

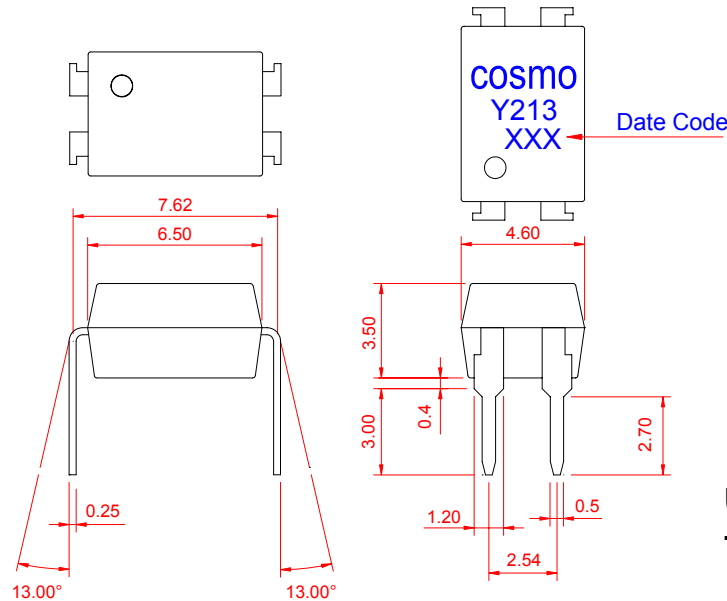
# PRODUCT SPECIFICATION

RoHS Compliance

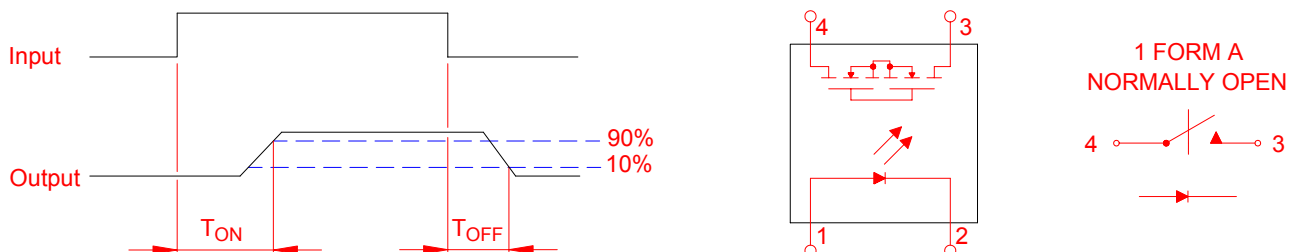
DATE : 02/12/2008

<b>cosmo</b> ELECTRONICS CORPORATION	SOLID STATE RELAY - MOSFET OUTPUT <b>KAQY213</b>	NO.60M00019	REV. 3
		SHEET 1 OF 7	

## ● OUTSIDE DIMENSION :



## ● Turn On / Turn Off time



## ● Absolute Maximum Ratings

(  $T_a=25^\circ\text{C}$  )

Emitter ( Input )		Detector ( Output )	
Reverse Voltage .....	5.0V	Output Breakdown Voltage .....	$\pm 250\text{V}$
Continuous Forward Current .....	50mA	Continuous Load Current .....	$\pm 200\text{mA}$
Peak Forward Current .....	1A	Power Dissipation .....	500mW
Power Dissipation .....	100mW		
Derate Linearly from $25^\circ\text{C}$ .....	1.3mW/ $^\circ\text{C}$		
General Characteristics			
Isolation Test Voltage .....	5000VACrms	Storage Temperature Range .....	$-40^\circ\text{C}$ to $+125^\circ\text{C}$
Isolation Resistance		Operating Temperature Range ...	$-40^\circ\text{C}$ to $+85^\circ\text{C}$
$V_{io}=500\text{V}$ , $T_a=25^\circ\text{C}$ .....	$\geq 10^{10}\Omega$	Junction Temperature .....	$100^\circ\text{C}$
Total Power Dissipation .....	550mW	Soldering Temperature ,	
Derate Linearly from $25^\circ\text{C}$ .....	2.5mW/ $^\circ\text{C}$	2mm from case , 10 sec .....	$260^\circ\text{C}$

