LH1546

Solid State Relay 1 Form A

FEATURES

- **Current Limit Protection**
- **I/O Isolation, 5300 V_{RMS}**
- **Typical R_{ON} 20 Ω**
- **Load Voltage 350 V**
- **Load Current 120 mA**
- **High Surge Capability**
- **Linear, AC/DC Operation**
- **Clean Bounce Free Switching**
- **Low Power Consumption**
- **High Reliability Monolithic Receptor**
- **SMD lead available on tape and reel**
- **Equivalent to CP Clare LCA110**
- **UL File 52744**
- **BABT/BSI Certified**

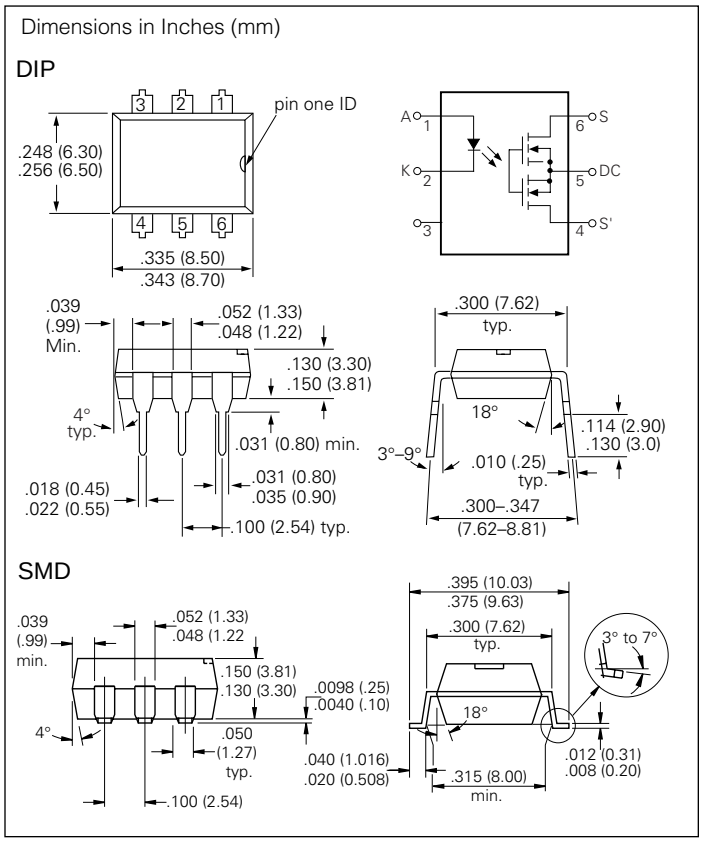
APPLICATIONS

- **General Telecom Switching**
  - **On/off Hook Control**
  - **Ring Delay**
  - **Dial Pulse**
  - **Ground Start**
  - **Ground Fault Protection**
- **Instrumentation**
- **Industrial Controls**

DESCRIPTION

The LH1546 is robust, ideal for telecom and ground fault applications. It is a SPST normally open switch (1 Form A) that replaces electromechanical relays in many applications. It is constructed using a GaAlAs LED for actuation control and an integrated monolithic die for the switch output. The die, fabricated in a high-voltage dielectrically isolated BCD-MOS technology, is comprised of a photodiode array, switch control circuitry and MOSFET switches. In addition, it employs current-limiting circuitry which meets FCC 68.302 and other regulatory voltage surge requirements when over-voltage protection is provided.

The LH1546 is available in through hole (LH1546AT), surface mount (LH1546AAB), and SMD on tape and reel (LH1546AABTR).



Absolute Maximum Ratings T_A=25°C

Ambient Temperature Range	–40 to +85°C
Storage Temperature Range	–40 to +150°C
Soldering Temperature (t=10 s. max.)	260°C
Isolation Test Voltage (for 1.0 s.)	5300 V_{RMS}
Isolation Resistance	
V_{IO}=500 V, T_A=25°C	≥10^{12} Ω
V_{IO}=500 V, T_A=100°C	≥10^{11} Ω
SSR Output Power Dissipation (continuous)	550 mW
LED Continuous Forward Current	50 mA
LED Reverse Voltage (I_R≤10 mA)	8.0 V
DC or Peak AC Load Voltage (I_L≤50 mA)	350 V
Continuous DC Load Current at 25°C	
Bidirectional	120 mA
Unidirectional	200 mA

Stresses in excess of the absolute Maximum Ratings can cause permanent damage to the device. These are absolute stress ratings only. 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 time can adversely affect reliability.

