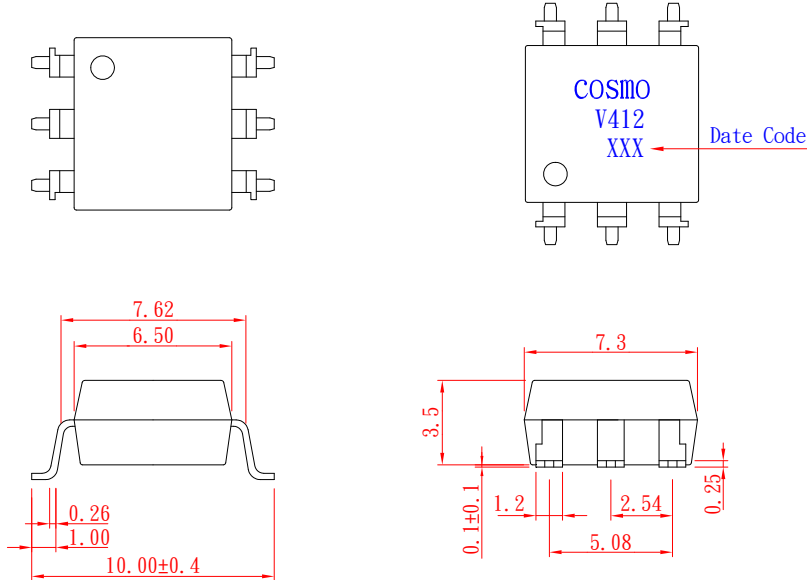


# PRODUCT SPECIFICATION

DATE : 02/22/2011

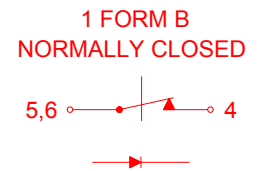
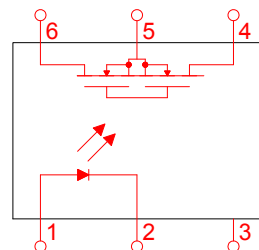
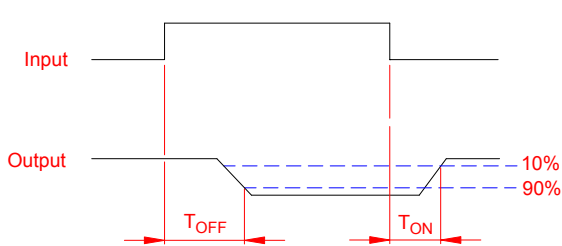
<b>cosmo</b> ELECTRONICS CORPORATION	SOLID STATE RELAY - MOSFET OUTPUT <b>KAQV412A</b>	NO.61M11007	REV. 2
		SHEET 1 OF 7	

## ● OUTSIDE DIMENSION :



Unit : mm  
Tolerance : ±0.2mm

## ● Operate/Reverse time



## ● Absolute Maximum Ratings

(Ta=25°C)

Emitter ( Input )	Detector ( Output )
Reverse Voltage ..... 5.0V	Output Breakdown Voltage ..... ± 60V
Continuous Forward Current ..... 50mA	Continuous Load Current ..... ± 200mA
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

# PRODUCT SPECIFICATION

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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	$I_{F\text{OFF}}$	$V_L=\pm 20\text{V}$ , $I_L \leq 5\mu\text{A}$			5.0	mA	
Recovery Input Current	$I_{F\text{on}}$	$V_L=\pm 20\text{V}$ , $I_L=100\text{mA}$ , $t=10\text{ms}$	0.2			mA	
Detector ( Output )							
Output Breakdown Voltage	$V_B$	$I_B=50\mu\text{A}$ , $I_F=10\text{mA}$	60			V	
Output Off-State Leakage	$I_{T\text{OFF}}$	$V_T=60\text{V}$ , $I_F=10\text{mA}$		0.2	2	$\mu\text{A}$	
I/O Capacitance	$C_{\text{ISO}}$	$I_F=0$ , $f=1\text{MHz}$		6		pF	
ON Resistance	Connection	A	$I_L=100\text{mA}$ , $I_F=0\text{mA}$		2.5	5	$\Omega$
		B			1.25	2.5	
		C			0.63	1.25	
Turn-On Time	$T_{\text{ON}}$	$I_F=10\text{mA}$ , $V_L=\pm 20\text{V}$ $t=10\text{ms}$ , $I_L=\pm 100\text{mA}$		0.6	1.5	ms	
Turn-Off Time	$T_{\text{OFF}}$			0.3	1.5	ms	

