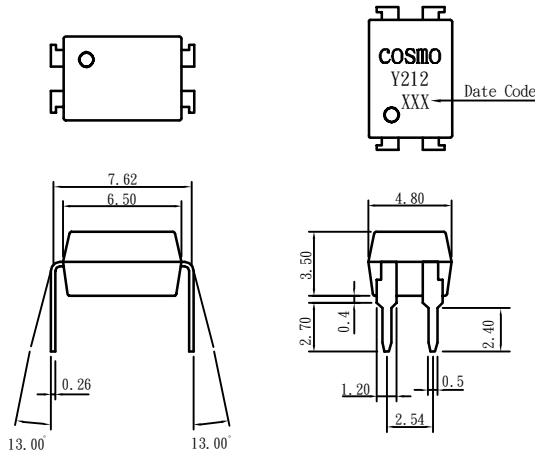


PRODUCT SPECIFICATION

DATE: 11/18/2003

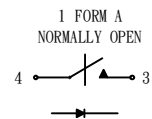
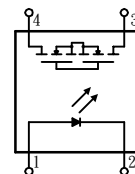
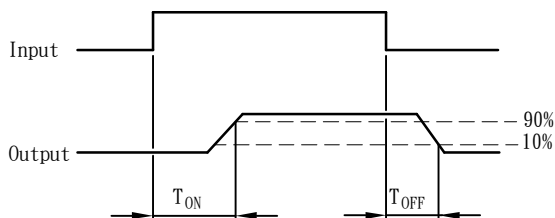
| | | | |
|---|---------------------------------|--------------|------|
| COSMO ELECTRONICS CORPORATION | SOLID STATE RELAY-MOSFET OUTPUT | NO. 60M00009 | REV. |
| | KAQY212 | SHEET 1 OF 7 | 1 |

• OUTSIDE DIMENSION :



Unit:mm
Tolerance:± 0.2 mm

• Turn on/Turn off time



Absolute Maximum Ratings ($T_A=25^\circ\text{C}$)

| | |
|--|-------------------------|
| Emitter (Input) | |
| Reverse Voltage | 5.0V |
| Continuous Forward Current | 50mA |
| Peak Forward Current (1us) | 1A |
| Power Dissipation. | 100mW |
| Derate Linearly from 25°C | 1.3mW/ $^\circ\text{C}$ |
| Detector (Output) | |
| Output Breakdown Voltage | ± 60V |
| Continuous Load Current | ± 400mA |
| Power Dissipation | 500mW |
| General Characteristics | |
| Isolation Test Voltage. | 3750VAC _{RMS} |
| Isolation Resistance | |
| $V_{10}=500\text{V}, T_A=25^\circ\text{C}$ | $\geq 10^{10}\Omega$ |
| Total Power Dissipation | 550mW |

| | |
|---|------------------------------|
| Derate Linearly from 25°C | 2.5mW/ $^\circ\text{C}$ |
| Storage Temperature Range | -40 to +150 $^\circ\text{C}$ |
| Operating Temperature Range. | -40 to +85 $^\circ\text{C}$ |
| Junction Temperature | 100 $^\circ\text{C}$ |
| Soldering Temperature, 2mm from case, 10 sec. 260$^\circ\text{C}$ | |

PRODUCT SPECIFICATION

DATE: 11/18/2003

| | | | |
|---|---|--------------|------|
| COSMO ELECTRONICS CORPORATION | SOLID STATE RELAY-MOSFET OUTPUT KAQY212 | NO. 60M00009 | REV. |
| | | SHEET 2 OF 7 | 1 |

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 |
| Detector (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} | | 6 | | pF | I _F = 0, f = 1MHz |
| ON Resistance | R _{ON} | | 0.83 | 2.5 | Ω | I _L = 100mA, I _F = 10mA |
| 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 |

Schematic and Wiring Diagrams

| Type | Schematic | Output configuration | Load | Con-nection | Wiring diagram |
|---------|-----------|----------------------|-------|-------------|----------------|
| KAQY212 | | 1a | AC/DC | - | |

