

### FEATURES

- Normally Open and Close, Single Pole Single Throw
- Control 400 VAC or DC Voltage
- Switch 130 mA Loads
- LED Control Current, 2mA
- Low ON-Resistance
- $dv/dt$ , >500 V/ms
- Isolation Test Voltage, 3750 VAC<sub>RMS</sub>
- UL, CSA, FCC compatible
- Applications
  - Telecommunications
    - Telecom Switching
    - Tip/Ring Circuits
    - Modem Switching (Laptop, Notebook, Pocket Size)
    - Hookswitch
    - Dial Pulsing
    - Ground Start
    - Ringer Injection
  - Instrumentation
    - Multiplexers
    - Data Acquisition
    - Electronic Switching
    - I/O Subsystems
  - Meters (Watt-Hour, Water, Gas)
  - Medical Equipment
  - High Voltage Test Equipment
  - TRIAC Driver
  - Motor Control
  - Security
  - Aerospace
  - Industrial Controls

### DESCRIPTION

The LH1502 is a single pole single throw (SPST), normally open and close. The relay can control AC or DC loads currents up to 130 mA, with a supply voltage up to 400 V. The device is packaged in a 8 pin SMD and dual-in line package. Those package offer an insulation dielectric withstand of 3750 VAC<sub>RMS</sub>.

The coupler consists of a AlGaAs LED that is optically coupled to a dielectrically isolated photodiode array which drives two series connected high voltage MOS transistors.

#### ● Turn on/Turn off time

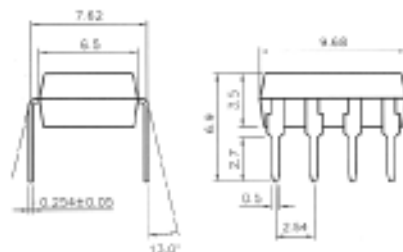


#### ● Operate/Reverse time



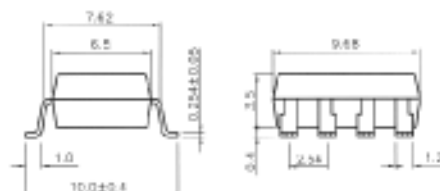
Unit: mm  
Tolerance:  $\pm 0.1$  mm

LH1502



Unit: mm  
Tolerance:  $\pm 0.1$  mm

LH1502A



### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ )

#### Emitter (Input)

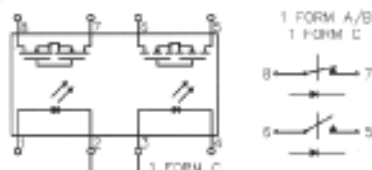
|                                               |                         |
|-----------------------------------------------|-------------------------|
| Reverse Voltage.....                          | 5.0V                    |
| Continuous Forward Current.....               | 50mA                    |
| Peak Forward Current (1s).....                | 1A                      |
| Power Dissipation.....                        | 100mW                   |
| Derate Linearly from $25^\circ\text{C}$ ..... | 1.3mW/ $^\circ\text{C}$ |

#### Detector (Output)

|                               |                    |
|-------------------------------|--------------------|
| Output Breakdown Voltage..... | $\pm 400\text{V}$  |
| Continuous Load Current.....  | $\pm 130\text{mA}$ |
| Power Dissipation.....        | 500mW              |

#### General Characteristics

|                                                      |                               |
|------------------------------------------------------|-------------------------------|
| Isolation Test Voltage.....                          | 3750VAC <sub>RMS</sub>        |
| Isolation Resistance                                 |                               |
| $V_{ID} = 500\text{V}, T_A = 25^\circ\text{C}$ ..... | $\geq 10^{10}\Omega$          |
| Total Power Dissipation.....                         | 550mW                         |
| Derate Linearly from $25^\circ\text{C}$ .....        | 2.5mW/ $^\circ\text{C}$       |
| Storage Temperature Range.....                       | $-40$ to $+150^\circ\text{C}$ |
| Operating Temperature Range.....                     | $-40$ to $+85^\circ\text{C}$  |
| Junction Temperature.....                            | $100^\circ\text{C}$           |
| Soldering Temperature, 2mm from case, 10 sec....     | $260^\circ\text{C}$           |

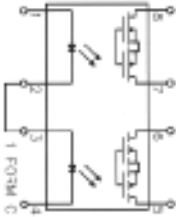
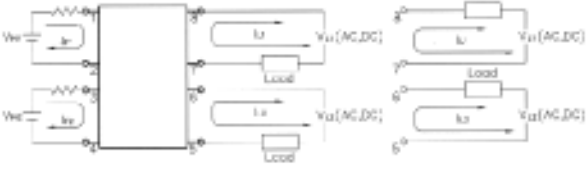
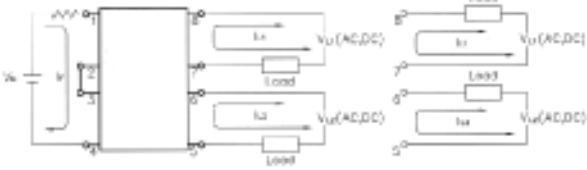