Electrical Characteristics T_A=25°C

Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input						
LED Forward Current, Switch Turn-on	I_{Fon}	—	1.0	2.0	mA	I_L=100 mA, t=10 ms
LED Forward Current, Switch Turn-off	I_{Foff}	0.2	0.9	—	mA	V_L±350 V
LED Forward Voltage	V_F	1.15	1.26	1.45	V	I_F=10 mA
Output						
ON-resistance, ac/dc: Pin 4 (±) to 6 (±)	R_{ON}	—	20	35	Ω	I_F=5.0 mA, I_L=50 mA
ON-resistance, dc: Pin 4, 6 (+) to 5 (-)		—	5.00	10.0	Ω	I_F=5.0 mA, I_L=100 mA
OFF-resistance	R_{OFF}	0.5	5000	—	GΩ	I_F=0 mA, V_L=±100 V
Off-state Leakage Current	I_O	—	0.32	200	nA	I_F=0 mA, V_L=±100 V
		—	—	1.0	mA	I_F=0 mA, V_L=±350 V
Output Capacitance, Pin 4 to 6	C_O	—	55	—	pF	I_F=0 mA, V_L=1.0 V
		—	10	—	pF	I_F=0 mA, V_L=50 V
Switch Offset	—	—	0.15	—	µV	I_F=5.0 mA
Transfer						
Input/Output Capacitance	C_{ISO}	—	0.8	—	pF	V_{ISO}=1.0 V
Turn-on Time	t_{on}	—	2.0	3.0	ms	I_F=5.0 mA, I_L=50 mA
Turn-off Time	t_{off}	—	1.0	3.0	ms	I_F=5.0 mA, I_L=50 mA

