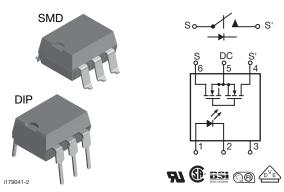


Vishay Semiconductors

1 Form A Solid State Relay



DESCRIPTION

Vishay solid state relays (SSRs) are miniature, optically coupled relays with high-voltage MOSFET outputs. The LH1518 relays are capable of switching AC or DC loads from as little as nanovolts to hundreds of volts.

The relays can switch currents in the range of nanoamps to hundreds of milliamps. The MOSFET switches are ideal for small signal switching and are primarily suited for DC or audio frequency applications.

The LH1518 relays feature a monolithic output die that minimizes wire bonds and permits easy integration of high-performance circuits such as current limiting in normally-open switches. The output die integrates the photodiode receptor array, turn-on and turn-off control circuitry, and the MOSFET switches. The optically-coupled input is controlled by a highly efficient GaAlAs infrared LED.

FEATURES

- Isolation test voltage 5300 V_{RMS}
- Current limit protection
- High reliability monolithic detector
- Low power consumption
- Clean bounce free switching
- High surge capability
- Surface mountable
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



- General telecom switching
- Instrumentation
- · Industrial controls

AGENCY APPROVALS

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

CSA: certification no. 093751
BSI: certification no. 7979/7980

DIN EN: 60747-5-2 (VDE 0884)/60747-5-5 (pending),

available with option 1

FIMKO: 25419

ORDERING INFORMATION					
L H 1 5 1 8 # PART NUMBER ELECTR. VARIATION	# # T R PACKAGE CONFIG. TAPE AND REEL TAPE AND 7.62 mm				
PACKAGE	UL, CSA, BSI, FIMKO				
SMD-6, tubes	LH1518AAB				
SMD-6, tape and reel	LH1518AABTR				
DIP-6, tubes	LH1518AT				

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	8	V	
OUTPUT					
DC or peak AC load voltage		V_L	250	V	
Continuous DC load current, bidirektional operation		ال	155	mA	
Continuous DC load current, unidirektional operation		ال	300	mA	
Peak load current (single shot)	t = 100 ms	Ι _P	(1)		

Document Number: 83816 Rev. 1.5, 17-Mar-11 For technical questions, contact: optocoupleranswers@vishay.com

LH1518AAB, LH1518AABTR, LH1518AT

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ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
SSR					
Ambient temperature range		T _{amb}	- 40 to + 85	°C	
Storage temperature range		T _{stg}	- 40 to + 150	°C	
Pin soldering temperature (2)	t = 10 s max.	T _{sld}	260	°C	
Input to output isolation voltage		V _{ISO}	5300	V _{RMS}	
Output power dissipation (continuous)		P _{diss}	550	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 58 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).

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}		0.8	2	mA	
LED forward current switch turn-off	$V_{L} = \pm 200 \text{ V}$	I _{Foff}	0.2	0.7		mA	
LED forward voltage	I _F = 10 mA	V_{F}	1.15	1.26	1.45	V	
OUTPUT							
On-resistance AC/DC: pin 4 (±) to 6 (±)	$I_F = 5 \text{ mA}, I_L = 50 \text{ mA}$	R _{ON}	10	15	20	Ω	
Off-resistance DC: pin 4, 6 (+) to 5 (±)	$I_F = 5 \text{ mA}, I_L = 100 \text{ mA}$	R _{ON}	2.5	3.75	5	Ω	
Off-resistance	$I_F = 0 \text{ mA}, V_L = \pm 100 \text{ V}$	R _{OFF}	0.5	5000		GΩ	
Current limit AC (1): pin 4 (±) to 6 (±)	$I_F = 5 \text{ mA}, t = 5 \text{ ms}, V_L = \pm 6 \text{ V}$	I _{LMT}	170	200	280	mA	
Off-state leakage current	$I_F = 0 \text{ mA}, V_L = \pm 100 \text{ V}$	I _O		0.02	200	nA	
OII-State leakage current	$I_F = 0 \text{ mA}, V_L = \pm 250 \text{ V}$	Io			1	μΑ	
Output conscitance nin 4 to 6	$I_F = 0 \text{ mA}, V_L = 1 \text{ V}$	Co		55		pF	
Output capacitance pin 4 to 6	$I_F = 0 \text{ mA}, V_L = 50 \text{ V}$	Co		10		pF	
Switch offset	I _F = 5 mA	V _{OS}		0.15		μV	
TRANSFER							
Capacitance (input to output)	V _{ISO} = 1 V	C _{IO}		0.8		pF	

Notes

• 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.

