

# cosmo High Voltage, Solid State Relay-MOSFET Output KAQY414/414A

UL 1577/ UL 508 (File No.E108430), FI EN60950 (File No.FI13698)

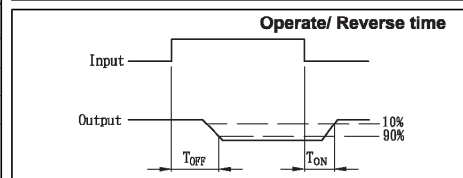
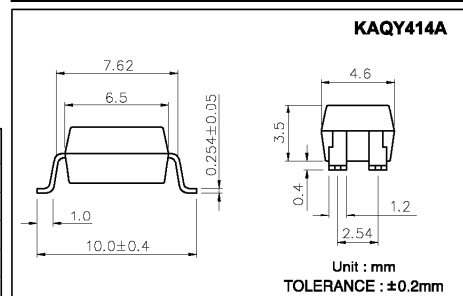
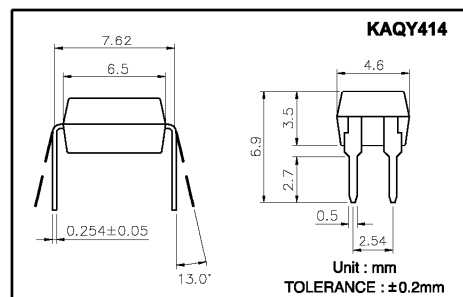
## Features

1. Normally Close, Single Pole Single Throw
2. Control 400VAC or DC Voltage
3. Switch 130mA Loads
4. LED control Current, 5mA
5. Low ON-Resistance
6.  $dv/dt$ , >500V/ms
7. Isolation Test Voltage, 3750VACrms

## 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	
<b>General Characteristics</b>	
Isolation Test Voltage..... 3750VACrms	Storage Temperature Range.... -40°C to +125°C
Isolation Resistance	Operating Temperature Range... -30°C to +85°C
Vio=500V, Ta=25°C..... $\geq 10^{10} \Omega$	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



## Electro-optical Characteristics

(Ta=25°C)

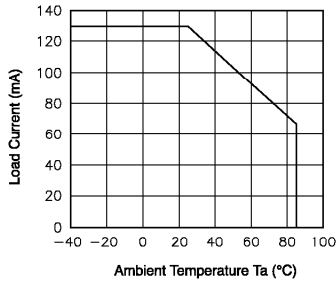
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Emitter (Input)</b>						
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 10mA		1.2	1.5	V
Operation Input Current	I <sub>OFF</sub>	V <sub>L</sub> = ±20V, I <sub>L</sub> ≤ 5uA			5	mA
Recovery Input Current	I <sub>ON</sub>	V <sub>L</sub> = ±20V, I <sub>L</sub> = 100mA, t = 10mS	0.2			mA
<b>Detector (Output)</b>						
Output Breakdown Voltage	V <sub>B</sub>	I <sub>B</sub> = 50uA	400			V
Output Off-State Leakage	I <sub>TOFF</sub>	V <sub>T</sub> = 100V, I <sub>F</sub> = 10mA		0.2	2	uA
I/O Capacitance	C <sub>ISO</sub>	I <sub>F</sub> = 0, f = 1MHz		6		pF
ON Resistance	R <sub>ON</sub>	I <sub>L</sub> = 100mA, I <sub>F</sub> = 0mA		40	50	Ω
Reverse (ON) Time	T <sub>ON</sub>	I <sub>F</sub> = 10mA, V <sub>L</sub> = ±20V		0.6	1.5	ms
Operate (OFF) Time	T <sub>OFF</sub>	t = 10ms, I <sub>L</sub> = ±100mA		0.3	1.0	ms

## Schematic and Wiring Diagrams

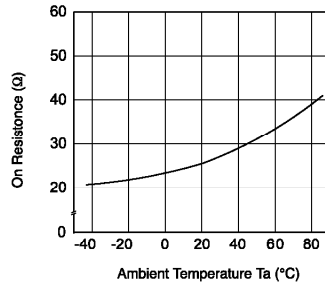
Type	Schematic	Output configuration	Load	Connection	Wiring Diagrams
KAQY414 & KAQY414A		1b	AC/DC	—	

Data Curve

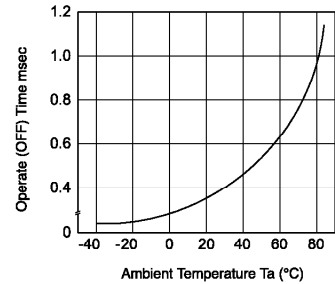
**Fig.1** Load current vs. ambient temperature  
Allowable ambient temperature:  
-40°C to +85°C



