

### FEATURES

- 5300 V<sub>RMS</sub> I/O Isolation
- Current-limit Protection Built-in
- Linear AC/DC Operation
- High-reliability Monolithic Receptor
- Low Power Consumption
- Clean, Bounce-free Switching
- High Surge Capability
- Surface Mountable
- Flammability; UL94,VØ

### AGENCY APPROVALS

- UL – File No. E52744
- CSA – Certification 093751

### APPLICATIONS

- General Telecom Switching
- Instrumentation
- Industrial Controls

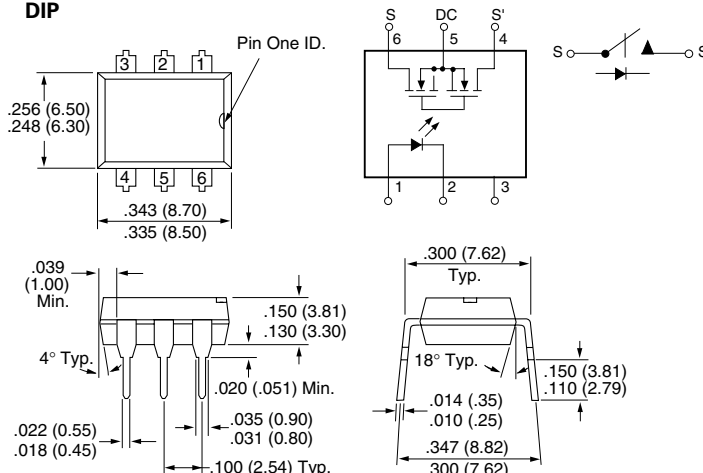
### DESCRIPTION

The LH1519 relays are miniature, optically-coupled relays with high-voltage MOSFET outputs. The relays are capable of switching AC or DC loads from as little as nanovolts to hundreds of volts. Likewise, the relays can switch currents in the range of nanoamps to hundreds of milliamps. The MOSFET switches are ideal for small signal switching and are primarily suited for DC or audio frequency applications.

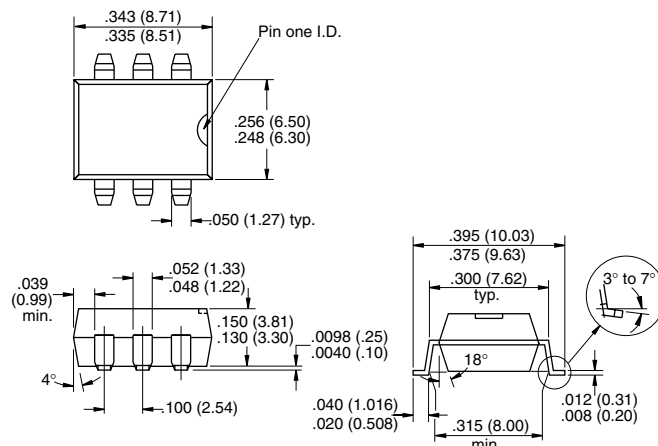
The LH1519 relays offer low on-resistance.

Package Dimensions in Inches (mm)

#### DIP



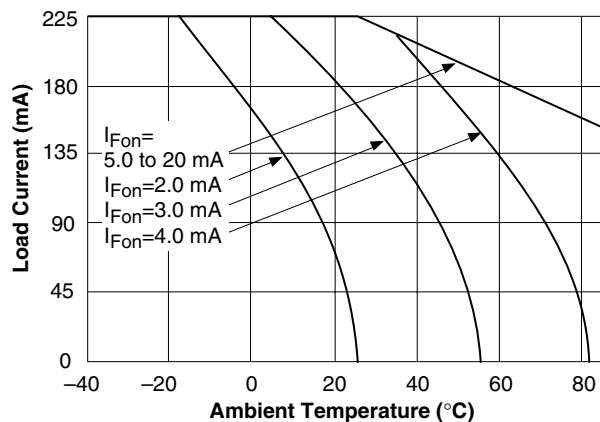
#### SMD



### Part Identification

| Part Number | Description                        |
|-------------|------------------------------------|
| LH1519AT    | 6-pin DIP, Tubes                   |
| LH1519AAB   | 6-pin SMD, Gullwing, Tubes         |
| LH1519AABTR | 6-pin SMD, Gullwing, Tape and Reel |

## Recommended Operating Conditions



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

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.

