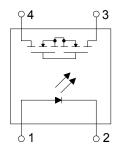


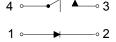
Description

The KAQY214 series is robust, ideal for telecom and ground fault applications. It is a SPST normally open switch (1 Form A) that replaces electromechanical relays in many applications. It is constructed using a GaAlAs LED for actuation control and an integrated monolithic die for the switch output. The die, fabricated in a high-voltage dielectrically isolated technology, is comprised of a photodiode array, switch control circuitry and MOSFET switches.

Schematic



1 FORM A NORMALLY OPEN



Features

- 1. Normally open, single pole single throw
- 2. Control 400V AC or DC voltage
- 3. Switch 130mA loads
- 4. Controls low-level analog signals
- 5. High sensitivity, low ON resistance
- 6. Low-level off-state leakage current
- 7. High isolation voltage 5KV (DIP / SMD)
- 8. Pb free and RoHS compliant
- 9. MSL class 1
- 10. Agency Approvals:
 - UL Approved (No. E108430): UL508
 - c-UL Approved (No. E108430)
 - FIMKO Approved: EN60950

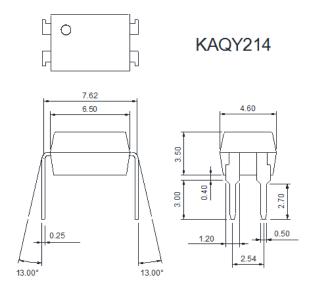
Application

- Telecommunications (PC, electronic notepad)
- Modem
- Telephone equipment
- · Security equipment
- Sensors
- Measuring and testing equipment
- · Factory automation equipment
- High speed inspection machines

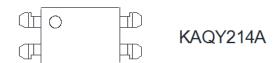
Unit: mm

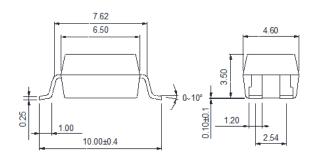
Outside Dimension

1. Dual-in-line type.

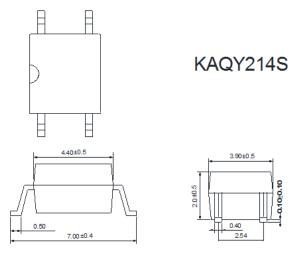


2. Surface mount type.



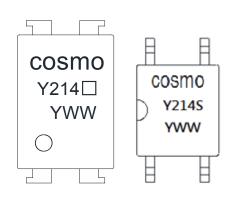


3. Small outline for surface mount type.



TOLERANCE: ±0.2mm

Device Marking



Notes:

cosmo

Y214 ☐ (Blank) : DIP or SMD

Y214S S: SOP

YWW Y: Year code / W: Week code





• Absolute Maximum Ratings

(Ta=25°€)

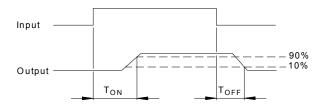
Item		Symbol	Rating	Unit
Input	Continuous forward current	I _F	50	mA
	Peak forward current	I _{FP}	1	А
	Reverse voltage	V_R	5	V
	Power dissipation	P _{in}	100	mW
	Derate linearly from 25°C	-	1.3	mW/°C
	Breakdown voltage	V _B	400	V
Output	Continuous load current	IL	130	mA
	Power dissipation	P _{out}	500	mW
loolation	Isolation voltage		KAQY214S	KAQY214
isolation			1500Vrms	5000Vrms
Isolation resistance (Vio=500V)		R _{iso}	$\geq 10^{10}$	Ω
Total power dissipation		Pt	550	mW
Derate linearly from 25°C		_	2.5	mW/°C
Operating temperature		T _{opr}	-40 to +85	$^{\circ}\!\mathbb{C}$
Storage temperature		T _{stg}	-40 to +125	$^{\circ}\!\mathbb{C}$
Junction temperature		T _j	100	$^{\circ}\!\mathbb{C}$
Soldering temperature 10 seconds		T _{sot}	260	$^{\circ}\!\mathbb{C}$

Electro-optical Characteristics

(Ta=25°C)

