

KAQY212SE Series

4PIN 60V N.O TYPE

SOLID STATE RELAY-MOSFET OUTPUT

● Description

The KAQY212SE 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.

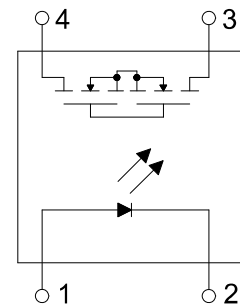
● Features

1. Normally open, single pole single throw
2. Control 60V AC or DC Voltage
3. Switch 200mA Loads
4. Controls low-level analog signals
5. High sensitivity, low ON resistance
6. Low-level off-state leakage current
7. High isolation Voltage
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: EN62368-1, EN60601-1
 - VDE Approved (No. 40053989): EN60747-5-5

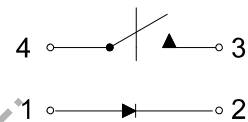
● Application

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

● Schematic



1 FORM A
NORMALLY OPEN

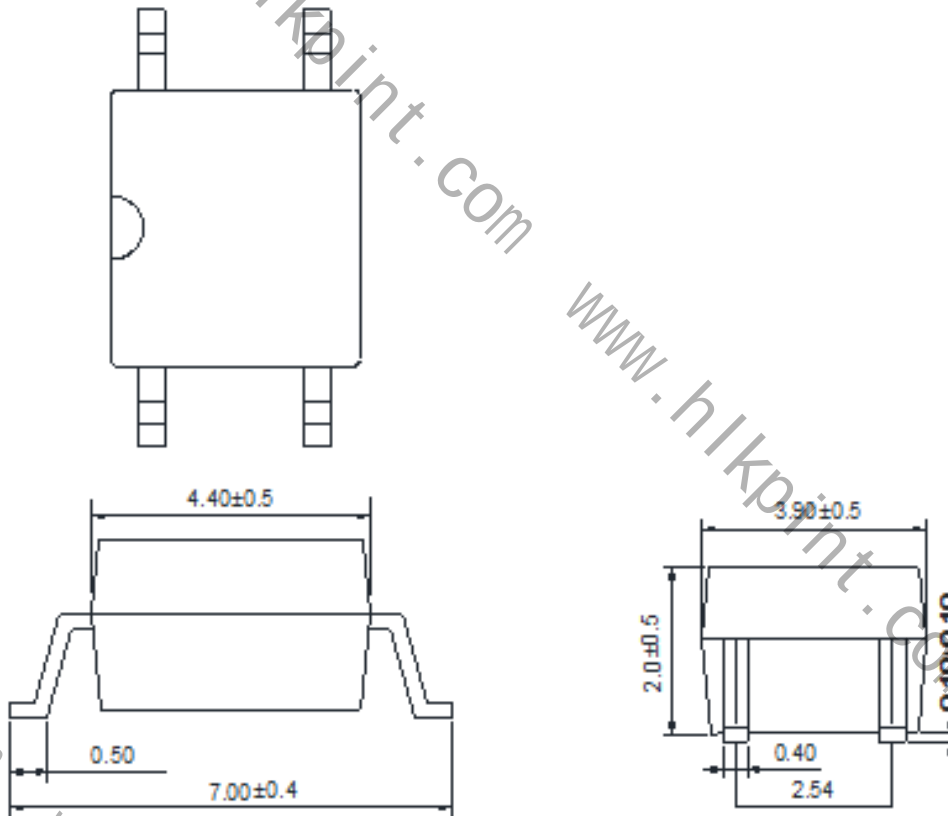


KAQY212SE Series

4PIN 60V N.O TYPE
SOLID STATE RELAY-MOSFET OUTPUT

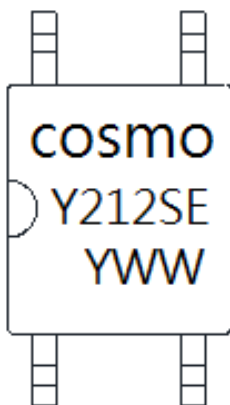
● Outside Dimension

Unit : mm



TOLERANCE : ±0.2mm

● Device Marking



Notes :

cosmo
Y212SE
YWW

Y : Year code / W : Week code

KAQY212SE Series

4PIN 60V N.O TYPE

SOLID STATE RELAY-MOSFET OUTPUT

● Absolute Maximum Ratings

(Ta=25°C)

