LH1556FP/FPTR

Dual 1 Form A
Solid State Relay

FEATURES

- **Two Independent Relays in a Single Package**
- **Package—FLAT PAK**
- **I/O Isolation, 3000 V_{RMS}**
- **Solid-state Relay**
  - **Typical R_{ON} 20 Ω**
  - **Load Voltage 350 V**
  - **Load Current 120 mA**
  - **Current Limit Protection**
  - **High Surge Capability**
  - **Linear, AC/DC Operation**
  - **Clean Bounce Free Switching**
  - **Low Power Consumption**
  - **High Reliability Monolithic Receptor**

AGENCY APPROVALS

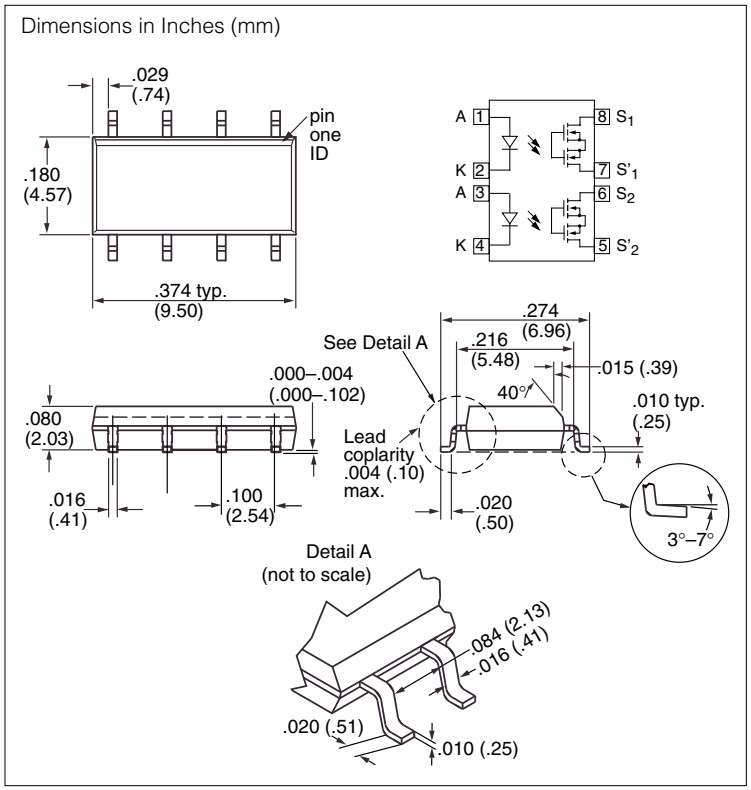
- **UL – File No. E52744**
- **BSI/BABT Cert. No. 7980**

APPLICATIONS

- **General Telecom Switching**
  - **On/off Hook Control**
  - **Ring Relay**
  - **Ground Start**
- **Industrial Controls**
  - **Triac Predriver**
  - **Output Modules**
- **Peripherals**
  - **Transducer Driver**
- **Instrumentation**
  - **Automatic Tuning/Balancing**
  - **Flying Capacitor**
  - **Analog Multiplexing**
- **See Application Note 56**

DESCRIPTION

The LH1556FP is robust, ideal for telecom and ground fault applications. It contains two SPST normally open switches (1 Form A) that replace electromechanical relays in many applications. It is constructed using a GaAs LED for actuation control and an integrated monolithic die for the switch output. The die, fabricated in a high-voltage dielectrically isolated BCDMOS 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 overvoltage protection is provided.



Part Identification

Part Number	Description
LH1556FP	8-pin SMD, Tubes
LH1556FPTR	8-pin SMD, Tape and Reel

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 this document. Exposure to absolute Maximum Ratings for extended periods of time can adversely affect reliability.

