

## Photo DMOS-FET Relay

### Description

The **LT438** is a 1-Form A solid state relay in a 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.

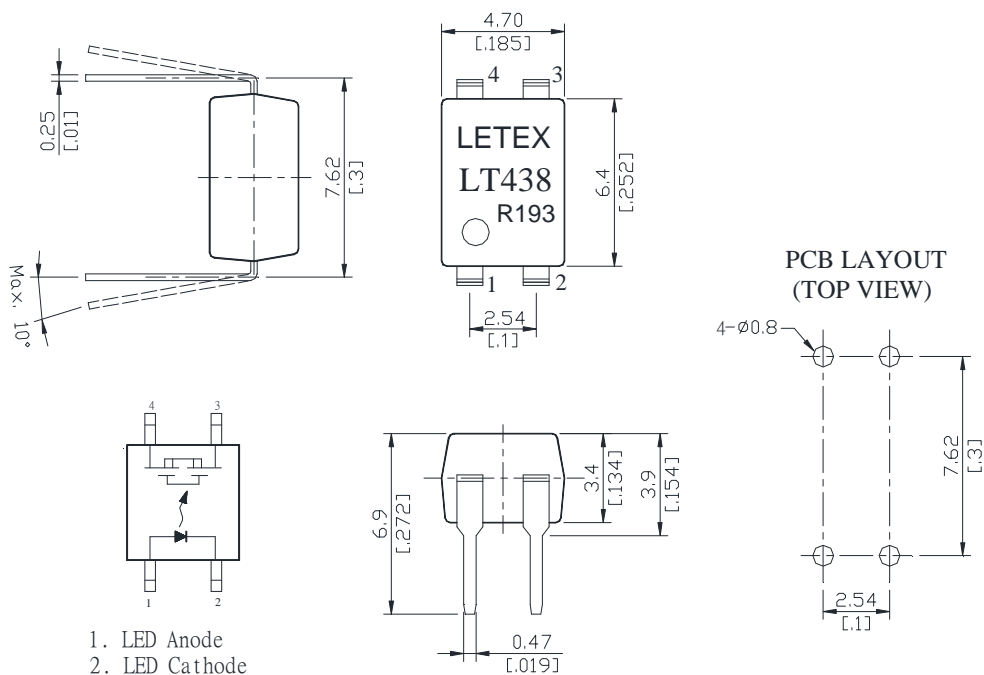
### Features

- Low driver power requirements (TTL/CMOS Compatible)
- High reliability
- Arc-Free with no snubbing circuits
- 3750/5000 Vrms Input/Output isolation
- Tape & Reel version available

### 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)

Unit : mm inch  
Tolerance: +0.2 +.007



## Photo DMOS-FET Relay Specifications

**Part Name: LT438**

(Load voltage: 60V / Load current: 550mA)

Absolute Maximum Ratings (Ambient Temperature: 25°C)

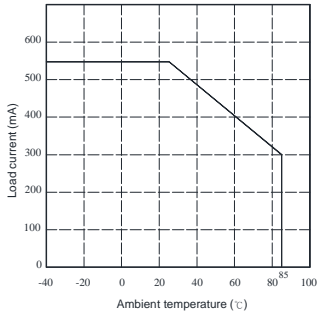
Item	Symbol	Value	Units	Note	
Input	Continuous LED Current	I <sub>F</sub>	50	mA	
	Peak LED Current	I <sub>FP</sub>	1000	mA	f=100Hz, duty=1%
	LED Reverse Voltage	V <sub>R</sub>	5	V	
	Input Power Dissipation	P <sub>In</sub>	75	mW	
Output	Load Voltage	V <sub>L</sub>	60	V(AC peak or DC)	
	Load Current	I <sub>L</sub>	550	mA	
	Peak Load Current	I <sub>Peak</sub>	1.0	A	100ms(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)