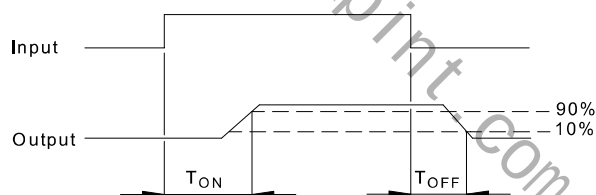
Item	Symbol	Rating	Unit
Input	Continuous forward current	I _F	50
	Peak forward current	I _{FP}	1
	Reverse voltage	V _R	5
	Power dissipation	P _{in}	100
	Derate linearly from 25°C	-	1.3
Output	Breakdown voltage	V _B	60
	Continuous load current	I _L	200
	Power dissipation	P _{out}	500
Isolation voltage		V _{iso}	1500
Isolation resistance (V _{io} =500V)		R _{iso}	≥10 ¹⁰
Total power dissipation		P _t	550
Derate linearly from 25°C		-	2.5
Operating temperature		T _{opr}	-40 to +85
Storage temperature		T _{stg}	-40 to +125
Junction temperature		T _j	100
Soldering temperature 10 seconds		T _{sot}	260

● Electro-optical Characteristics

(Ta=25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	V _F	I _F =10mA	-	1.2	1.5
	Operation input current	I _{FON}	V _L =20V, I _L =100mA	-	-	2.0
	Recovery input Voltage	V _{FOFF}	V _L =20V, I _L ≤5μA	0.2	-	-
Output	Breakdown voltage	V _B	I _B =50μA	60	-	-
	Off-state leakage current	I _{LEAK}	V _L =60V, I _F =0mA	-	0.2	1.0
I/O capacitance		C _{iso}	V _B =0V, f=1MHz	-	6	-
ON resistance		R _{ON}	I _F =10mA, I _L =100mA	-	7	10
Turn-on time		T _{ON}	I _F =10mA, V _L =20V	-	0.3	1.5
Turn-off time		T _{OFF}	I _L =100mA, t=10ms	-	0.1	1.0

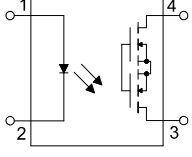
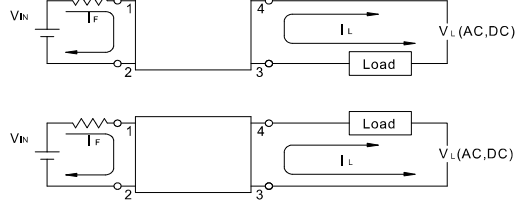
● Turn-on / Turn-off Time