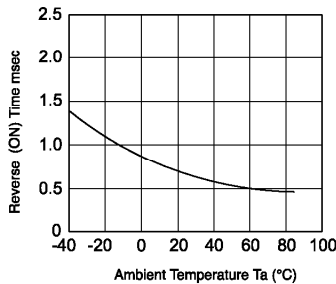
**Fig.2** On resistance vs. ambient temperature  
Across terminals 3 and 4 pin  
LED current: 0mA  
Continuous load current: 130mA(DC)



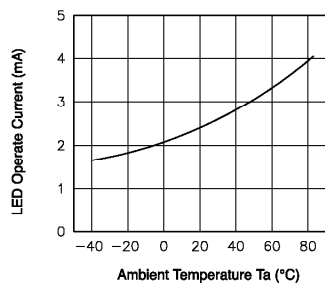
**Fig.3** Operate (OFF) time vs. ambient temperature  
Load voltage 400V(DC)  
LED current: 5mA  
Continuous load current: 130mA(DC)



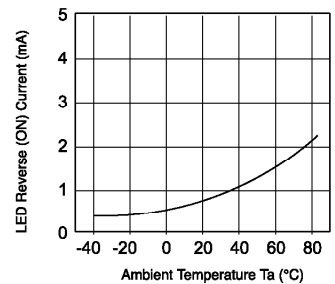
**Fig.4** Reverse (ON) time vs. ambient temperature; LED current: 5mA;  
Load voltage: 400V(DC)  
Continuous load current: 130mA(DC)



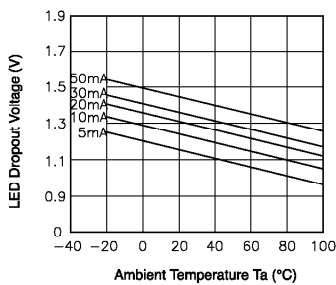
**Fig.5** LED operate (OFF) vs. ambient temperature  
Load voltage: 400V(DC)  
Continuous load current: 130mA(DC)



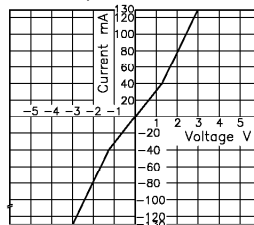
**Fig.6** LED reverse (ON) current vs. ambient temperature  
Load voltage 400V(DC)  
Continuous load current: 130mA(DC)



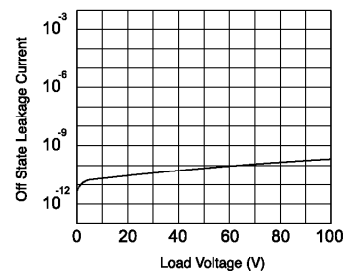
**Fig.7** LED dropout voltage vs. ambient temperature  
LED current: 5 to 50mA



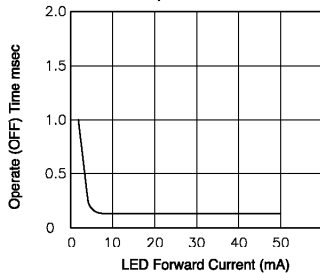
**Fig.8** Voltage vs. current characteristics of output at MOS FET portion  
Measured portion: across terminals 3 and 4 pin  
Ambient temperature: 25°C



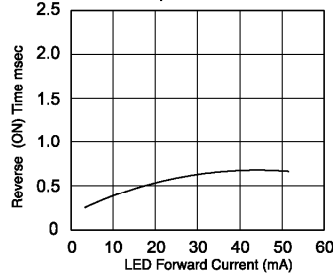
**Fig.9** Off state leakage current  
Across terminals 3 and 4 pin  
Ambient temperature: 25°C



**Fig.10** LED forward current vs. operate (OFF) time Across terminals 3 and 4 pin;  
Load voltage: 400V (DC);  
Continuous load current: 130mA (DC);  
Ambient temperature: 25°C



**Fig.11** LED forward current vs. reverse (ON) time Across terminals 3 and 4 pin;  
Load voltage: 400V (DC);  
Continuous load current: 130mA (DC);  
Ambient temperature: 25°C



**Fig.12** Applied voltage vs. output capacitance  
Across terminals 3 and 4 pin  
Frequency: 1MHz  
Ambient temperature: 25°C

