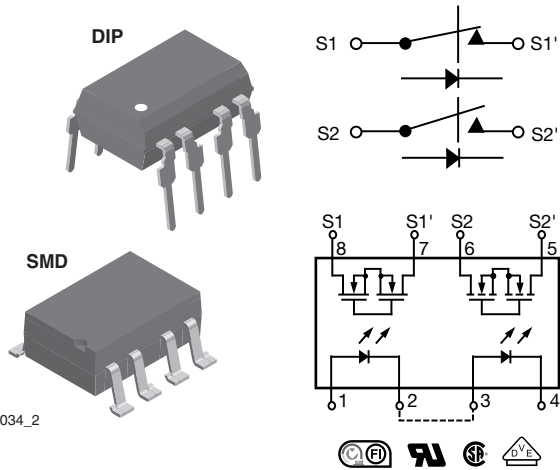




## Dual 1 Form A/B, C Solid State Relay



i179034\_2

### DESCRIPTION

The LH1502 relays contain normally open and normally closed switches that can be used independently as a 1 form A and 1 form B relay, or when used together, as a 1 form C relay. The relays are constructed as a multi-chip hybrid device. Actuation control is via an infrared LED. The output switch is a combination of a photodiode array with MOSFET switches and control circuitry.

### FEATURES

- Current limit protection
- Isolation test voltage 3750 V<sub>RMS</sub>
- Typical R<sub>ON</sub> 20 Ω
- Load voltage 350 V
- Load current 150 mA
- 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 093751  
 DIN EN: 60747-5-2 (VDE 0884)/60747-5-5 (pending), available with option 1  
 FIMKO: 25419

ORDERING INFORMATION												
L	H	1	5	0	2	B	#	#	T	R		
PART NUMBER						ELECTR. VARIATION	PACKAGE CONFIG.	TAPE AND REEL				
<b>PACKAGE</b>						<b>UL, CSA, FIMKO</b>						
SMD-8, tubes						LH1502BAC						
SMD-8, tape and reel						LH1502BACTR						
DIP-8, tubes						LH1502BB						



ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
LED continuous forward current		I <sub>F</sub>	50	mA
LED reverse voltage	I <sub>R</sub> ≤ 10 μA	V <sub>R</sub>	8	V
<b>OUTPUT</b>				
DC or peak AC load voltage	I <sub>L</sub> ≤ 50 μA	V <sub>L</sub>	350	V
Continuous DC load current (form C operation)		I <sub>L</sub>	150	mA
Peak load current, form A	t = 100 ms	I <sub>P</sub>	(3)	
Peak load current (single shot), form B		I <sub>P</sub>	350	mA
<b>SSR</b>				
Ambient operating temperature range		T <sub>amb</sub>	- 40 to + 85	°C
Storage temperature range		T <sub>stg</sub>	- 40 to + 125	°C
Pin soldering temperature (1)	t = 10 s max.	T <sub>sld</sub>	260	°C
Input to output isolation test voltage	t = 1 s, I <sub>ISO</sub> = 10 μA max.	V <sub>ISO</sub>	3750	V <sub>RMS</sub>
Pole-to-pole isolation voltage (S1 to S2) (2), (dry air, dust free, at sea level)			1600	V
Output power dissipation (continuous)		P <sub>diss</sub>	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 reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).
- (2) Breakdown occurs between the output pins external to the package.
- (3) Refer to current limit performance application note for a discussion on relay operation during transient currents.

ELECTRICAL CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
LED forward current, switch turn-on (NO)	I <sub>L</sub> = 100 mA, t = 10 ms	I <sub>Fon</sub>		0.6	2	mA
LED forward current, switch turn-off (NO)	V <sub>L</sub> = ± 300 V	I <sub>Foff</sub>	0.4	0.5		mA
LED forward current, switch turn-on (NC)	I <sub>L</sub> = 300 mA, t = 10 ms	I <sub>Fon</sub>	0.2	0.9		mA
LED forward current, switch turn-off (NC)	V <sub>L</sub> = ± 300 V	I <sub>Foff</sub>		1	2	mA
LED forward voltage	I <sub>F</sub> = 10 mA	V <sub>F</sub>	1.15	1.26	1.45	V
<b>OUTPUT</b>						
On-resistance (NO, NC)	I <sub>F</sub> = 5 mA (NO), I <sub>F</sub> = 0 mA (NC), I <sub>L</sub> = 50 mA (NC)	R <sub>ON</sub>	12	20	25	Ω
Off-resistance (NO)	I <sub>F</sub> = 0 mA, V <sub>L</sub> = ± 100 V	R <sub>OFF</sub>	0.35	5000		GΩ
Off-resistance (NC)	I <sub>F</sub> = 5 mA, V <sub>L</sub> = ± 100 V	R <sub>OFF</sub>	0.1	1.4		GΩ
Current limit (NO)	I <sub>F</sub> = 5 mA, t = 5 ms, V <sub>L</sub> = ± 5 V	I <sub>LMT</sub>	270	290	380	mA
Off-state leakage current (NO)	I <sub>F</sub> = 0 mA, V <sub>L</sub> = ± 100 V	I <sub>O</sub>		0.02	1000	nA
Off-state leakage current (NC)	I <sub>F</sub> = 5 mA, V <sub>L</sub> = ± 100 V	I <sub>O</sub>		0.07	1	μA
Off-state leakage current (NO, NC)	I <sub>F</sub> = 0 mA (NO), I <sub>F</sub> = 5 mA (NC), V <sub>L</sub> = ± 200 V	I <sub>O</sub>			1	μA
Output capacitance (NO)	I <sub>F</sub> = 0 mA, V <sub>L</sub> = 50 V	C <sub>O</sub>		50		pF
Output capacitance (NC)	I <sub>F</sub> = 5 mA, V <sub>L</sub> = 50 V	C <sub>O</sub>		50		pF
<b>TRANSFER</b>						
Capacitance (input to output)	V <sub>ISO</sub> = 1 V	C <sub>IO</sub>		3		pF