(ia 250)							
	Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit
	Forward voltage	V _F	I _F =10mA	-	1.2	1.5	V
Input	Operation input current	I _{FON}	V _L =20V, I _L =100mA	-	-	3.0	mA
	Recovery input current	I _{FOFF}	V _L =20V, I _L ≦5μA	0.2	-	-	mA
Output	Breakdown voltage	V _B	I _B =50μA	400	-	-	V
	Off-state leakage current	I _{LEAK}	V _L =400V, I _F =0mA	-	0.2	1.0	μΑ
I/O capacitance		C _{iso}	V _B =0V, f=1MHz	-	6	-	pF
ON resistance		R _{ON}	I _F =10mA, I _L =100mA	-	20	30	Ω
Turn-on time		T _{ON}	I _F =10mA, V _L =20V	-	0.3	1.0	ms
Turn-off Time		T _{OFF}	I _L =100mA, t=10ms		0.1	1.0	ms

• Turn-on / Turn-off Time



KAQY214 Series

4PIN 400V N.O TYPE SOLID STATE RELAY-MOSFET Output

• Schematic and Wiring Diagrams

Schematic	Output Configuration	Load	Connection	Wiring Diagrams
	1a	AC DC	-	$V_{\text{IN}} = \begin{bmatrix} V_{\text{L}} & V_{L$

Fig.1 Load Current vs. Ambient Temperature

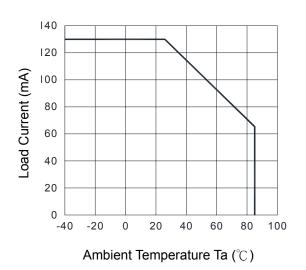


Fig.3 Turn-on Time vs. Ambient Temperature

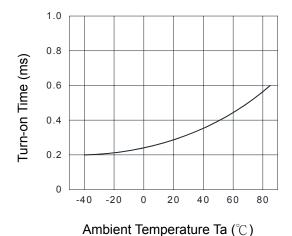
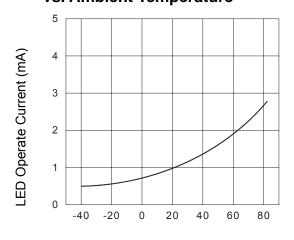
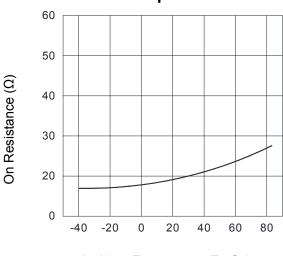


Fig.5 LED Operate Current vs. Ambient Temperature



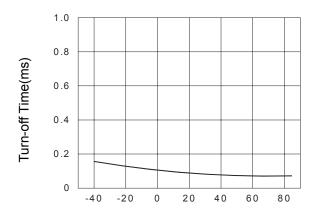
Ambient Temperature Ta (°C)

Fig.2 On Resistance vs. Ambient Temperature



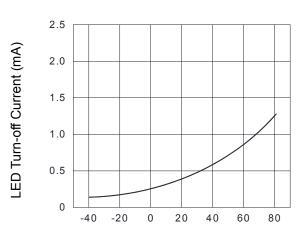
Ambient Temperature Ta (°C)

Fig.4 Turn-off Time vs. Ambient Temperature



Ambient Temperature Ta (°C)

Fig.6 LED Turn-off Current vs. Ambient Temperature



Ambient Temperature Ta (°C)

Fig.7 LED Dropout Voltage vs. Ambient Temperature

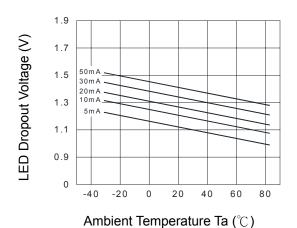
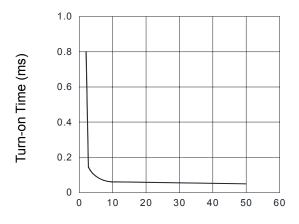


Fig.9 Turn-on Time vs. LED Forward Current



LED Forward Current (mA)