|                                                                    |       |                |
|--------------------------------------------------------------------|-------|----------------|
| 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 ( $V_{ISO}$ )                       | ..... | 5300 $V_{RMS}$ |
| LED Continuous Forward Current ( $I_F$ )                           | ..... | 50 mA          |
| LED Reverse Voltage ( $I_R \leq 10 \mu\text{A}$ ) ( $V_R$ )        | ..... | 8.0 V          |
| DC or Peak AC Load Voltage ( $I_L \leq 50 \mu\text{A}$ ) ( $V_L$ ) | ..... | 250 V          |
| Continuous DC Load Current ( $I_L$ )                               | ..... |                |
| Bidirectional Operation                                            | ..... | 240 mA         |
| Unidirectional Operation                                           | ..... | 450 mA         |
| Peak Load Current ( $t=100$ ms) (single shot) ( $I_P$ )            | ..... | †              |
| Output Power Dissipation ( $P_{DISS}$ )                            | ..... | 550 mW         |

† Refer to Current Limit Performance Application Note 58 for a discussion on relay operation during transient currents.

## Electrical Characteristics, $T_A=25^{\circ}\text{C}$

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                             |
|-------------------------------------------------------------------------------------------|------------|------|------|------|---------------|---------------------------------------------|
| <b>Input</b>                                                                              |            |      |      |      |               |                                             |
| LED Forward Current, Switch Turn-on                                                       | $I_{Fon}$  | —    | 0.9  | 2.0  | mA            | $I_L=100$ mA, $t=10$ ms                     |
| LED Forward Current, Switch Turn-off                                                      | $I_{Foff}$ | 0.2  | 0.8  | —    | mA            | $V_L \pm 200$ V                             |
| LED Forward Voltage                                                                       | $V_F$      | 1.15 | 1.26 | 1.45 | V             | $I_F=10$ mA                                 |
| <b>Output</b>                                                                             |            |      |      |      |               |                                             |
| ON-resistance<br>ac/dc: Pin 4 ( $\pm$ ) to 6 ( $\pm$ )<br>dc: Pin 4, 6 (+) to 5 ( $\pm$ ) | $R_{ON}$   | 3.0  | 6.0  | 10   | $\Omega$      | $I_F=5.0$ mA, $I_L=50$ mA                   |
|                                                                                           |            | 0.75 | 1.5  | 2.5  |               | $I_F=5.0$ mA, $I_L=100$ mA                  |
| OFF-resistance                                                                            | $R_{OFF}$  | 0.5  | 2500 | —    | G $\Omega$    | $I_F=0$ mA, $V_L=\pm 100$ V                 |
| Current Limit<br>ac/dc: Pin 4 ( $\pm$ ) to 6 ( $\pm$ )<br>dc: Pin 4, 6 (+) to 5 ( $\pm$ ) | $I_{LMT}$  | 330  | 450  | 550  | mA            | $I_F=5.0$ mA, $t=5.0$ ms<br>$V_L=\pm 4.0$ V |
|                                                                                           |            | —    | —    | —    |               | $I_F=5.0$ mA, $V_L=4.0$ mA<br>$t=5.0$ ms    |
| Off-state Leakage Current                                                                 | —          | —    | 0.04 | 200  | nA            | $I_F=0$ mA, $V_L=\pm 100$ V                 |
|                                                                                           |            | —    | —    | 1.0  | $\mu\text{A}$ | $I_F=0$ mA                                  |
| Output Capacitance<br>Pin 4 to 6                                                          | —          | —    | 100  | —    | pF            | $I_F=0$ mA, $V_L=1.0$ V                     |
|                                                                                           |            | —    | 20   | —    |               | $I_F=0$ mA, $V_L=50$ V                      |
| Switch Offset                                                                             | —          | —    | 0.1  | —    | V             | $I_F=5.0$ mA                                |
| <b>Transfer</b>                                                                           |            |      |      |      |               |                                             |
| 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                                                                             | $t_{off}$  | —    | 0.9  | 3.0  | ms            | $I_F=5.0$ mA, $I_L=50$ mA                   |