Figure 1. Recommended Operating Conditions

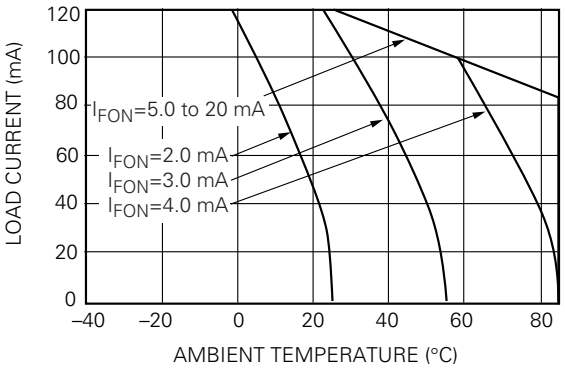


Figure 2. LED Voltage vs. Temperature

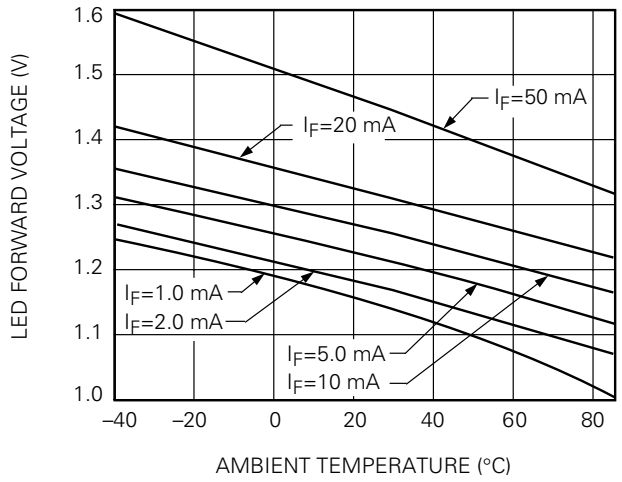


Figure 3. LED Current for Switch Turn-on vs. Temperature

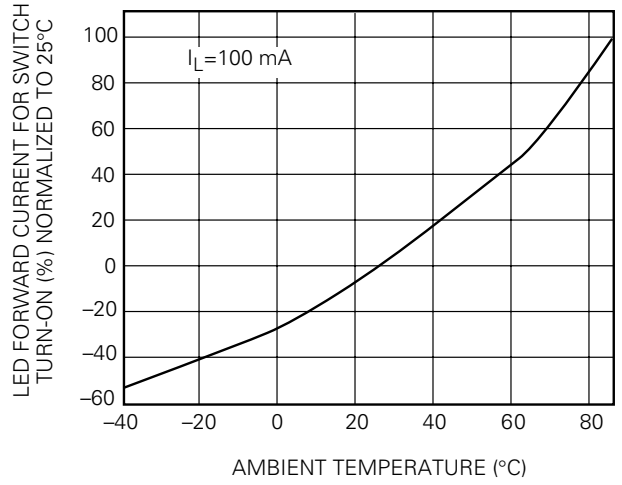


Figure 4. LED Dropout Voltage vs. Temperature

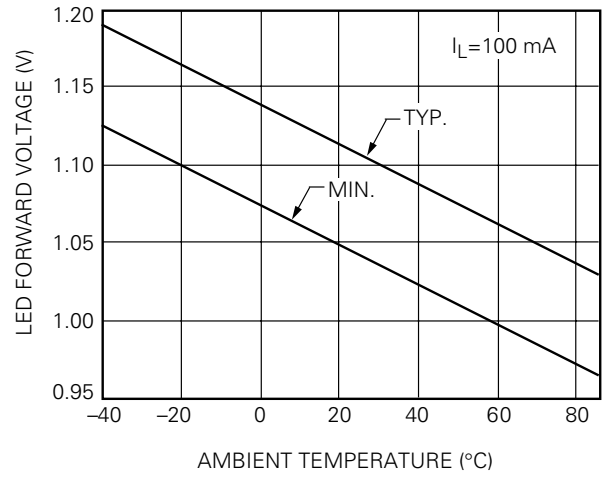


Figure 5. Current Limit vs. Temperature

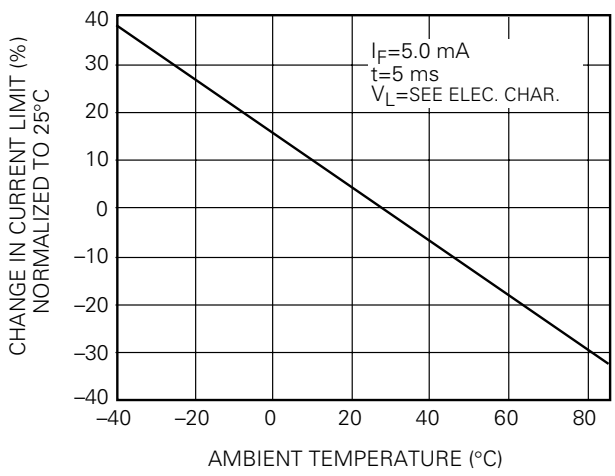


