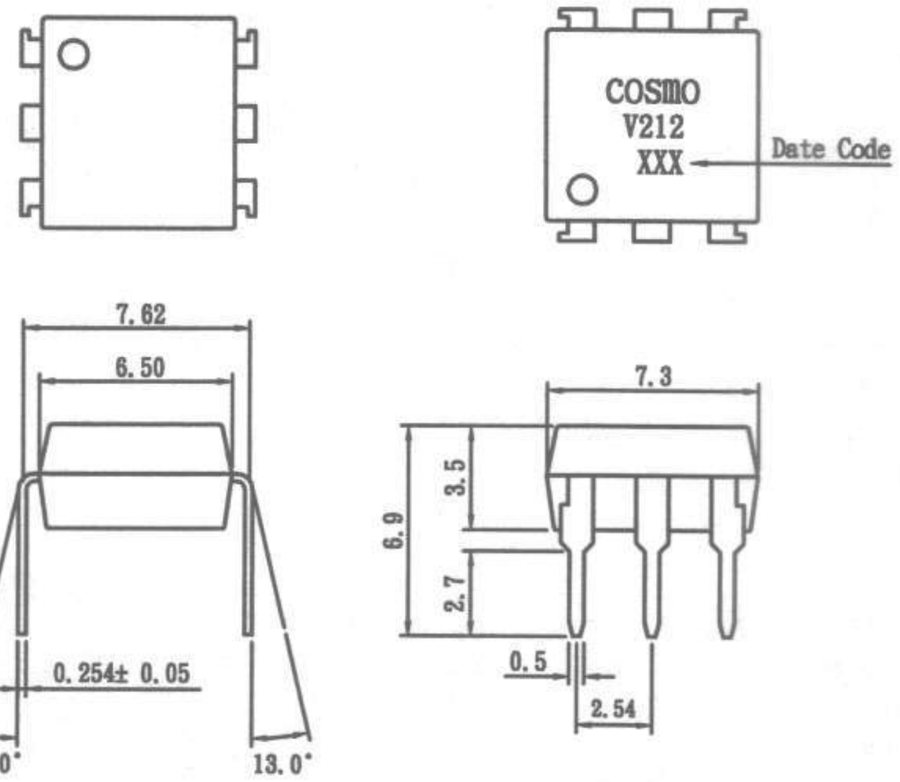
# PRODUCT SPECIFICATION

DATE:12/11/2000

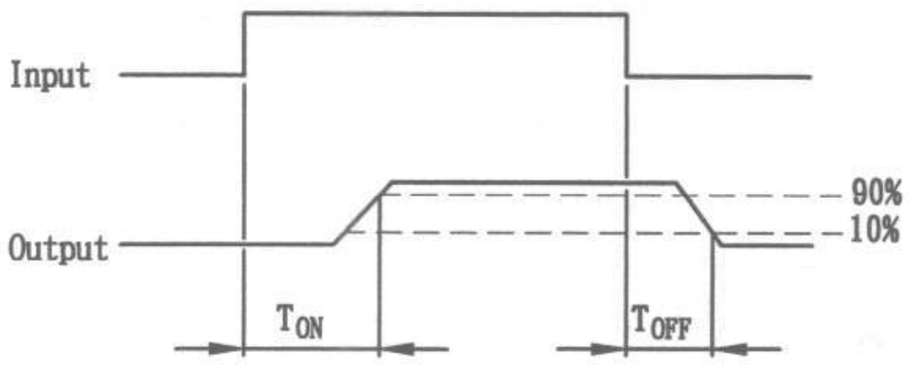
| COSMO ELECTRONICS CO.,LTD. | PHOTO MOS RELAYS: KAQV212 | NO. 60M10013 | VER. 2 |
|---|---|---|---|
| | | SHEET 1 OF 7 | |

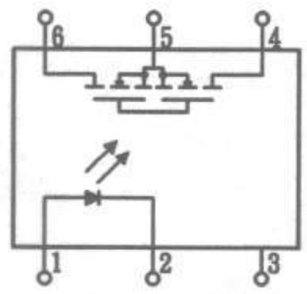
- OUTSIDE DIMENSION :

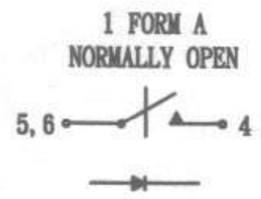



Unit:mm
Tolerance:± 0.2 mm

- Turn on/Turn off time




Absolute Maximum Ratings ($T_A$=25° C)

Emitter (Inpute)

Reverse Voltage . . . . . 5.0V
Continuous Forward Current . . . . . .50mA
Peak Forward Current (1s) . . . . . 1A
Power Dissipation. . . . . 100mW
Derate Linearly from 25° C . . . . . 1.3mW/° C

Detector (Output)

Output Breakdown Voltage . . . . . ± 60V
Continous Load Current . . . . . ± 400mA
Power Dissipation . . . . . .500mW

General Characteristics

Isolation Test Voltage. . . . . .3750$VAC_{RMS}$
Isolation Resistance
$V_{IO}$ =500V, $T_A$=25° C. . . . . .$\geq 10^{10}\Omega$
Total Power Dissipation . . . . . .550mW