KAQY212SE Series

4PIN 60V N.O TYPE
SOLID STATE RELAY-MOSFET OUTPUT

● Schematic and Wiring Diagrams

Schematic	Output Configuration	Load	Connection	Wiring Diagrams
	1a	AC DC	-	

KAQY212SE Series

4PIN 60V N.O TYPE
SOLID STATE RELAY-MOSFET OUTPUT

Fig.1 Load Current vs. Ambient Temperature

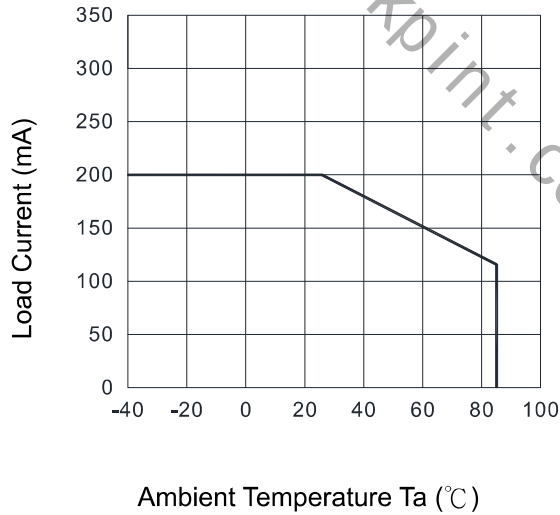


Fig.2 On Resistance vs. Ambient Temperature