Fig.11 Turn-off Time vs. LED Forward Current

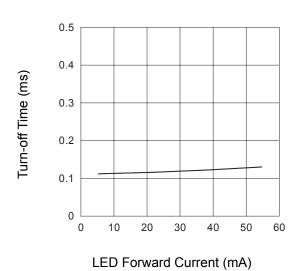
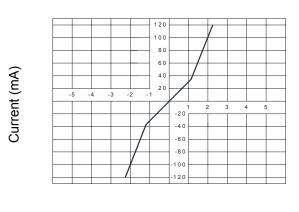
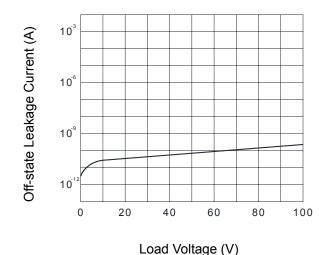


Fig.8 Voltage vs. Current Characteristics of Output at MOSFET Portion



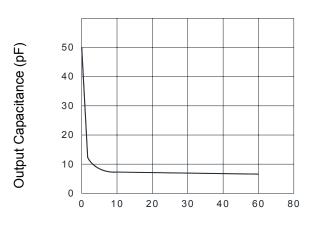
Voltage (V)

Fig.10 Off-state Leakage Current vs. Load Voltage



Loud Vollago (V

Fig.12 Output Capacitance vs. Applied Voltage

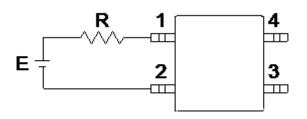


Applied Voltage (V)



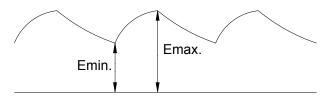
Using Methods

Examples of resistance value to control LED forward current (I_F=5mA)

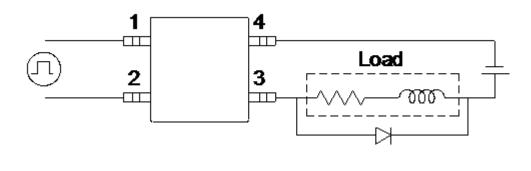


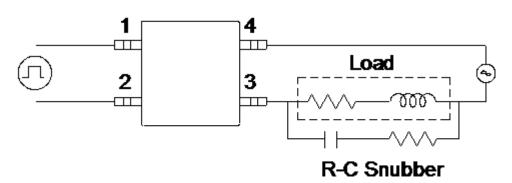
E	R
3.3V	Approx. 330 Ω
5V	Approx. 640 Ω
12V	Approx. 1.9K Ω
15V	Approx. 2.5K Ω
24V	Approx. 4.1K Ω

- 1. LED forward current must be more than 5mA, at E min.
- 2. LED forward current must be less than 50mA, at E max.



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







KAQY214 Series

4PIN 400V N.O TYPE SOLID STATE RELAY-MOSFET Output

Recommended Soldering Conditions

(a) Infrared reflow soldering:

■ Peak reflow soldering : 260°C or below (package surface temperature)

■ Time of peak reflow temperature: 10 sec

■ Time of temperature higher than 230°C : 30-60 sec
■ Time to preheat temperature from 60-120 sec

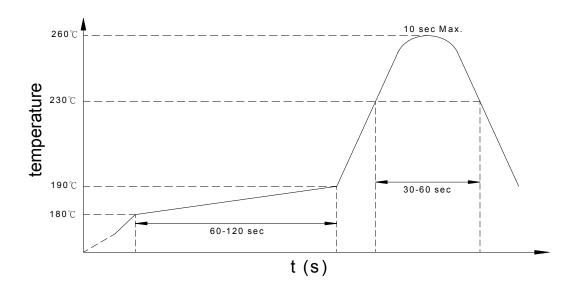
180~190°C ∶ Two

Number of reflows : Rosin flux containing small amount of chlorine

■ Flux: (The flux with a maximum chlorine content of 0.2

Wt% is recommended.)

Recommended Temperature Profile of Infrared Reflow



(b) Wave soldering:

■ Temperature : 260°C or below (molten solder temperature)

■ Time : 10 seconds or less

■ Preheating conditions: 120°C or below (package surface temperature)

■ Number of times : One

■ Flux: Rosin flux containing small amount of chlorine (The flux with a

maximum chlorine content of 0.2 Wt% is recommended.)