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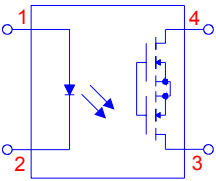
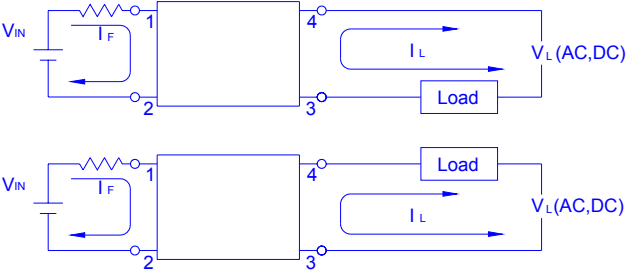
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## ● Electro-optical Characteristics

(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	$V_B$	$I_B=50\mu\text{A}$	250			V
Output Off-State Leakage	$I_{T\text{OFF}}$	$V_T=250\text{V}$ , $I_F=0\text{mA}$		0.2	1	$\mu\text{A}$
I/O Capacitance	$C_{\text{ISO}}$	$I_F=0$ , $f=1\text{MHz}$		6		pF
ON Resistance	$R_{\text{ON}}$	$I_L=100\text{mA}$ , $I_F=10\text{mA}$		8	16	$\Omega$
Turn-On Time	$T_{\text{ON}}$	$I_F=10\text{mA}$ , $V_L=\pm 20\text{V}$ $t=10\text{ms}$ , $I_L=\pm 100\text{mA}$		0.3	1.0	ms
Turn-Off Time	$T_{\text{OFF}}$			0.5	1.5	ms

## ● MOS Relay Schematic and Wiring Diagrams

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

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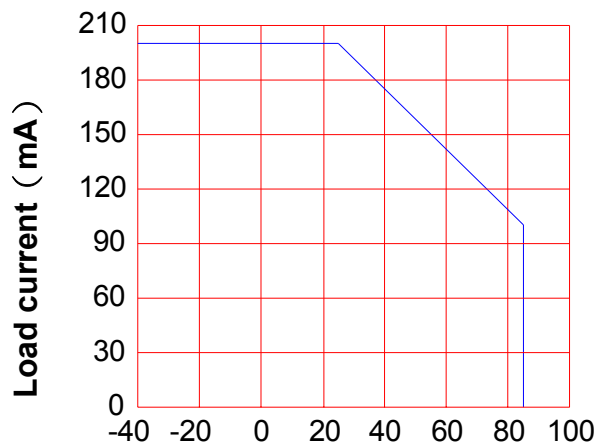
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## ● Data Curve

Load current vs. ambient temperature

Allowable ambient Temperature :

-40°C to +85°C



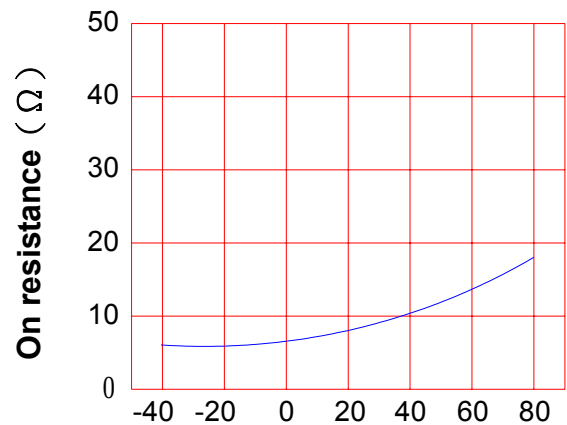
Ambient temperature Ta (°C)

On resistance vs. ambient temperature

across terminals 3 and 4 pin

LED current : 5mA

Continuous load current : 200mA (DC)



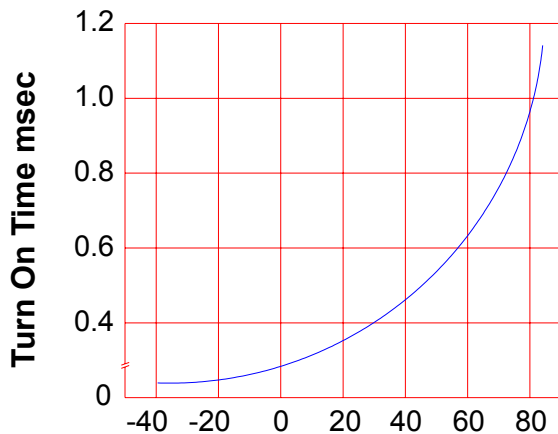
Ambient temperature Ta (°C)

Turn On Time vs. ambient temperature

Load voltage 250V (DC)

LED current : 5mA

Continuous load current : 200mA (DC)



