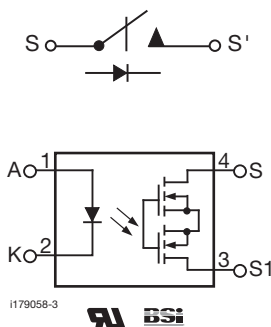
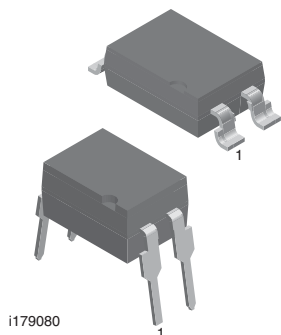


1 Form A Solid-State Relay



RoHS
COMPLIANT

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

APPLICATIONS

- General telecom switching
 - On/off hook control
 - Ring relay
 - Dial pulse
 - Ground start
 - Ground fault protection
- Instrumentation
- Industrial controls

Note

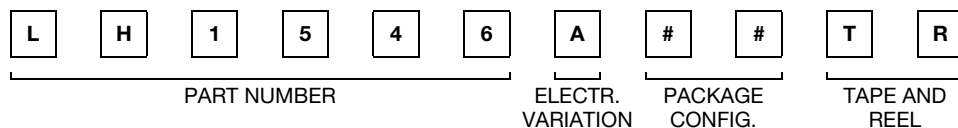
- See "solid-state relays" (application note 56)

AGENCY APPROVALS

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

BSI/BABT: certification no. 7980

ORDERING INFORMATION



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 °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}		1.7	3	mA
LED forward current, switch turn-off	V _L = ± 300 V	I _{Foff}	0.2	1.6		mA
LED forward voltage	I _F = 10 mA	V _F	1.15	1.2	1.45	V
OUTPUT						
On-resistance, AC/DC: pin 3 (±) to 4 (±)	I _F = 5 mA, I _L = 50 mA	R _{ON}		28	35	Ω
Off-resistance	I _F = 0 mA, V _L = ± 100 V	R _{OFF}	0.5	300		GΩ
Off-state leakage current	I _F = 0 mA, V _L = ± 100 V	I _O		0.32	200	nA
Output capacitance pin 3 to 4	I _F = 0 mA, V _L = 1 V	C _O		55		pF
		C _O		10		pF
TRANSFER						
Capacitance (input to output)	V _{ISO} = 1 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)

