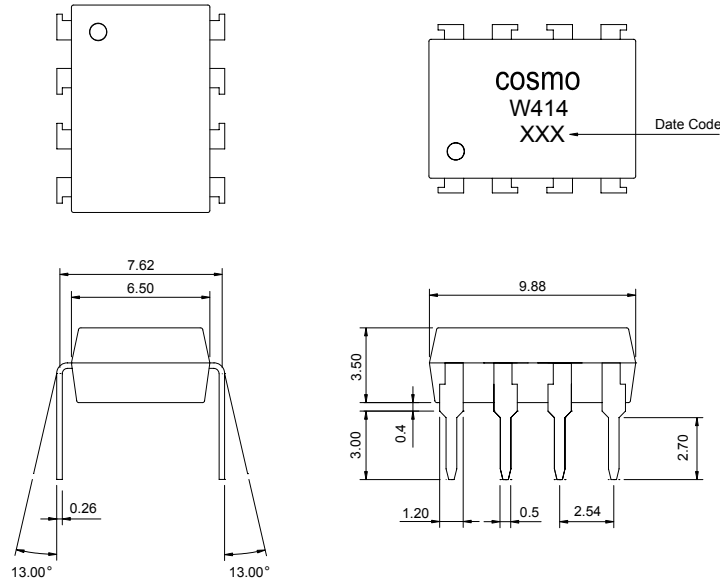


# PRODUCT SPECIFICATION

DATE : 11/22/2004

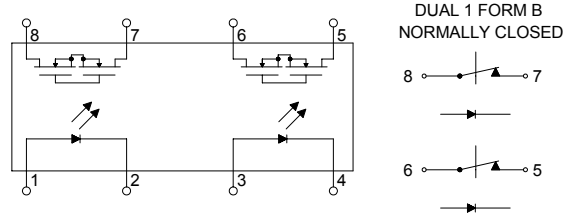
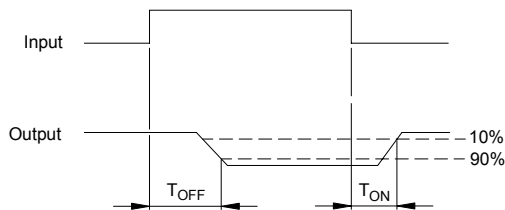
<b>cosmo</b> ELECTRONICS CORPORATION	SOLID STATE RELAY - MOSFET OUTPUT <b>KAQW414</b>	NO.60M21003	VER. 1
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● **OUTSIDE DIMENSION :**



Unit : mm  
Tolerance : ±0.2mm

● **Operate / Reverse time**



● **Absolute Maximum Ratings**

( Ta=25 )

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 ..... 1.3mW/	
General Characteristics	
Isolation Test Voltage ..... 3750VACrms	Storage Temperature Range ..... -40 to +125
Isolation Resistance	Operating Temperature Range ... -40 to +85
Viso=500V , Ta=25 ..... 10 <sup>10</sup> Ω	Junction Temperature ..... 100
Total Power Dissipation ..... 550mW	Soldering Temperature ,
Derate Linearly from 25 ..... 2.5mW/	2mm from case , 10 sec ..... 260

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## ● Electro-optical Characteristics

( Ta=25 )

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	$I_{F\text{OFF}}$	$V_L=\pm 20\text{V}$ , $I_L=5\mu\text{A}$			5	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	$V_B$	$I_B=50\mu\text{A}$	400			V	
Output Off-State Leakage	$I_{T\text{OFF}}$	$V_T=100\text{V}$ , $I_F=10\text{mA}$		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	$R_{\text{ON}}$	$I_L=100\text{mA}$ , $I_F=0\text{mA}$	40	50	
		B			20	25	
		C			10	12.5	
Operate Time	$T_{\text{OFF}}$	$I_F=10\text{mA}$ , $V_L=\pm 20\text{V}$ $t=10\text{ms}$ , $I_L=\pm 100\text{mA}$		0.6	1.5	ms	
Reverse Time	$T_{\text{ON}}$			0.3	1.0	ms	

## ● MOS Relay Schematic and Wiring Diagrams

Schematic	Output configuration	Load	Connection	Wiring Diagrams
	2b	AC/DC	-	<p>(1) Two independent 1 Form B use</p> <p>(2) 2 Form B use</p>

