

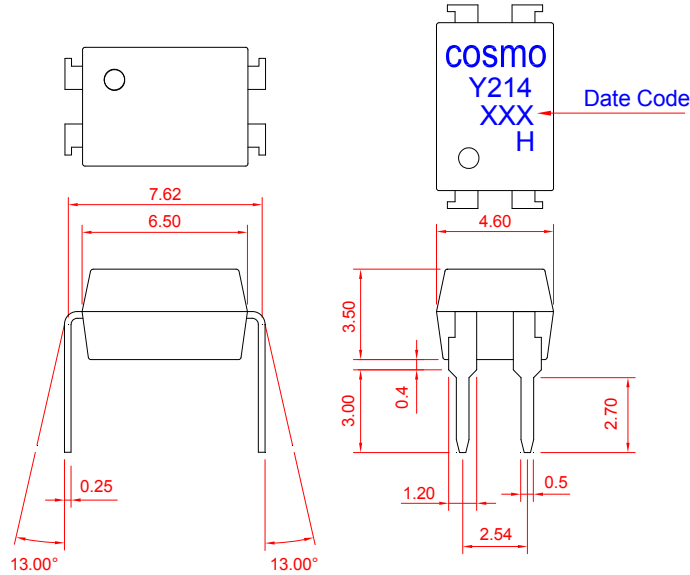
# PRODUCT SPECIFICATION

RoHS Compliance

DATE : 02/22/2011

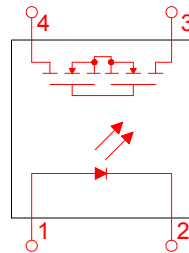
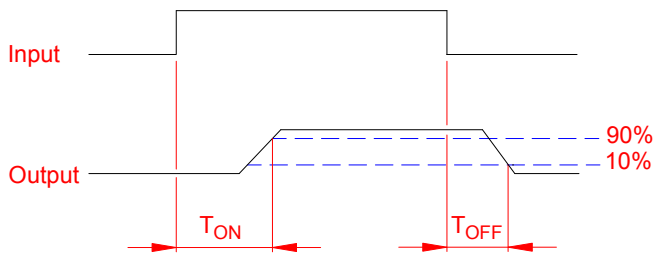
|   |  |              |        |
|---|--|--------------|--------|
| <b>cosmo</b><br>ELECTRONICS CORPORATION | SOLID STATE RELAY - MOSFET OUTPUT<br><b>KAQY214H</b> | NO.60M00014  | REV. 2 |
|   |  | SHEET 1 OF 7 |        |

## ● OUTSIDE DIMENSION :

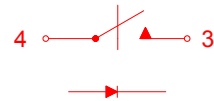


Unit : mm  
Tolerance : ±0.2mm

## ● Turn On / Turn Off time



1 FORM A  
NORMALLY OPEN



## ● Absolute Maximum Ratings

(Ta=25°C)

| Emitter (Input)                              | Detector (Output)                               |
|--|---|
| Reverse Voltage ..... 5.0V                   | Output Breakdown Voltage ..... ± 400V           |
| Continuous Forward Current ..... 50mA        | Continuous Load Current ..... ± 130mA           |
| Peak Forward Current ..... 1A                | Power Dissipation ..... 500mW                   |
| Power Dissipation ..... 100mW                |   |
| Derate Linearly from 25°C ..... 1.3mW/°C     |   |
| General Characteristics                      |   |
| Isolation Test Voltage ..... 5000VACrms      | Storage Temperature Range ..... -40°C to +125°C |
| Isolation Resistance                         | Operating Temperature Range ... -40°C to +85°C  |
| Vio=500V, Ta=25°C ..... ≥ 10 <sup>10</sup> Ω | Junction Temperature ..... 100°C                |
| Total Power Dissipation ..... 550mW          | Soldering Temperature ,                         |
| Derate Linearly from 25°C ..... 2.5mW/°C     | 2mm from case , 10 sec ..... 260°C              |