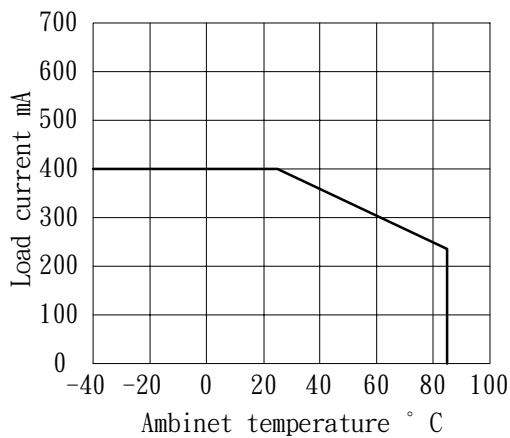
PRODUCT SPECIFICATION

DATE: 11/18/2003

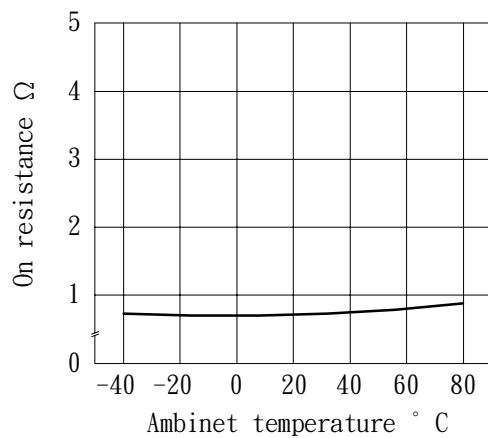
| | | | |
|---|---|--------------|------|
| COSMO ELECTRONICS CORPORATION | SOLID STATE RELAY-MOSFET OUTPUT KAQY212 | NO. 60M00009 | REV. |
| | | SHEET 3 OF 7 | 1 |

DATA CURVE

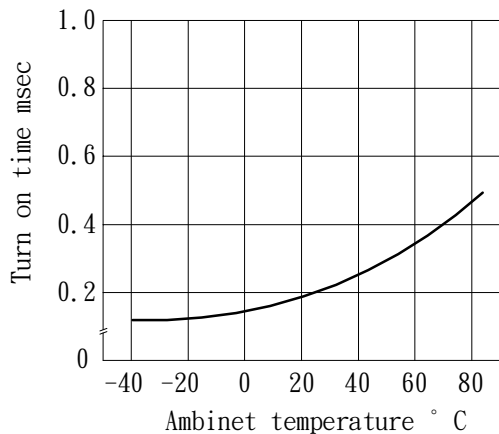
Load current vs. ambient temperature
 Allowable ambient temperature:
 -40°C to +85°C



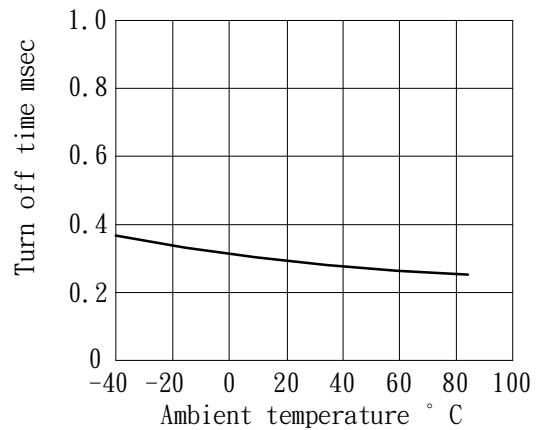
On resistance vs. ambient temperature
 Across terminals 3 and 4 pin
 LED current: 5mA
 Continuous load current: 130 mA(DC)



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)

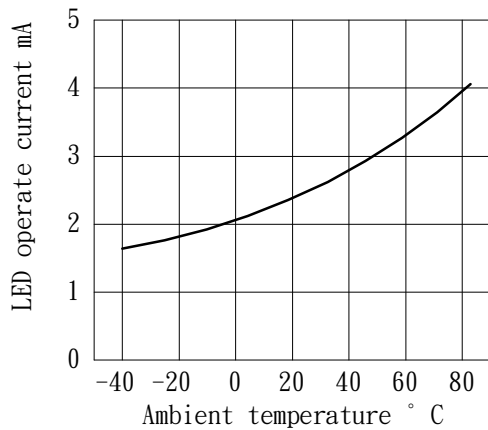


PRODUCT SPECIFICATION

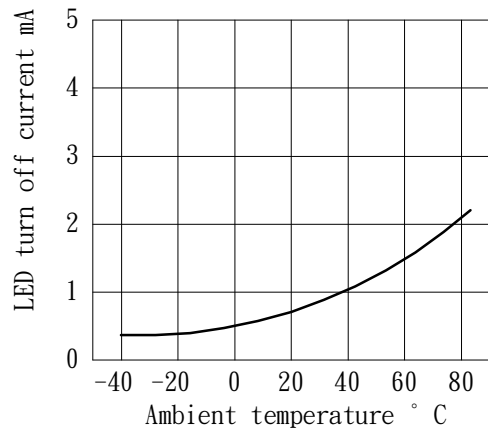
DATE: 11/18/2003

| | | | |
|---|---|--------------|------|
| COSMO ELECTRONICS CORPORATION | SOLID STATE RELAY-MOSFET OUTPUT KAQY212 | NO. 60M00009 | REV. |
| | | SHEET 4 OF 7 | 1 |

