

KAQW213 Series

8PIN 250V N.O. TYPE

SOLID STATE RELAY-MOSFET OUTPUT

● Description

The KAQW213 series contains two normally open switches that can be used as two independent SPST relays or as one DPST relay. The relay is constructed using a GaAlAs LED for actuation control and an integrated monolithic dies 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.

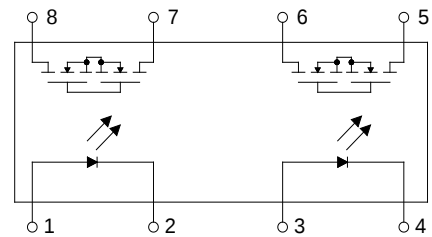
● Features

1. Normally open, double pole single throw
2. Control 250V 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 5KV (DIP / SMD)
8. Pb free and RoHS compliant
9. MSL class 1
10. Agency Approvals :
 - UL Approved (No. E169586, E108430): UL1577, UL508
 - c-UL Approved (No. E169586, E108430)
 - VDE Approved (No. 40053989): EN60747-5-5

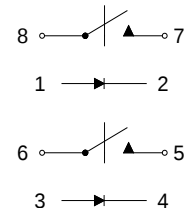
● Application

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

● Schematic



DUAL 1 FORM A
NORMALLY OPEN



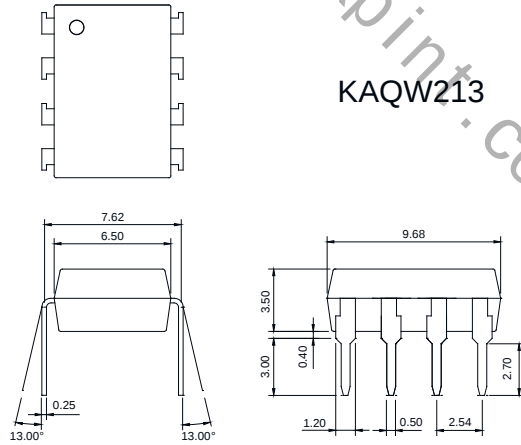
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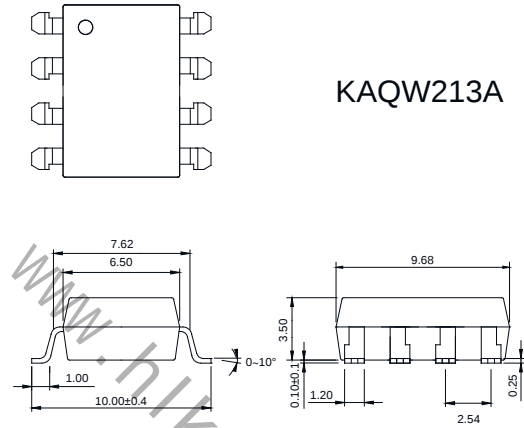
● Outside Dimension

Unit : mm

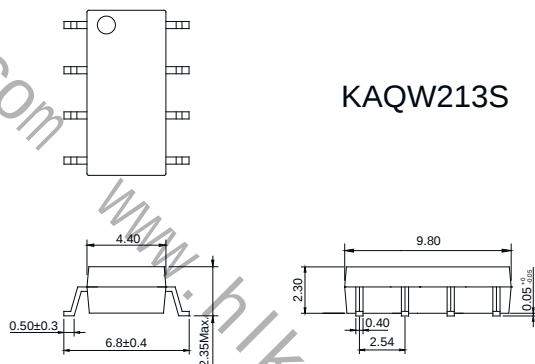
1. Dual-in-line type.



2. Surface mount type.

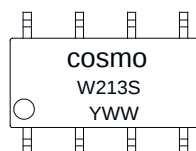
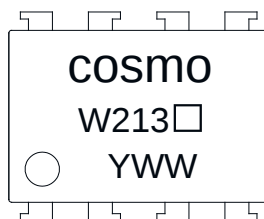


3. Small outline for surface mount type.



TOLERANCE : ±0.2mm

● Device Marking



Notes :

cosmo

W213□

W213S

YWW

□(Blank): DIP or SMD

S : SOP

Y : Year code / W : Week code

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● Absolute Maximum Ratings

(Ta=25°C)