Figure 6. Switch Offset Voltage vs. LED Current

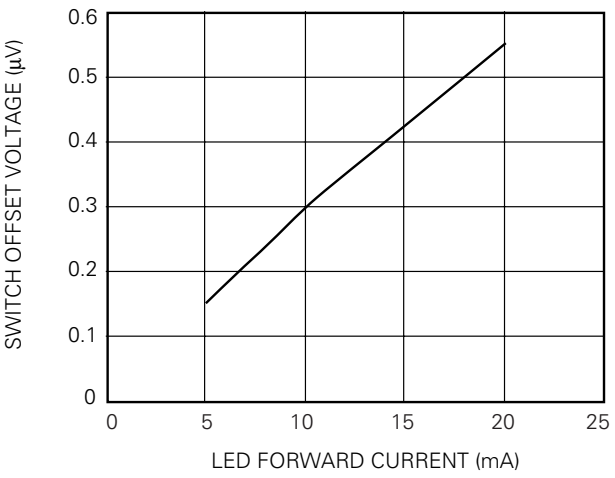


Figure 7. ON-Resistance vs. Temperature

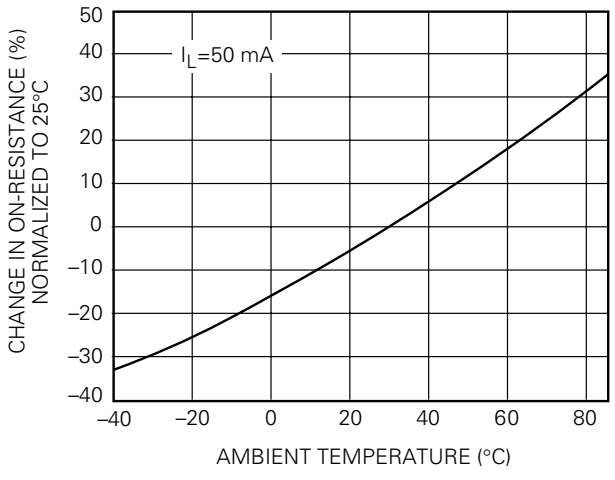


Figure 8. Variation in ON-Resistance vs. LED Current

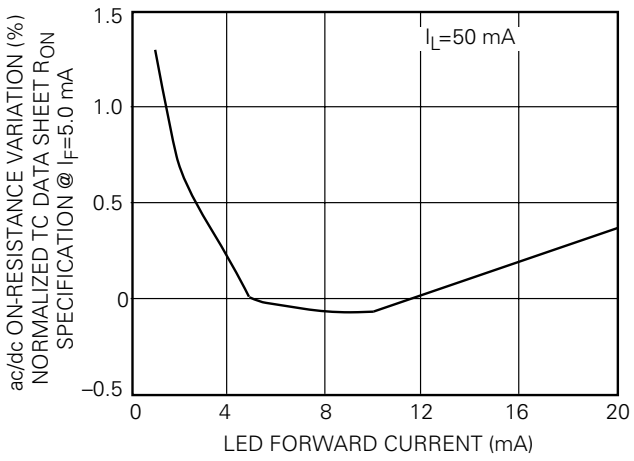


Figure 9. Switch Capacitance vs. Applied Voltage

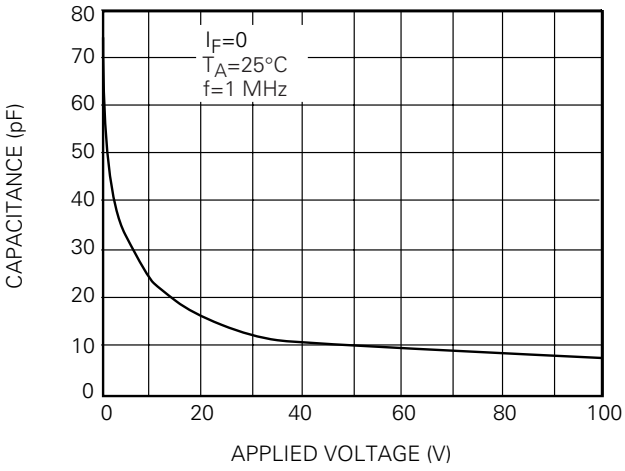


Figure 10. Insertion Loss vs. Frequency

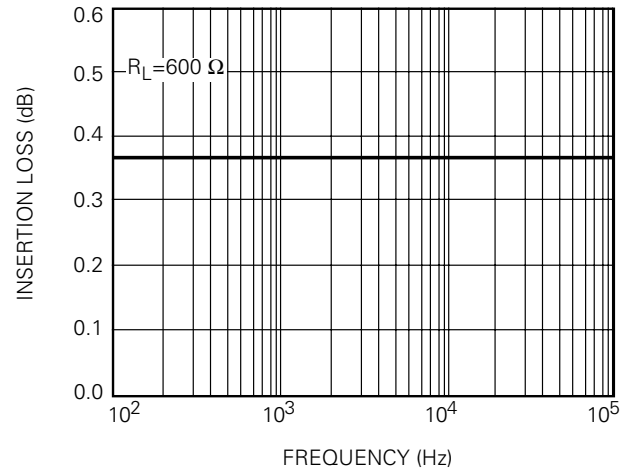


Figure 11. Output Isolation