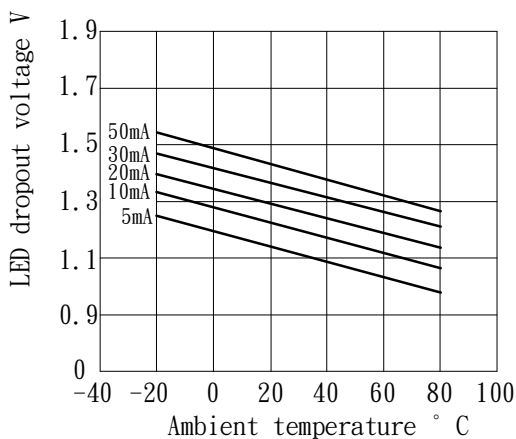
LED operate vs. ambient temperature
 Load voltage: 60V(DC)
 Continuous load current: 130mA(DC)



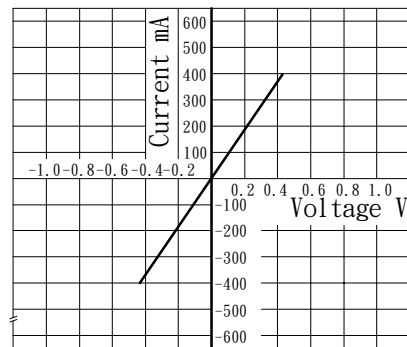
LED turn off current vs. ambient temperature
 Load voltage: 60V(DC)
 Continuous load current: 130mA(DC)



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 3 and 4 pin
 Ambient temperature: 25°C

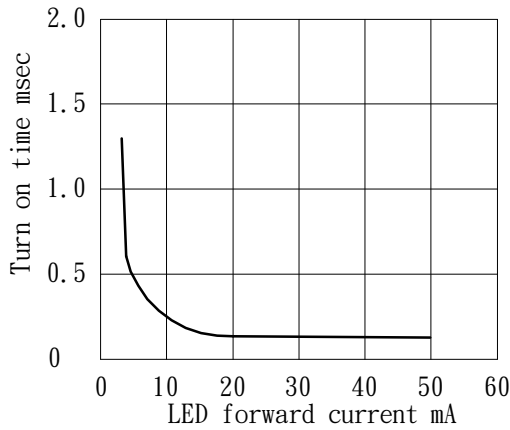


PRODUCT SPECIFICATION

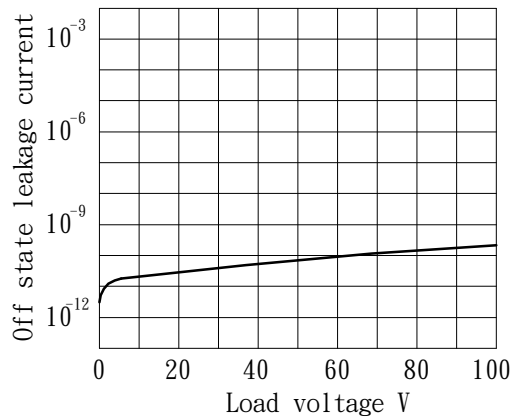
DATE: 11/18/2003

| | | | |
|---|---|--------------|-----------|
| COSMO ELECTRONICS CORPORATION | SOLID STATE RELAY-MOSFET OUTPUT KAQY212 | NO. 60M00009 | REV. 1 |
| | | SHEET 5 OF 7 | |

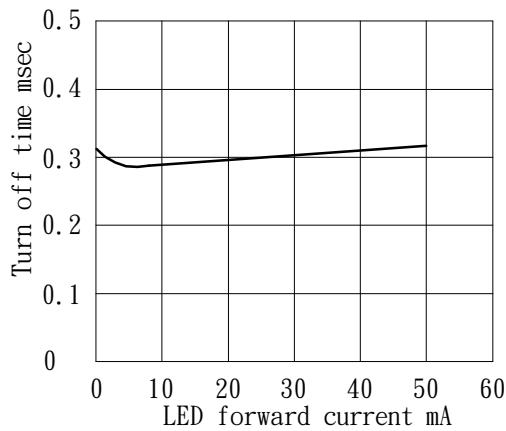
LED forward current vs. turn on time
 Across terminals 3 and 4pin; Load voltage: 60V(DC); Continuous load current: 130mA(DC); Ambient temperature: 25° C