Package

Ambient Temperature Range ..... –40 to +85°C
Storage Temperature Range ..... –40 to +125°C
Soldering Temperature (t=10 s max.)..... 260°C
Isolation Test Voltage (t=1.0 s) ..... 3000 V_{RMS}
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
Total Power Dissipation ..... 550 mW

SSR

LED Continuous Forward Current ..... 50 mA
LED Reverse Voltage ($I_R \leq 10$ µA)..... 6.0 V
DC or Peak AC Load Voltage ($I_L \leq 50$ µA) ..... 350 V
Continuous DC Load Current ..... 120 mA

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.	Unit	Test Condition
Input						
LED Forward Current for Switch Turn-on	I_{Fon}	—	1.1	2.0	mA	I_L=100 mA, t=10 ms
LED Forward Current for Switch Turn-off	I_{Foff}	0.2	0.6	—	mA	V_L=±300 V
LED Forward Voltage	V_F	1.0	1.18	1.45	V	I_F=10 mA
Current Limit	I_{limit}	230	260	370	mA	I_F=5.0 mA, t=5.0 ms V_L=±6.0 V
Output						
ON-Resistance, AC/DC: Pin 3 (±) to 4 (±)	R_{ON}	—	20	35	Ω	I_F=5 mA, I_L=50 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	µA	I_F=0 mA, V_L=±350 V
Output Capacitance, Pin 3 to 4	C_O	—	55	—	pF	I_F=0 mA, V_L=1.0 V
		—	10	—	pF	I_F=0 mA, V_L=50 V
Transfer						
Turn-on Time	t_{on}	—	2.0	3.0	ms	I_F=5.0 mA, I_L=50 mA
Turn-off Time	t_{off}	—	0.08	3.0	ms	I_F=5.0 mA, I_L=50 mA
Input/Output Capacitance	C_{ISO}	—	0.6	—	pF	V_{ISO}=1.0 V