⁽¹⁾ No DC mode current limit available.

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}		1.4	3	ms
Turn-off time	$I_F = 5 \text{ mA}, I_L = 50 \text{ mA}$	t _{off}		0.7	3	ms



1 Form A Solid State Relay

Vishay Semiconductors

PARAMETER		TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification		IEC 68 part 1	OTHIBOL	40/85/21	Oilii
Pollution degree		DIN VDE 0109		2	
Tracking resistance (comparative tracking index)		Insulation group Illa	СТІ	175	
Highest allowable overvolta	ige	Transient overvoltage	V _{IOTM}	8000	V _{peak}
Max. working insulation voltage		Recurring peak voltage	V_{IORM}	890	V _{peak}
Insulation resistance at 25 °C			R _{IS}	≥ 10 ¹²	Ω
Insulation resistance at T _S Insulation resistance at 100 °C		V _{IO} = 500 V	R _{IS}	≥ 10 ⁹	Ω
			R _{IS}	≥ 10 ¹¹	Ω
Partial discharge test voltage		Methode a, V _{pd} = V _{IORM} x 1.875	V_{pd}	1669	V _{peak}
Safety limiting values - Case temperature			T _{SI}	175	°C
maximum values allowed	Input current		I _{SI}	300	mA
in the event of a failure	Output power		P _{SO}	700	mW
Minimum external air gap (clearance)		Measured from input terminals to output terminals, shortest distance through air		≥ 7	mm
Minimum external tracking (creepage)		Measured from input terminals to output terminals, shortest distance path along body		≥ 7	mm