## ● Schematic and Wiring Diagrams

Schematic	Output Configuration	Load	Connection	Wiring Diagrams
	1b	AC/DC	A	
		DC	B	
		DC	C	

# PRODUCT SPECIFICATION

DATE : 02/22/2011

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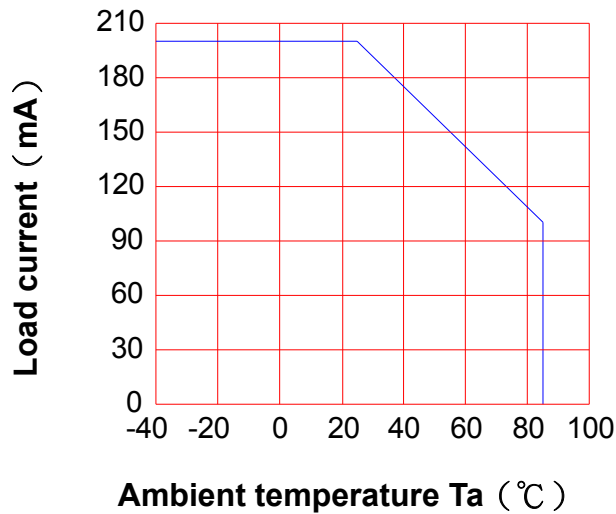
SOLID STATE RELAY - MOSFET OUTPUT  
**KAQV412A**

NO.61M11007  
SHEET 3 OF 7

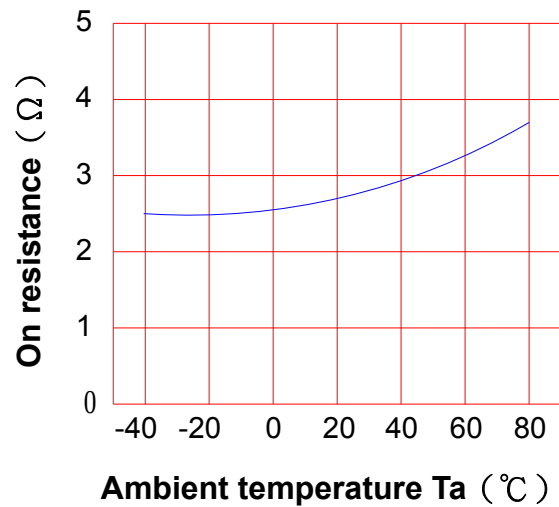
REV.  
2

## ● Data Curve

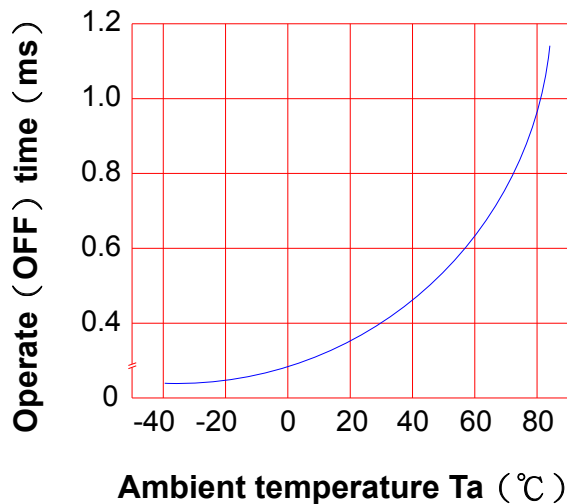
Load current vs. ambient temperature  
Allowable ambient Temperature :  
-40°C to +85°C