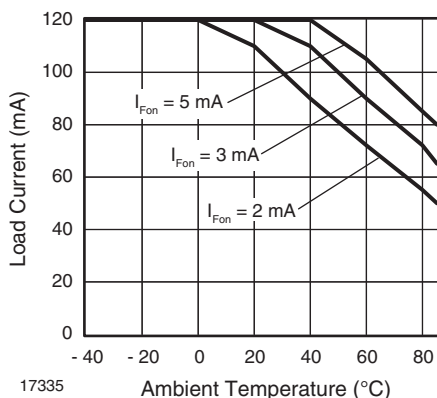


Fig. 1 - Recommended Operating Conditions

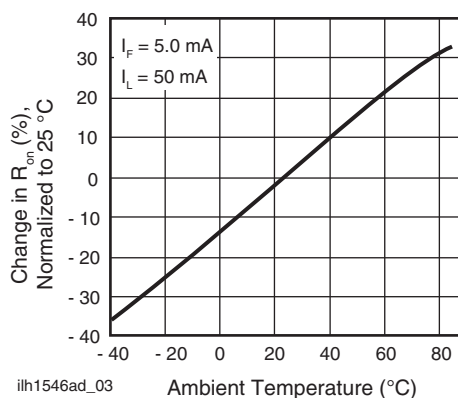


Fig. 4 - CTR_{CB} vs. LED Current

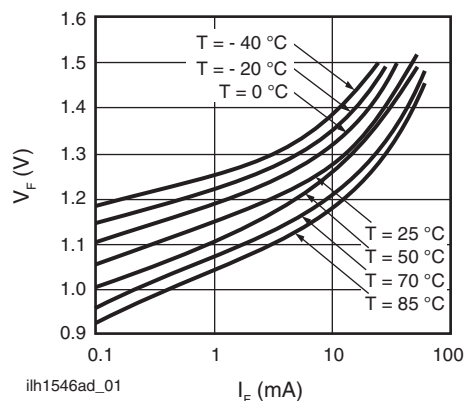


Fig. 2 - LED Voltage vs. Temperature

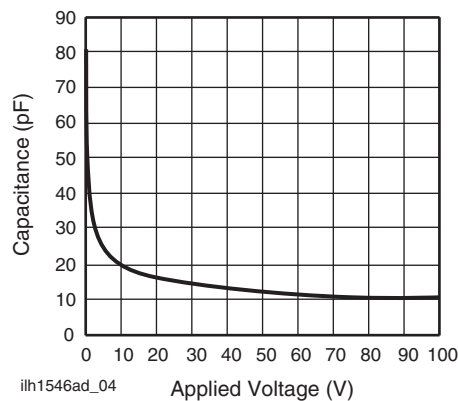


Fig. 5 - Switch Capacitance vs. Applied Voltage

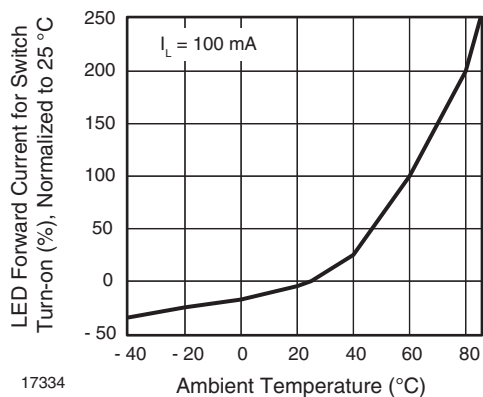


Fig. 3 - LED Current for Switch Turn-on vs. Temperature

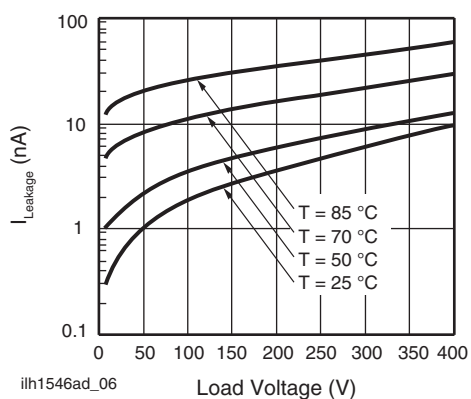


Fig. 6 - Leakage Current vs. Applied Voltage

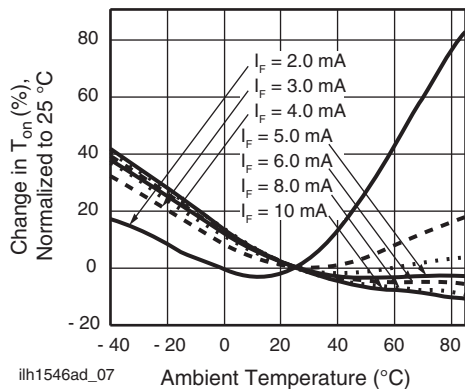


Fig. 7 - Turn-on Time vs. Temperature

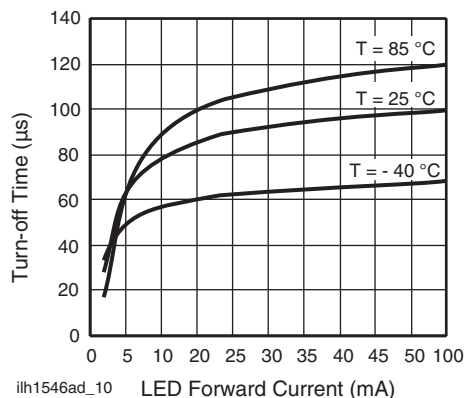