Derate Linearly form 25° C. . . . . .2.5mW/° C
Storage Temperature Range . . . . -40 to +150° C
Operating Temperature Range. . . . -40 to +85° C
Junction Temperature . . . . . .100° C
Soldering Temperature, 2mm from case, 10 sec. 260° C

| ISSUE | CHECK | APPROVED |
|---|---|---|
| Ming Chen 12-11-'00 | Vincent Chuang 12-11-'00 | Stan Hsu 12-11-'00 |

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| COSMO ELECTRONICS CO., LTD. | PHOTO MOS RELAYS: KAQV212 | NO. 60M10013 | VER. |
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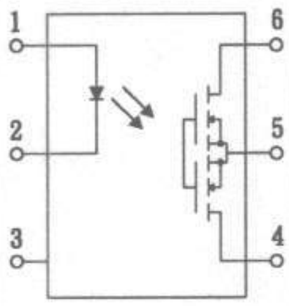
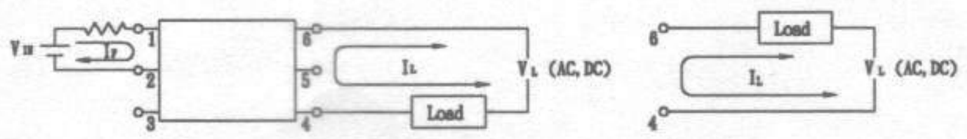
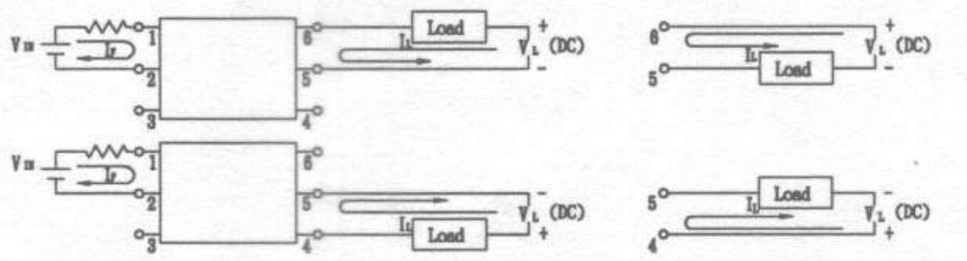
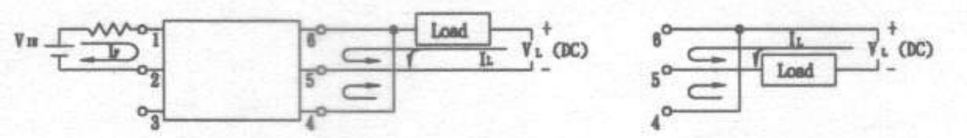
Characteristics ($T_A$=25° C)

| Description | | | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|---|---|---|---|---|---|---|---|---|
| Emitter (Input) | | | | | | | | |
| Forward Voltage | | | $V_F$ | | 1.2 | 1.5 | V | $I_F$ =10mA |
| Operation Input Current | | | $I_{FON}$ | | | 5 | mA | $V_L$=± 20V, $I_L$=100mA, t=10 ms |
| Recovery Input Current | | | $I_{FOFF}$ | 0.2 | | | mA | $V_L$=± 20V, $I_L$=<5uA |
| Deterctor (Output) | | | | | | | | |
| Output Breakdown Voltage | | | $V_B$ | 60 | | | V | $I_B$=50uA |
| Output Off-State Leakage | | | $I_{T(OFF)}$ | | 0.2 | 1 | uA | $V_T$=60V, $I_F$=0mA |
| I/O Capacitance | | | $C_{ISO}$ | | 0.8 | | pF | $I_F$=0, f=1MHz |
| ON Resistance | Connection | A | $R_{ON}$ | | 0.83 | 2.5 | Ω | $I_L$=100mA, $I_F$=10mA |
| | | B | | | 0.44 | 1.25 | | |
| | | C | | | 0.25 | 0.63 | | |
| Turn-on Time | | | $T_{ON}$ | | 0.2 | 1.5 | ms | $I_F$=10mA, $V_L$=± 20V |
| Turn-off Time | | | $T_{OFF}$ | | 0.3 | 1.5 | ms | t=10ms, $I_L$=± 100mA |

## Mos Relay Schematic and Wiring Diagrams

| Type | Schematic | Output configur-ation | Load | Con-nection | Wiring diagram |
|---|---|---|---|---|---|
| KAQV212 |  | 1a | AC/DC | A |  |
| | | | DC | B |  |
| | | | DC | C |  |

