

### FEATURES

- Normally Open, Single Pole Single Throw Operation
- Control 350 VAC or DC Voltage
- Switch 100 mA Loads
- LED Control Current, 2.5 mA
- Low ON-Resistance, 37  $\Omega$  Typ. at 100 mA
- Isolation Test Voltage, 3750 VAC<sub>RMS</sub>
- Current Limit Protection
- Underwriters Lab File # E52744

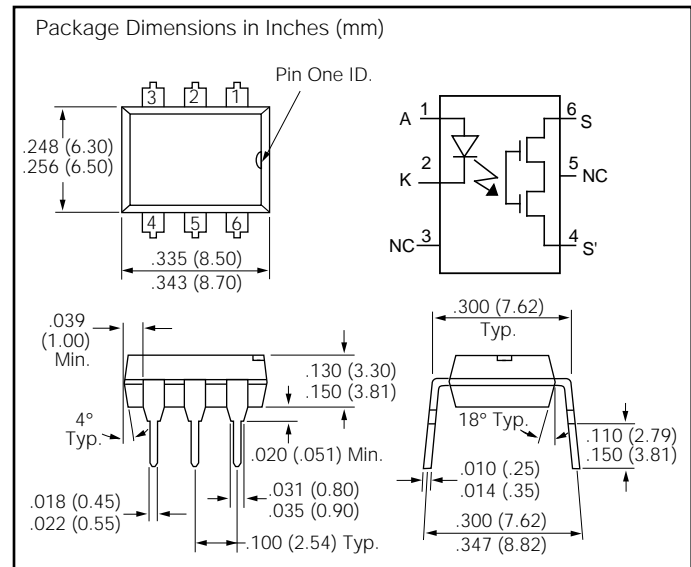
### APPLICATIONS

- Telephone Switch Hook
- High Voltage Test Equipment
- TRIAC Driver
- Motor Control
- Industrial Control Systems

### DESCRIPTION

The LH1550 is a single pole single throw (SPST), normally open (NO), solid state relay. The relay can control AC or DC loads currents up to 100 mA, with a supply voltage up to 350 V. The device is packaged in a six pin 0.3 inch dual-in line package. This package offers an insulation dielectric withstand of 3750 V<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. The typical ON-Resistance is 37  $\Omega$  at 25 mA and is linear up to 50 mA. There is built-in current limiting circuitry in the detector chip, enabling it to pass FCC 68-302 and other regulatory voltage surge requirements when over voltage protection is provided.



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

#### Emitter

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

#### Detector

Output Breakdown Voltage.....	350 V
Continuous Load Current .....	100 mA
Total Power Dissipation .....	300 mW
Derate Linearly from 25°C .....	See Figure 4

#### Package

Isolation Test Voltage .....	3750 VAC <sub>RMS</sub>
Power Dissipation .....	400 mW
Derate Linearly from 25°C .....	2.5 mW/°C
Isolation Resistance	
$V_{IO}=500\text{ V}, T_A=25^\circ\text{C}$ .....	$\geq 10^{12}\ \Omega$
$V_{IO}=500\text{ V}, T_A=100^\circ\text{C}$ .....	$\geq 10^{11}\ \Omega$
Storage Temperature Range .....	-40 to +150°C
Operating Temperature Range.....	-40 to +85°C
Junction Temperature .....	100°C
Soldering Temperature, 2 mm from case, 10 sec. ....	260°C

Characteristics ( $T_A=25^\circ\text{C}$ )

Description	Symbol	Min.	Typ.	Max.	Unit	Test Condition
<b>Emitter</b>						
Forward Voltage	$V_F$	0.9	1.25	1.4	V	$I_F=5\text{ mA}$
Reverse Current	$I_R$		1	10	$\mu\text{A}$	$V_R=5\text{ V}$
Junction Capacitance	$C_J$		15		pF	$V_F=0\text{ V}$ , $f=1\text{ MHz}$
Dynamic Resistance	$\Delta V_F/\Delta I_F$		6		$\Omega$	$I_F=10\text{ mA}$
Switching Time	$t_R, t_F$		1		$\mu\text{s}$	$I_F=10\text{ mA}$
<b>Detector</b>						
Output Breakdown Voltage	$V_B$	350	380		V	$I_B=50\text{ }\mu\text{A}$
Output Off-State Leakage Current	$I_{T(OFF)}$		.03	1.0	$\mu\text{A}$	$V_T=\pm 100\text{ V}$ , $I_F=0\text{ mA}$
Feed through Capacitance, pins 4 to 6	$C_T$		TBD			$I_F=0$ , $f=1\text{ KHz}$ , $V_L=4\text{ VP-P}$
Current Limit	$I_{LMT}$	150	190	270	mA	$I_F=5\text{ mA}$ , $t=5\text{ ms}$
<b>Package</b>						
LED Forward Current for Turn-on	$I_{FON}$			2.5	mA	$I_L=100\text{ mA}$ , $t=10\text{ ms}$
LED Forward Current for Turn-off	$I_{FOFF}$		0.2		mA	$V_L=\pm 300\text{ V}$ , $I_L<5\text{ }\mu\text{A}$
ON-resistance	$R_{ON}$	25	37	50	$\Omega$	$I_F=5\text{ mA}$ , $I_L=100\text{ mA}$
Turn-on Time	$t_{ON}$		0.8	3.0	ms	$I_F=5\text{ mA}$ , $V_L=+50\text{ V}$ $R_L=1\text{ k}\Omega$
Turn-off Time	$t_{OFF}$		0.04	3.0	ms	