## Typical Performance Characteristics

Figure 1. LED Current for Switch Turn-on vs. Temperature

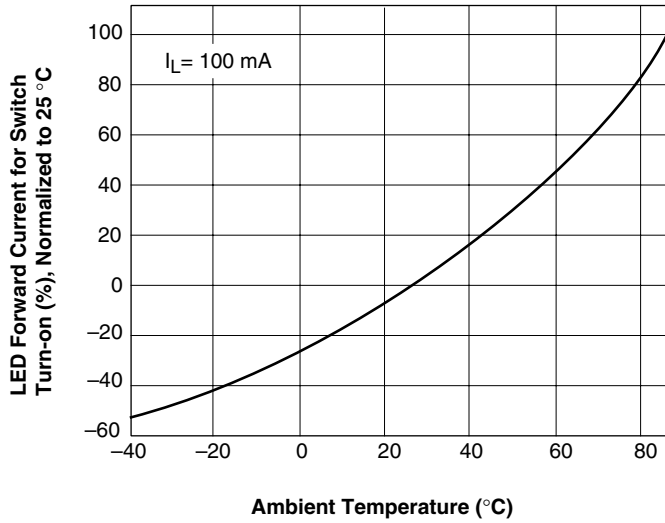


Figure 4. Current Limit vs. Temperature

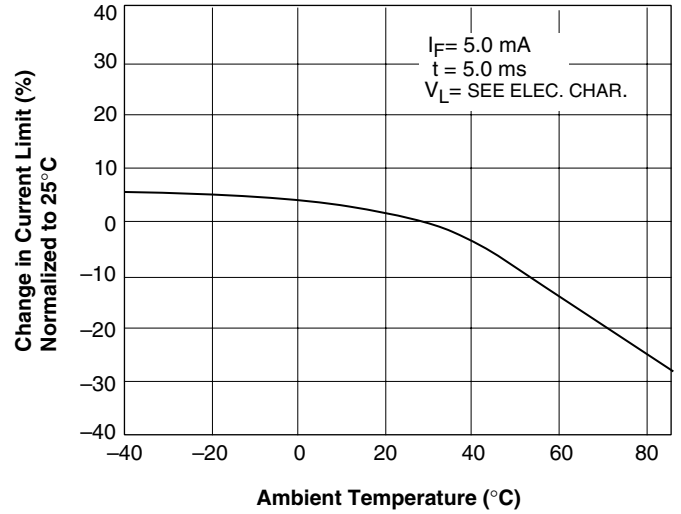


Figure 2. LED Drop-out Voltage vs. Temperature

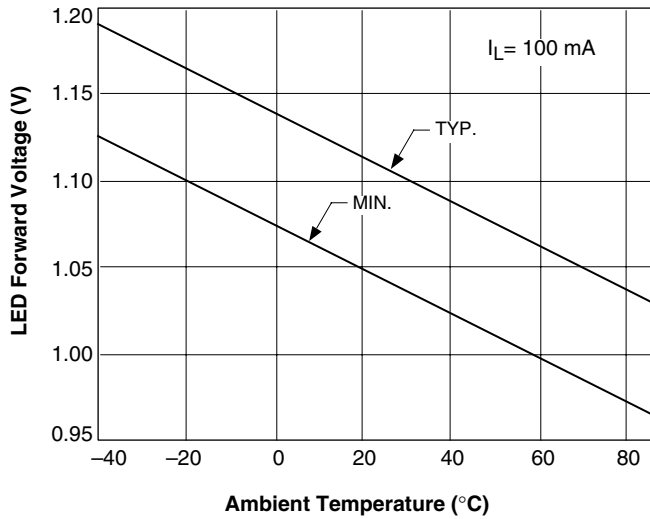


Figure 5. Switch Capacitance vs. Applied Voltage

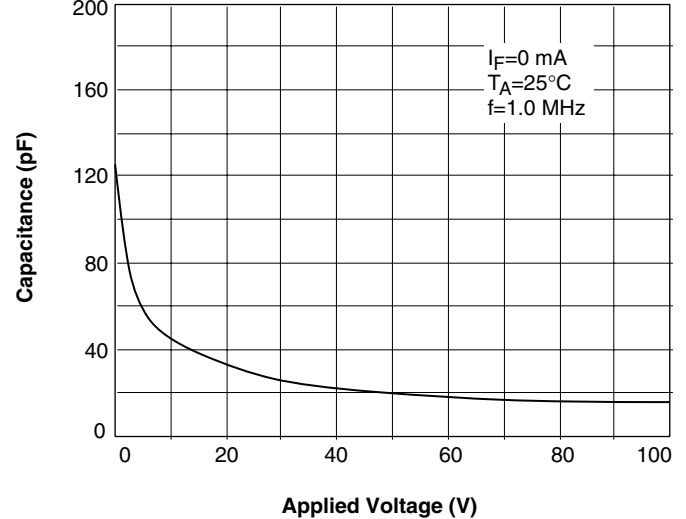