# PRODUCT SPECIFICATION

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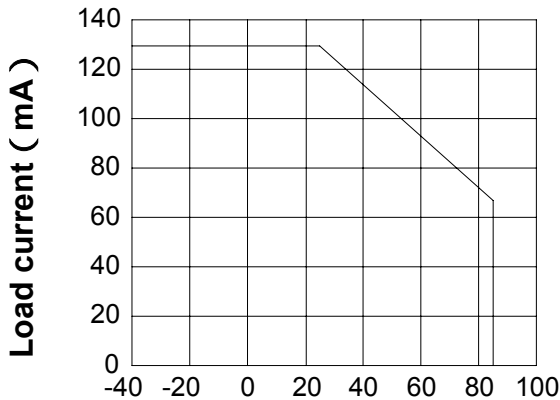
SOLID STATE RELAY - MOSFET OUTPUT  
**KAQW414**

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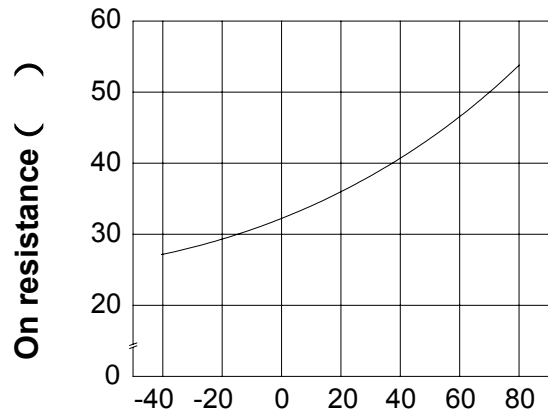
## ● Data Curve

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



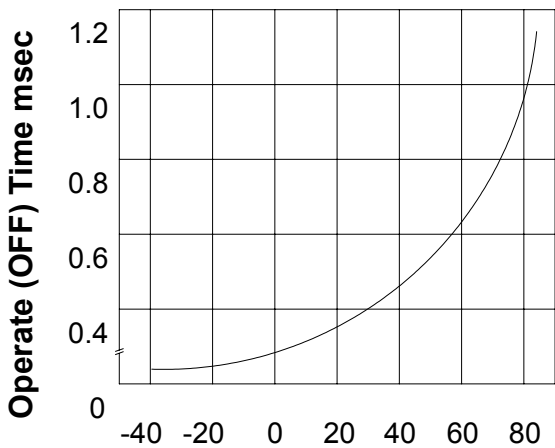
Ambient temperature Ta ( )

**On resistance vs. ambient temperature**  
across terminals 5 , 7 and 6 , 8 pin  
LED current : 0mA  
Continuous load current : 130mA ( DC )



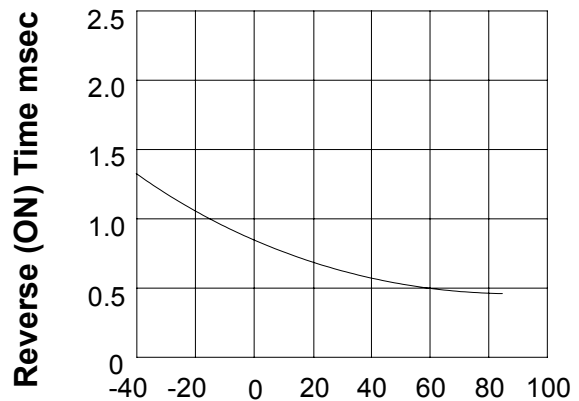
Ambient temperature Ta ( )

**Operate (OFF) time vs. ambient temperature**  
Load voltage 400V ( DC )  
LED current : 5mA  
Continuous load current : 130mA ( DC )



Ambient temperature Ta ( )

**Reverse (ON) time vs. ambient temperature**  
Load voltage 400V ( DC )  
LED current : 5mA  
Continuous load current : 130mA ( DC )



Ambient temperature Ta ( )

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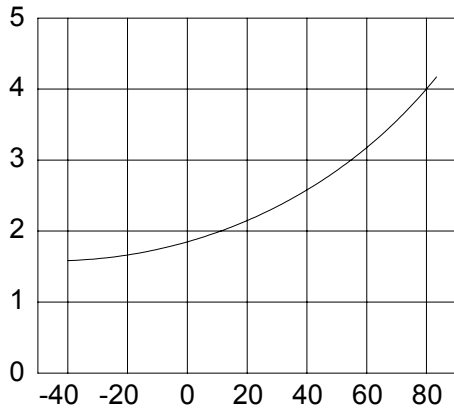
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1

