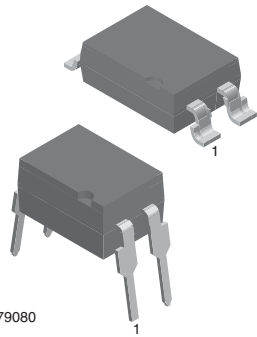
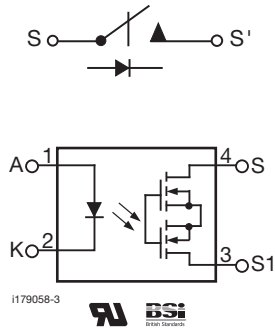


1 Form A Solid-State Relay



i179080



i179058-3



DESCRIPTION

The LH1546AD (4 pin DIP) is robust, ideal for telecom and ground fault applications. It is an SPST normally open switch (1 form A) that replaces electromechanical relays in many applications. It is constructed using a GaAs LED for actuation control and an integrated monolithic die for the switch output. The die, fabricated in a high-voltage dielectrically isolated BCDMOS technology, is comprised of a photodiode array, switch control circuitry and MOSFET switches. In addition, it employs current-limiting circuitry which meets lightning surge testing as per ANSI/TIA-968-B and other regulatory voltage surge requirements when overvoltage protection is provided.

FEATURES

- Current limit protection
- Isolation test voltage 5300 V_{RMS}
- Typical R_{ON} 28 Ω
- Load voltage 350 V
- Load current 120 mA
- High surge capability
- Clean bounce free switching
- Low power consumption
- High reliability monolithic receptor
- 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 relay
 - Dial pulse
 - Ground start
 - Ground fault protection
- Instrumentation
- Industrial controls

Note

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

AGENCY APPROVALS

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

BSI/BABT: certification no. 7980

ORDERING INFORMATION												
L	H	1	5	4	6	A	#	#	T	R		
PART NUMBER						ELECTR. VARIATION	PACKAGE CONFIG.		TAPE AND REEL			
PACKAGE						UL, BSI						
SMD-4, gullwing, tubes						LH1546ADF						
SMD-4, gullwing, tape and reel						LH1546ADFTR						
DIP-4, tubes						LH1546AD						



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 at 25 °C		I_L	120	mA
SSR				
SSR output power dissipation (continuous)		P_{diss}	550	mW
Ambient temperature range		T_{amb}	- 40 to + 85	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	- 40 to + 150	$^{\circ}\text{C}$
Soldering temperature ⁽¹⁾	$t = 10\text{ s max.}$	T_{sld}	260	$^{\circ}\text{C}$
Isolation test voltage	$t = 1\text{ s}$	V_{ISO}	5300	V_{RMS}
Isolation resistance	$V_{IO} = 500\text{ V}, T_{amb} = 25\text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{12}$	Ω
	$V_{IO} = 500\text{ V}, T_{amb} = 100\text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{11}$	Ω

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 (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

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}		1.7	3	mA
LED forward current, switch turn-off	$V_L = \pm 300\text{ V}$	I_{Foff}	0.2	1.6		mA
LED forward voltage	$I_F = 10\text{ mA}$	V_F	1.15	1.2	1.45	V
OUTPUT						
On-resistance, AC/DC: pin 3 (\pm) to 4 (\pm)	$I_F = 5\text{ mA}, I_L = 50\text{ mA}$	R_{ON}		28	35	Ω
Off-resistance	$I_F = 0\text{ mA}, V_L = \pm 100\text{ V}$	R_{OFF}	0.5	300		$\text{G}\Omega$
Off-state leakage current	$I_F = 0\text{ mA}, V_L = \pm 100\text{ V}$	I_O		0.32	200	nA
Output capacitance pin 3 to 4	$I_F = 0\text{ mA}, V_L = 1\text{ V}$	C_O		55		pF
		C_O		10		pF
TRANSFER						
Capacitance (input to output)	$V_{ISO} = 1\text{ V}$	C_{IO}		0.5		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}		2	3	ms
Turn-off time	$I_F = 5\text{ mA}, I_L = 50\text{ mA}$	t_{off}		0.08	3	ms