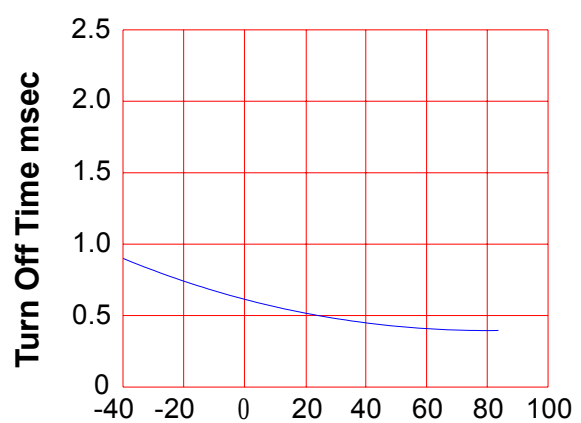
Ambient temperature Ta (°C)

Turn Off Time vs. ambient temperature

Load voltage 250V (DC)

LED current : 5mA

Continuous load current : 200mA (DC)



Ambient temperature Ta (°C)

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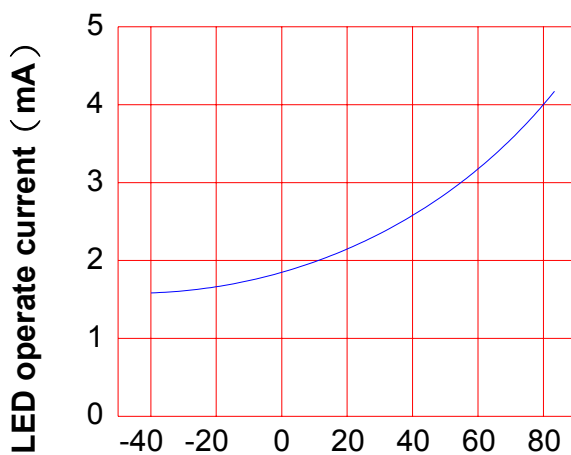
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LED operate current vs.  
ambient temperature

Load Voltage : 250V (DC)

Continuous load current : 200mA (DC)

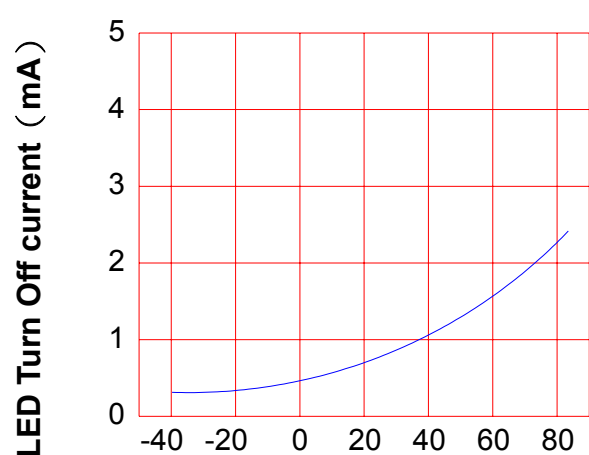


Ambient temperature Ta (°C)

LED Turn Off current vs.  
ambient temperature

Load Voltage : 250V (DC)

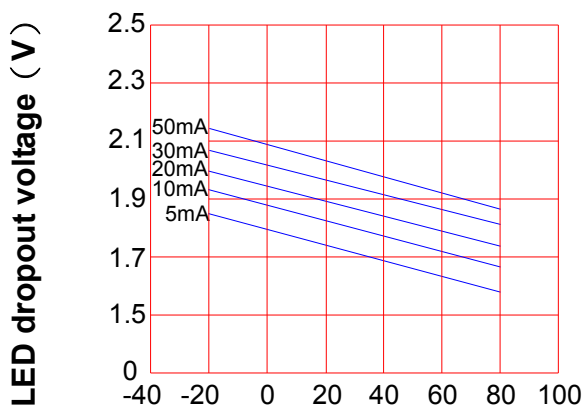
Continuous load current : 200mA (DC)



Ambient temperature Ta (°C)

LED dropout voltage vs.  
ambient temperature

LED current : 5 to 50mA

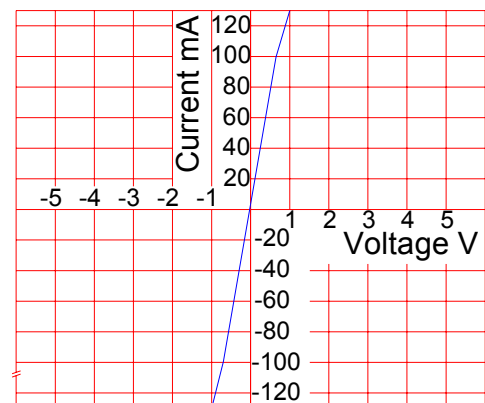


Ambient temperature Ta (°C)