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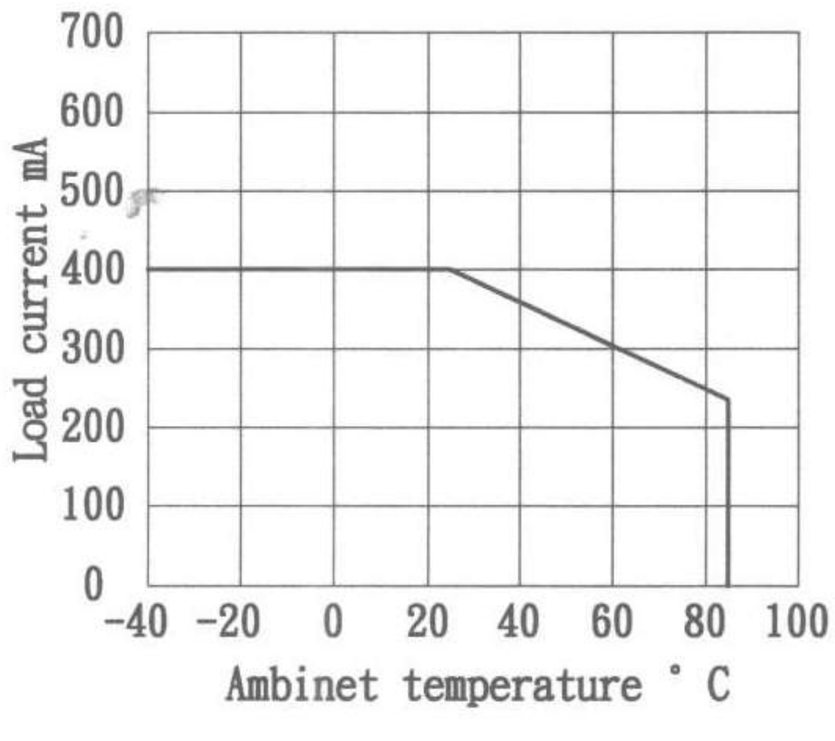
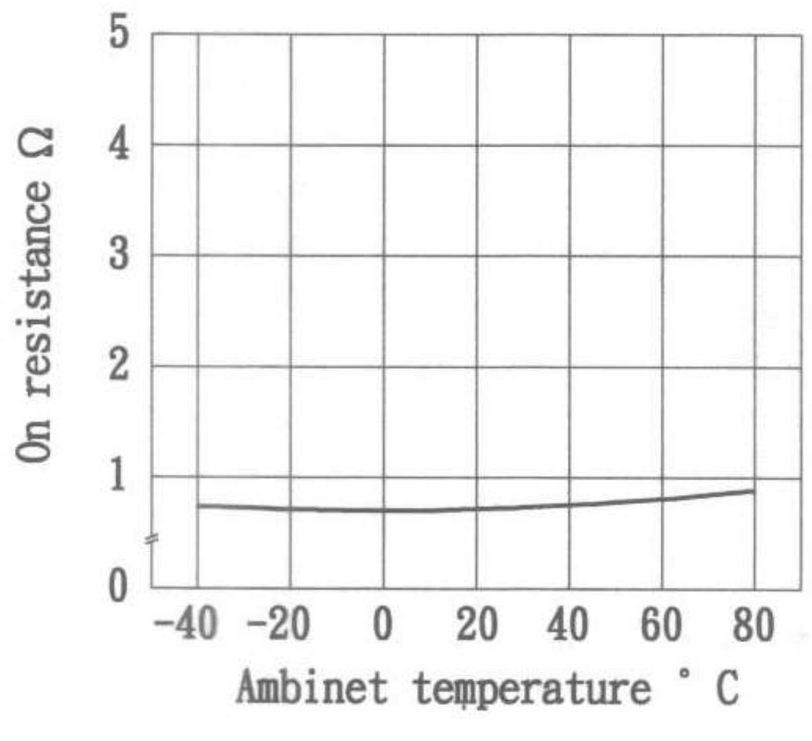
|---|---|---|---|
| | | SHEET 3 OF 7 | 2 |

## DATA CURVE

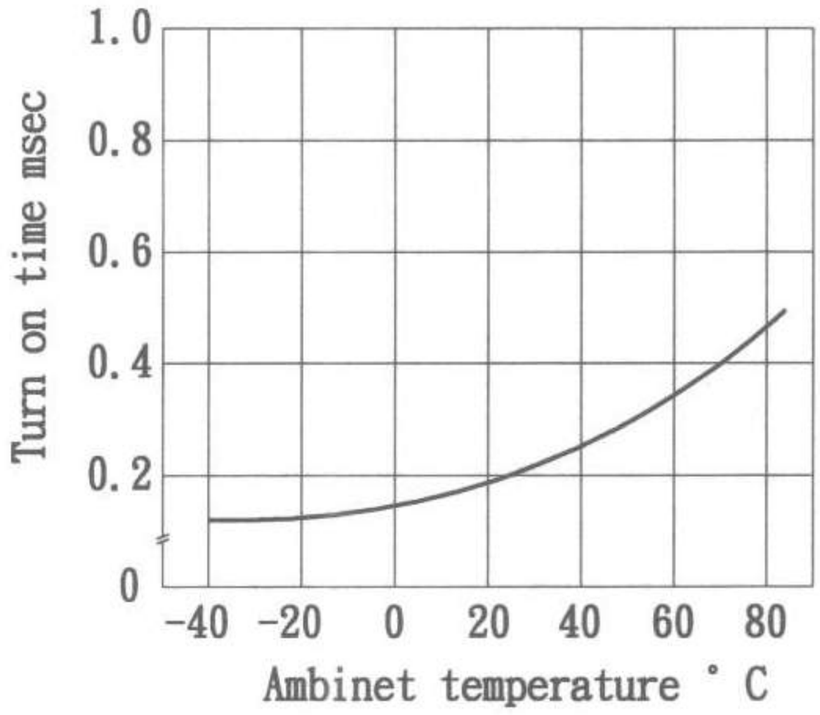
Load current vs. ambient temperature
Allowable ambient temperature:
-40°C to +85°C