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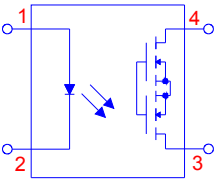
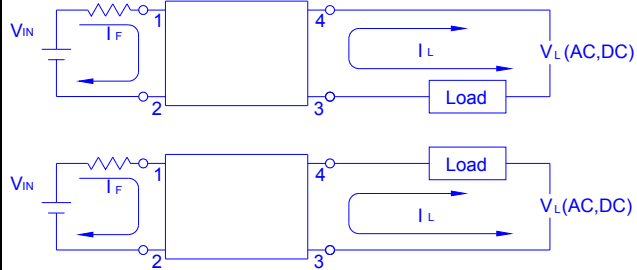
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## ● Electro-optical Characteristics

(Ta=25°C)

| Parameter                | Symbol            | Conditions   | Min. | Typ. | Max. | Unit.         |
|--------------------------|-------------------|--|------|------|------|---------------|
| Emitter ( Input )        |                   |  |      |      |      |               |
| Forward Voltage          | $V_F$             | $I_F=10\text{mA}$  |      | 1.2  | 1.5  | V             |
| Operation Input Current  | $I_{F\text{ON}}$  | $V_L=\pm 20\text{V}$ , $I_L=100\text{mA}$ , $t=10\text{ms}$                          |      |      | 5.0  | mA            |
| Recovery Input Current   | $I_{F\text{OFF}}$ | $V_L=\pm 20\text{V}$ , $I_L \leq 5\mu\text{A}$                                       | 0.2  |      |      | mA            |
| Detector ( Output )      |                   |  |      |      |      |               |
| Output Breakdown Voltage | $V_B$             | $I_B=50\mu\text{A}$  | 400  |      |      | V             |
| Output Off-State Leakage | $I_{T\text{OFF}}$ | $V_T=400\text{V}$ , $I_F=0\text{mA}$   |      | 0.2  | 1    | $\mu\text{A}$ |
| I/O Capacitance          | $C_{\text{ISO}}$  | $I_F=0$ , $f=1\text{MHz}$  |      | 6    |      | pF            |
| ON Resistance            | $R_{\text{ON}}$   | $I_L=100\text{mA}$ , $I_F=10\text{mA}$   |      | 20   | 30   | $\Omega$      |
| Turn-On Time             | $T_{\text{ON}}$   | $I_F=10\text{mA}$ , $V_L=\pm 20\text{V}$<br>$t=10\text{ms}$ , $I_L=\pm 100\text{mA}$ |      | 0.3  | 1.0  | ms            |
| Turn-Off Time            | $T_{\text{OFF}}$  |  |      | 0.1  | 1.0  | ms            |

## ● Schematic and Wiring Diagrams

| Schematic   | Output Configuration | Load  | Connection | Wiring Diagrams  |
|---|----------------------|-------|------------|--|
|  | 1a                   | AC/DC | -          |  |

# PRODUCT SPECIFICATION

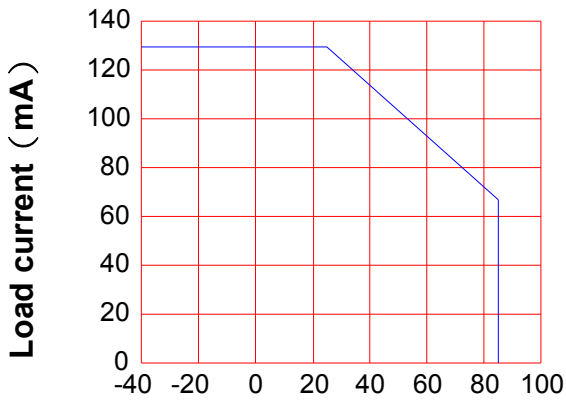
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|   |  | SHEET 3 OF 7 |           |