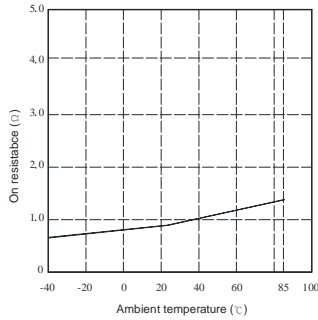
Item	Symbol	MIN.	TYP.	MAX.	Units	Conditions
Input	LED Forward Voltage	V <sub>F</sub>	1.2	1.5	V	I <sub>F</sub> =10mA
	Operation LED Current	I <sub>F on</sub>	0.5	5.0	mA	
	Recovery LED Current	I <sub>F off</sub>	0.35	0.5	mA	
	Recovery LED Voltage	V <sub>F off</sub>	0.7		V	
Output	On-Resistance	R <sub>on</sub>	0.8	1.5	Ω	I <sub>F</sub> =10mA, I <sub>L</sub> =100mA, Time to flow is within 1 sec.
	Off-State Leakage Current	I <sub>Leak</sub>	1	10	nA	V <sub>L</sub> =Rating
	Output Capacitance	C <sub>out</sub>	28		pF	V <sub>L</sub> =0, f=1MHz
Transmission	Turn-On Time	T <sub>on</sub>	0.25	0.35	ms	I <sub>F</sub> =10mA, I <sub>L</sub> =100mA,
	Turn-Off Time	T <sub>off</sub>	0.02	0.05	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	f=1MHz

## Reference Data

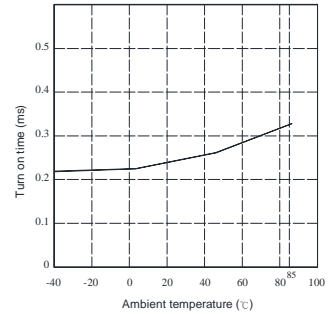
Load current Vs. Ambient temperature



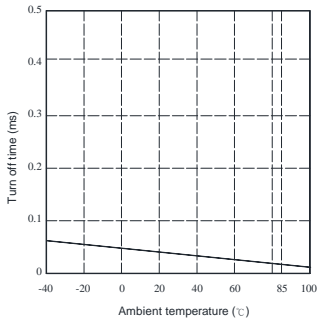
On resistance Vs. Ambient temperature



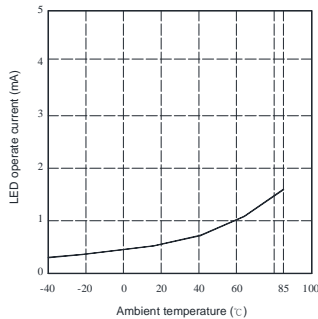
Turn on time Vs. Ambient temperature



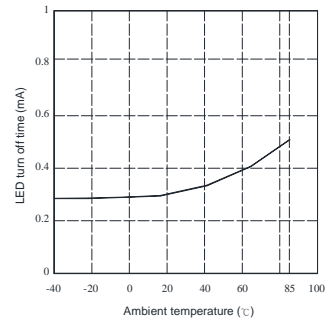
Turn off time Vs. Ambient temperature



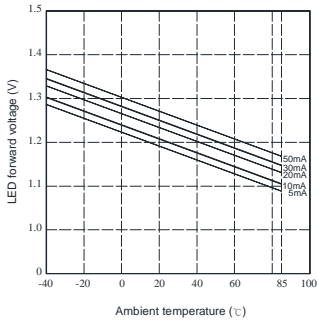
LED operate current Vs. Ambient temperature



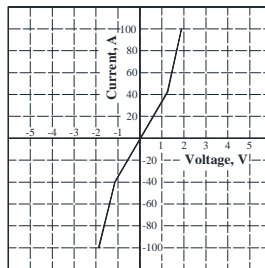
LED turn off current Vs. Ambient temperature



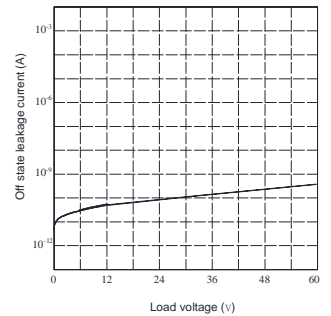
LED forward voltage Vs. Ambient temperature



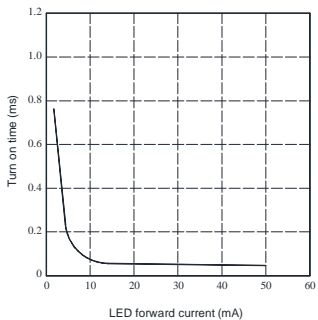
Voltage Vs. current characteristics of output at MOS portion



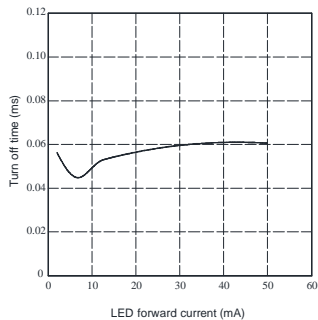
Off state leakage current Vs. Load voltage characteristics



LED forward current Vs. turn on time characteristics



LED forward current Vs. turn off time characteristics



Applied voltage Vs. output capacitance characteristics