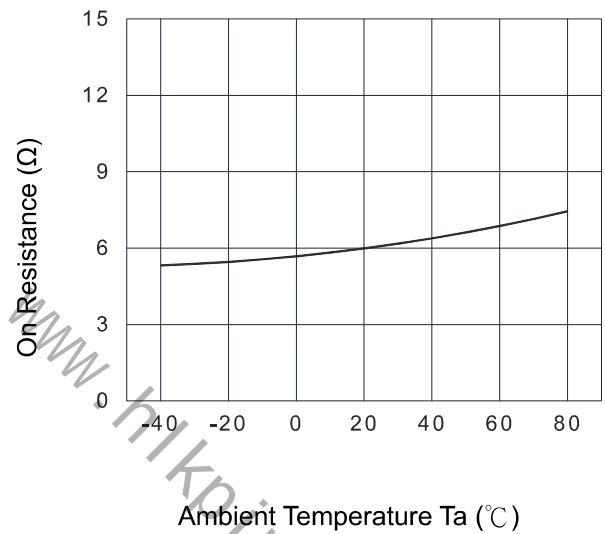


Fig.3 Turn-on Time vs. Ambient Temperature

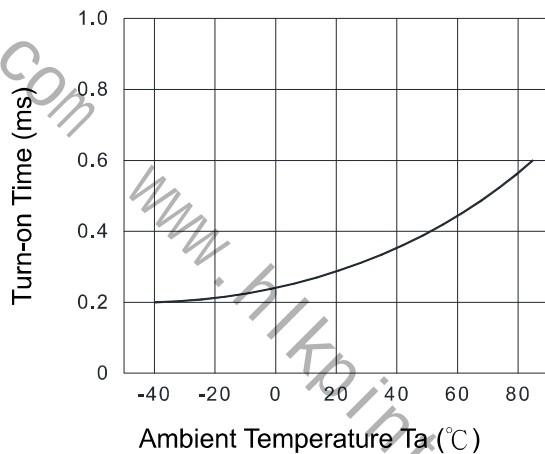


Fig.4 Turn-off Time vs. Ambient Temperature

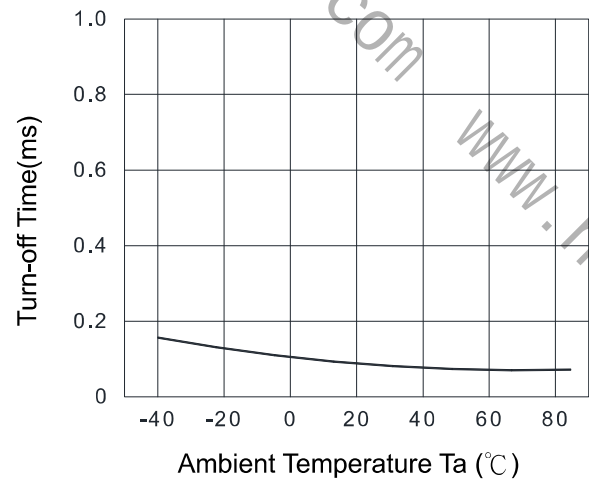


Fig.5 LED Operate Current vs. Ambient Temperature

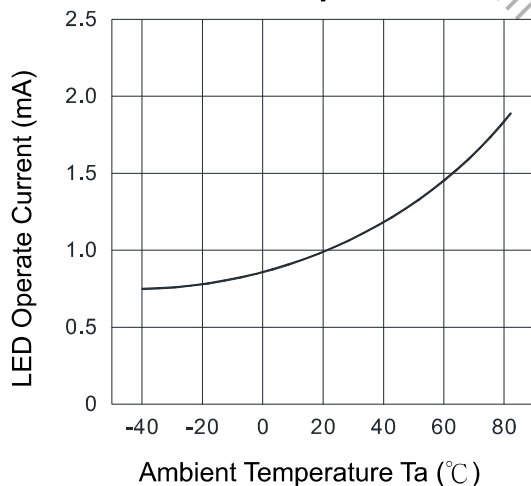
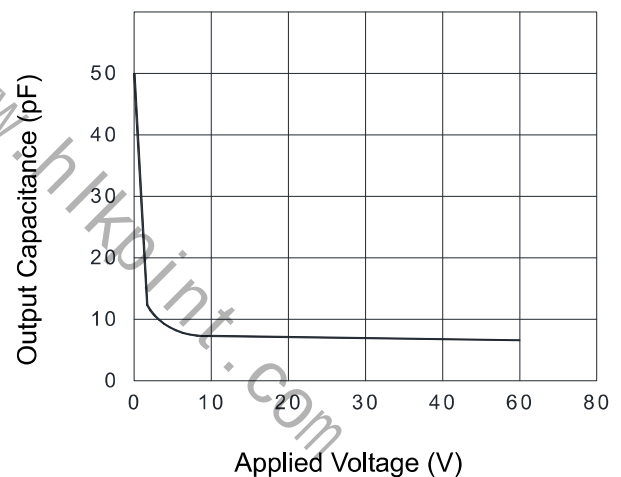