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

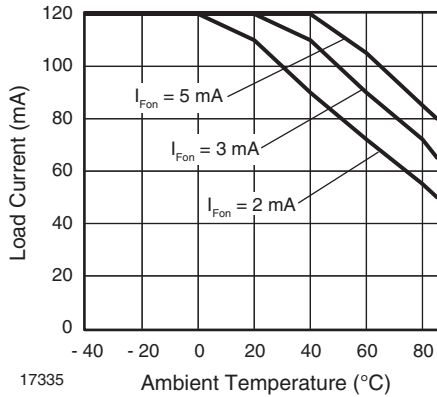


Fig. 1 - Recommended Operating Conditions

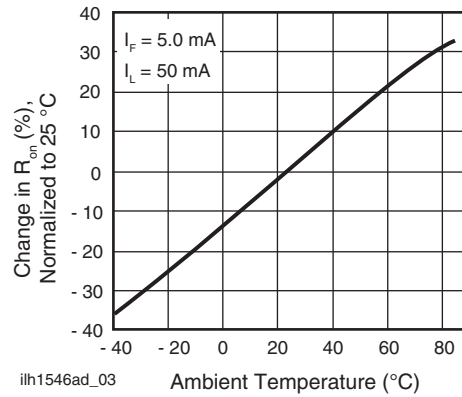


Fig. 4 - CTR_{CB} vs. LED Current

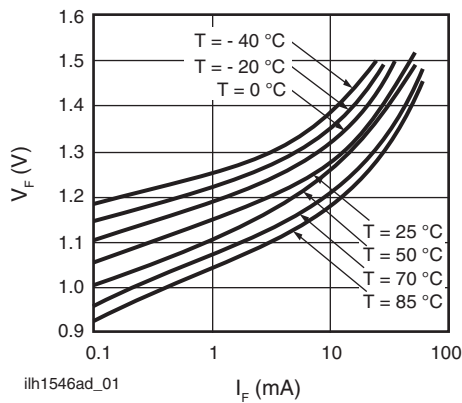


Fig. 2 - LED Voltage vs. Temperature

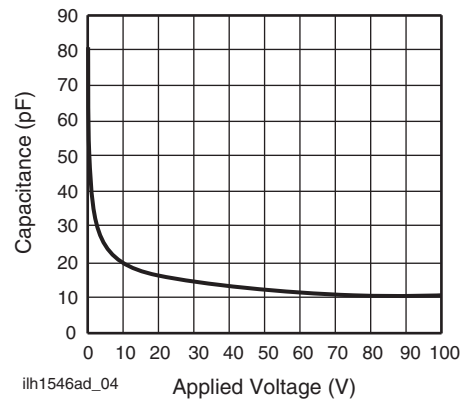


Fig. 5 - Switch Capacitance vs. Applied Voltage

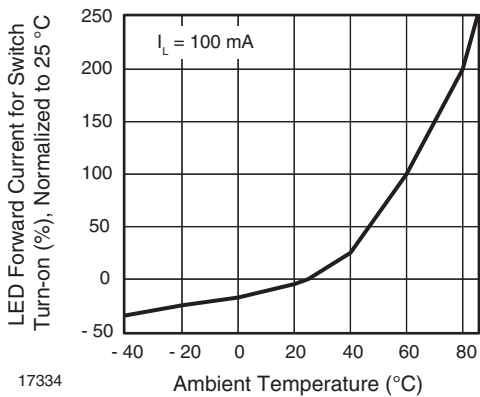