Typical Performance Characteristics

Figure 1. LED Voltage vs. Temperature

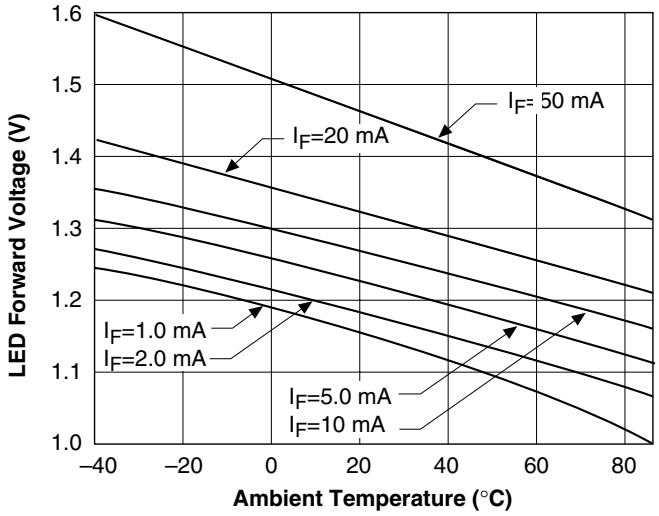


Figure 2. LED Current for Switch Turn-on vs. Temperature

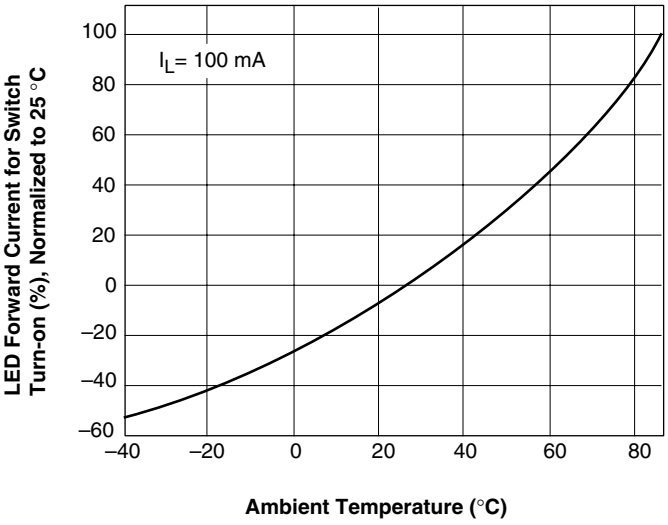


Figure 3. ON-Resistance vs. Temperature

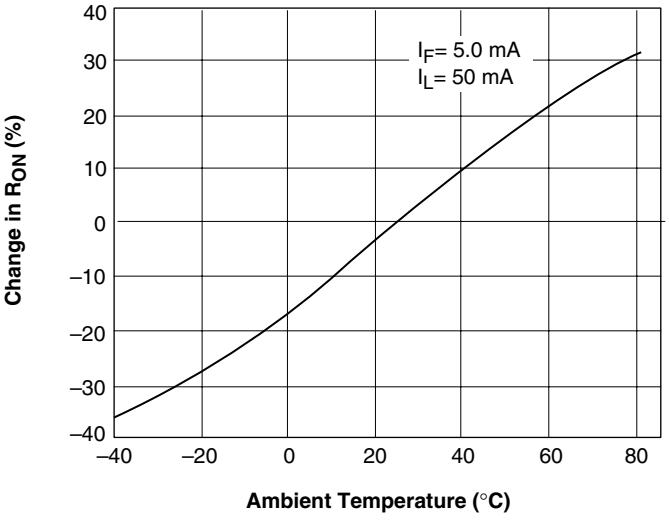


Figure 4. Current Limit vs. Temperature

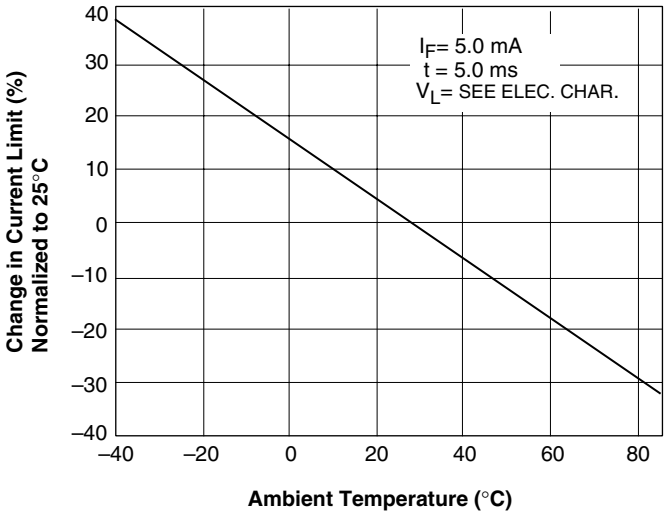


Figure 5. Switch Breakdown Voltage vs. Temperature

