

## Photo DMOS-FET Relay

### Description

The **LT416** is a 1-Form A solid state relay in an 4 pin DIP package that employs optically coupled MOSFET technology to provide 3750V/5000V of input to output isolation. The optically coupled input is controlled by a highly efficient GaAlAs infrared LED and MOS FETs on the output side.

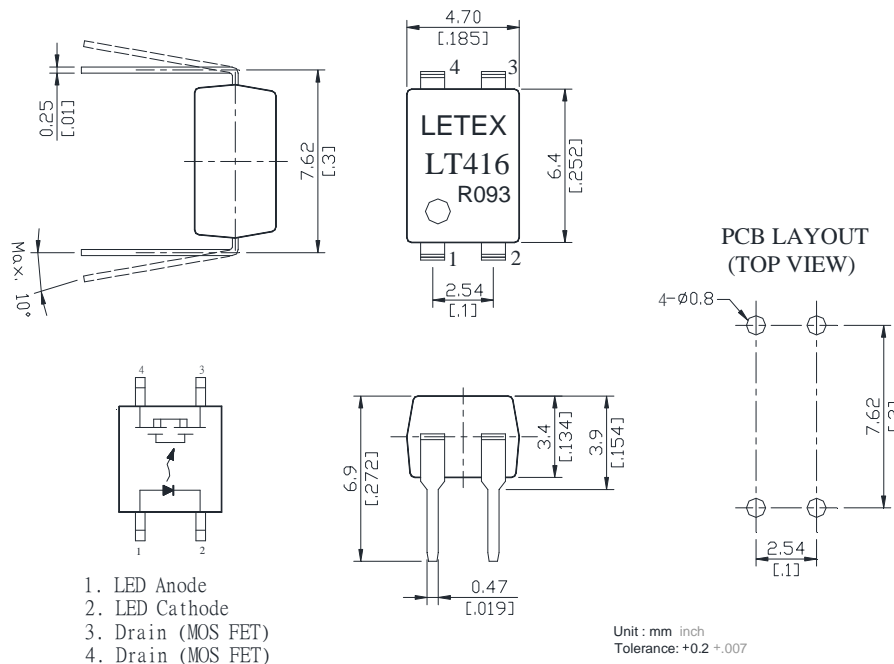
### Features

- Low driver power requirements (TTL/CMOS Compatible)
- No moving parts
- High reliability
- Arc-Free with no snubbing circuits
- 3750 / 5000Vrms Input/Output isolation

### Applications

- Telecommunications (PC, Electronic notepad)
- Measuring and Testing equipment
- Industrial control
- Security equipments
- High speed inspection machine

### Outline Dimensions



1. LED Anode
2. LED Cathode
3. Drain (MOS FET)
4. Drain (MOS FET)

## Photo DMOS-FET Relay Specifications

### Part Name: LT416

(Load voltage:20V / Load current:2A)

#### Absolute Maximum Ratings (Ambient Temperature: 25°C)

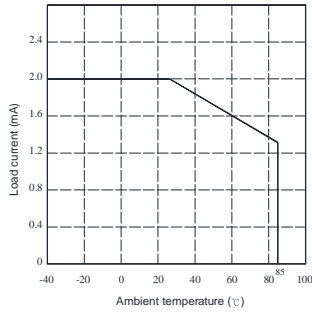
| Item                            | Symbol                   | Value             | Units            | Note             |                     |
|---------------------------------|--------------------------|-------------------|------------------|------------------|---------------------|
| Input                           | Continuous LED Current   | I <sub>F</sub>    | 50               | mA               |                     |
|                                 | Peak LED Current         | I <sub>FP</sub>   | 1000             | mA               | f=100Hz,<br>duty=1% |
|                                 | LED Reverse Voltage      | V <sub>R</sub>    | 5                | V                |                     |
|                                 | Input Power Dissipation  | P <sub>In</sub>   | 75               | mW               |                     |
| Output                          | Load Voltage             | V <sub>L</sub>    | 20               | V(AC peak or DC) |                     |
|                                 | Load Current             | I <sub>L</sub>    | 2                | A                |                     |
|                                 | Peak Load Current        | I <sub>Peak</sub> | 3.5              | A                | 300 μs(1 pulse)     |
|                                 | Output Power Dissipation | P <sub>out</sub>  | 450              | mW               |                     |
| Total Power Dissipation         | P <sub>T</sub>           | 500               | mW               |                  |                     |
| I/O Breakdown Voltage           | V <sub>I/O</sub>         | 3750              | V <sub>rms</sub> | RH=60%, 1min     |                     |
| I/O Breakdown Voltage(Suffix-V) | V <sub>I/O</sub>         | 5000              | V <sub>rms</sub> | RH=60%, 1min     |                     |
| Operating Temperature           | T <sub>Opr</sub>         | -40 to +85        | °C               |                  |                     |
| Storage Temperature             | T <sub>Stg</sub>         | -40 to +100       | °C               |                  |                     |
| Pin Soldering Temperature       | T <sub>Sol</sub>         | 260               | °C               | 10 sec max.      |                     |

