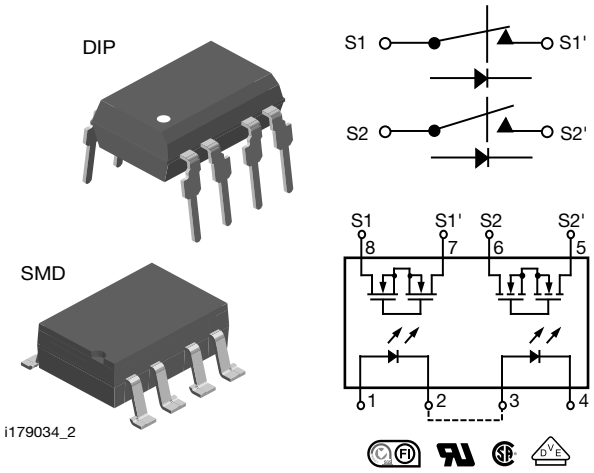
LH1502BAC, LH1502BACTR, LH1502BB

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



FEATURES

- Current limit protection
- Isolation test voltage 3750 V_{RMS}
- Typical R_{ON} 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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
e3
RoHS COMPLIANT

APPLICATIONS

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

AGENCY APPROVALS

- UL
- VDE
- CQC
- FIMKO

LINKS TO ADDITIONAL RESOURCES

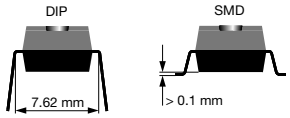
Design Tools | Models | 3D Models

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 circuity.

ORDERING INFORMATION

L	H	1	5	0	2	B	#	#	T	R
PART NUMBER						ELECTR. VARIATION	PACKAGE CONFIG.		TAPE AND REEL	



PACKAGE	UL, CSA, FIMKO
SMD-8, tubes	LH1502BAC
SMD-8, tape and reel	LH1502BACTR
DIP-8, tubes	LH1502BB

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	$I_R \leq 10$ µA	V_R	8	V
OUTPUT				
DC or peak AC load voltage	$I_L \leq 50$ µA	V_L	350	V
Continuous DC load current (form C operation)		I_L	150	mA
Peak load current, form A	t = 100 ms	I_P	(3)	
Peak load current (single shot), form B		I_P	350	mA
SSR				
Ambient operating temperature range		T_{amb}	-40 to +85	°C
Storage temperature range		T_{stg}	-40 to +125	°C
Pin soldering temperature (1)	t = 10 s max.	T_{sld}	260	°C
Input to output isolation test voltage	t = 1 s, I_{ISO} = 10 µA max.	V_{ISO}	3750	V_{RMS}
Pole-to-pole isolation voltage (S1 to S2) (2), (dry air, dust free, at sea level)			1600	V
Output power dissipation (continuous)		P_{diss}	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_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
LED forward current, switch turn-on (NO)	I_L = 100 mA, t = 10 ms	I_{Fon}	-	0.6	2	mA
LED forward current, switch turn-off (NO)	V_L = ± 300 V	I_{Foff}	0.4	0.5	-	mA
LED forward current, switch turn-on (NC)	I_L = 300 mA, t = 10 ms	I_{Fon}	0.2	0.9	-	mA
LED forward current, switch turn-off (NC)	V_L = ± 300 V	I_{Foff}	-	1	2	mA
LED forward voltage	I_F = 10 mA	V_F	1.15	1.26	1.45	V
OUTPUT						
On-resistance (NO, NC)	I_F = 5 mA (NO), I_F = 0 mA (NC), I_L = 50 mA (NC)	R_{ON}	12	20	25	Ω
Off-resistance (NO)	I_F = 0 mA, V_L = ± 100 V	R_{OFF}	0.35	5000	-	GΩ
Off-resistance (NC)	I_F = 5 mA, V_L = ± 100 V	R_{OFF}	0.1	1.4	-	GΩ
Current limit (NO)	I_F = 5 mA, t = 5 ms, V_L = ± 5 V	I_{LMT}	270	290	380	mA
Off-state leakage current (NO)	I_F = 0 mA, V_L = ± 100 V	I_O	-	0.02	1000	nA
Off-state leakage current (NC)	I_F = 5 mA, V_L = ± 100 V	I_O	-	0.07	1	µA
Off-state leakage current (NO, NC)	I_F = 0 mA (NO), I_F = 5 mA (NC), V_L = ± 200 V	I_O	-	-	1	µA
Output capacitance (NO)	I_F = 0 mA, V_L = 50 V	C_O	-	50	-	pF
Output capacitance (NC)	I_F = 5 mA, V_L = 50 V	C_O	-	50	-	pF
TRANSFER						
Capacitance (input to output)	V_{ISO} = 1 V	C_{IO}	-	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 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
TRANSFER						
Turn-on time (NO)	I_F = 10 mA, I_L = 37.5 mA, V_L = 150 V	t_{on}	0.2	3.2	6	ms
Turn-on time (NC)	I_F = 10 mA, I_L = 37.5 mA, V_L = 150 V	t_{on}	0.2	3.8	6	ms
Turn-off time (NO)	I_F = 10 mA, I_L = 37.5 mA, V_L = 150 V	t_{off}	-	1.6	3	ms
Turn-off time (NC)	I_F = 10 mA, I_L = 37.5 mA, V_L = 150 V	t_{off}	-	0.8	3	ms