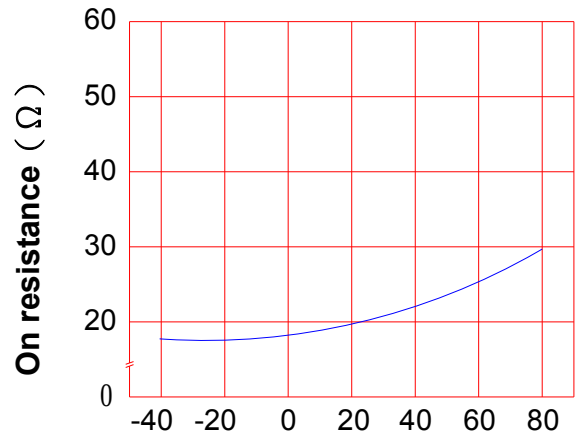
## ● Data Curve

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



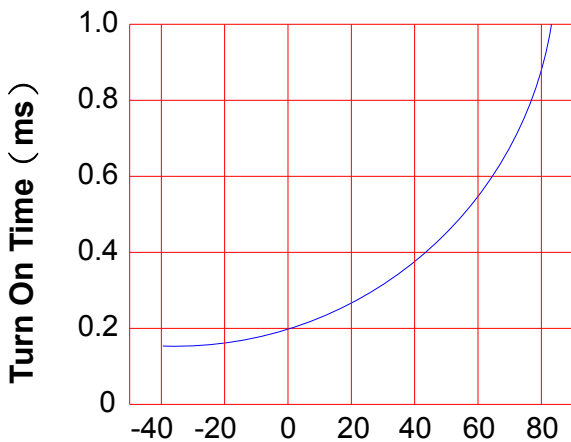
Ambient temperature Ta (°C)

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



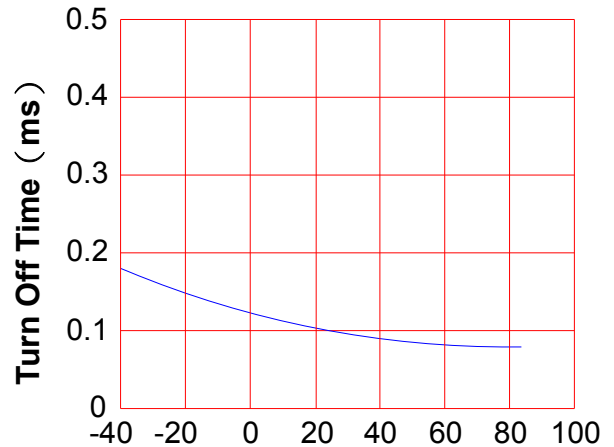
Ambient temperature Ta (°C)

Turn On Time vs. ambient temperature  
 Load voltage 400V (DC)  
 LED current : 5mA  
 Continuous load current : 130mA (DC)



Ambient temperature Ta (°C)

Turn Off Time vs. ambient temperature  
 Load voltage 400V (DC)  
 LED current : 5mA  
 Continuous load current : 130mA (DC)



Ambient temperature Ta (°C)

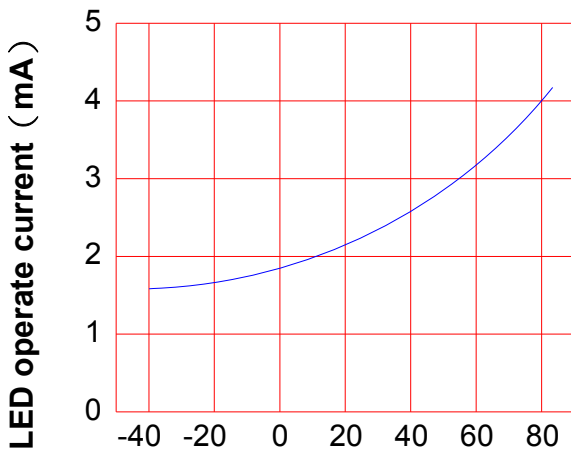
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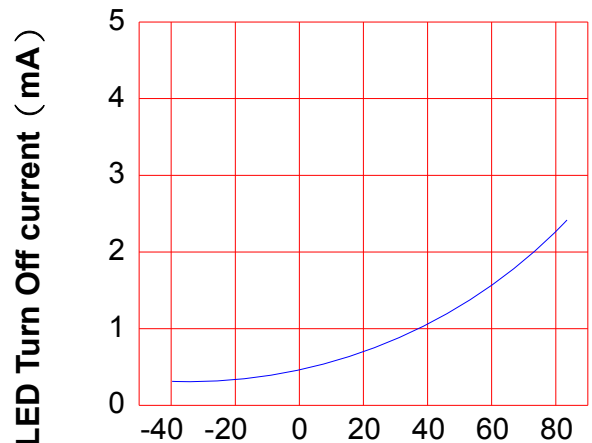
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LED operate current vs.  
ambient temperature  
Load Voltage : 400V (DC)  
Continuous load current : 130mA (DC)