Voltage vs. current characteristics  
of output at MOSFET portion  
Measured portion : across terminals  
3 and 4 pin

Ambient temperature : 25°C

Voltage VS. Current  
Characteristics



Ambient temperature : 25°C

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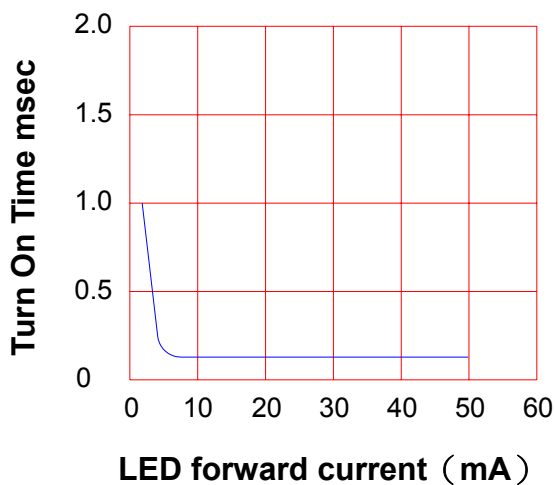
## LED forward current vs. Turn On Time

Across terminals 3 and 4 pin

Load voltage : 250V (DC)

Continuous load current : 200mA (DC)

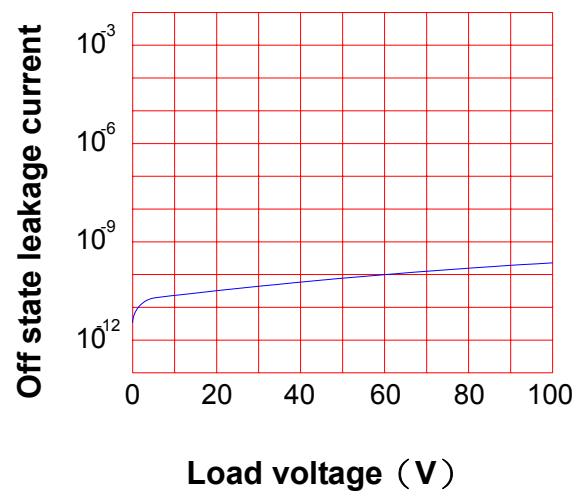
Ambient temperature : 25°C



## Off state leakage current

Across terminals 3 and 4 pin

Ambient temperature : 25°C



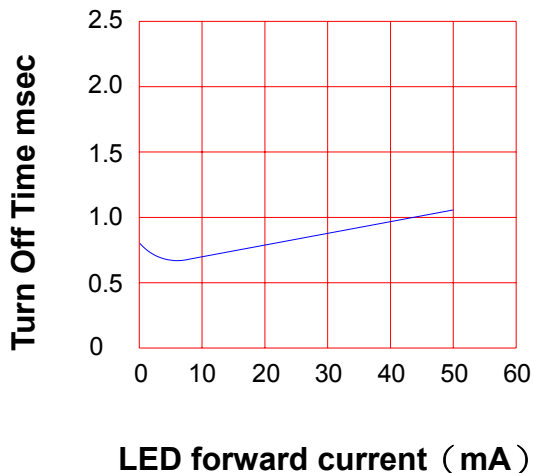
## LED forward current vs. Turn Off Time

Across terminals 3 and 4 pin

Load voltage : 250V (DC)

Continuous load current : 200mA (DC)

Ambient temperature : 25°C

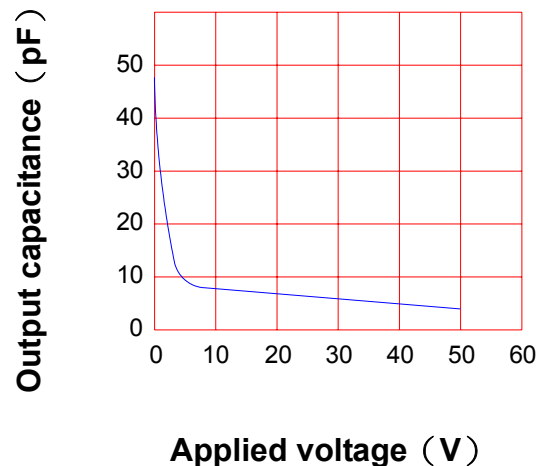


## Applied voltage vs. output capacitance

Across terminals 3 and 4 pin

Frequency : 1MHz

Ambient temperature : 25°C



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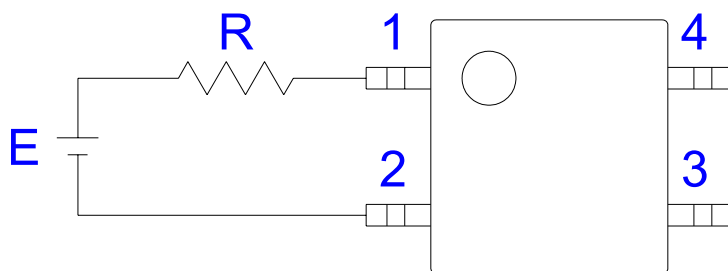
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## ● USING METHODS