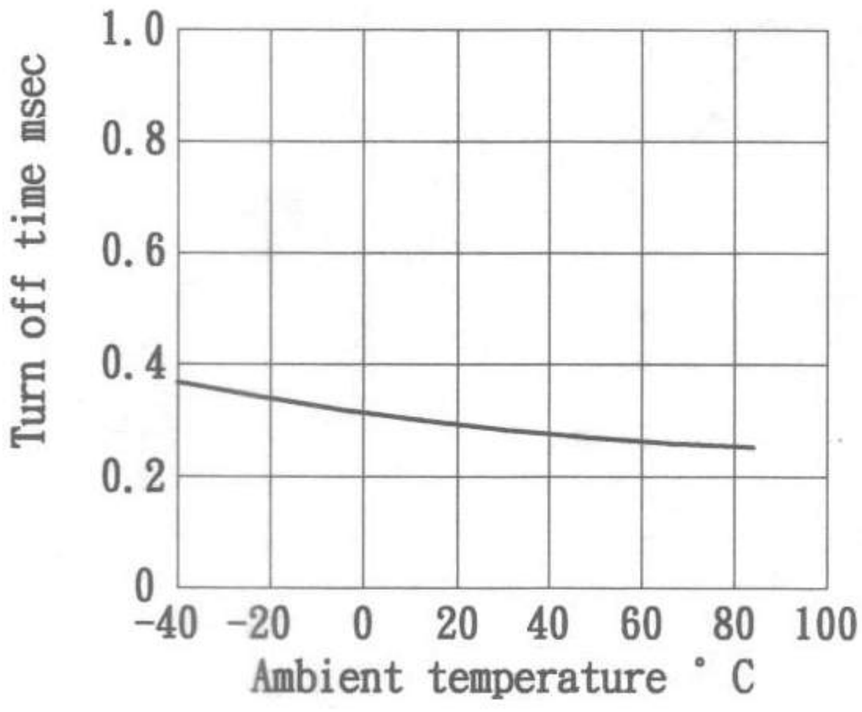

On resistance vs. ambient temperature
Across terminals 4 and 6 pin
LED current: 5mA
Continuous load current: 130 mA(DC)




Turn on time vs. ambient temperature
Load voltage 60 V(DC)
LED current :5mA
Continuous load current: 130mA(DC)




Turn off time vs. ambient temperature
LED current: 5mA;Load voltage: 60V(DC)
Continuous load current: 130mA(DC)



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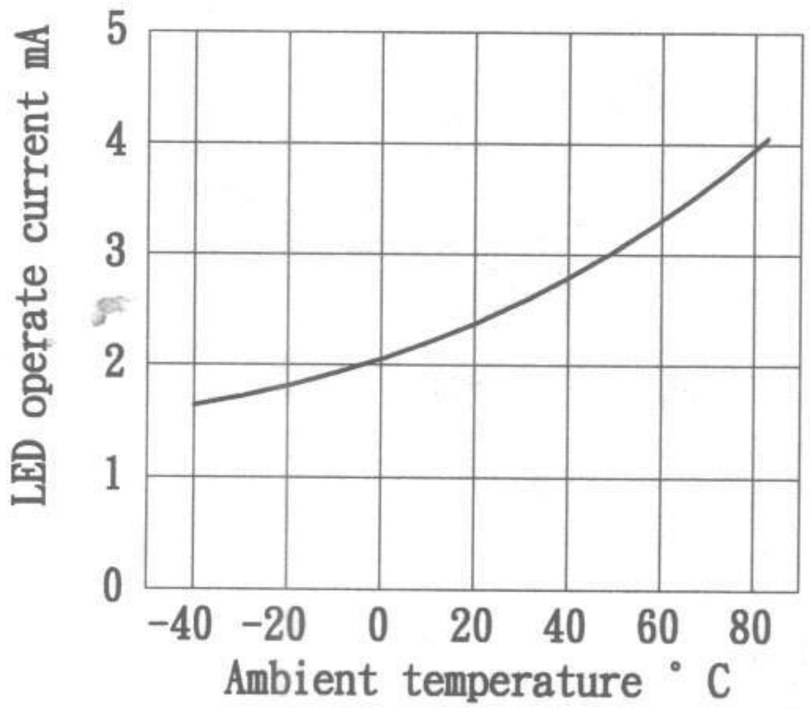
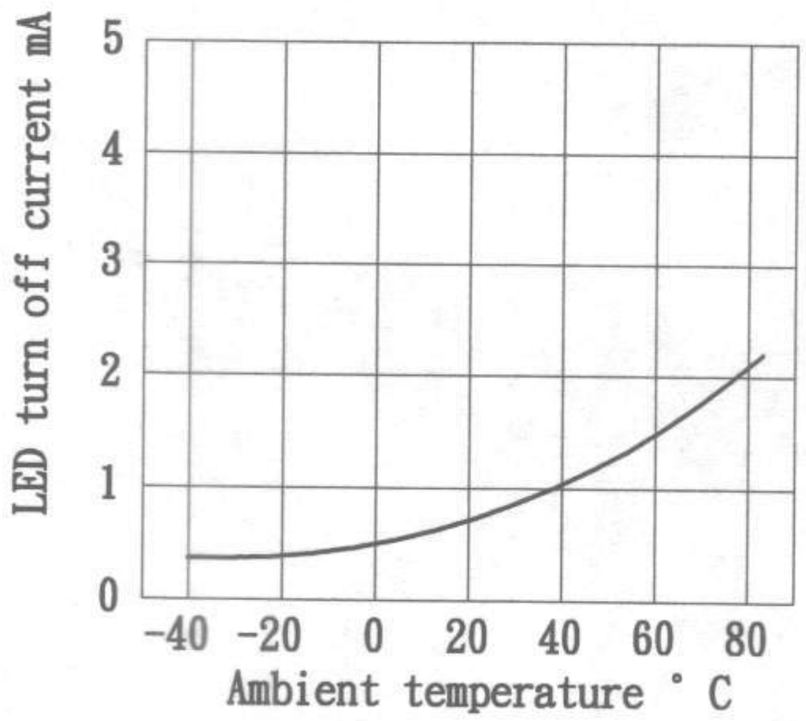
|---|---|---|---|
| | | SHEET 4 OF 7 | 2 |