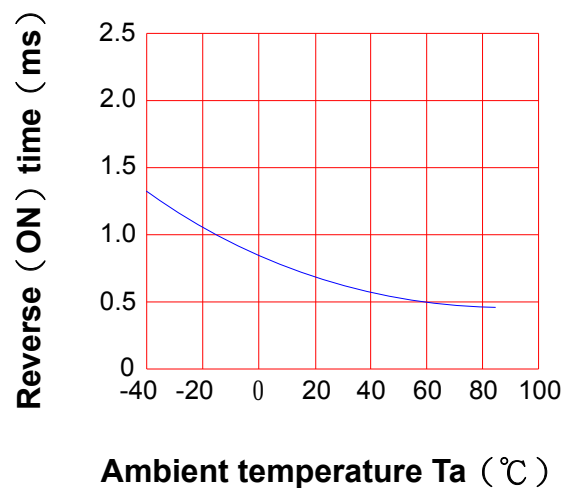
On resistance vs. ambient temperature  
across terminals 4 and 6 pin  
LED current : 0mA  
Continuous load current : 200mA (DC)



Operate (OFF) time vs.  
ambient temperature  
Load voltage 60V (DC)  
LED current : 5mA  
Continuous load current : 200mA (DC)



Reverse (ON) time vs.  
ambient temperature  
Load voltage 60V (DC)  
LED current : 5mA  
Continuous load current : 200mA (DC)



# PRODUCT SPECIFICATION

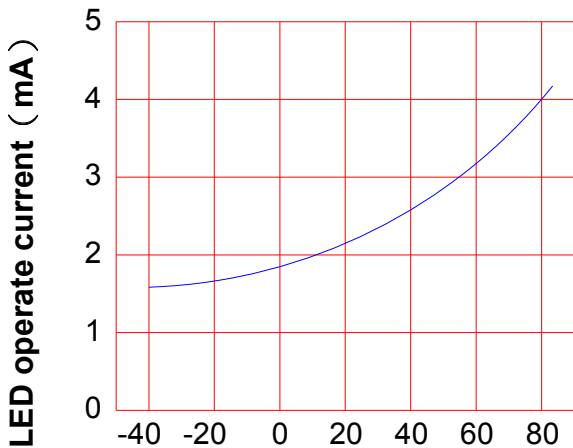
DATE : 02/22/2011

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	<b>KAQV412A</b>	SHEET 4 OF 7	

