LH1511AT/AAB/AABTR

1 Form B
Solid State Relay

FEATURES

- **I/O Isolation, 5300 V_{RMS}**
- **Typical R_{ON} 10 Ω**
- **Load Voltage 200 V**
- **Linear, AC/DC Operation**
- **Clean Bounce Free Switching**
- **Low Power Consumption**
- **High Reliability Monolithic Receptor**
- **SMD Lead Available on Tape and Reel**

AGENCY APPROVALS

- **UL – File No. E52744**
- **CSA – Certification 093751**
- **BSI/BABT Cert. No. 7980**
- **VDE 0884 Approval**
- **FIMKO Approval**

APPLICATIONS

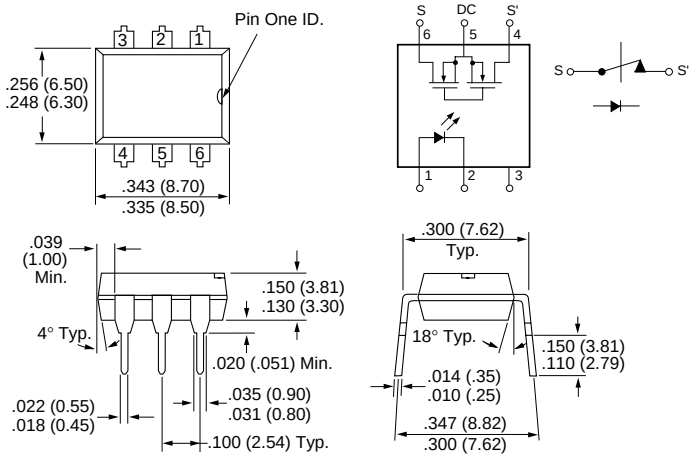
- **General Telecom Switching**
- **Security Equipment**
- **Instrumentation**
- **Industrial Controls**

DESCRIPTION

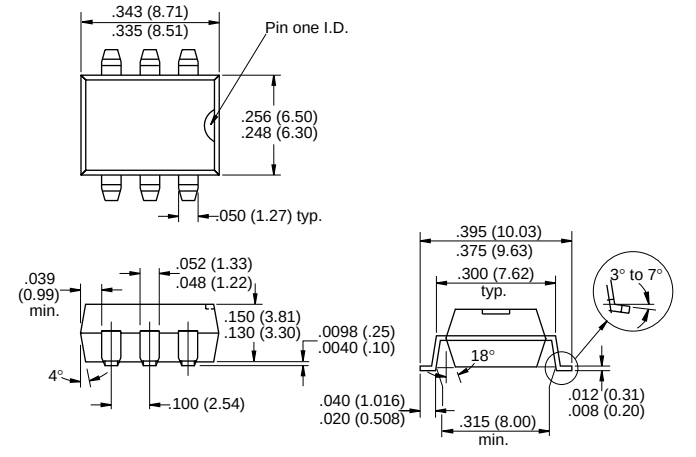
The LH1511 relays are SPST normally closed switches (1 Form B) that can replace electromechanical relays in many applications. The relays are constructed by using a GaAlAs LED for actuation control and an integrated monolithic die for the switch output. The die, fabricated in a high-voltage dielectrically isolated technology, is comprised of a photodiode array, switch control circuity, and MOSFET switches. The relays can be configured for AC/DC or DC only operation.

Package Dimensions in Inches (mm)

DIP



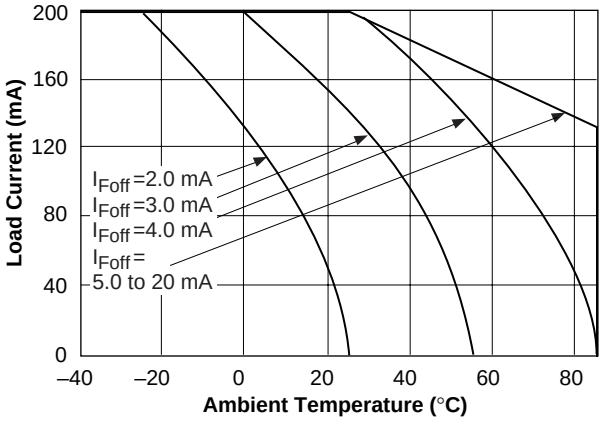
SMD



Part Identification

Part Number	Description
LH1511AT	6-pin DIP, Tubes
LH1511AAB	6-pin SMD, Gullwing, Tubes
LH1511AABTR	6-pin SMD, Gullwing, Tape and Reel