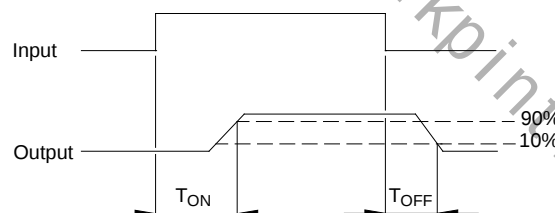
Item	Symbol	Rating	Unit
Input	Continuous forward current	I_F	50
	Peak forward current	I_{FP}	1
	Reverse voltage	V_R	5
	Power dissipation	P_{in}	100
	Derate linearly from 25°C	-	1.3
Output	Breakdown voltage	V_B	250
	Continuous load current	I_L	200
	Power dissipation	P_{out}	500
Isolation voltage		V_{iso}	KAQW213S 1500Vrms
Isolation resistance ($V_{io}=500V$)		R_{iso}	$\geq 10^{10}$ 5000Vrms
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.	Avg.	Max.	Unit
Input	Forward voltage	V_F	$I_F=10mA$	-	1.2	1.5
	Operation input current	I_{FON}	$V_L=20V, I_L=100mA$	-	-	3.0
	Recovery input current	I_{FOFF}	$V_L=20V, I_L \leq 5\mu A$	0.2	-	-
Output	Breakdown voltage	V_B	$I_B=50\mu A$	250	-	-
	Off-state leakage current	I_{LEAK}	$V_L=250V, I_F=0mA$	-	0.2	1.0
I/O capacitance		C_{iso}	$V_B=0V, f=1MHz$	-	6	pF
ON resistance		R_{ON}	$I_F=10mA, I_L=100mA$	-	8	16
Turn-on time		T_{ON}	$I_F=10mA, V_L=20V$	-	0.3	1.0
Turn-off time		T_{OFF}	$I_L=100mA, t=10ms$	-	0.1	1.5

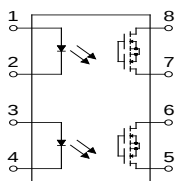
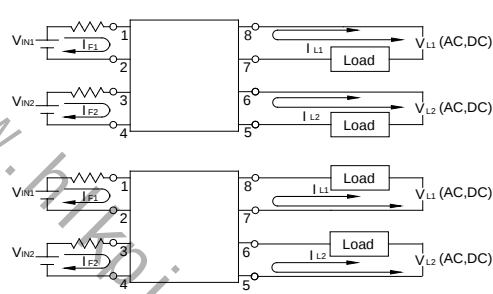
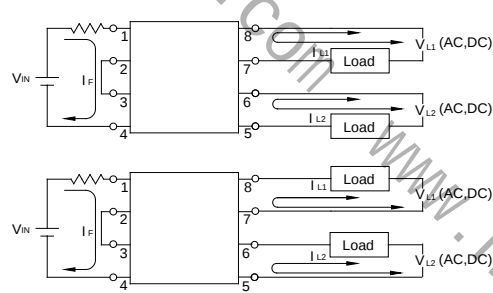
● Turn-on / Turn-off Time



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● Schematic and Wiring Diagrams

Schematic	Output Configuration	Load	Connection	Wiring Diagrams
	2a	AC DC	-	(1) Two independent 1 Form A use  (2) 2 Form A use 

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Fig.1 Load Current vs. Ambient Temperature