**Note**

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. 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
transfer						
Turn-on time (NO)	$I_F = 10\text{ mA}$ , $I_L = 37.5\text{ mA}$ , $V_L = 150\text{ V}$	$t_{on}$	0.2	3.2	6	ms
Turn-on time (NC)	$I_F = 10\text{ mA}$ , $I_L = 37.5\text{ mA}$ , $V_L = 150\text{ V}$	$t_{on}$	0.2	3.8	6	ms
Turn-off time (NO)	$I_F = 10\text{ mA}$ , $I_L = 37.5\text{ mA}$ , $V_L = 150\text{ V}$	$t_{off}$		1.6	3	ms
Turn-off time (NC)	$I_F = 10\text{ mA}$ , $I_L = 37.5\text{ mA}$ , $V_L = 150\text{ V}$	$t_{off}$		0.8	3	ms

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

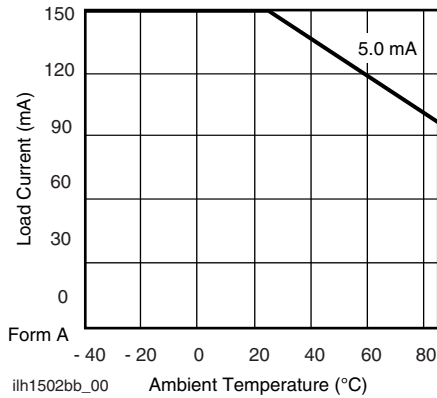


Fig. 1 - Recommended Operating Conditions

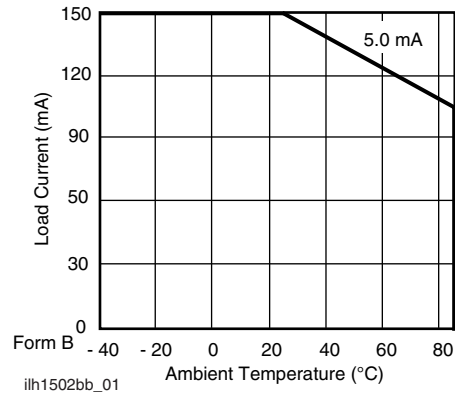
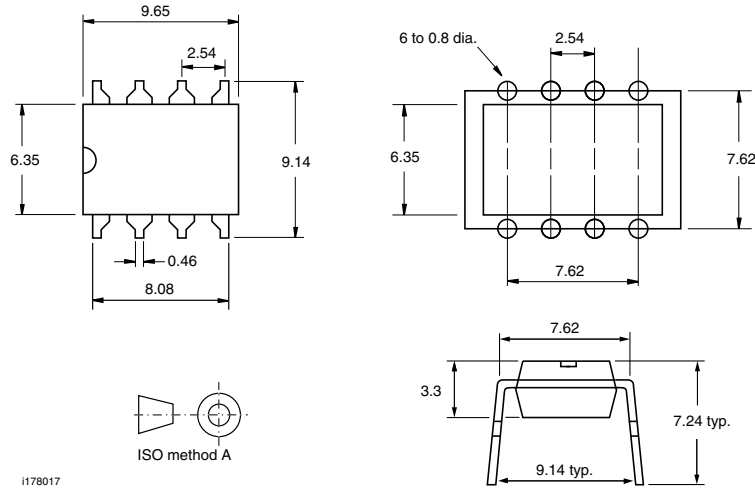


Fig. 2 - Recommended Operating Conditions

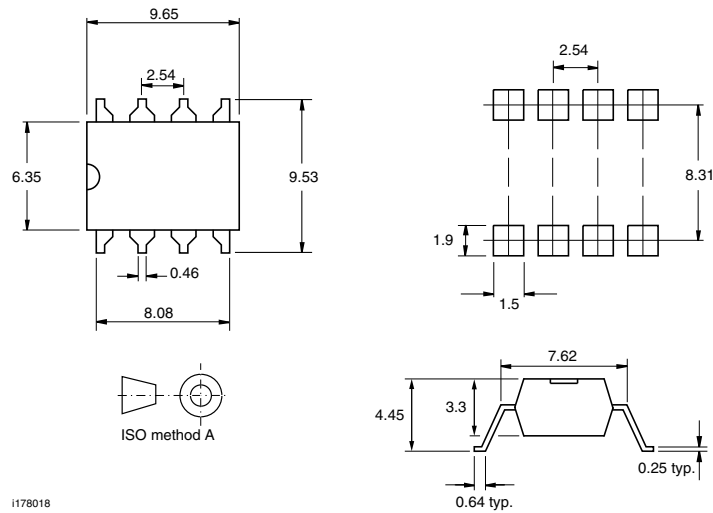


## PACKAGE DIMENSIONS in millimeters

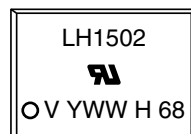
### DIP



### SMD



## PACKAGE MARKING (example)



### Note

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



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Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)