Recommended Operating Conditions



Absolute Maximum Ratings, T_A=25°C

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 the data sheet. Exposure to maximum rating conditions for extended periods can adversely affect device reliability.

Ambient Temperature Range (T_A) ..... –40 to +85°C
Storage Temperature Range (T_{stg}) ..... –40 to +150°C
Pin Soldering Temperature (t=10 s max) (T_S) ..... 260°C
Input/Output Isolation Voltage
(V_{RMS} t=1.0 s, I_{ISO}=10 µA max) (V_{ISO}) ..... 5300 V_{RMS}
LED Continuous Forward Current (I_F) ..... 50 mA
LED Reverse Voltage (I_R≤10 µA) (V_R) ..... 8.0 V
DC or Peak AC Load Voltage (I_L≤50 µA) (V_L) ..... 200 V
Continuous DC Load Current (I_L)
Bidirectional Operation ..... 200 mA
Unidirectional Operation ..... 350 mA
Peak Load Current (t=100 ms) (single shot) (I_P) ..... 600 mA
Output Power Dissipation (continuous) (P_{DISS}) ..... 550 mW

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	Sym.	Min.	Typ.	Max.	Units	Test Conditions
Input						
LED Forward Current, Switch Turn-on	I_{Fon}	0.2	0.9	—	mA	I_L=±200 mA, t=10 ms
LED Forward Current, Switch Turn-off	I_{Foff}	—	1.0	2.0	mA	V_L±150 V
LED Forward Voltage	V_F	1.15	1.26	1.45	V	I_F=10 mA
Output						
ON-resistance ac/dc: Pin 4, 6 (+) to 5 (–)	R_{ON}	6.0	10	15	Ω	I_F=0 mA, I_L=50 mA
dc: Pin 4, 6 (+) to 5 (–)		1.5	2.5	3.75		I_F=0 mA, I_L=100 mA
OFF-resistance	R_{OFF}	0.1	1.4	—	GΩ	I_F=5.0 mA, V_L=±100 V
Off-state Leakage Current	—	—	0.07	1.0	µA	I_F=5.0 mA, V_L=±100 V
		—	0.07	1.0		I_F=5.0 mA, V_L=±200 V
Output Capacitance	—	—	35	—	pF	I_F=5.0 mA, V_L=1.0 V
		—	15	—		I_F=5.0 mA, V_L=50 V
Switch Offset	—	—	0.1	—	µV	I_F=0 mA
Transfer						
Input/Output Capacitance	C_{ISO}	—	0.8	—	pF	V_{ISO}=1.0 V
Turn-on Time	t_{on}	—	1.2*	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

