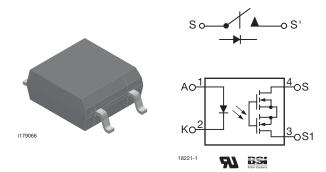
LH1546AEF, LH1546AEFTR

Vishay Semiconductors

1 Form A Solid-State Relay



DESCRIPTION

The LH1546AEF (4 pin SOP) 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 3000 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
- Equivalent to CPC1035N
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

APPLICATIONS

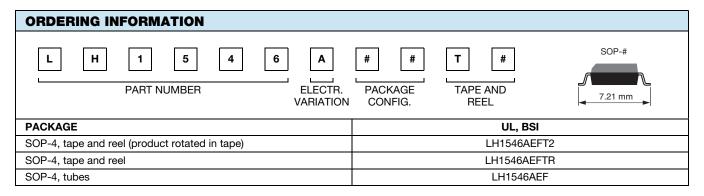
- · General telecom switching
 - On/off hook control
 - Ring relay
 - Dial pulse
 - Ground start
 - Ground fault protection
- Instrumentation
- Industrial controls

Note

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

AGENCY APPROVALS

UL1577: file no. E52744 system code O BSI/BABT: certification no. 8500 issue 2



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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 ≤ 10 μA	V_R	6	V				
OUTPUT								
DC or peak AC load voltage	I _L ≤ 50 μA	V_L	350	V				
Continuous DC load current at 25 °C, bidirectional		IL	120	mA				
SSR								
SSR output power dissipation (continuous)		P _{diss}	550	mW				
Ambient temperature range		T _{amb}	- 40 to + 85	°C				
Storage temperature range		T _{stg}	- 40 to + 150	°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}	≥ 10 ¹²	Ω				
	V _{IO} = 500 V, T _{amb} = 100 °C	R _{IO}	≥ 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.

ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)								
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT		
INPUT								
LED forward current, switch turn-on	$I_L = 100 \text{ mA}, t = 10 \text{ ms}$	I _{Fon}		1.1	2	mA		
LED forward current, switch turn-off	$V_{L} = \pm 300 \text{ V}$	I _{Foff}	0.2	0.6		mA		
LED forward voltage	I _F = 10 mA	V _F	1	1.18	1.45	V		
OUTPUT								
On-resistance, AC/DC: pin 3 (±) to 4 (±)	$I_F = 5 \text{ mA}, I_L = 50 \text{ mA}$	R _{ON}		28	35	Ω		
Off-resistance	$I_F = 0 \text{ mA}, V_L = \pm 100 \text{ V}$	R _{OFF}	0.5	5000		GΩ		
Off-state leakage current	$I_F = 0 \text{ mA}, V_L = \pm 100 \text{ V}$	Io		0.32	200	nA		
	$I_F = 0 \text{ mA}, V_L = \pm 350 \text{ V}$	Io			1	nA		
Output capacitance pin 3 to 4	$I_F = 0 \text{ mA}, V_L = 1 \text{ V}$	Co		55		pF		
	$I_F = 0 \text{ mA}, V_L = 50 \text{ V}$	Co		10		pF		
Current limit	$I_F = 5 \text{ mA}, t = 5 \text{ ms}, V_L = \pm 6 \text{ V}$	I _{limit}	170	210	250	mA		
TRANSFER								
Capacitance (input to output)	V _{ISO} = 1 V	C _{IO}		0.6		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 °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	

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

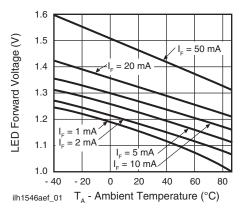


Fig. 1 - LED Voltage vs. Temperature

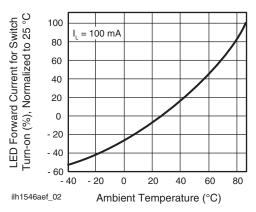


Fig. 2 - LED Current for Switch Turn-on vs. Temperature

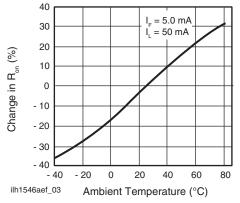


Fig. 3 - On-Resistance vs. Temperature

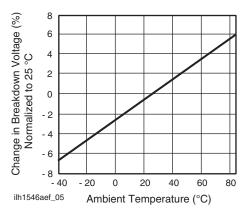


Fig. 4 - Switch Breakdown Voltage vs. Temperature

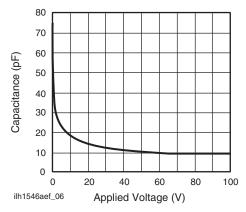


Fig. 5 - Switch Capacitance vs. Applied Voltage

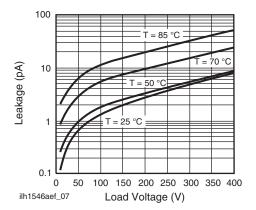


Fig. 6 - Leakage Current vs. Applied Voltage

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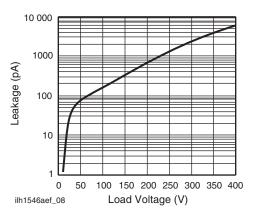


Fig. 7 - Leakage Current vs. Applied Voltage

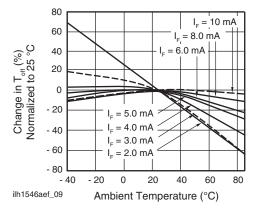


Fig. 8 - Turn-off Time vs. Temperature

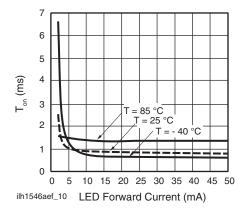
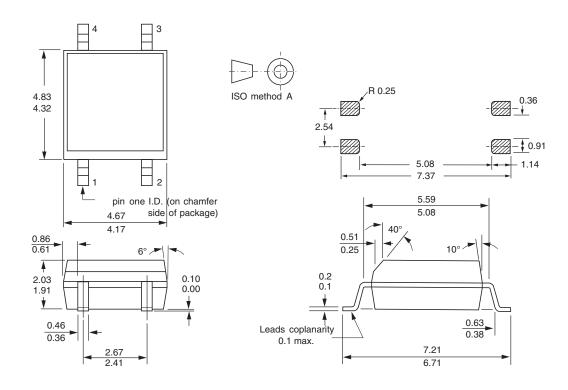


Fig. 9 - Turn-on Time vs. LED Current

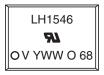


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PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



Note

i178030

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





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Revision: 11-Mar-11

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