Fig.6 Output Capacitance vs. Applied Voltage



KAQY212SE Series

4PIN 60V N.O TYPE
SOLID STATE RELAY-MOSFET OUTPUT

Fig.7 LED Dropout Voltage vs. Ambient Temperature

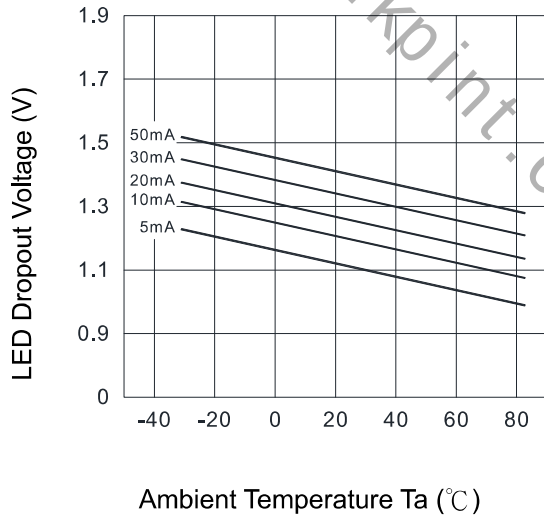


Fig.8 Voltage vs. Current Characteristics of Output at MOSFET Portion

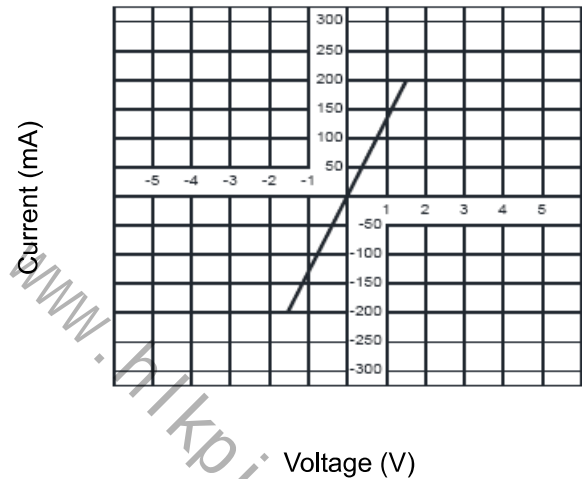


Fig.9 Turn-on Time vs. LED Forward Current

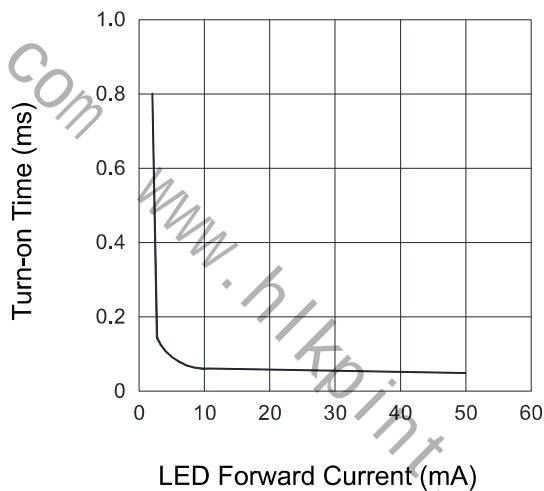


Fig.10 Off-state Leakage Current vs. Load Voltage

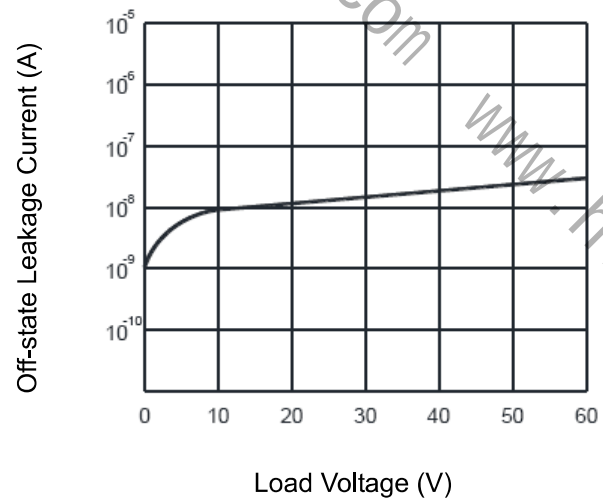


Fig.11 Turn-off Time vs. LED Forward Current

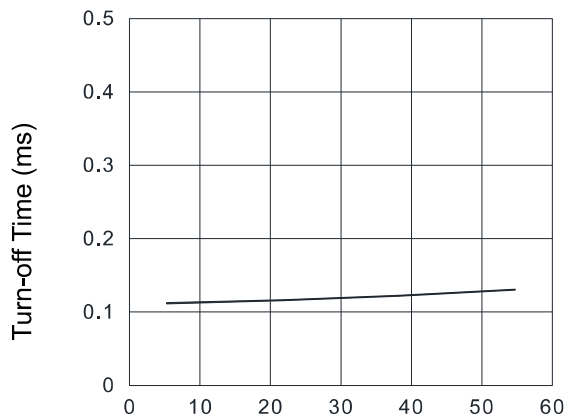
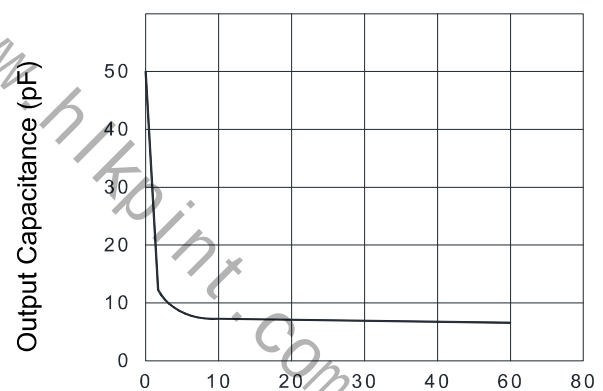