LED operate (OFF) current vs.  
ambient temperature

Load Voltage : 400V ( DC )

Continuous load current : 130mA ( DC )

LED operate (OFF) current ( mA )



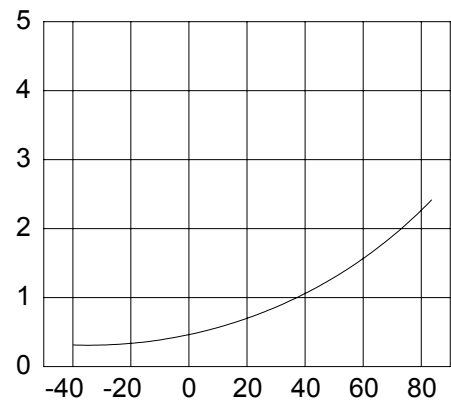
Ambient temperature Ta ( )

LED Reverse (ON) current vs.  
ambient temperature

Load Voltage : 400V ( DC )

Continuous load current : 130mA ( DC )

LED Reverse (ON) current ( mA )

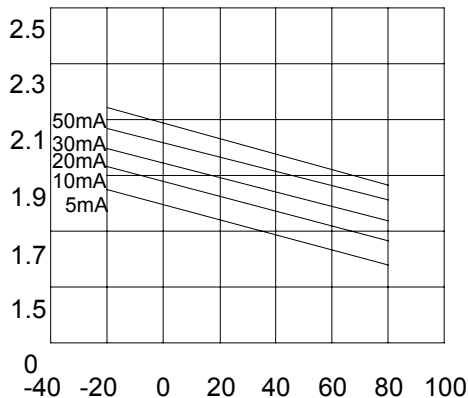


Ambient temperature Ta ( )

LED dropout voltage vs.  
ambient temperature

LED current : 5 to 50mA

LED dropout voltage ( V )



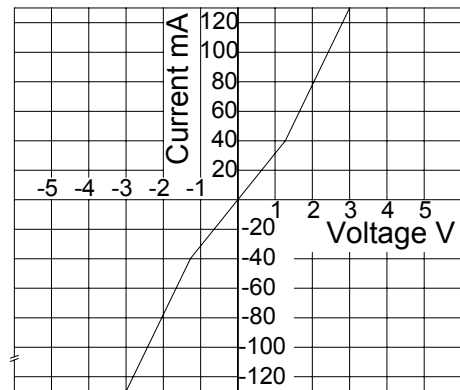
Ambient temperature Ta ( )

Voltage vs. current characteristics of  
output at MOSFET portion

Measured portion : across terminals  
5 , 7 and 6 , 8 pin

Ambient temperature : 25

Voltage VS. Current  
Characteristics



# PRODUCT SPECIFICATION

DATE : 11/22/2004

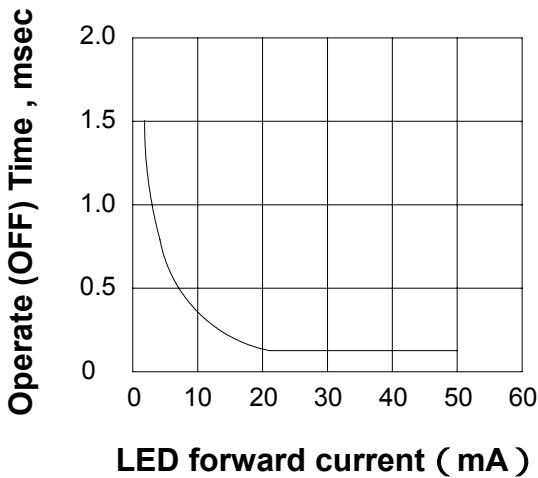
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SOLID STATE RELAY - MOSFET OUTPUT  
**KAQW414**