Figure 3. ON-Resistance vs. Temperature

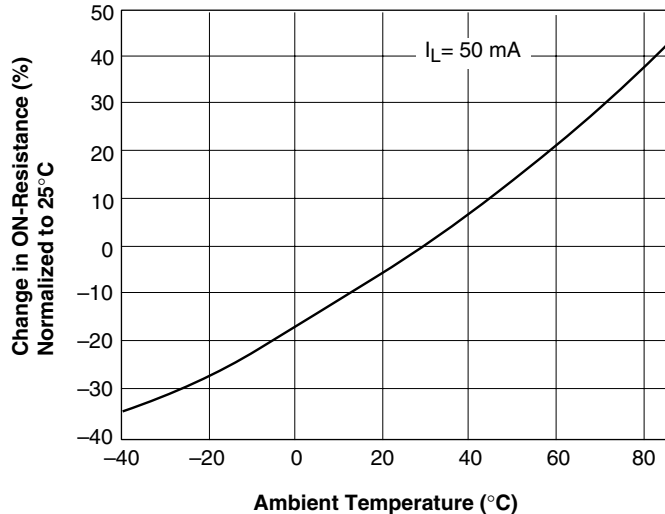
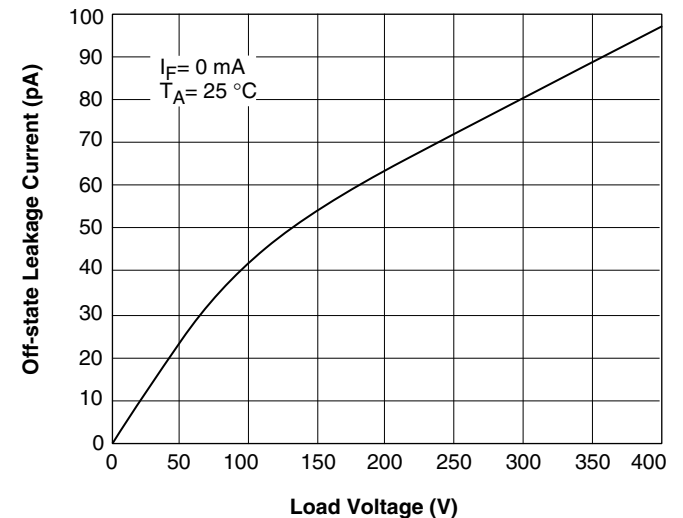
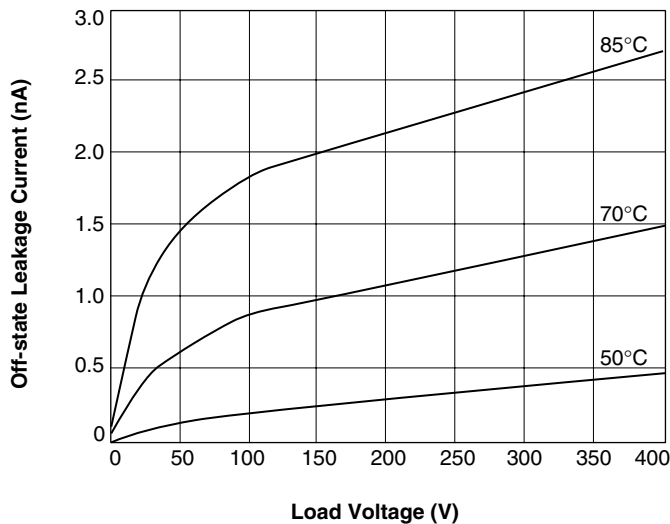


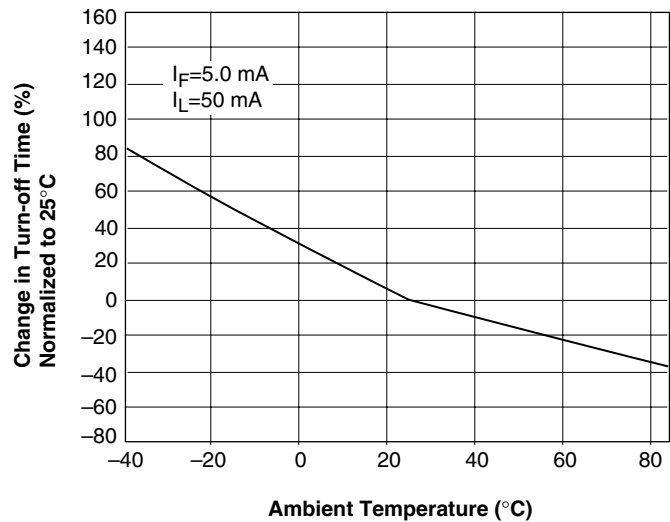
Figure 6. Leakage Current vs. Applied Voltage



**Figure 7. Leakage Current vs. Applied Voltage at Elevated Temperatures**



**Figure 8. Turn-Off Time vs. Temperature**



**Figure 9. Turn-On Time vs. LED Current**