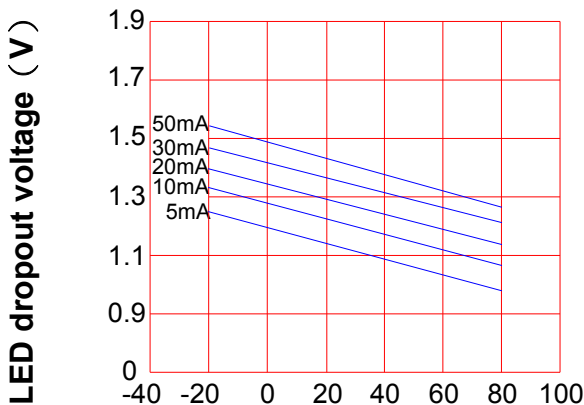
Ambient temperature Ta (°C)

LED Turn Off current vs.  
ambient temperature  
Load Voltage : 400V (DC)  
Continuous load current : 130mA (DC)



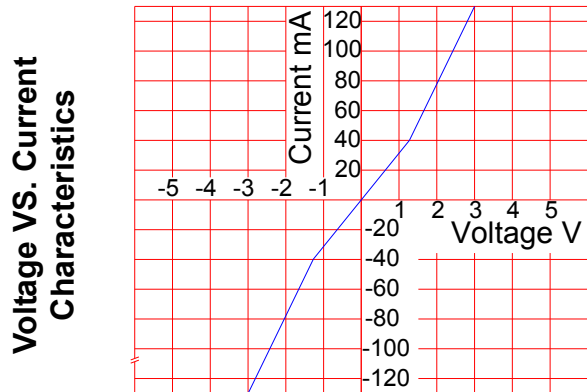
Ambient temperature Ta (°C)

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



Ambient temperature Ta (°C)

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



Ambient temperature : 25°C

# PRODUCT SPECIFICATION

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|---|--|--------------|--------|
| <b>cosmo</b><br>ELECTRONICS CORPORATION | SOLID STATE RELAY - MOSFET OUTPUT<br><b>KAQY214H</b> | NO.60M00014  | REV. 2 |
|   |  | SHEET 5 OF 7 |        |

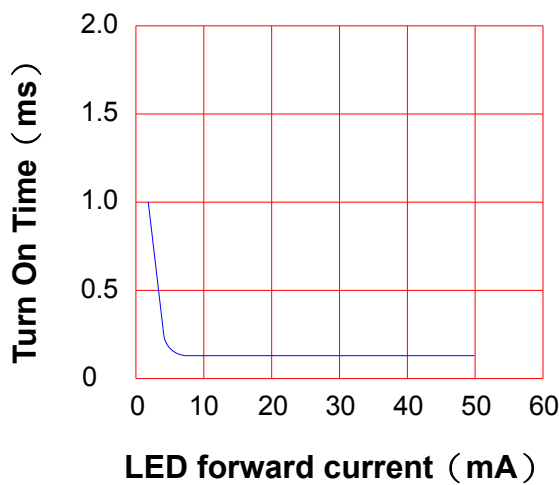
## LED forward current vs. Turn On Time

Across terminals 3 and 4 pin

Load voltage : 400V (DC)

Continuous load current : 130mA (DC)