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

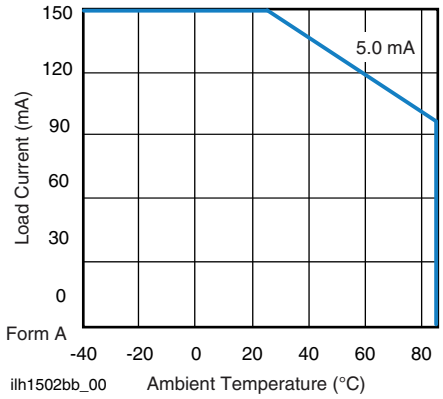


Fig. 1 - Maximum Load Current vs. Ambient Temperature

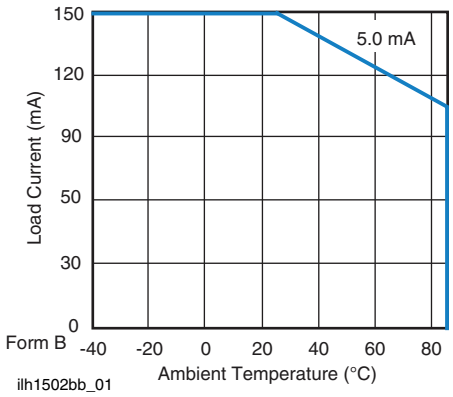
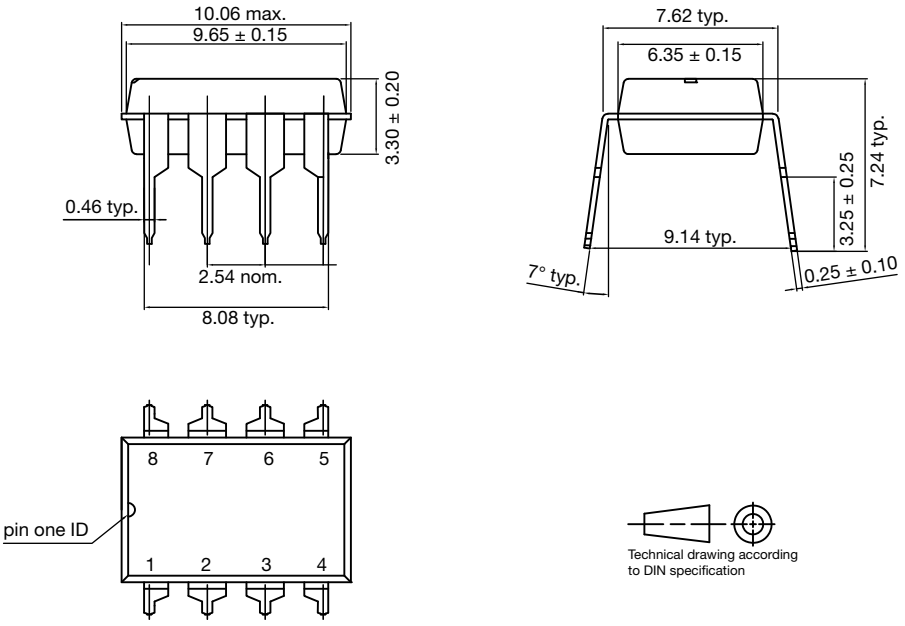