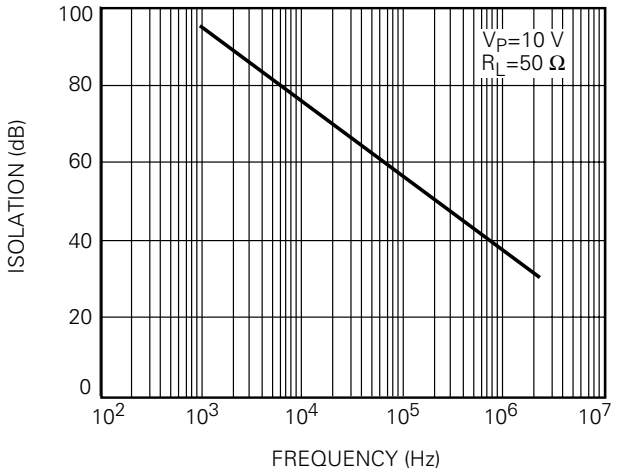


Figure 12. Leakage Current vs. Applied Voltage at Elevated Temperatures

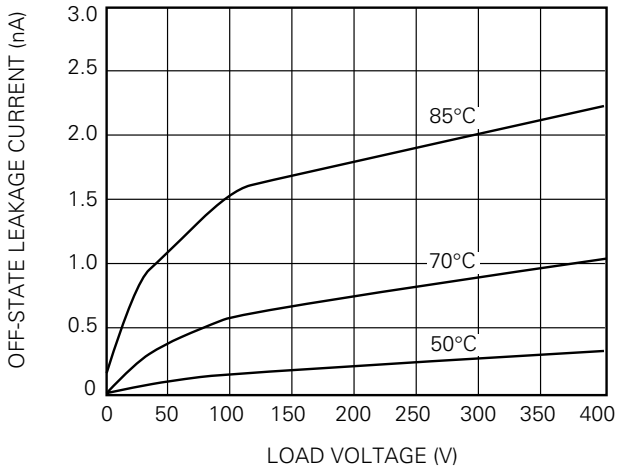


Figure 13. Switch Breakdown Voltage vs. Temperature

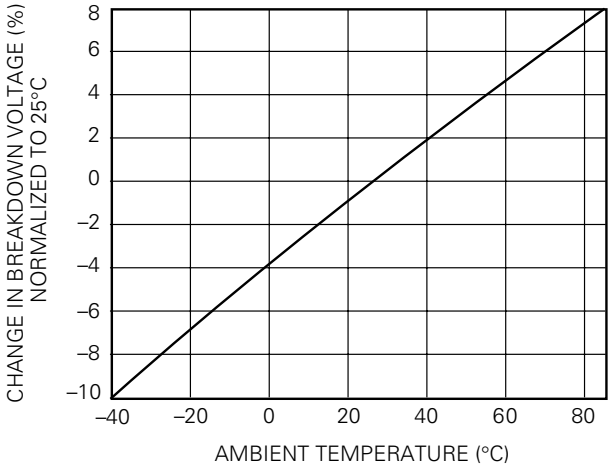


Figure 14. Switch Offset Voltage vs. Temperature

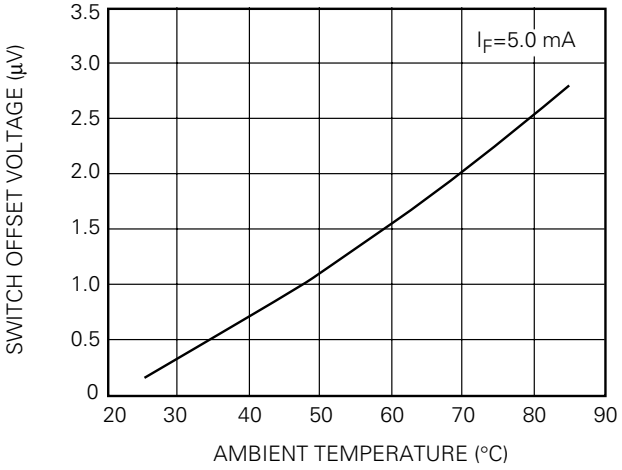


Figure 15. Turn-On Time vs. Temperature

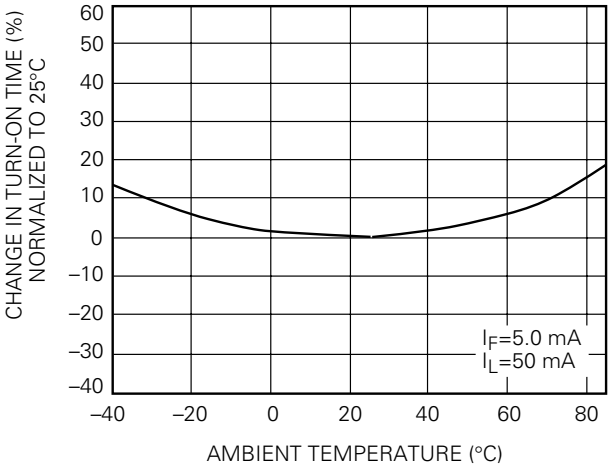


Figure 16. Turn-Off Time vs. Temperature