* I_F=10 mA

Typical Performance Characteristics

Figure 1. LED Voltage vs. Temperature

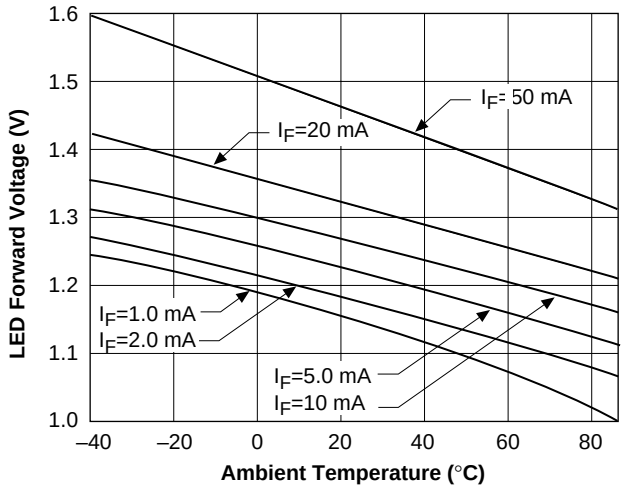


Figure 2. LED Current for Switch Turn-off vs. Temperature

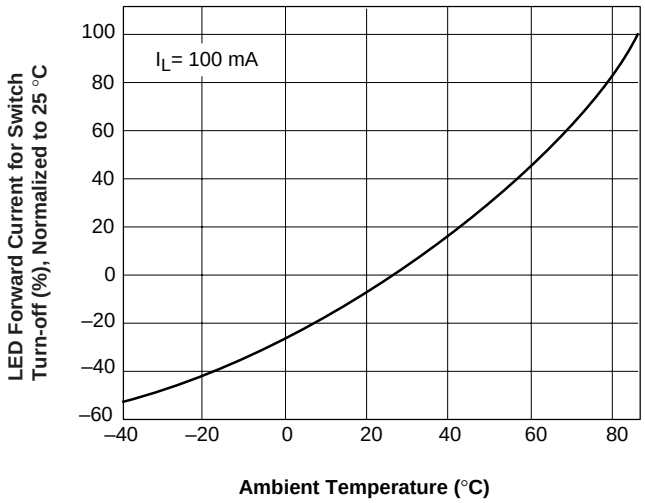


Figure 3. Switch Capacitance vs. Applied Voltage

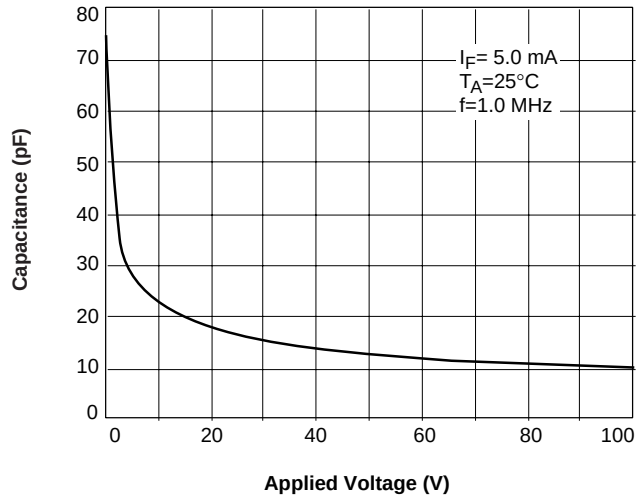


Figure 4. LED Dropout Voltage vs. Temperature