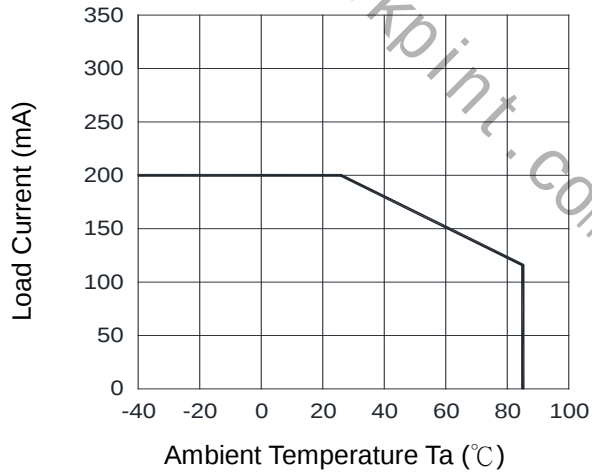


Fig.2 On Resistance vs. Ambient Temperature

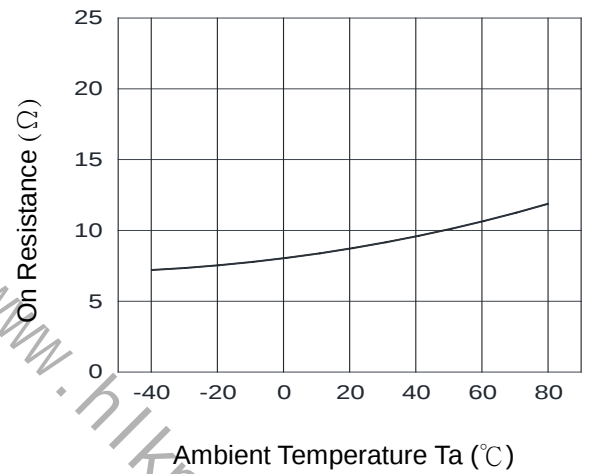


Fig.3 Turn-on Time vs. Ambient Temperature

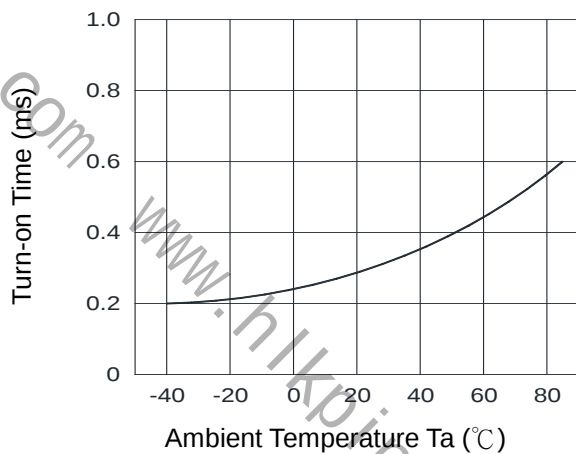


Fig.4 Turn-off Time vs. Ambient Temperature

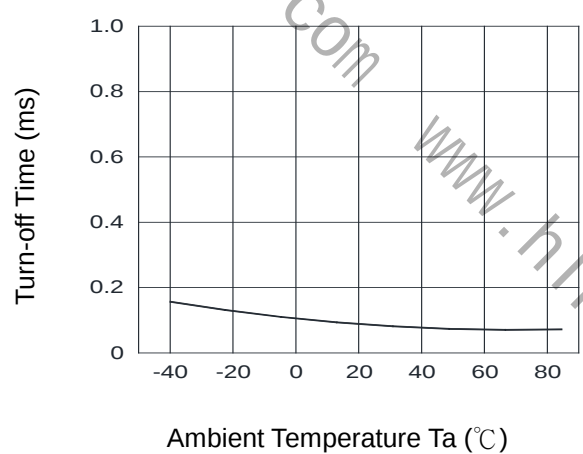


Fig.5 LED Operate Current vs. Ambient Temperature

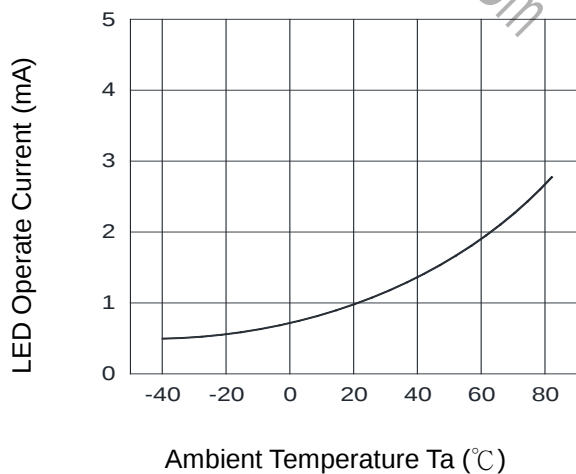
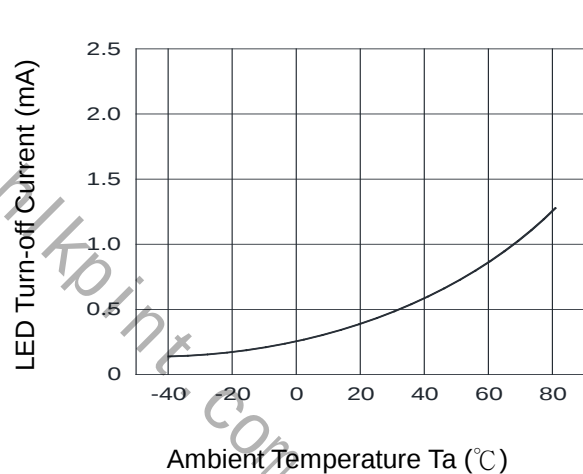