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

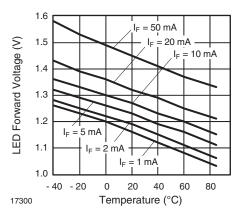


Fig. 1 - LED Voltage vs. Temperature

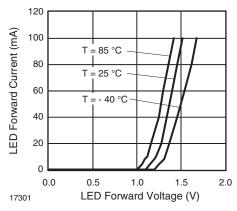


Fig. 2 - LED Forward Current vs. LED Forward Voltage

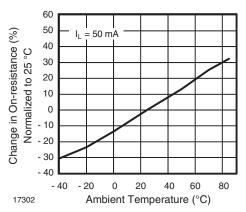


Fig. 3 - On-resistance vs. Temperature

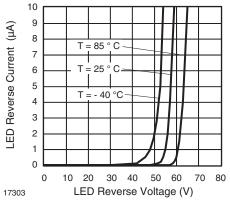


Fig. 4 - LED Reverse Current vs. LED Reverse Voltage



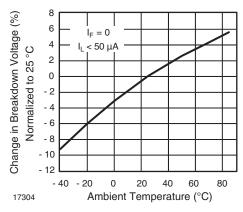


Fig. 5 - Switch Breakdown Voltage vs. Temperature

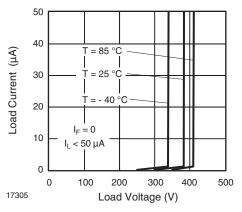


Fig. 6 - Switch Breakdown Voltage vs. Load Current

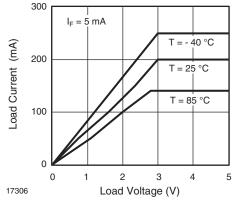


Fig. 7 - Load Current vs. Load Voltage

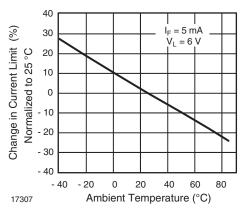


Fig. 8 - Current Limit vs. Temperature

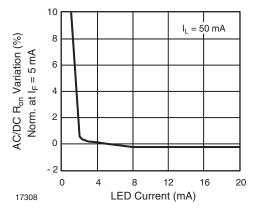


Fig. 9 - Variation in On-resistance vs. LED Current

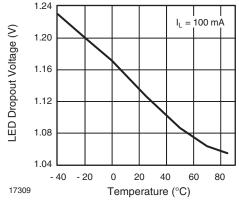


Fig. 10 - LED Dropout Voltage vs. Temperature

1 Form A Solid State Relay

Vishay Semiconductors

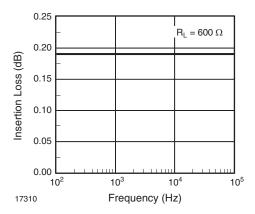


Fig. 11 - Insertion Loss vs. Frequency

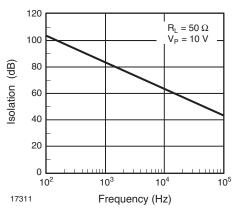


Fig. 12 - Output Isolation

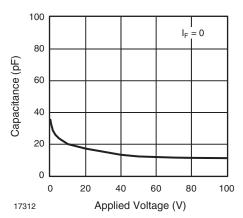


Fig. 13 - Switch Capacitance vs. Applied Voltage

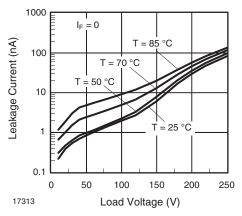


Fig. 14 - Leakage Current vs. Applied Voltage

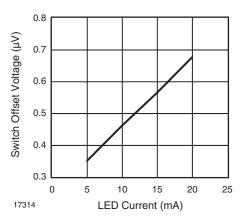


Fig. 15 - Switch Offset Voltage vs. LED Current

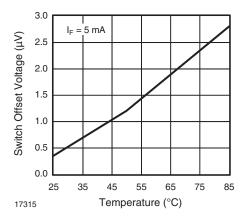


Fig. 16 - Switch Offset Voltage vs. Temperature

LH1518AAB, LH1518AABTR, LH1518AT

Vishay Semiconductors

1 Form A Solid State Relay



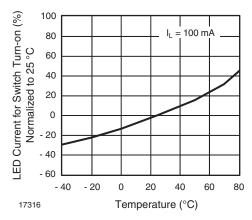


Fig. 17 - LED Current for Switch Turn-on vs. Temperature

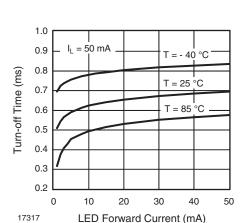


Fig. 18 - Turn-off Time vs. LED Current

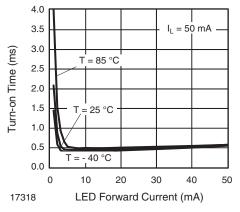


Fig. 19 - Turn-on Time vs. LED Current

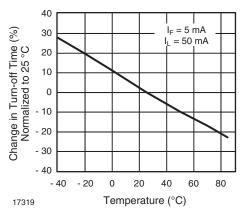


Fig. 20 - Turn-off Time vs. Temperature

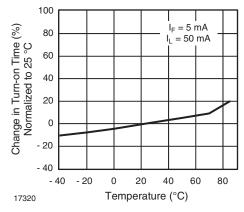


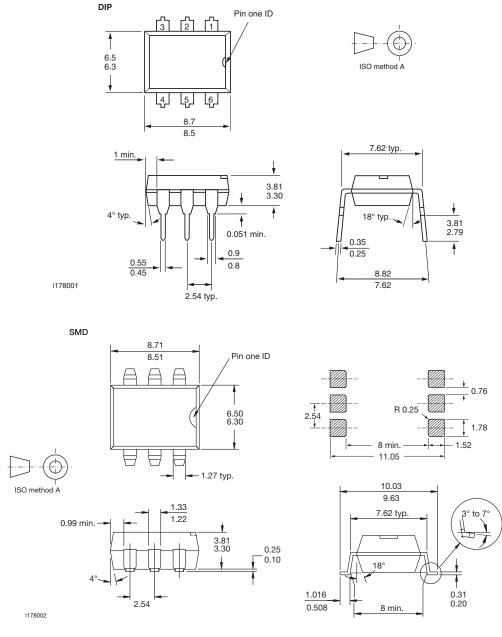
Fig. 21 - Turn-on Time vs. Temperature



1 Form A Solid State Relay

Vishay Semiconductors

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING



Note

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



Legal Disclaimer Notice

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