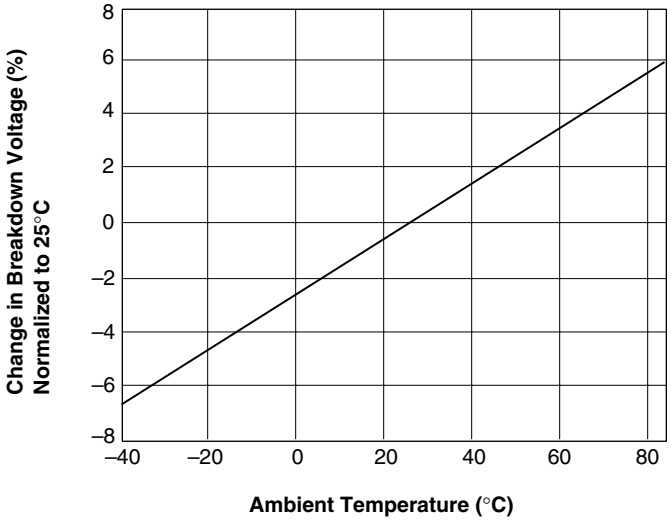


Figure 6. Switch Capacitance vs. Applied Voltage

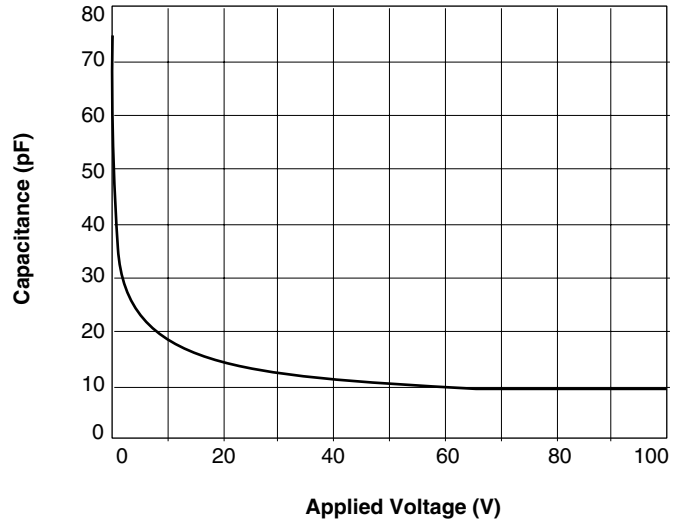


Figure 7. Leakage Current vs. Applied Voltage

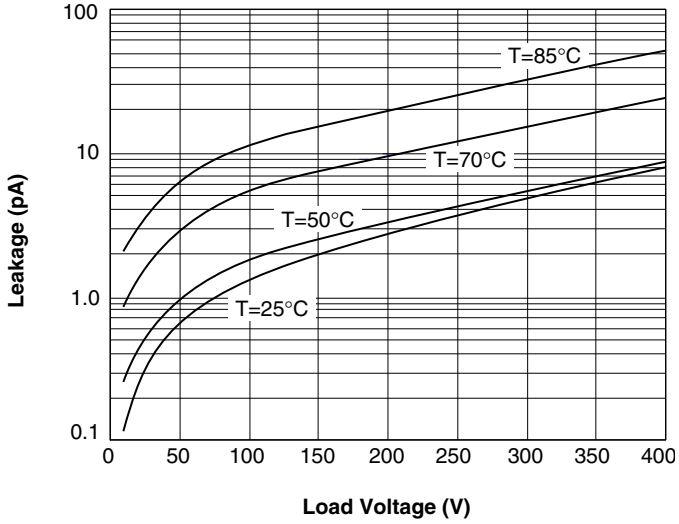


Figure 8. Leakage Current vs. Applied Voltage

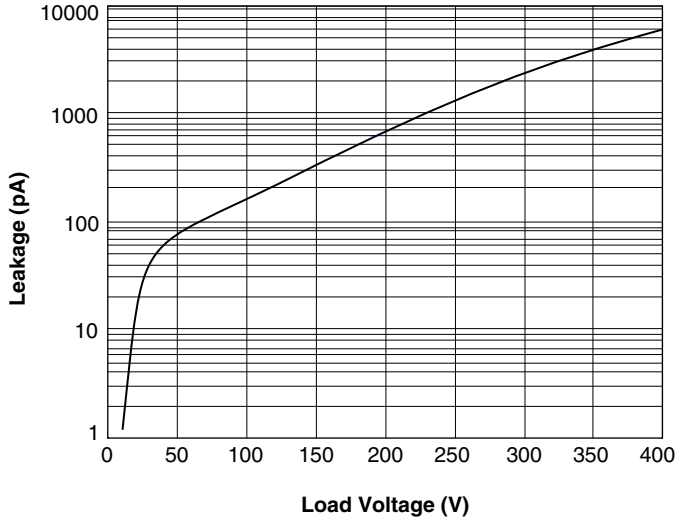


Figure 9. Turn-off Time vs. Temperature

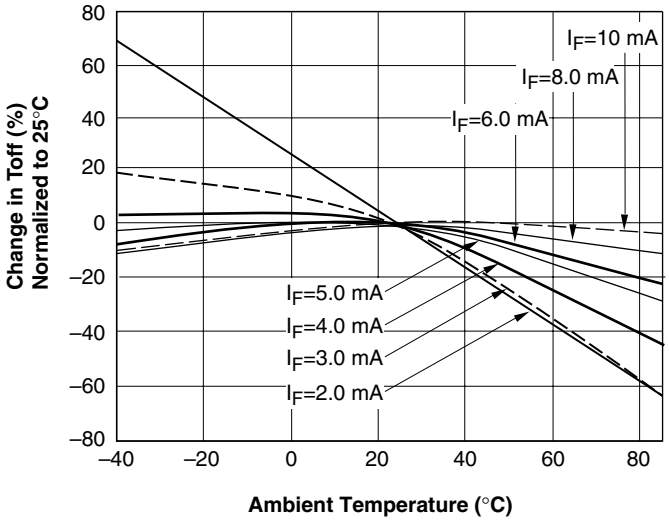


Figure 10. Turn-on Time vs. LED Current