Fig.6 LED Turn-off Current vs. Ambient Temperature



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Fig.7 LED Dropout Voltage vs. Ambient Temperature

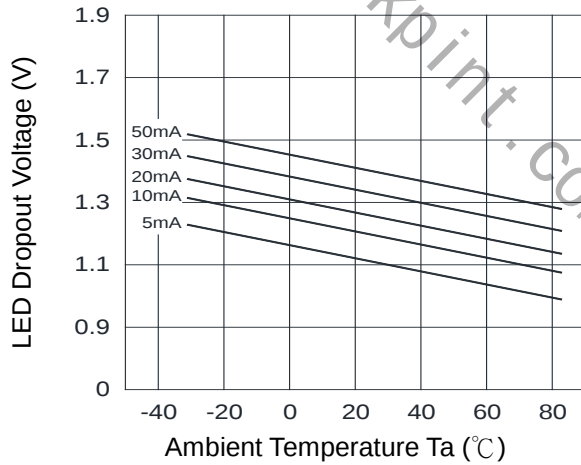


Fig.8 Voltage vs. Current Characteristics of Output at MOSFET Portion

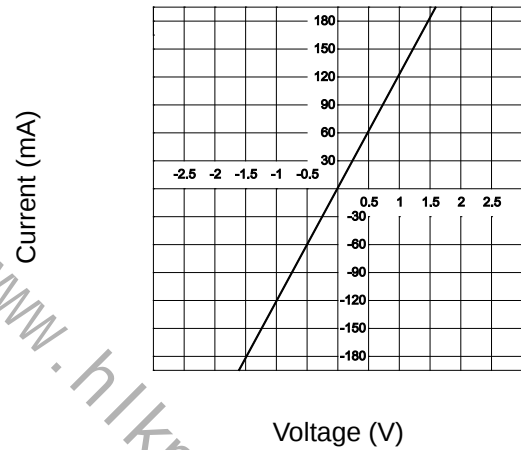


Fig.9 Turn-on Time vs. LED Forward Current vs.