Fig.12 Output Capacitance vs. Applied Voltage



KAQY212SE Series

4PIN 60V N.O TYPE

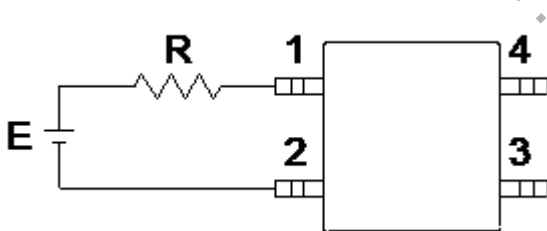
SOLID STATE RELAY-MOSFET OUTPUT

LED Forward Current (mA)

Applied Voltage (V)

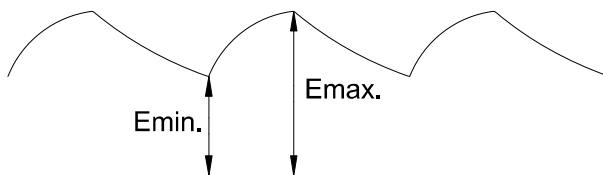
● Using Methods

Examples of resistance value to control LED forward current ($I_F=1\text{mA}$)

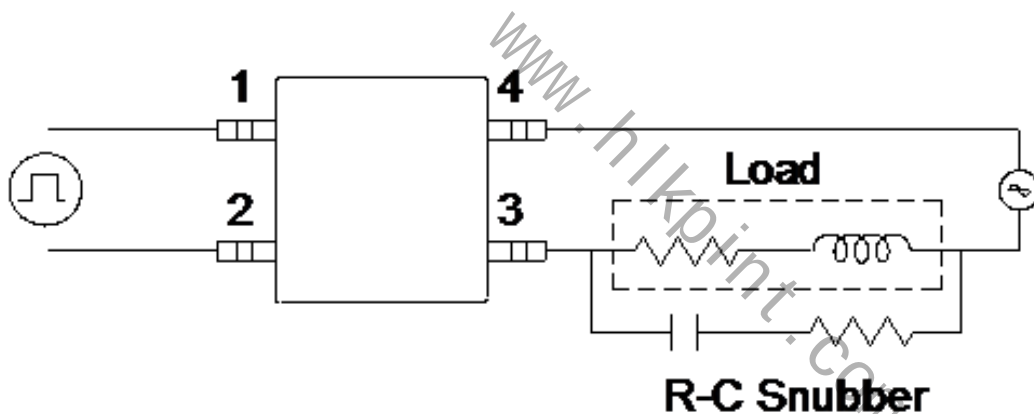
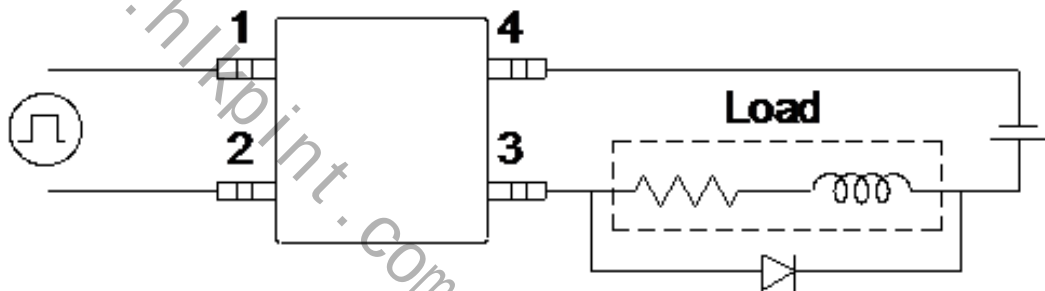


E	R
3.3V	Approx. 720 Ω
5V	Approx. 1.5K Ω
12V	Approx. 4.5K Ω
15V	Approx. 6.0K Ω
24V	Approx. 9.5K Ω