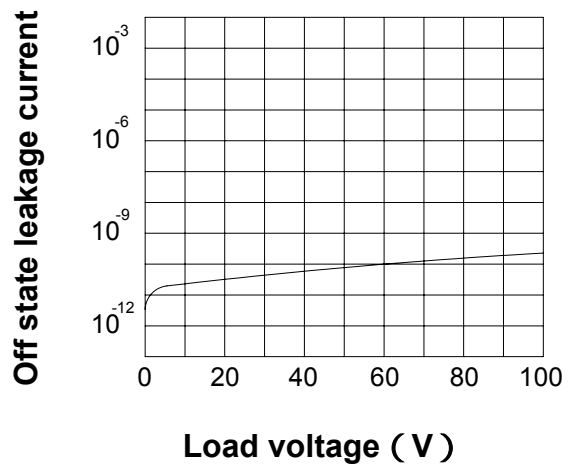
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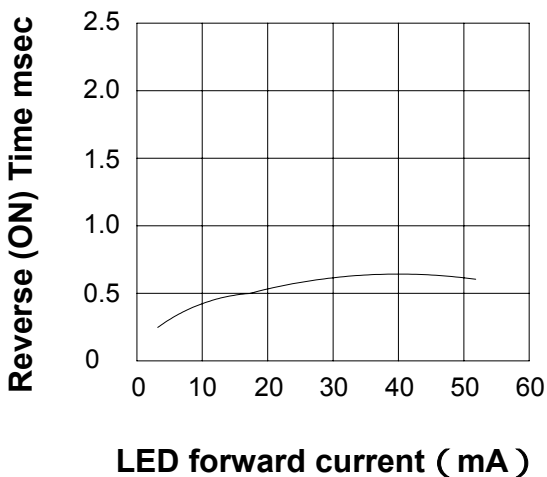
**LED forward current vs. Operate (OFF) time across terminals 5 , 7 and 6 , 8 pin**  
Load voltage : 400V ( DC )  
Continuous load current : 130mA ( DC )  
Ambient temperature : 25



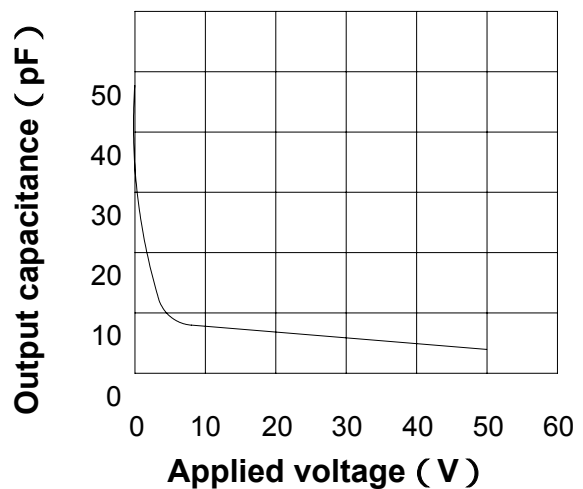
**Off state leakage current across terminals 5 , 7 and 6 , 8 pin**  
Ambient temperature : 25



**LED forward current vs. Reverse (ON) time across terminals 5 , 7 and 6 , 8 pin**  
Load voltage : 400V ( DC )  
Continuous load current : 130mA ( DC )  
Ambient temperature : 25



**Applied voltage vs. output capacitance across terminals 5 , 7 and 6 , 8 pin**  
Frequency : 1MHz  
Ambient temperature : 25



# PRODUCT SPECIFICATION

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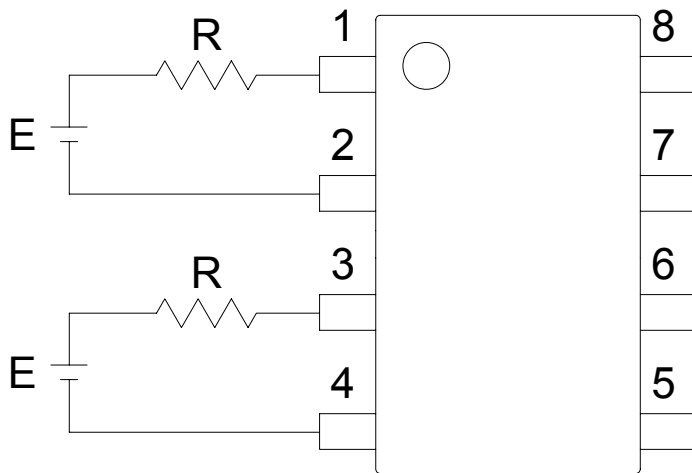
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## ● USING METHODS