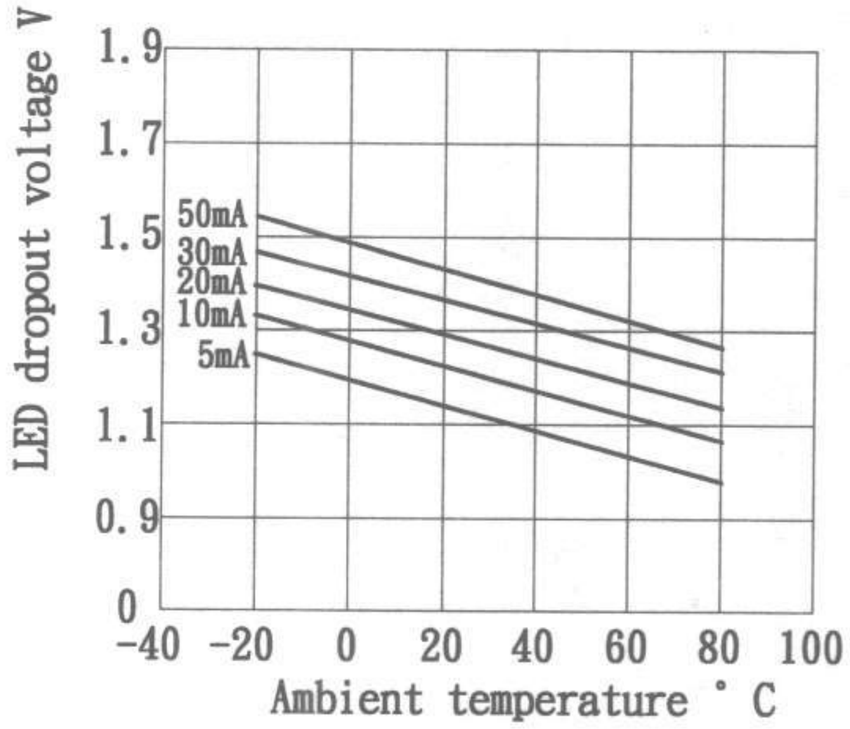
LED operate vs. ambient temperature
Load voltage: 60V(DC)
Continuous load current: 130mA(DC)



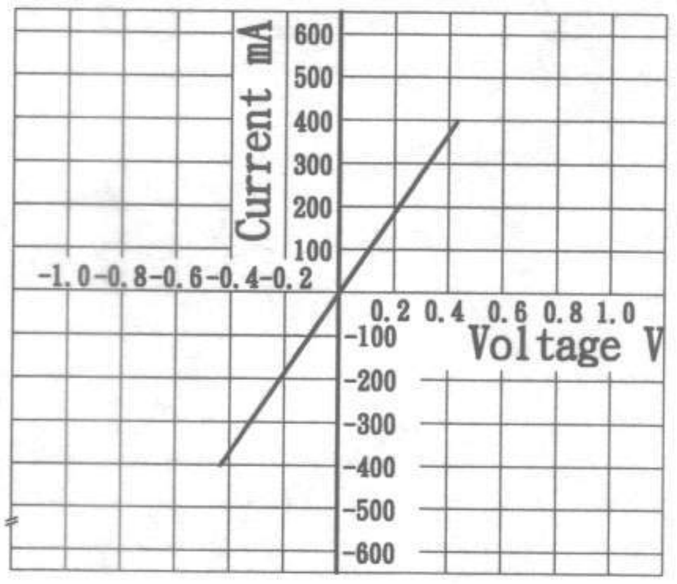

LED turn off current vs. ambient temperature
Load voltage: 60V(DC)
Continuons load current: 130mA(DC)




LED dropout voltage vs. ambient temperature
LED current: 5 to 50mA




Voltage vs. current characteristics of output at MOS FET portion
Measured portion: across terminals 4 and 6 pin
Ambient temperature: 25° C