(c) Cautions:

Fluxes: Avoid removing the residual flux with freon-based and

chlorine-based cleaning solvent.

Avoid shorting between portion of frame and leads.

Numbering System

KAQY214 <u>X</u> (Y)

Note:

KAQY214 = Part No.

 $X = Lead form option (blank \cdot S or A)$

Y = Tape and reel option (TLD · TRU)

Option	Description	Packing quantity	
A (TLD)	surface mount type package + TLD tape & reel option	2000 units per reel	
A (TRU)	surface mount type package + TRU tape & reel option	2000 units per reel	
S (TLD)	small outline for surface mount type package +	3000 units per reel	
O (ILD)	TLD tape & reel option	oooo ariito per reer	
S (TRU)	small outline for surface mount type package +	2000 unite per reel	
	TRU tape & reel option	3000 units per reel	

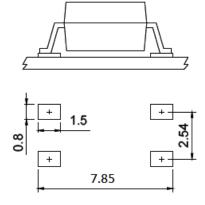
• Recommended Pad Layout for Surface Mount Lead Form

1. Surface mount type.

4-pin SMD

2. Small outline for surface mount type.

4-pin SOP

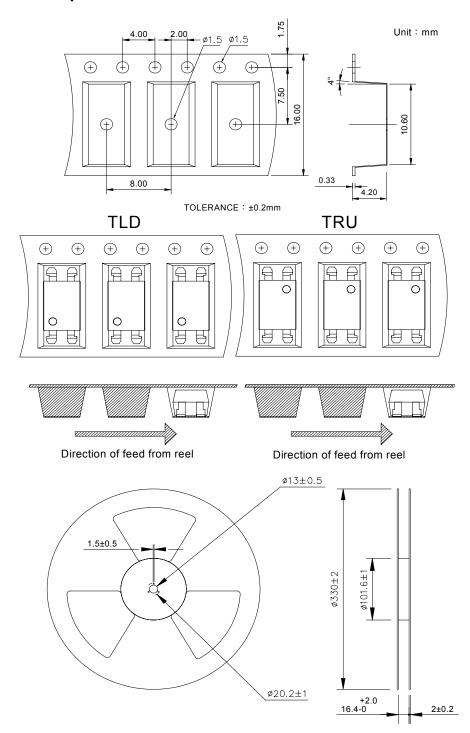


Unit: mm

KAQY214 Series

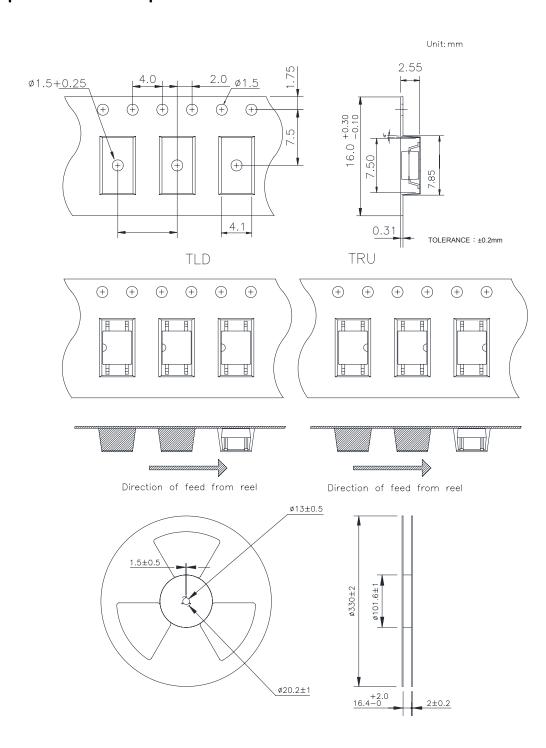
4PIN 400V N.O TYPE SOLID STATE RELAY-MOSFET Output

• 4-pin SMD Carrier Tape & Reel





4-pin SOP Carrier Tape & Reel



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KAQY214 Series

4PIN 400V N.O TYPE SOLID STATE RELAY-MOSFET Output

Application Notice

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