1. LED forward current must be more than 2mA , 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 :



KAQY212SE Series

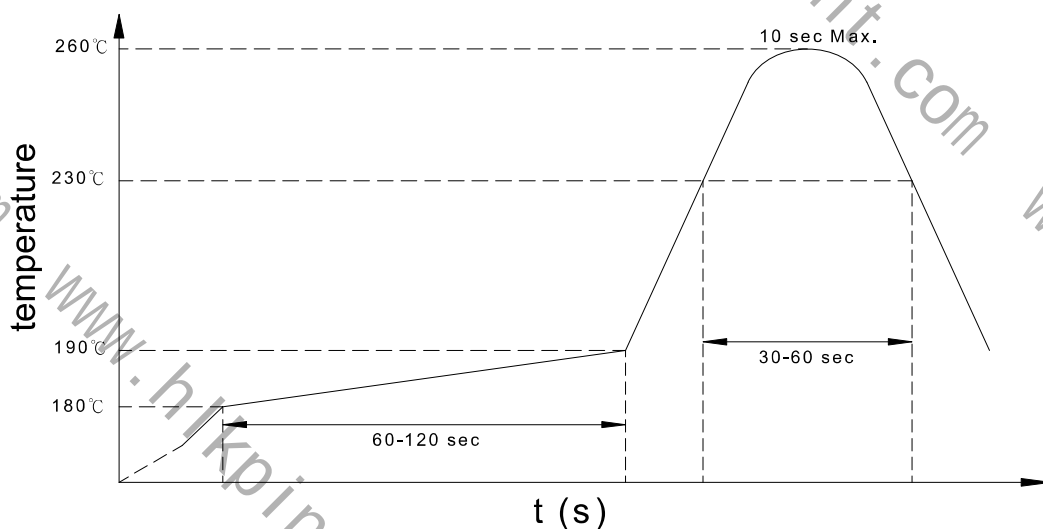
4PIN 60V N.O TYPE
SOLID STATE RELAY-MOSFET OUTPUT

● 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 180~190°C : 60-120 sec
- Number of reflows : Two
- Flux : Rosin flux containing small amount of chlorine
(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.

KAQY212SE Series

4PIN 60V N.O TYPE
SOLID STATE RELAY-MOSFET OUTPUT

● Numbering System

KAQY212SE (X)

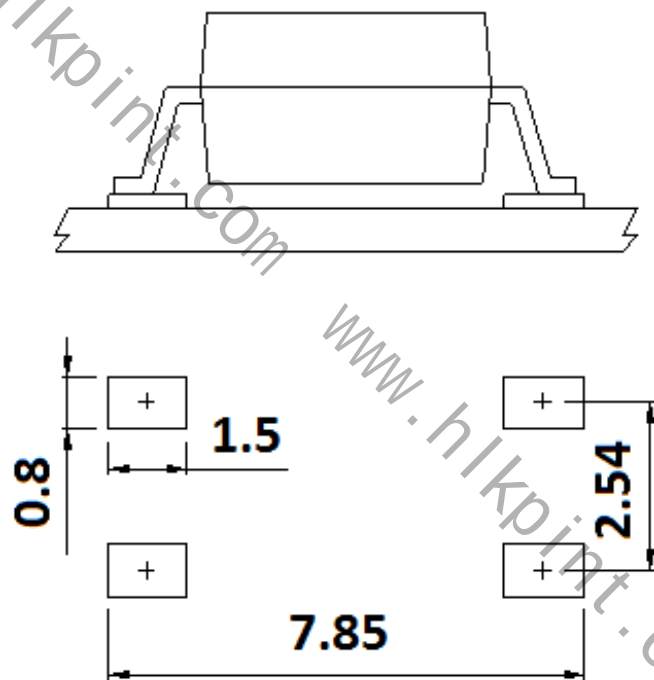
Note :

KAQY212SE = Part No.

X = Tape and reel option (TLD 、 TRU)

Option	Description	Packing quantity
SE (TLD)	small outline for surface mount type package + TLD tape & reel option	3000 units per reel
SE (TRU)	small outline for surface mount type package + TRU tape & reel option	3000 units per reel

● Recommended Pad Layout for Surface Mount Lead Form



Unit : mm

KAQY212SE Series

4PIN 60V N.O TYPE

SOLID STATE RELAY-MOSFET OUTPUT

● 4-pin SOP Carrier Tape & Reel