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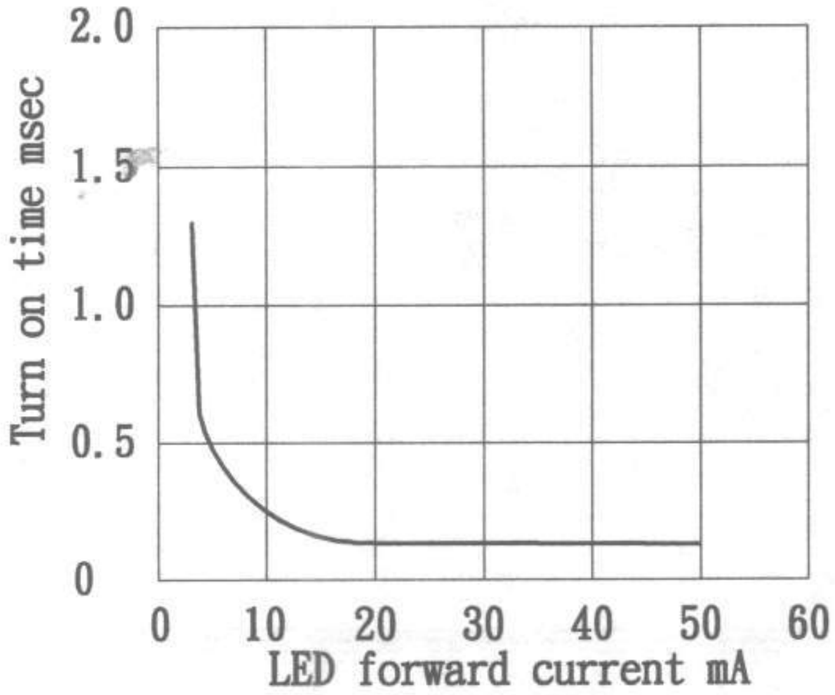
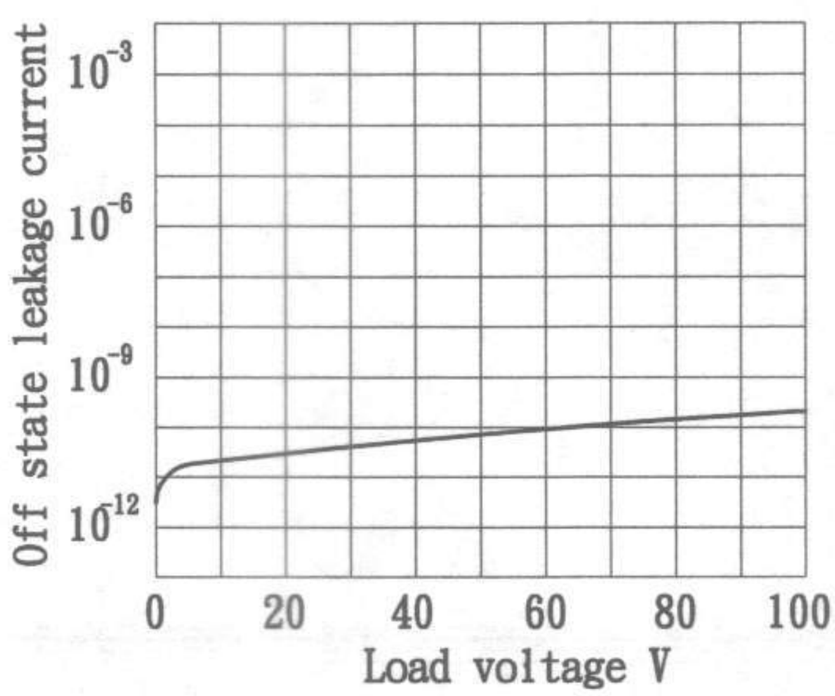
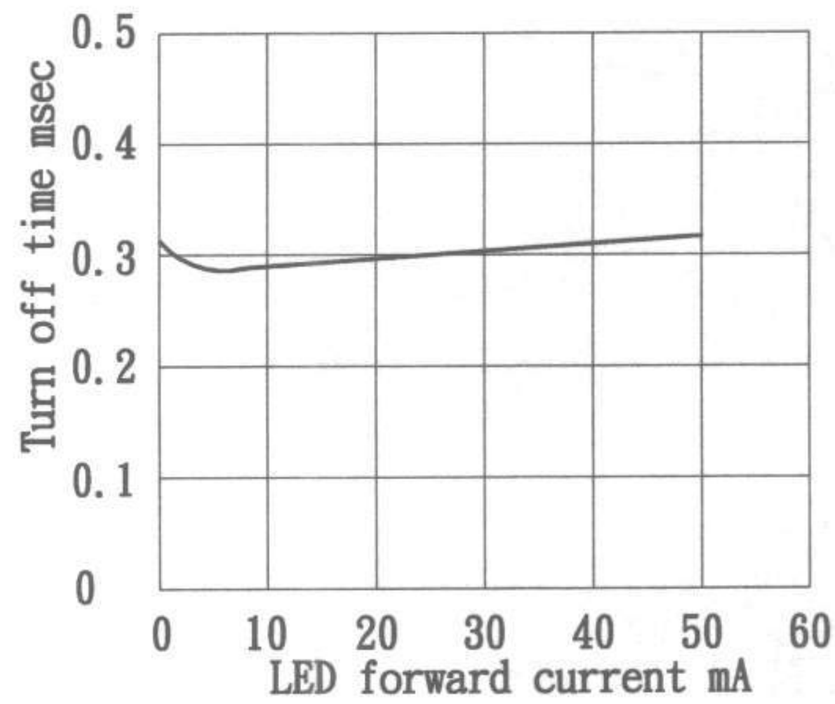
LED forward current vs. turn on time
Across terminals 4 and 6pin;Load voltage: 60V(DC);Continuous load current: 130mA(DC);Ambient temperature: 25° C