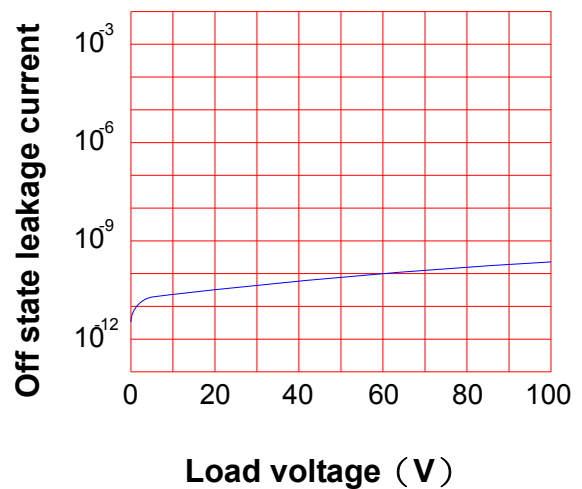
Ambient temperature : 25°C



## Off state leakage current

Across terminals 3 and 4 pin

Ambient temperature : 25°C



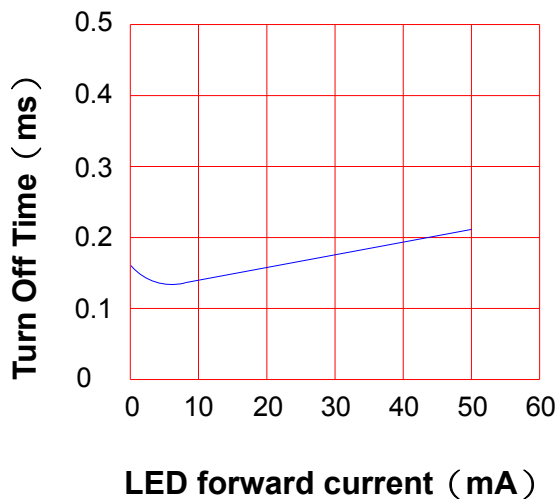
## LED forward current vs. Turn Off Time

Across terminals 3 and 4 pin

Load voltage : 400V (DC)

Continuous load current : 130mA (DC)

Ambient temperature : 25°C

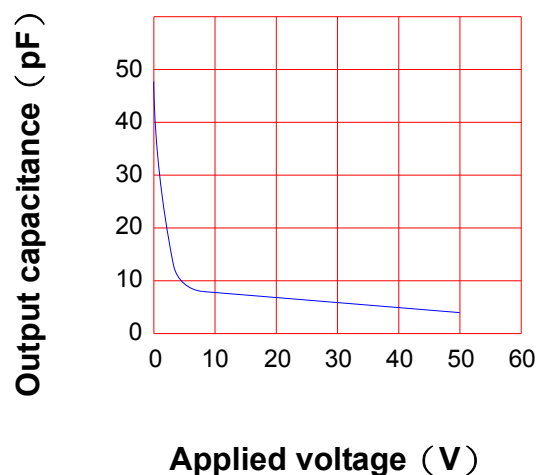


## Applied voltage vs. output capacitance

Across terminals 3 and 4 pin

Frequency : 1MHz

Ambient temperature : 25°C



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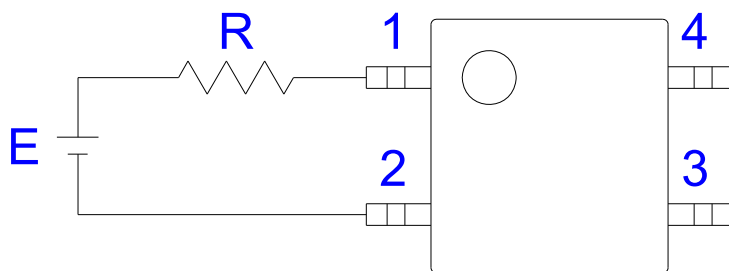
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## ● USING METHODS

Examples of resistance value to control LED forward current ( $I_F$ )