Figure 1. Timing test circuit

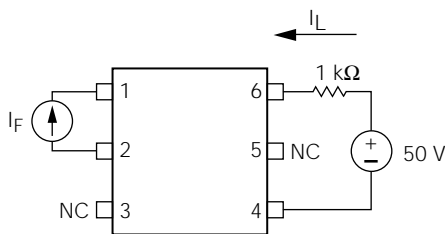


Figure 2. Timing waveform

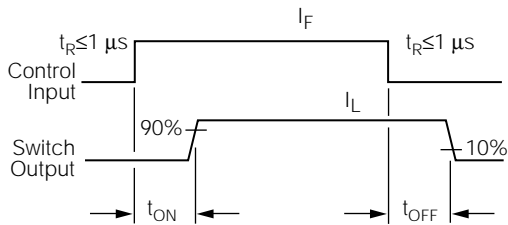


Figure 3. LED forward current vs. forward voltage

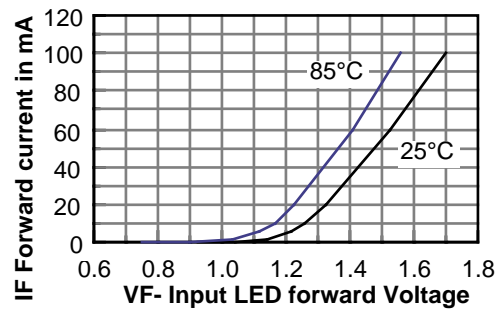


Figure 4. Recommended load current vs. temperature

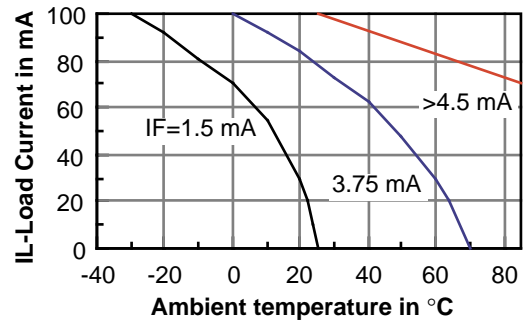


Figure 5. Turn on current vs. temperature

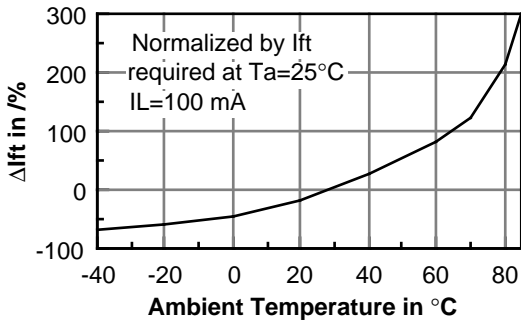


Figure 8. Change in t<sub>OFF</sub> vs. temperature

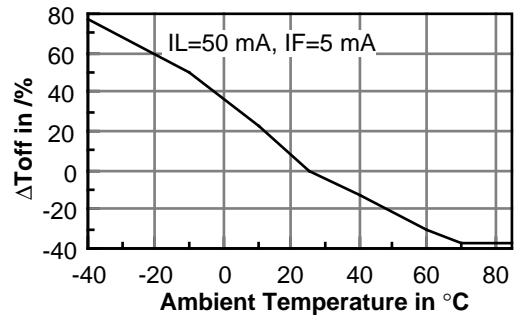


Figure 6. Change in current limit vs. temperature

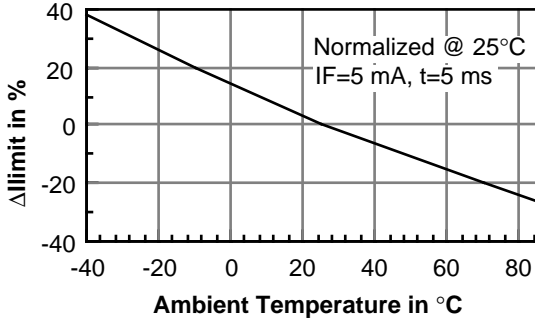


Figure 9. Change in t<sub>ON</sub> vs. temperature

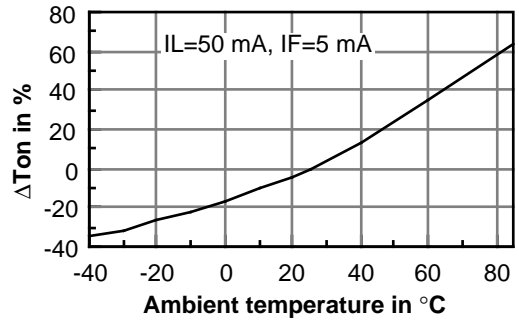


Figure 7. Change in ON resistance vs. temp.