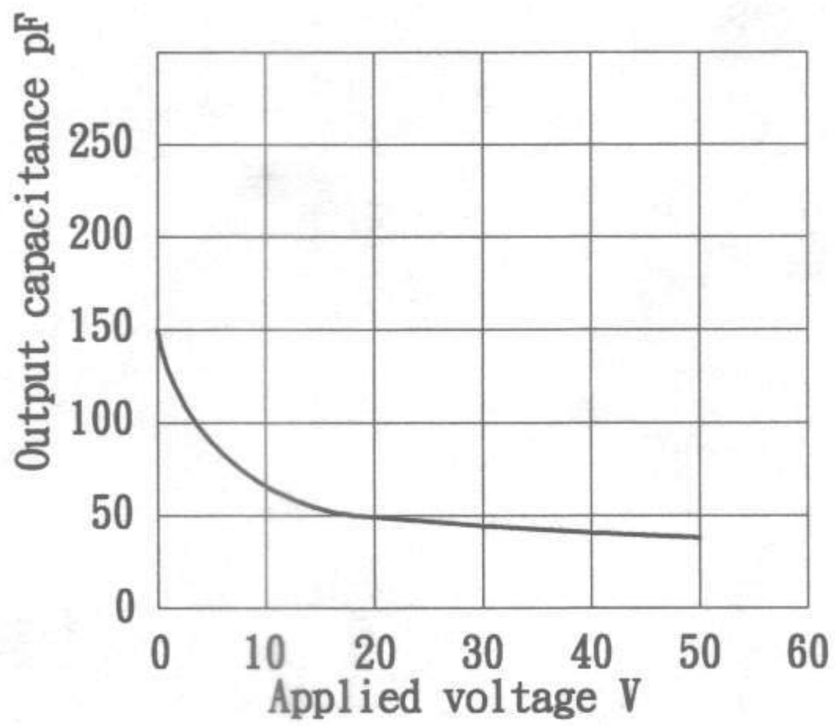

Off state leakage current
Across terminals 4 and 6pin
Ambient temperature: 25° C




LED forward current vs. turn off time
Across terminals 4 and 6pin;Load voltage: 60V(DC);Continuous load current: 130 mA(DC);Ambient temperature: 25° C




Applied voltage vs. output capacitance
Across terminals 4 and 6pin
Frequency: 1MHz;Ambient temperature: 25° C



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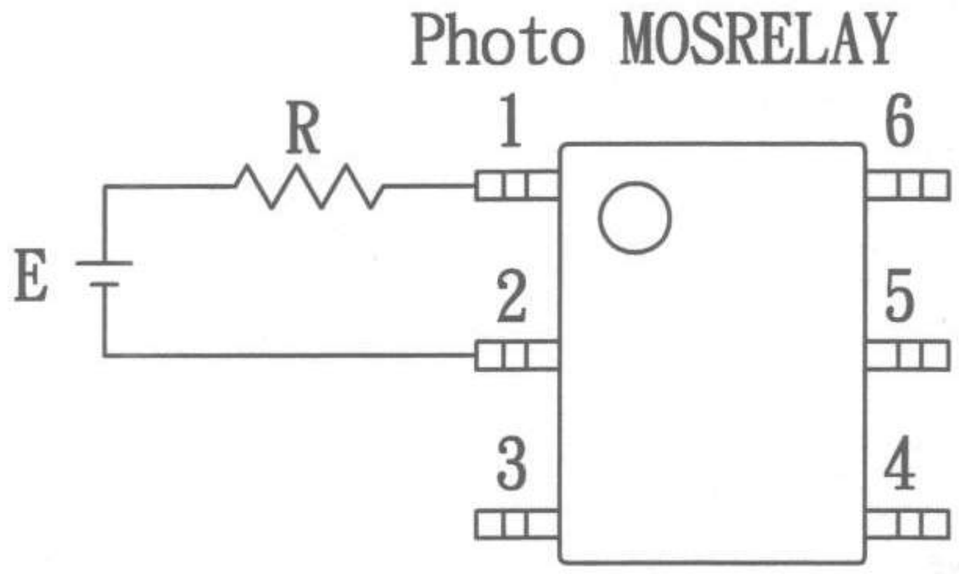
|---|---|---|---|
| | | SHEET 6 OF 7 | 2 |

## USING METHODS

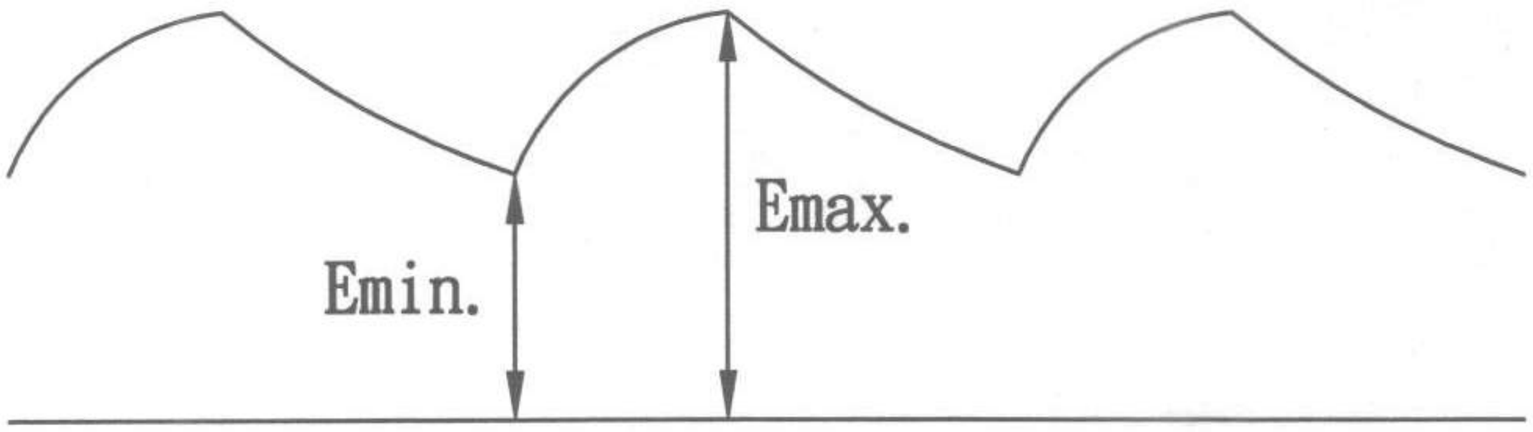
Examples of resistance value to control LED forward current IF