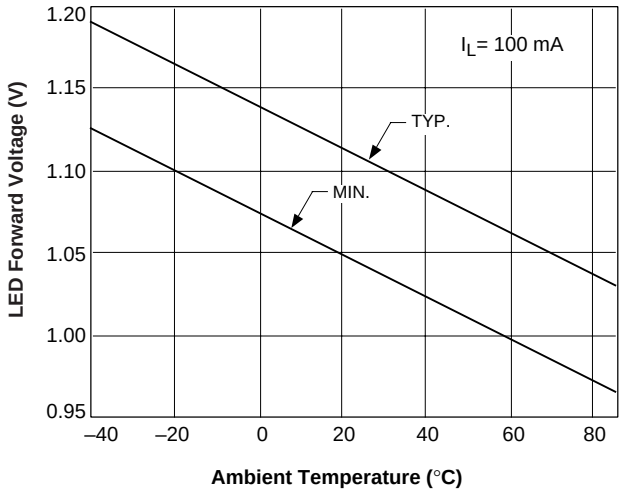


Figure 5. ON-resistance vs. Temperature

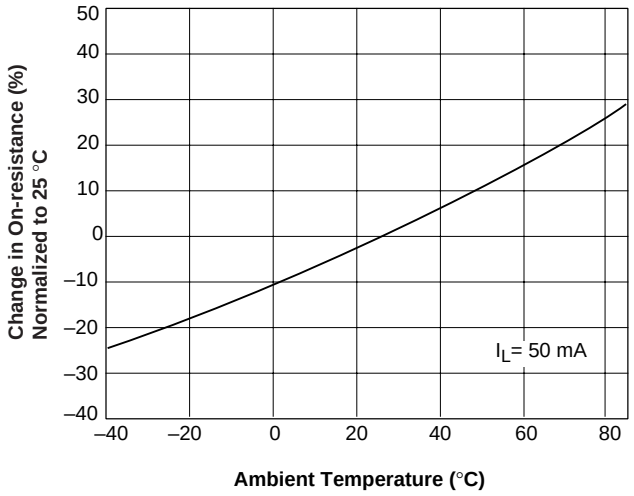


Figure 6. Output Isolation

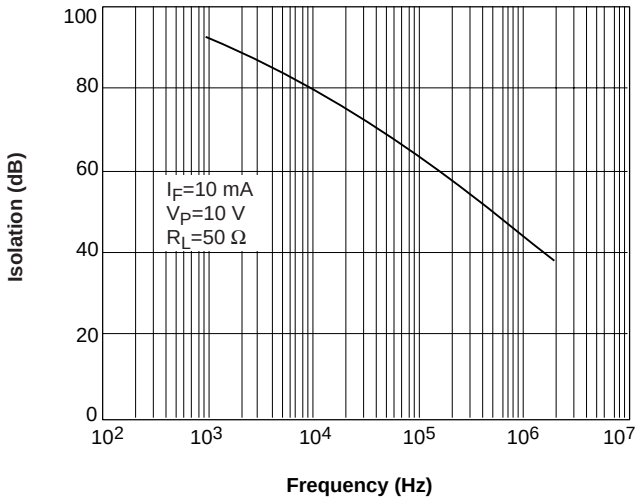


Figure 7. Insertion Loss vs. Frequency

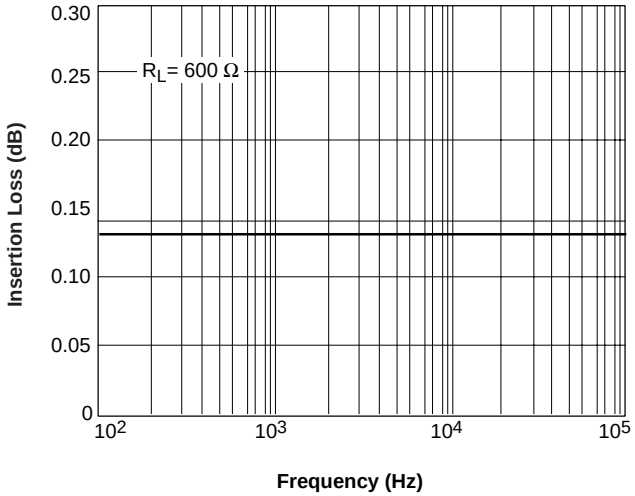


Figure 8. Leakage Current vs. Applied Voltage at 50°C