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

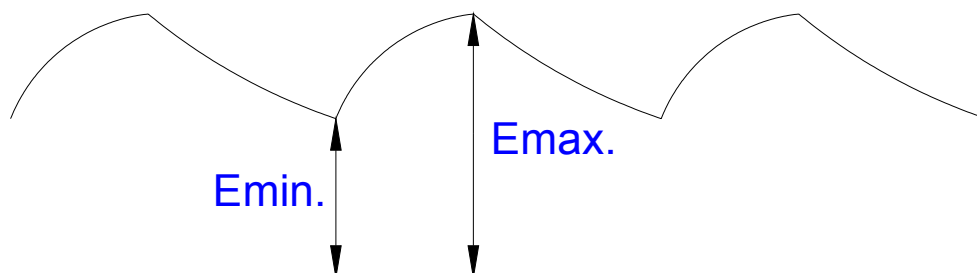
SSR-MOSFET OUTPUT

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



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.



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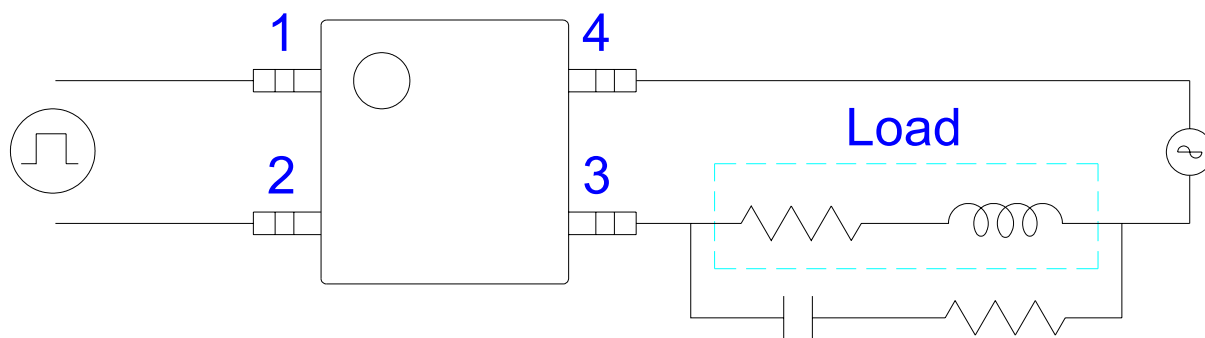
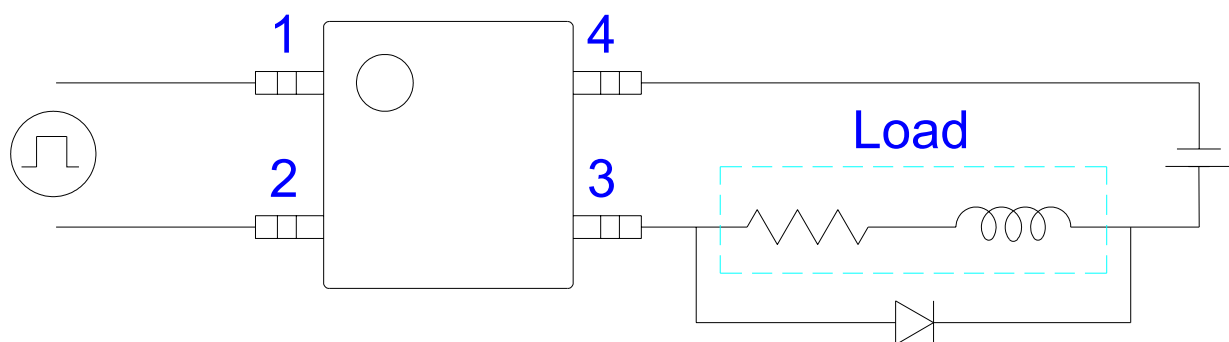
RoHS Compliance

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## ● USING METHODS

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



R-C Snubber