# Characteristics

(T<sub>A</sub> = 25°C)

| Description                            | Symbol                                            | Min. | Typ. | Max. | Unit | Test Condition                                                                                                               |
|----------------------------------------|---------------------------------------------------|------|------|------|------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Emitter (Input)</b>                 |                                                   |      |      |      |      |                                                                                                                              |
| Forward Voltage                        | V <sub>F</sub>                                    |      | 1.8  | 2.0  | V    | I <sub>F</sub> = 10 mA                                                                                                       |
| Operation Input Current                | I <sub>FON(N.O.)</sub><br>I <sub>FOFF(N.C.)</sub> |      |      | 5    | mA   | V <sub>L</sub> = ± 20V, I <sub>L</sub> = 100 mA (N.O.)<br>V <sub>L</sub> = ± 20V, I <sub>L</sub> = <5 μA (N.C.)<br>t = 10 ms |
| Recovery Input Current                 | I <sub>FOFF(N.O.)</sub><br>I <sub>FON(N.C.)</sub> | 0.2  |      |      | mA   | V <sub>L</sub> = ± 20V, I <sub>L</sub> = <5 μA (N.O.)<br>V <sub>L</sub> = ± 20V, I <sub>L</sub> = 100 mA (N.C.)<br>t = 10 ms |
| <b>Detector (output) normally open</b> |                                                   |      |      |      |      |                                                                                                                              |
| Output Breakdown Voltage               | V <sub>B</sub>                                    | 400  |      |      | V    | I <sub>B</sub> = 50 μA                                                                                                       |
| Output Off-State Leakage               | I <sub>T(OFF)</sub>                               |      | 0.2  | 1    | μA   | V <sub>T</sub> = 100 V, I <sub>F</sub> = 0 mA                                                                                |
| I/O Capacitance                        | C <sub>ISO</sub>                                  |      | 6    |      | pF   | I <sub>F</sub> = 0, f = 1 MHz                                                                                                |
| ON Resistance                          | R <sub>ON</sub>                                   |      | 20   | 25   | Ω    | I <sub>L</sub> = 100 mA, I <sub>F</sub> = 10 mA                                                                              |
| Turn-on Time                           | T <sub>ON</sub>                                   |      | 0.3  | 1.0  | ms   | I <sub>F</sub> = 10 mA, V <sub>L</sub> = ± 20 V                                                                              |
| Turn-off Time                          | T <sub>OFF</sub>                                  |      | 0.7  | 1.5  | ms   | t = 10 ms, I <sub>L</sub> = ± 100 mA                                                                                         |

|                                         |                     |     |     |     |    |                                                 |
|-----------------------------------------|---------------------|-----|-----|-----|----|-------------------------------------------------|
| <b>Detector (output) normally close</b> |                     |     |     |     |    |                                                 |
| Output Breakdown Voltage                | V <sub>B</sub>      | 400 |     |     | V  | I <sub>B</sub> = 50 μA                          |
| Output Off-State Leakage                | I <sub>T(OFF)</sub> |     | 0.2 | 1   | μA | V <sub>T</sub> = 100 V, I <sub>F</sub> = 10 mA  |
| I/O Capacitance                         | C <sub>ISO</sub>    |     | 6   |     | pF | I <sub>F</sub> = 0, f = 1 MHz                   |
| ON Resistance                           | R <sub>ON</sub>     |     | 40  | 50  | Ω  | I <sub>L</sub> = 100 mA, I <sub>F</sub> = 0 mA  |
| Reverse (ON) Time                       | T <sub>ON</sub>     |     | 0.6 | 1.5 | ms | I <sub>F</sub> = 10 mA, V <sub>L</sub> = ± 20 V |
| Operate (OFF) Time                      | T <sub>OFF</sub>    |     | 0.3 | 1.0 | ms | t = 10 ms, I <sub>L</sub> = ± 100 mA            |

| Photo Mos Relay Schematic and Wiring Diagrams |                                                                                     |                      |       |                 |                                                                                                                                                                                                                                                                   |
|-----------------------------------------------|-------------------------------------------------------------------------------------|----------------------|-------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type                                          | Schematic                                                                           | Output configuration | Load  | Con-<br>nection | Wiring diagram                                                                                                                                                                                                                                                    |
| LH1502<br>&<br>LH1502A                        |  | 1a1b                 | AC/DC | -               | <p>(1) Two independent 1 Form A &amp; 1 Form B use</p>  <p>(2) 1 Form A 1 Form B use</p>  |

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