**LED operate current vs. ambient temperature**

**Load Voltage : 60V (DC)**

**Continuous load current : 200mA (DC)**

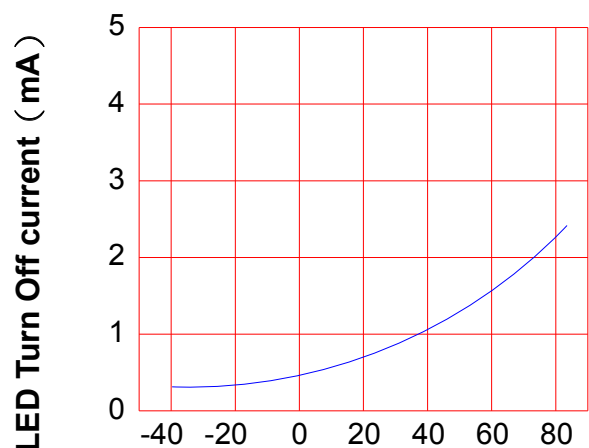


**Ambient temperature Ta (°C)**

**LED Turn Off current vs. ambient temperature**

**Load Voltage : 60V (DC)**

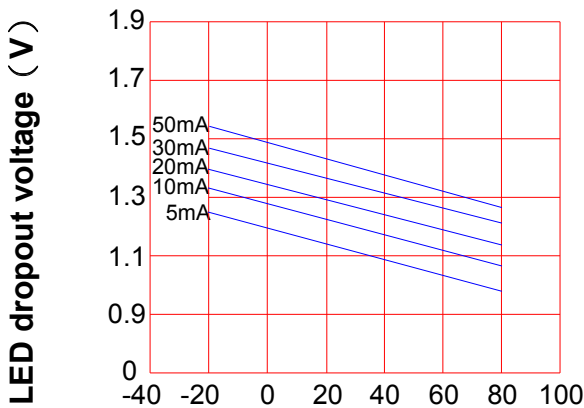
**Continuous load current : 200mA (DC)**



**Ambient temperature Ta (°C)**

**LED dropout voltage vs. ambient temperature**

**LED current : 5 to 50mA**

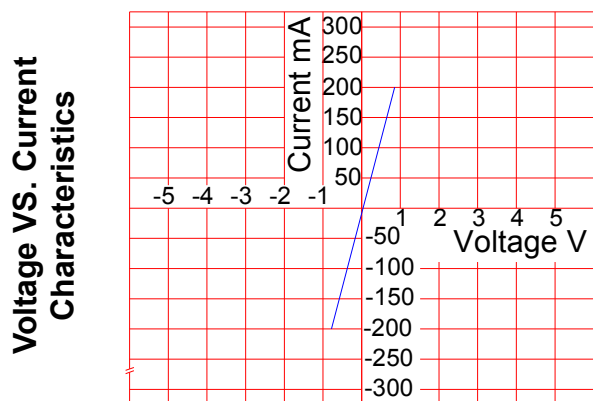


**Ambient temperature Ta (°C)**

**Voltage vs. current characteristics of output at MOSFET portion**

**Measured portion : across terminals 4 and 6 pin**

**Ambient temperature : 25°C**



**Ambient temperature : 25°C**

# PRODUCT SPECIFICATION

DATE : 02/22/2011

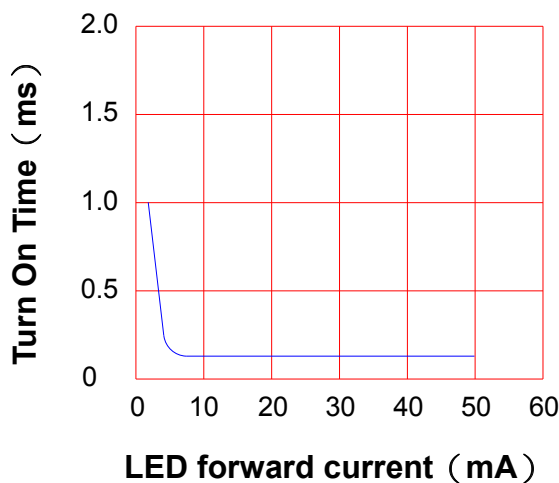
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SOLID STATE RELAY - MOSFET OUTPUT  
**KAQV412A**

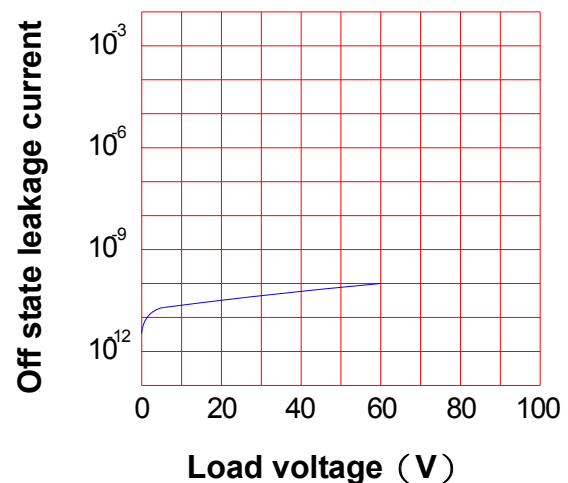
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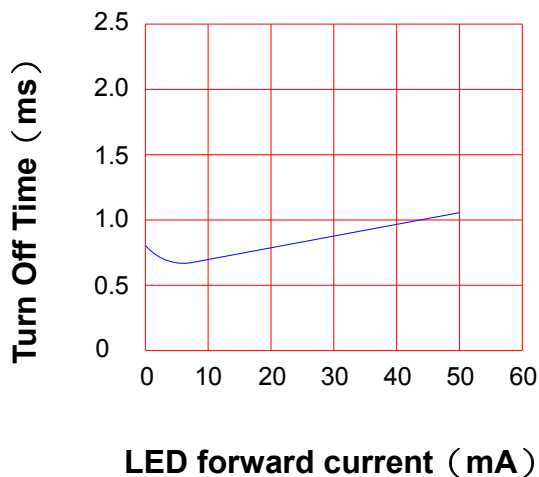
**LED forward current vs. Turn On Time**  
Across terminals 4 and 6 pin  
Load voltage : 60V (DC)  
Continuous load current : 200mA (DC)  
Ambient temperature : 25°C