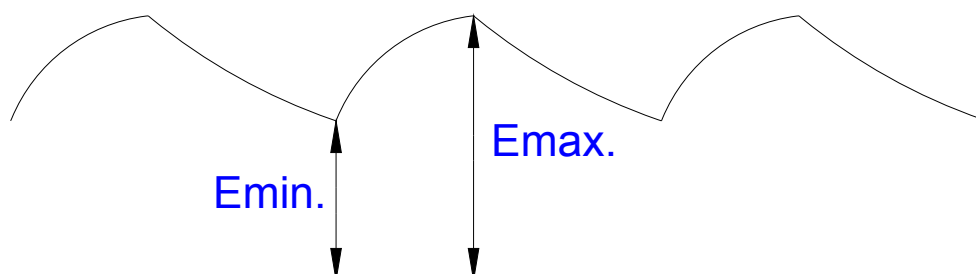
SSR-MOSFET OUTPUT

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



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

- (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

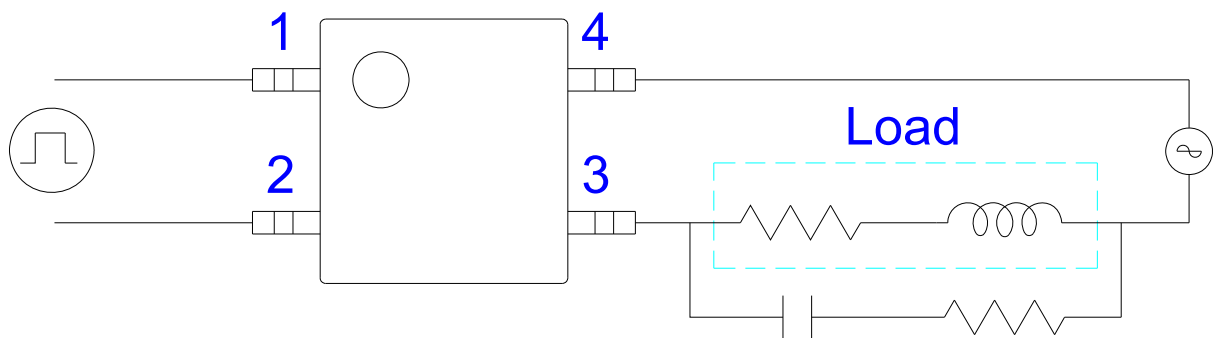
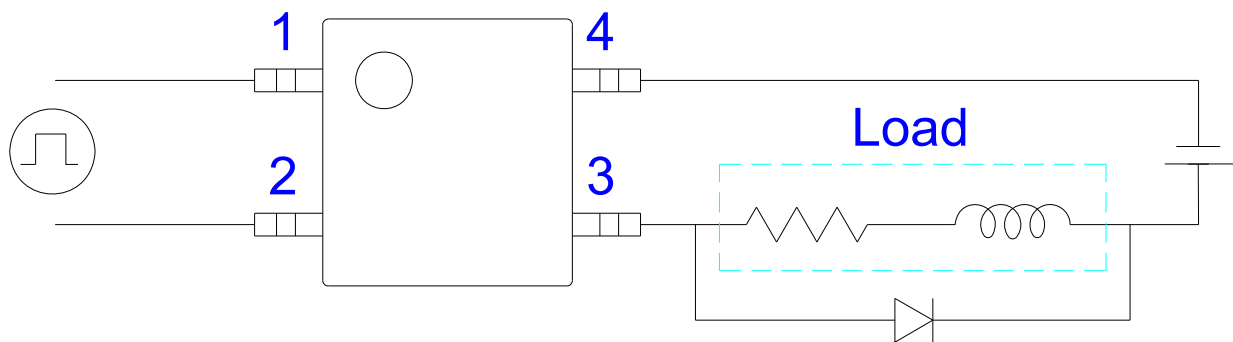
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|   |  | SHEET 7 OF 7 |           |

## ● USING METHODS

Regulate the spike voltage generated on the inductive load as follows :



R-C Snubber