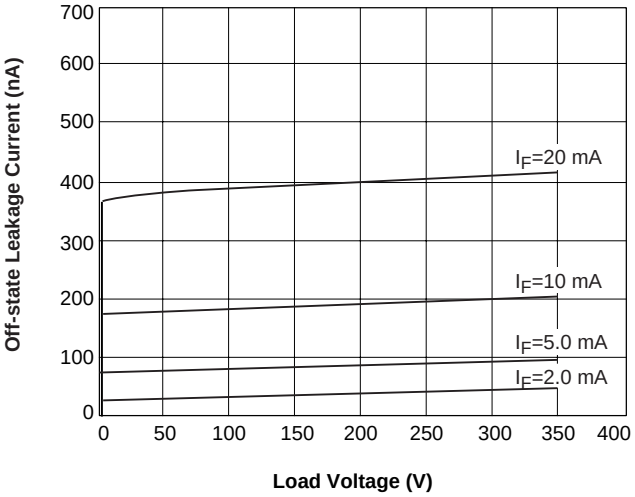


Figure 9. Leakage Current vs. Applied Voltage at 85°C

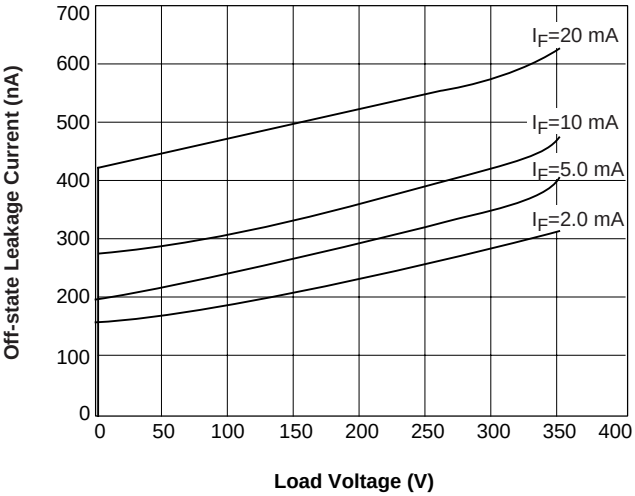


Figure 10. Leakage Current vs. Applied Voltage at 25°C

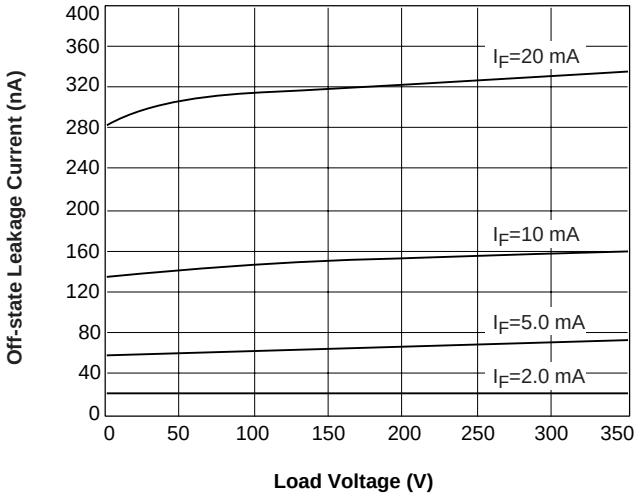


Figure 11. Leakage Current vs. Applied Voltage at 70°C

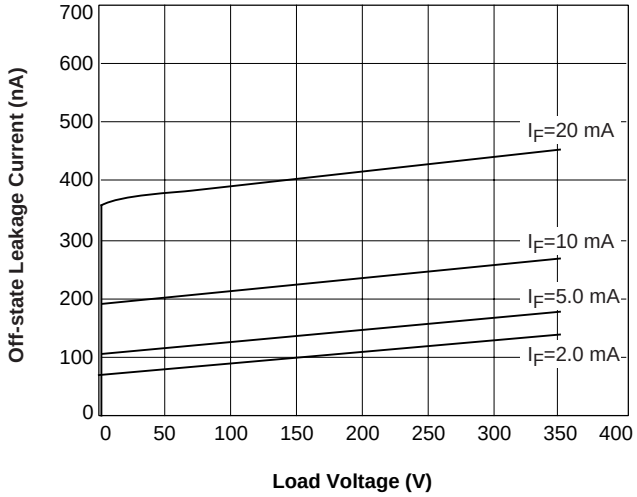


Figure 12. Switch Breakdown Voltage vs. Temperature