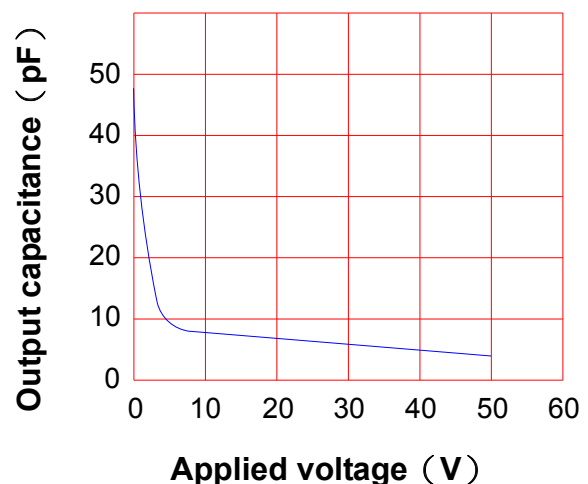
**Off state leakage current**  
Across terminals 4 and 6 pin  
Ambient temperature : 25°C



**LED forward current vs. reverse(ON) time**  
Across terminals 4 and 6 pin  
Load voltage : 60V (DC)  
Continuous load current : 200mA (DC)  
Ambient temperature : 25°C



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



# PRODUCT SPECIFICATION

DATE : 02/22/2011

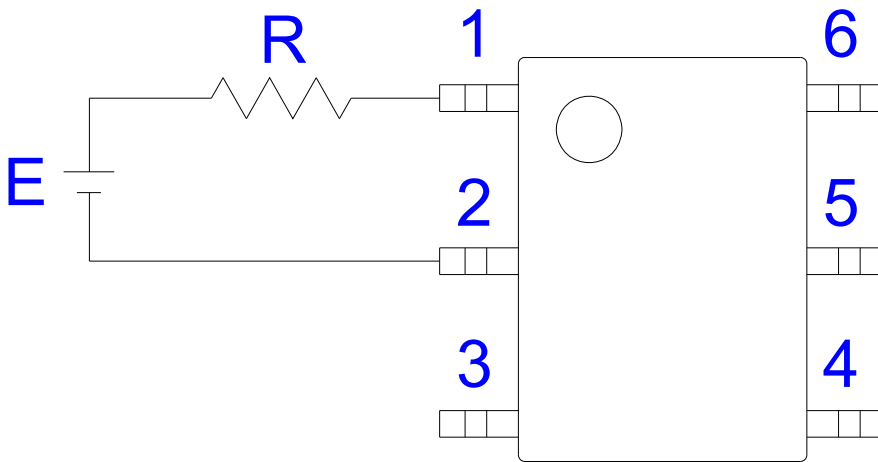
<b>cosmo</b> ELECTRONICS CORPORATION	SOLID STATE RELAY - MOSFET OUTPUT <b>KAQV412A</b>	NO.61M11007	REV.
		SHEET 6 OF 7	2