Fig. 10 - Turn-off Time vs. LED Current

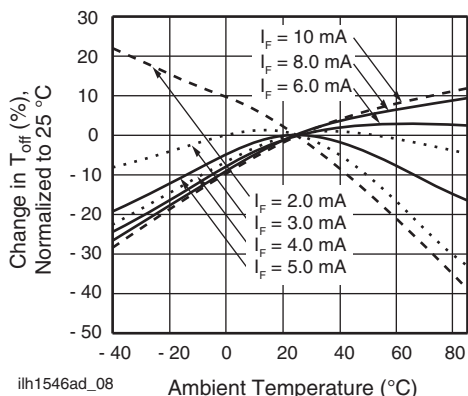


Fig. 8 - Turn-off Time vs. Temperature

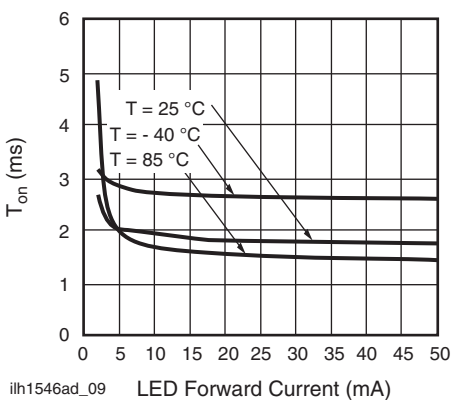
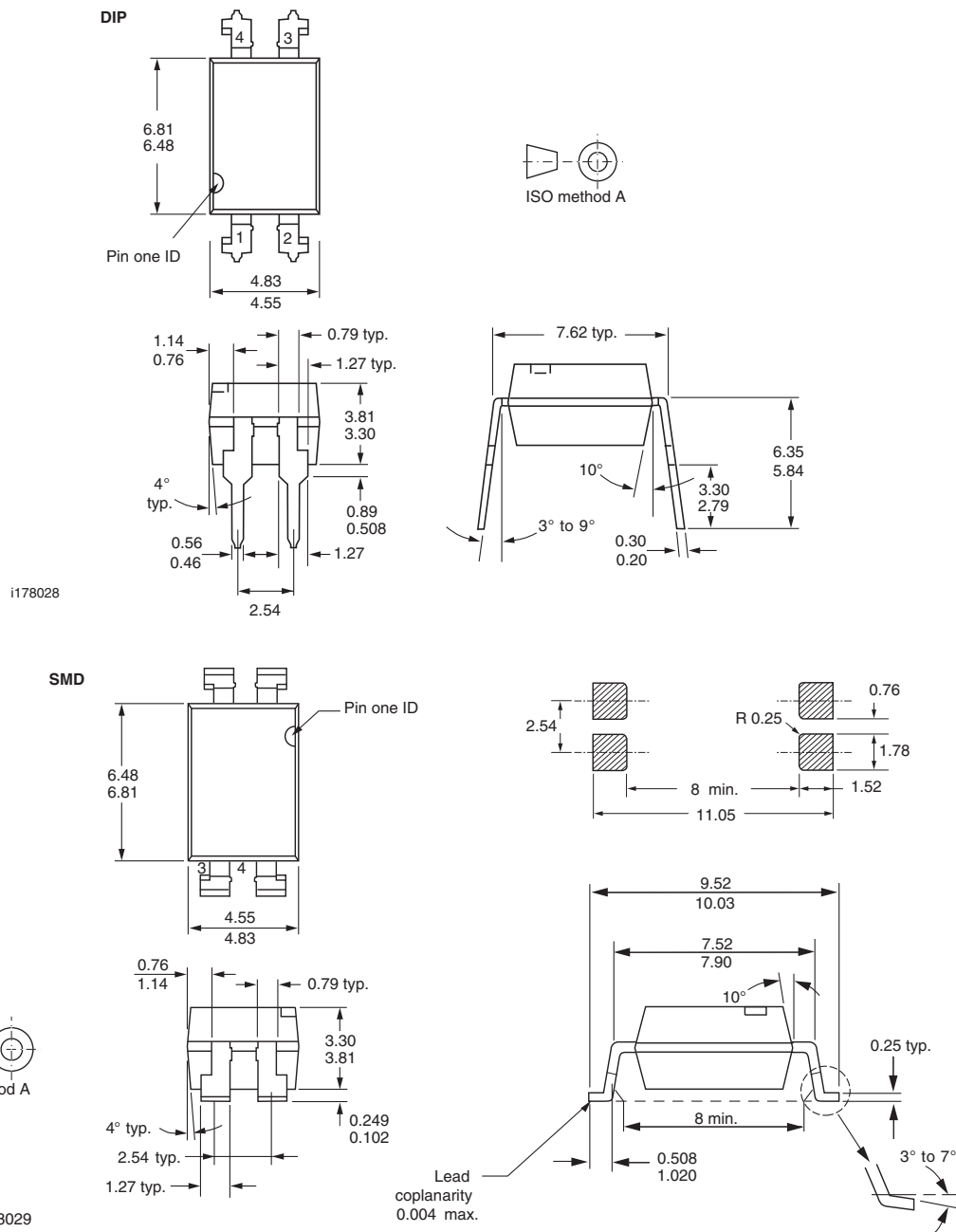


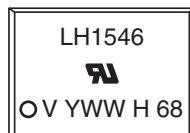
Fig. 9 - Turn-on Time vs. LED Current



PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



Note

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



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➤ Sales :

Direct +86 (21) 6401-6692
Email amall@ameya360.com
QQ 800077892
Skype ameyasales1 ameyasales2

➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333
Email mkt@ameya360.com