SIEMENS

LH1550

HIGH VOLTAGE, SOLID STATE RELAY OPTOCOUPLER

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 Ω Typ. at 100 mA**
- **Isolation Test Voltage, 3750 VAC_{RMS}**
- **Current Limit Protection**
- **Underwriters Lab File # E52744**

APPLICATIONS

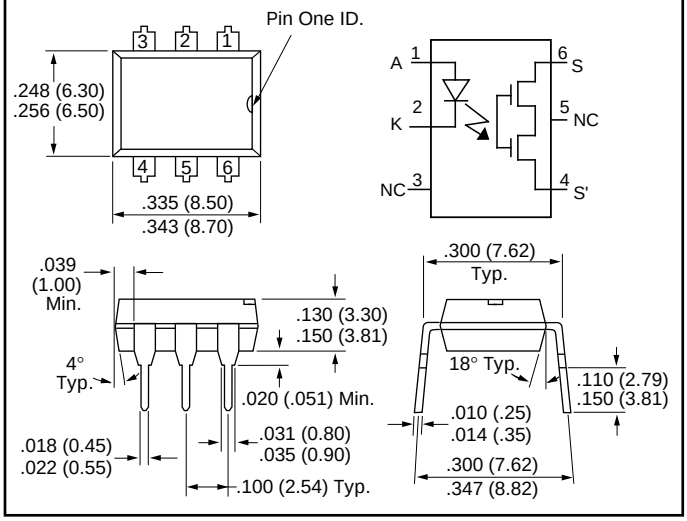
- **Telephone Switch Hook**
- **High Voltage Test Equipment**
- **TRIAC Driver**
- **Motor Control**
- **Industrial Control Systems**

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_{RMS}.

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 Ω 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.

Package Dimensions in Inches (mm)



Absolute Maximum Ratings (T_A=25°C)

Emitter

Reverse Voltage	5.0 V
Continuous Forward Current	50 mA
Peak Forward Current (1 µs)	1 A
Power Dissipation	100 mW
Derate Linearly from 25°C	1.3 mW/°C

Detector

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

Package

Isolation Test Voltage	3750 VAC_{RMS}
Power Dissipation	400 mW
Derate Linearly from 25°C	2.5 mW/°C
Isolation Resistance	
V_{IO}=500 V, T_A=25°C	$\geq 10^{12}$ Ω
V_{IO}=500 V, T_A=100°C	$\geq 10^{11}$ Ω
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°C)

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

Figure 1. Timing test circuit

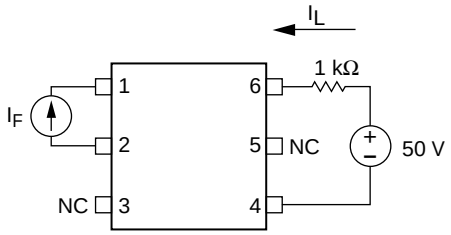


Figure 2. Timing waveform

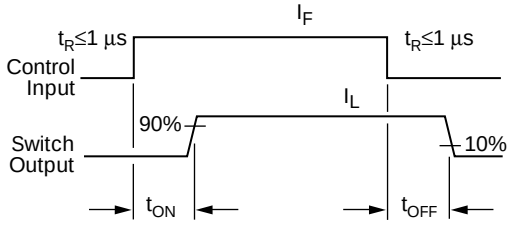


Figure 3. LED forward current vs. forward voltage

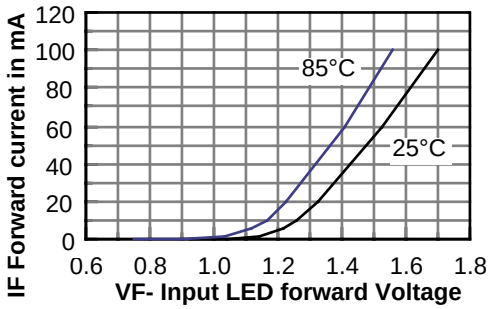


Figure 4. Recommended load current vs. temperature

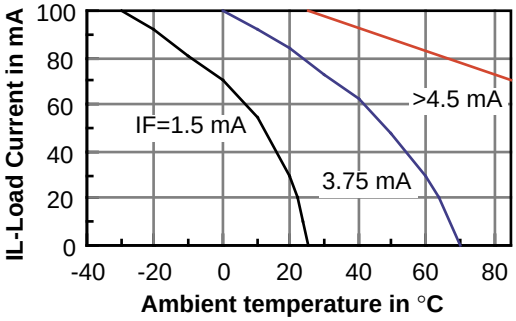


Figure 5. Turn on current vs. temperature

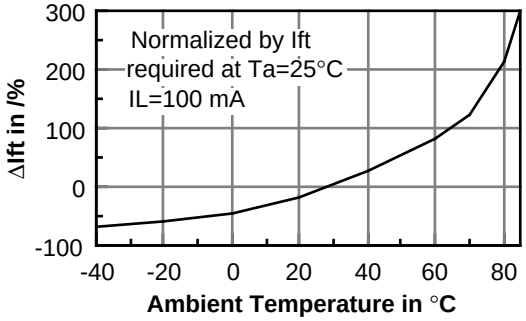


Figure 6. Change in current limit vs. temperature

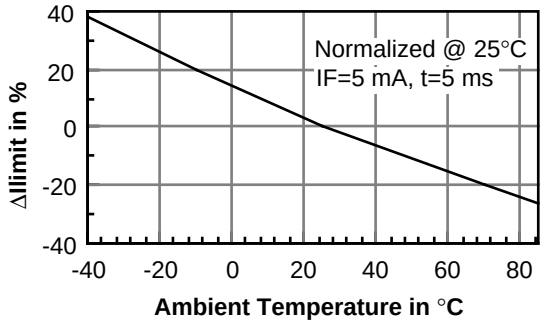


Figure 7. Change in ON resistance vs. temp.

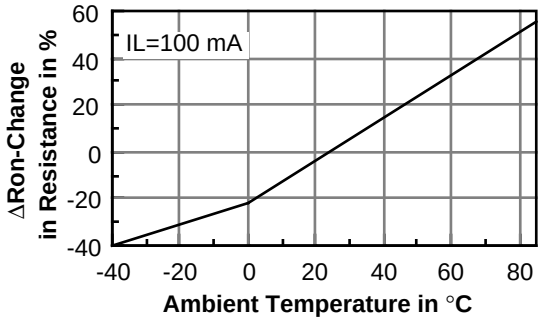


Figure 8. Change in t_{OFF} vs. temperature

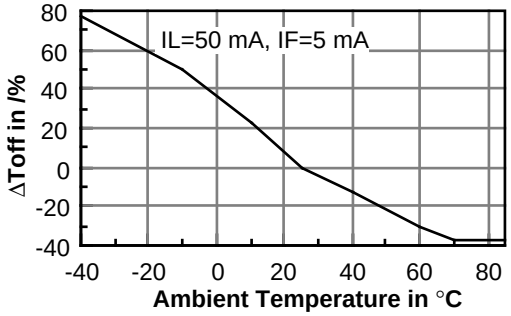


Figure 9. Change in t_{ON} vs. temperature