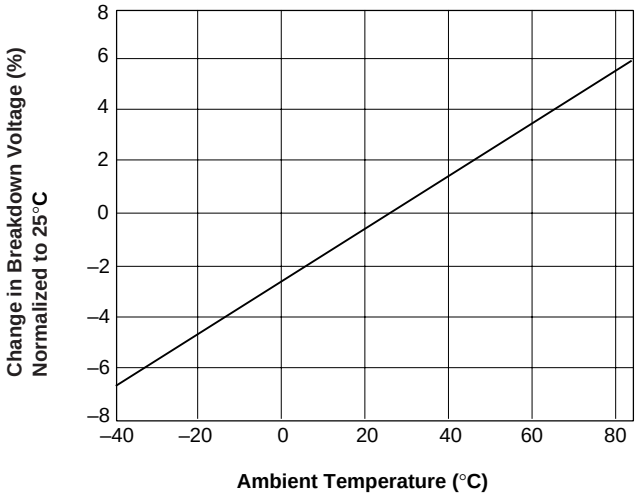


Figure 13. Switch Offset Voltage vs. Temperature

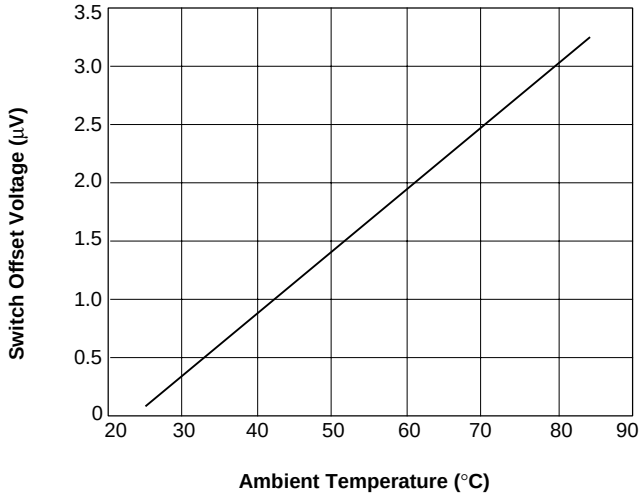


Figure 14. Turn-on Time vs. LED Current

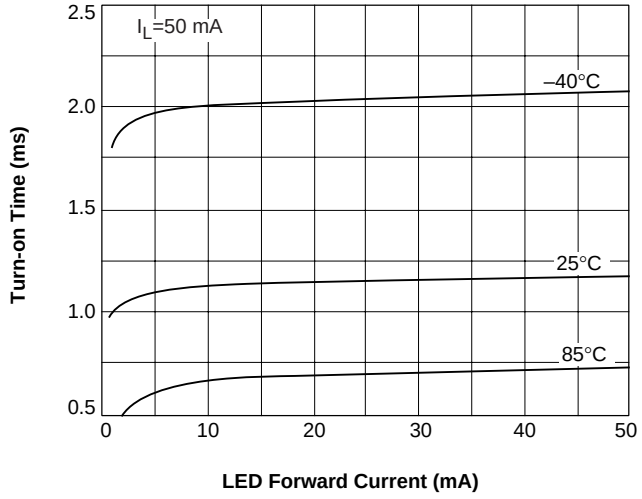


Figure 15. Turn-on/off vs. Temperature

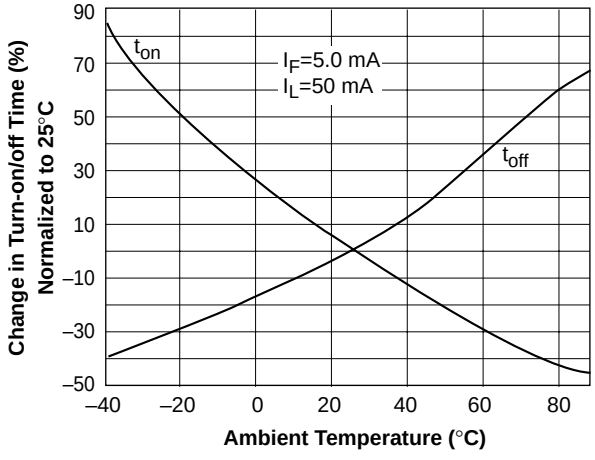


Figure 16. Turn-off Time vs. LED Current