## ● USING METHODS

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

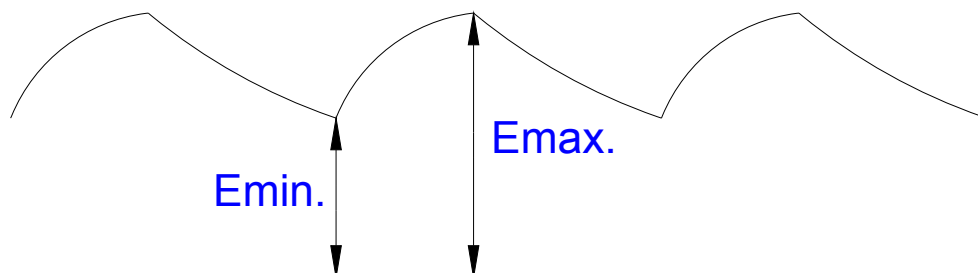
SSR-MOSFET OUTPUT

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



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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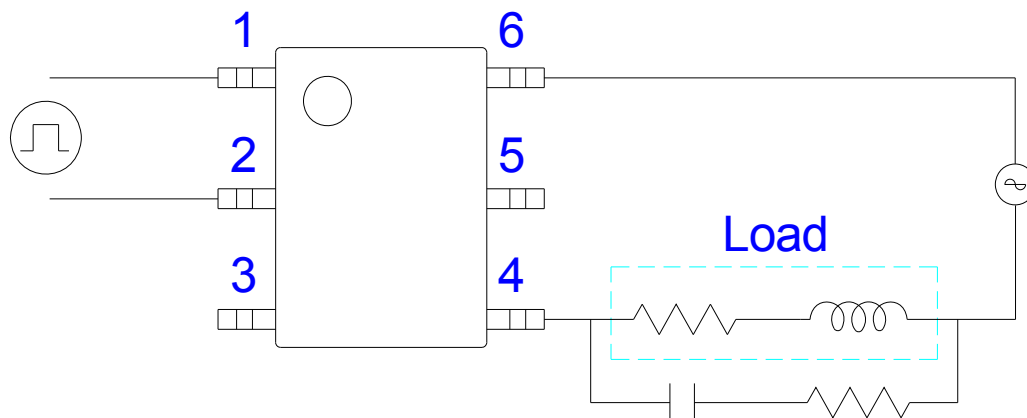
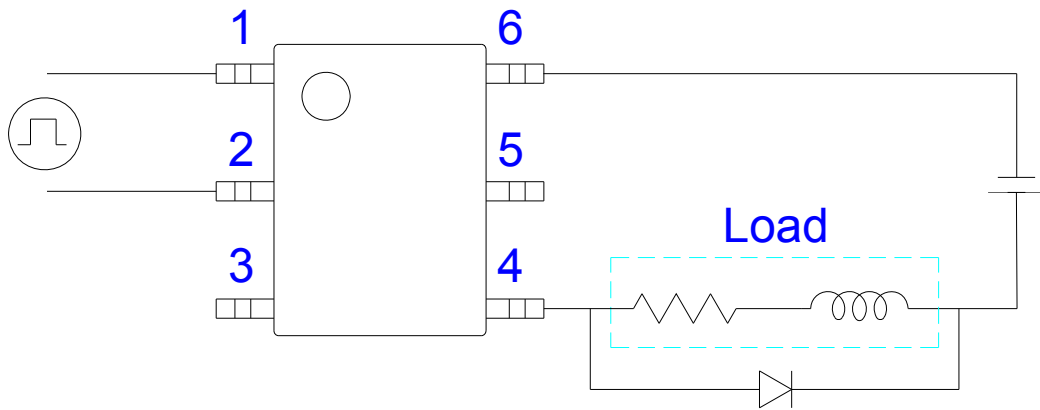
SOLID STATE RELAY - MOSFET OUTPUT  
**KAQV412A**

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## ● USING METHODS

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



R-C Snubber