#### Electrical Specifications (Ambient Temperature: 25°C)

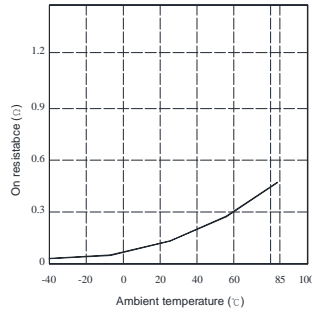
| Item             | Symbol                    | MIN.               | TYP.             | MAX. | Units | Conditions   |
|------------------|---------------------------|--------------------|------------------|------|-------|--|
| Input            | LED Forward Voltage       | V <sub>F</sub>     | 1.2              | 1.5  | V     | I <sub>F</sub> =10mA   |
|                  | Operation LED Current     | I <sub>F On</sub>  | 0.5              | 5.0  | mA    |  |
|                  | Recovery LED Current      | I <sub>F Off</sub> | 0.35             | 0.5  | mA    |  |
|                  | Recovery LED Voltage      | V <sub>F Off</sub> | 0.5              |      | V     |  |
| Output           | On-Resistance             | R <sub>on</sub>    | 0.1              | 0.5  | Ω     | I <sub>F</sub> =10mA, I <sub>L</sub> =100mA,<br>Time to flow is within<br>1 sec. |
|                  | Off-State Leakage Current | I <sub>Leak</sub>  |                  | 1    | μA    | V <sub>L</sub> =Rating   |
|                  | Output Capacitance        | C <sub>out</sub>   |                  | 150  | pF    | V <sub>L</sub> =0, f=1MHz  |
| Transmis<br>sion | Turn-On Time              | T <sub>on</sub>    | 0.8              | 1.5  | ms    | I <sub>F</sub> =10mA, I <sub>L</sub> =100mA                                      |
|                  | Turn-Off Time             | T <sub>off</sub>   | 0.02             | 0.5  | ms    |  |
| Coupled          | I/O Isolation Resistance  | R <sub>I/O</sub>   | 10 <sup>10</sup> |      | Ω     | DC500V   |
|                  | I/O Capacitance           | C <sub>I/O</sub>   |                  | 0.8  | 1.5   | pF   |

## Reference Data

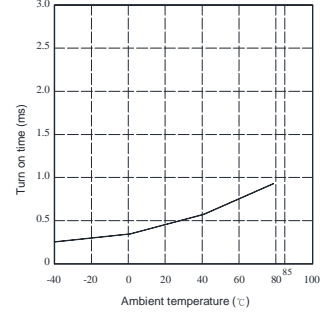
Load current Vs. Ambient temperature



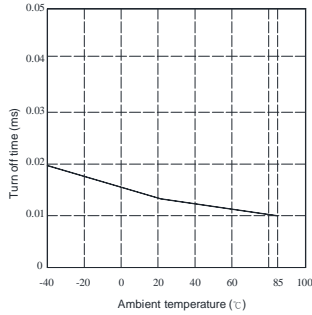
On resistance Vs. Ambient temperature



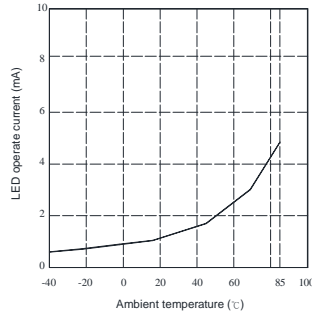
Turn on time Vs. Ambient temperature



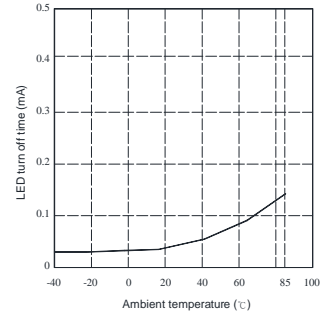
Turn off time Vs. Ambient temperature



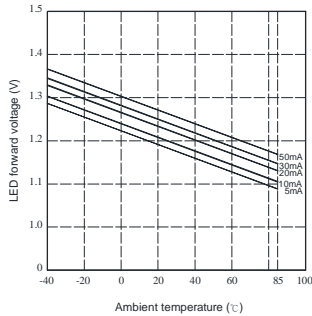
LED operate current Vs. Ambient temperature



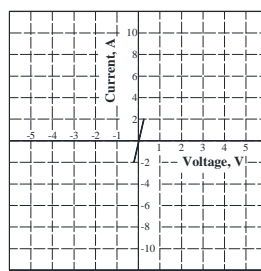
LED turn off current Vs. Ambient temperature



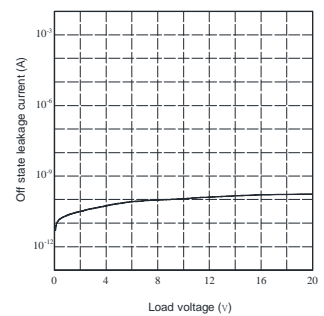
LED forward voltage Vs. Ambient temperature



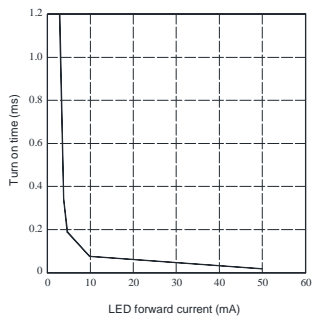
Voltage Vs. current characteristics of output at MOS portion



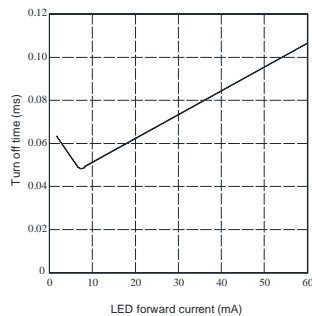
Off state leakage current Vs. Load voltage characteristics



LED forward current Vs. turn on time characteristics



LED forward current Vs. turn off time characteristics



Applied voltage Vs. output capacitance characteristics