| E | R |
|---|---|
| 3.3V | Approx. 330 ohm |
| 5V | Approx. 640 ohm |
| 12V | Approx. 1.9K ohm |
| 15V | Approx. 2.5K ohm |
| 24V | Approx. 4.1K ohm |

(1) LED forward current must be more than 5mA, at E min.

(2) LED forward current must be less than 50mA, at E max.



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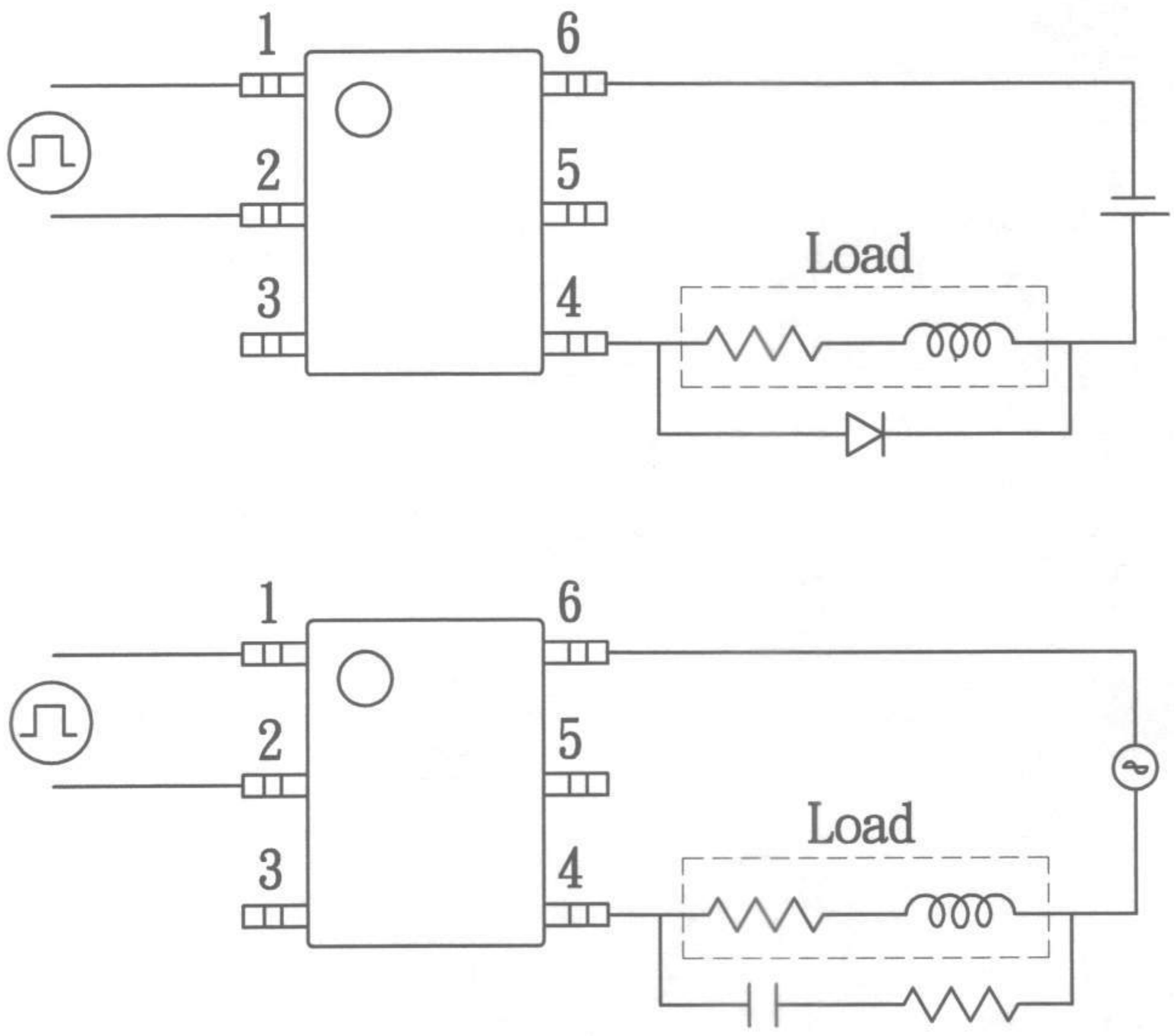
|---|---|---|---|
| | | SHEET 7 OF 7 | 2 |

## USING METHODS

Regulate the spike voltage generated on the inductive load as follows




R-C Snubber