Fig. 3 - LED Current for Switch Turn-on vs. Temperature

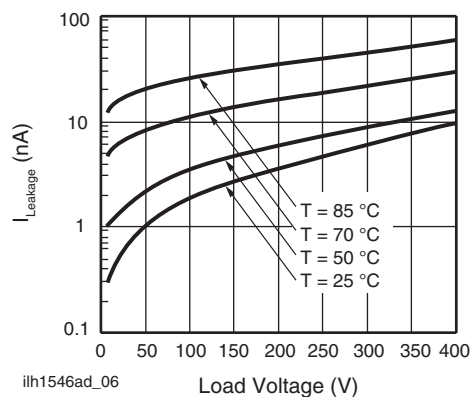


Fig. 6 - Leakage Current vs. Applied Voltage

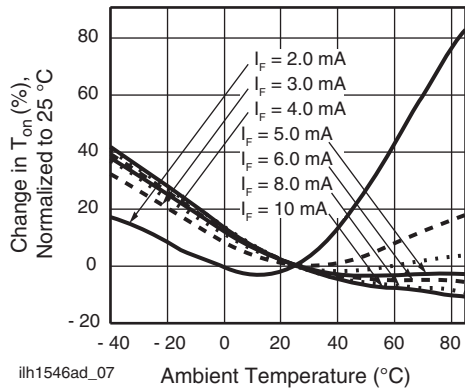


Fig. 7 - Turn-on Time vs. Temperature

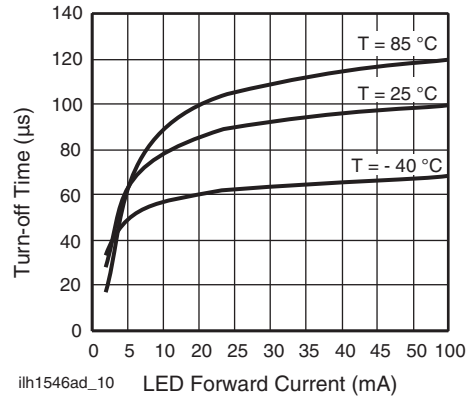


Fig. 10 - Turn-off Time vs. LED Current

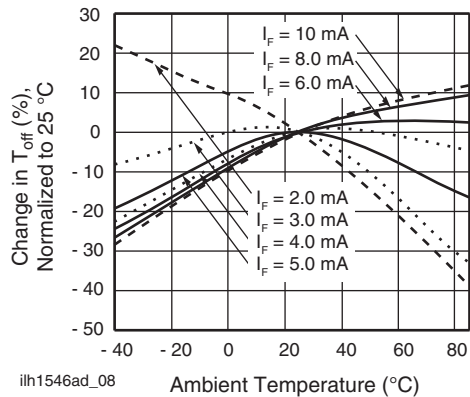


Fig. 8 - Turn-off Time vs. Temperature

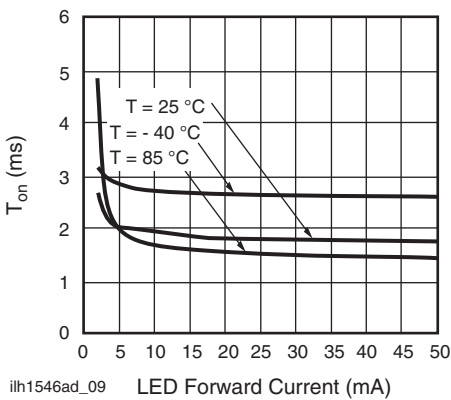
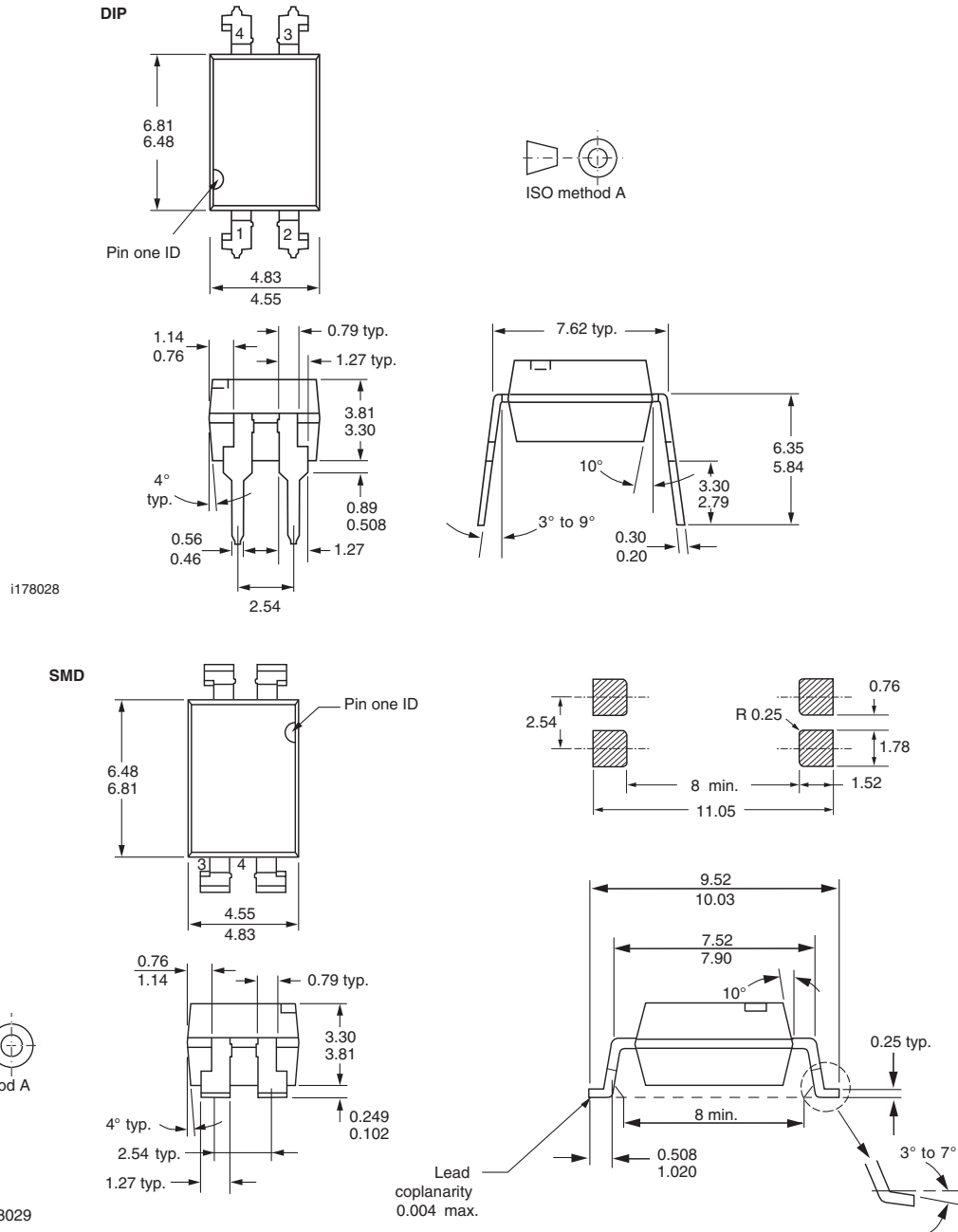