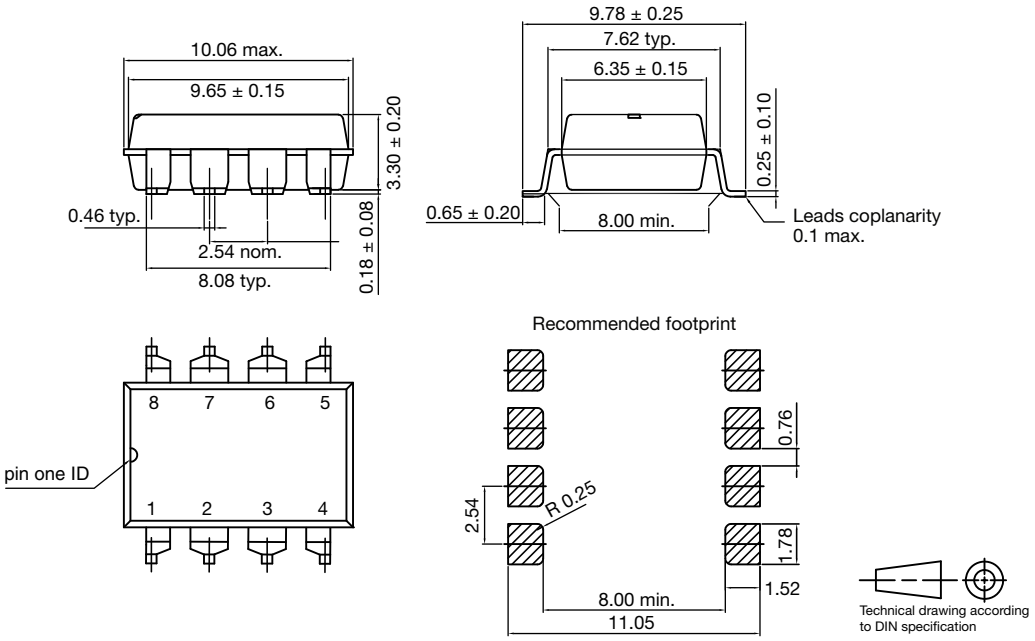
Fig. 2 - Maximum Load Current vs. Ambient Temperature

PACKAGE DIMENSIONS (in millimeters)

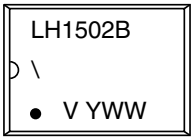
DIP-8



SMD-8



PACKAGE MARKING (example)



Note

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

SOLDER PROFILES

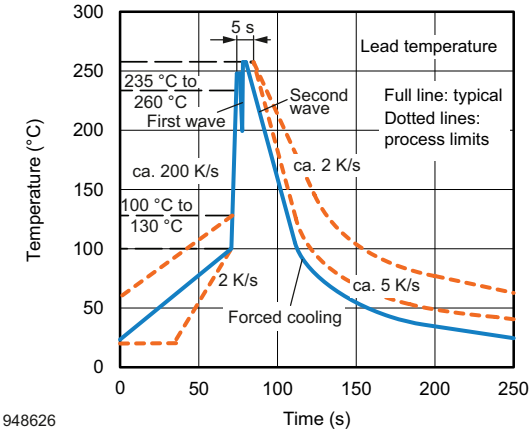


Fig. 3 - Wave Soldering Double Wave Profile
According to J-STD-020 for DIP Devices

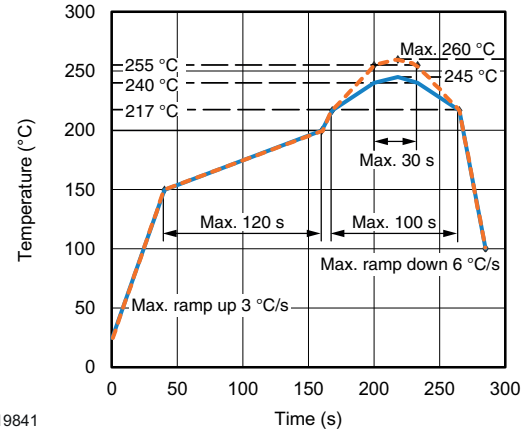


Fig. 4 - Lead (Pb)-free Reflow Solder Profile
According to J-STD-020 for SMD Devices

HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2

Floor life: unlimited

Conditions: T_{amb} < 30 °C, RH < 85 %

Moisture sensitivity level 1, according to J-STD-020

Footprint and Schematic Information for LH1502BAC, LH1502BACTR, LH1502BB

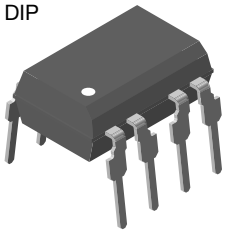
The footprint and schematic symbols for the following parts can be accessed using the associated links. They are available in Eagle, Altium, KiCad, OrCAD / Allegro, Pulsonix, and PADS.

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

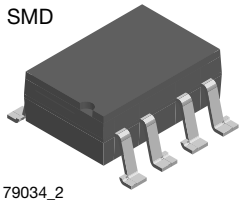
PART NUMBER	FOOTPRINT / SCHEMATIC
LH1502BAC	www.snapeda.com/parts/LH1502BAC/Vishay/view-part
LH1502BACTR	www.snapeda.com/parts/LH1502BACTR/Vishay/view-part
LH1502BB	www.snapeda.com/parts/LH1502BB/Vishay/view-part

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

DIP



SMD



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