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

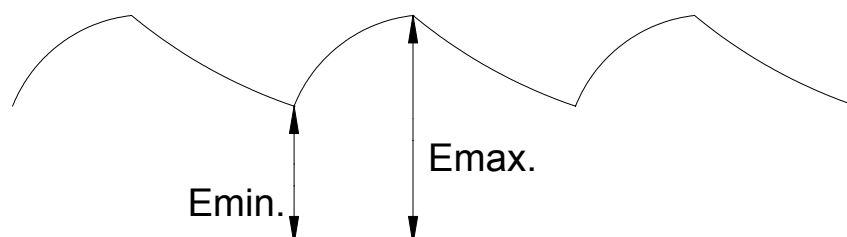
SSR-MOSFET OUTPUT

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



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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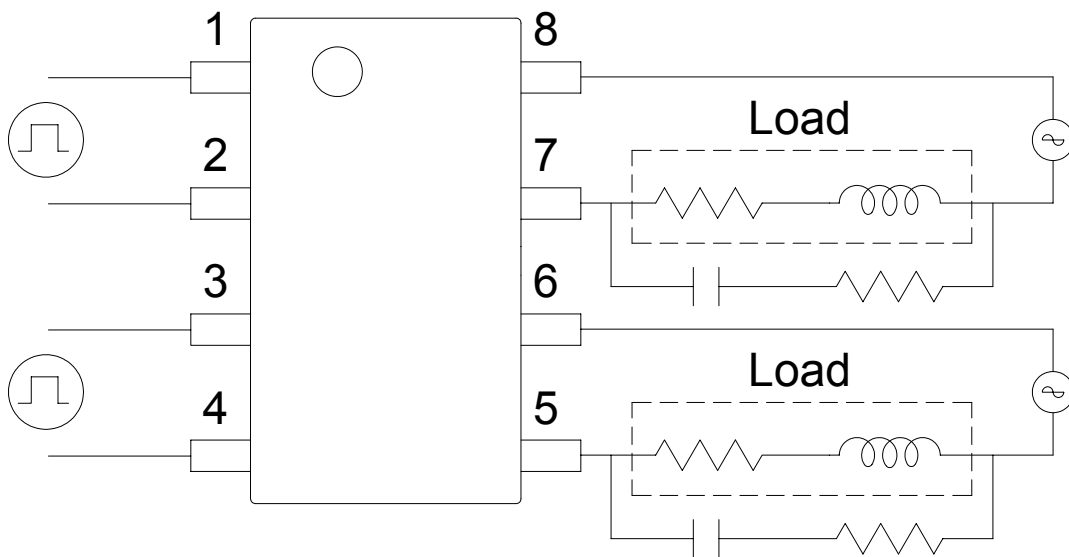
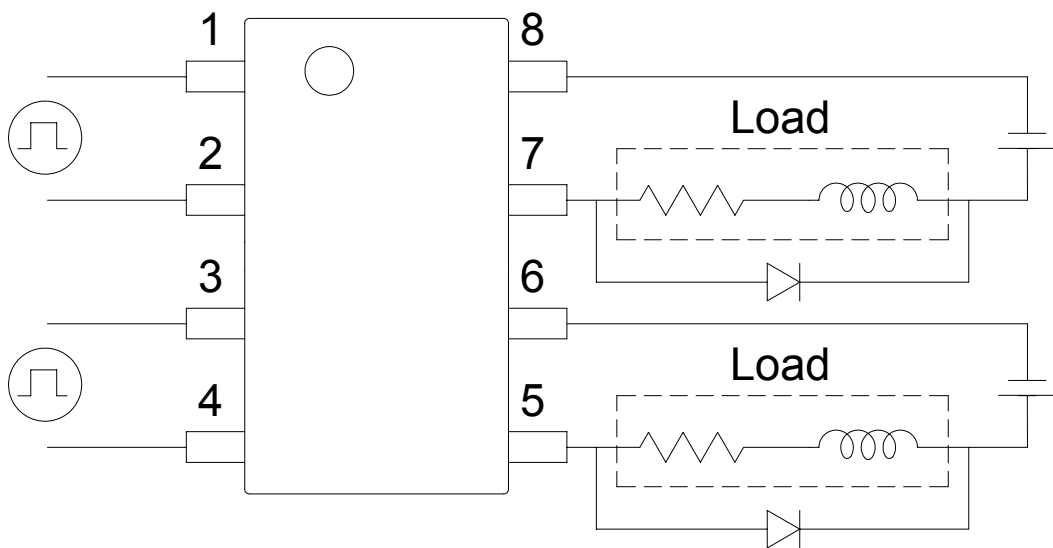
SOLID STATE RELAY - MOSFET OUTPUT  
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## ● USING METHODS

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



R-C Snubber