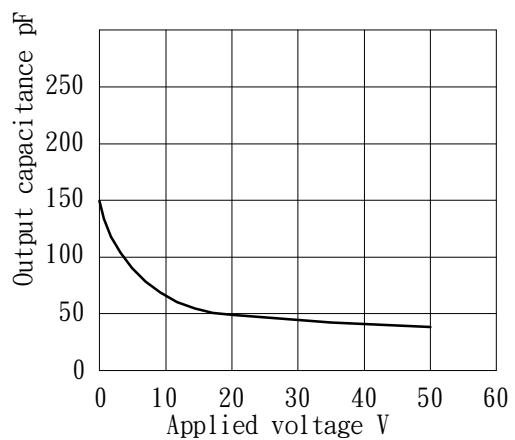
Off state leakage current
 Across terminals 3 and 4pin
 Ambient temperature: 25° C



LED forward current vs. turn off time
 Across terminals 3 and 4pin; Load voltage: 60V(DC); Continuous load current: 130 mA(DC); Ambient temperature: 25° C



Applied voltage vs. output capacitance
 Across terminals 3 and 4pin
 Frequency: 1MHz; Ambient temperature: 25° C



PRODUCT SPECIFICATION

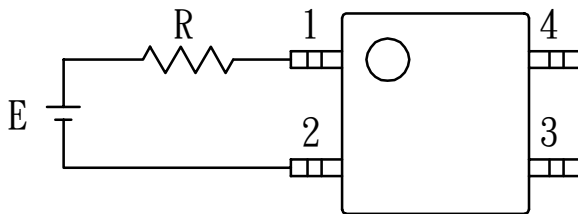
DATE: 11/18/2003

| | | | |
|---|---|--------------|------|
| COSMO ELECTRONICS CORPORATION | SOLID STATE RELAY-MOSFET OUTPUT KAQY212 | NO. 60M00009 | REV. |
| | | SHEET 6 OF 7 | 1 |

USING METHODS

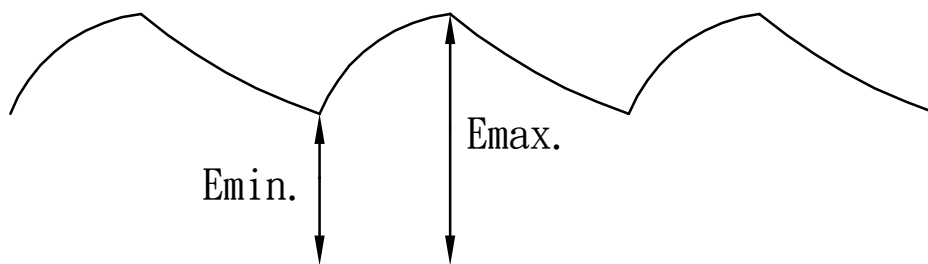
Examples of resistance value to control LED forward current I_F

($I_F = 5\text{mA}$)



| 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.



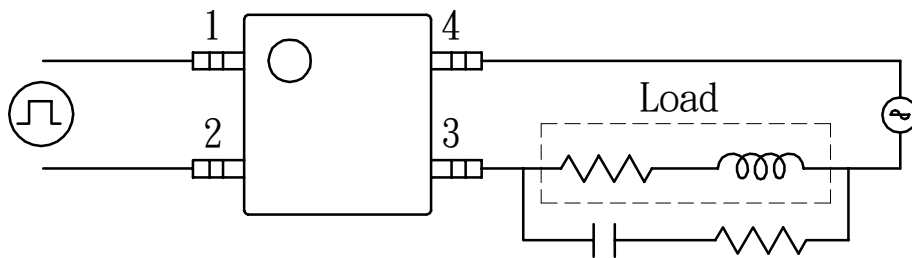
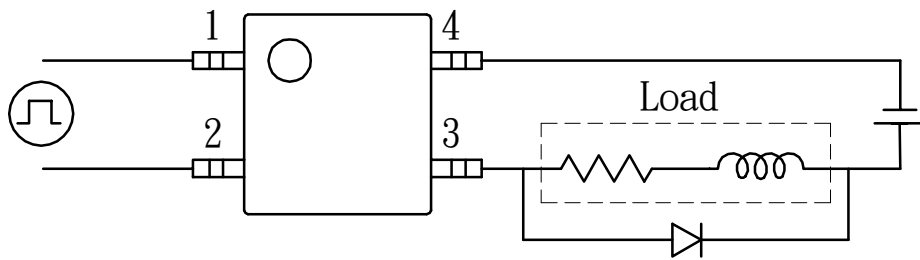
PRODUCT SPECIFICATION

DATE: 11/18/2003

| | | | |
|---|---|--------------|------|
| COSMO ELECTRONICS CORPORATION | SOLID STATE RELAY-MOSFET OUTPUT KAQY212 | NO. 60M00009 | REV. |
| | | SHEET 7 OF 7 | 1 |

USING METHODS

Regulate the spike voltage generated on the inductive load as follows



R-C Snubber