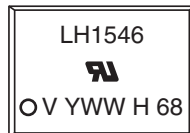
Fig. 9 - Turn-on Time vs. LED Current



PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



Note

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



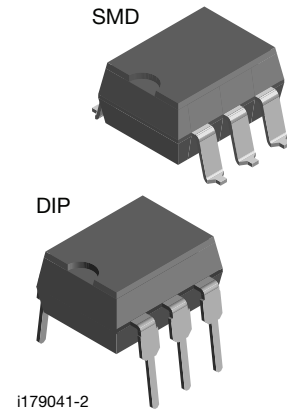
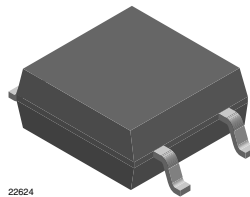
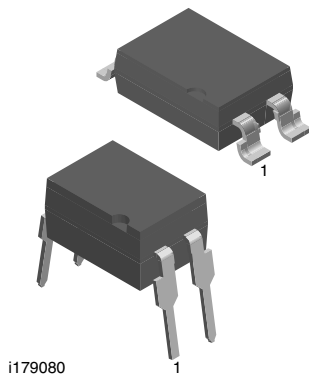
Footprint and Schematic Information for LH1546

The footprint and schematic symbols for the following parts can be accessed using the associated links. They are available in Eagle, Altium, KiCad, OrCAD / Allegro, Pulsonix, and PADS.

Note that the 3D models for these parts can be found on the Vishay product page.

PART NUMBER	FOOTPRINT / SCHEMATIC
LH1546AAB	www.snapeda.com/parts/LH1546AAB/Vishay/view-part
LH1546AABTR	www.snapeda.com/parts/LH1546AABTR/Vishay/view-part
LH1546AD	www.snapeda.com/parts/LH1546AD/Vishay/view-part
LH1546ADF	www.snapeda.com/parts/LH1546ADF/Vishay/view-part
LH1546ADFTR	www.snapeda.com/parts/LH1546ADFTR/Vishay/view-part
LH1546AEF	www.snapeda.com/parts/LH1546AEF/Vishay/view-part
LH1546AEFT2	www.snapeda.com/parts/LH1546AEFT2/Vishay/view-part
LH1546AEFTR	www.snapeda.com/parts/LH1546AEFTR/Vishay/view-part
LH1546AT	www.snapeda.com/parts/LH1546AT/Vishay/view-part

For technical issues and product support, please contact optocoupleranswers@vishay.com.





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