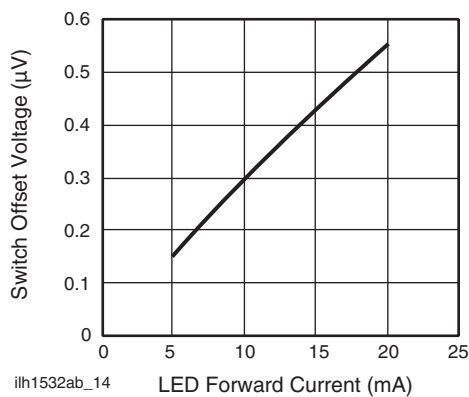


Fig. 15 - Switch Offset Voltage vs. LED Current

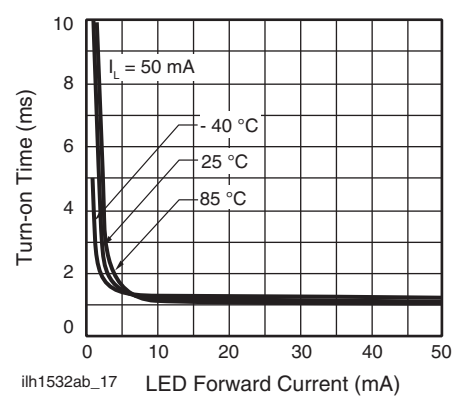


Fig. 18 - Turn-on Time vs. LED Current

LH1532AAC, LH1532AACTR, LH1532AB

Vishay Semiconductors Dual 1 Form A Solid State Relay

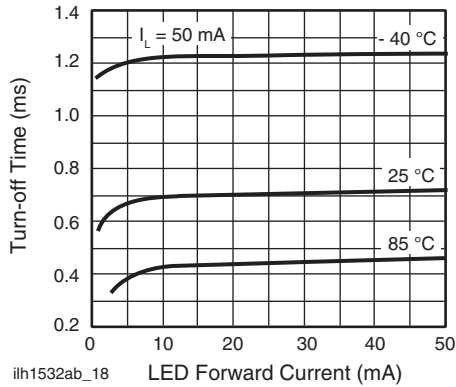
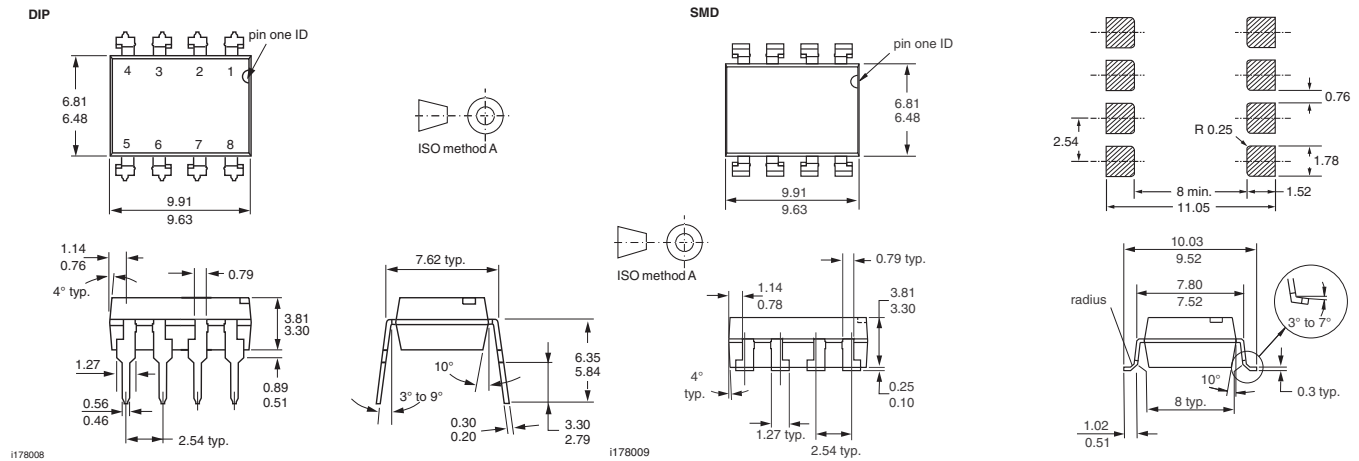
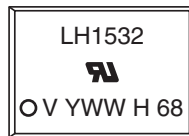


Fig. 19 - Turn-off Time vs. LED Current

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



Note

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



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