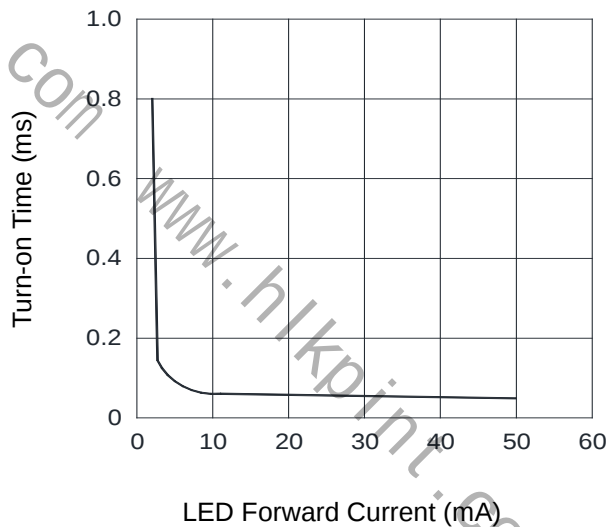


Fig.10 Off-state Leakage Current vs. Load Voltage

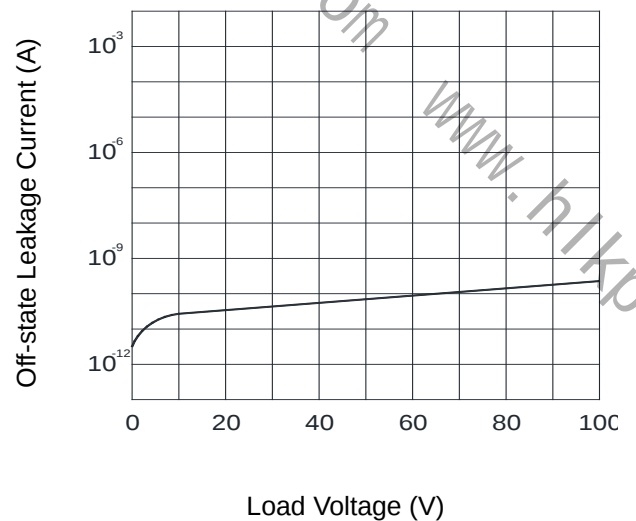


Fig.11 Turn-off Time vs. LED Forward Current

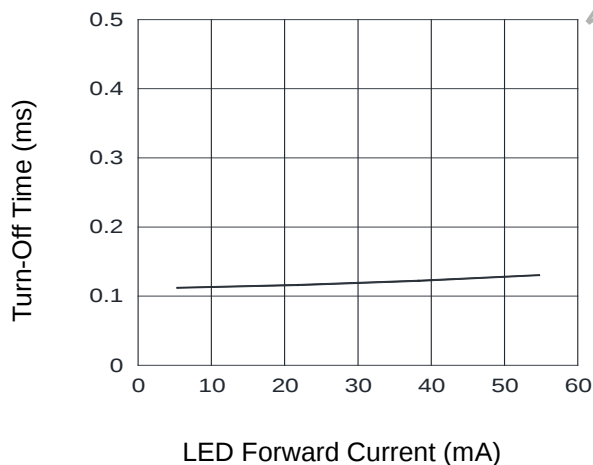
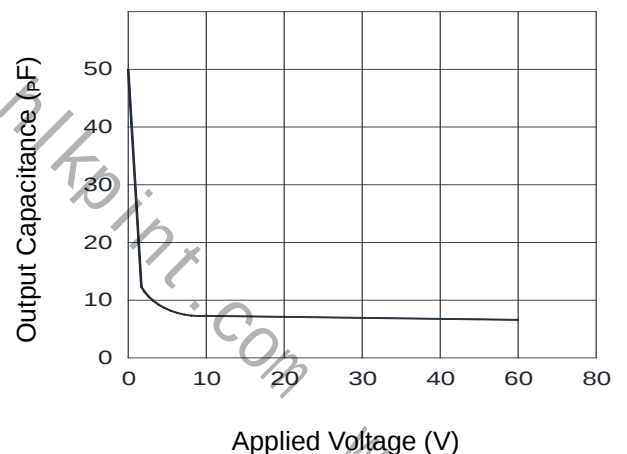


Fig.12 Output Capacitance vs. Applied Voltage

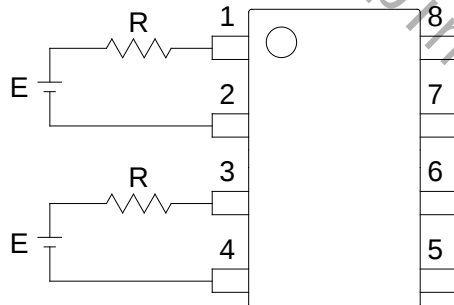


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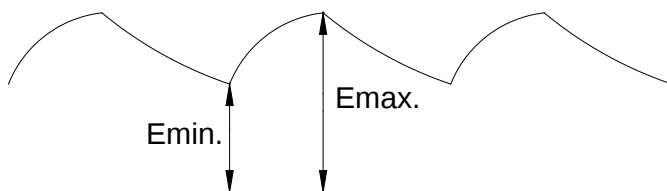
● Using Methods

Examples of resistance value to control LED forward current ($I_F=5\text{mA}$)

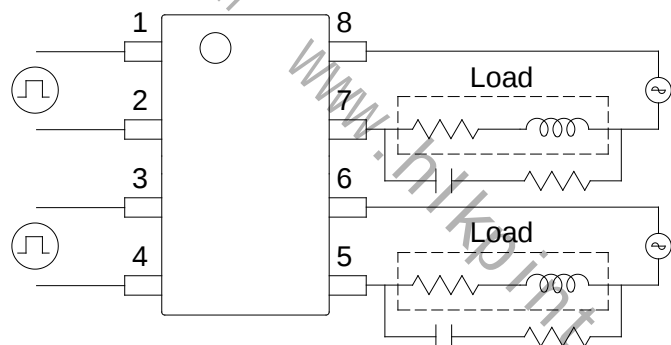
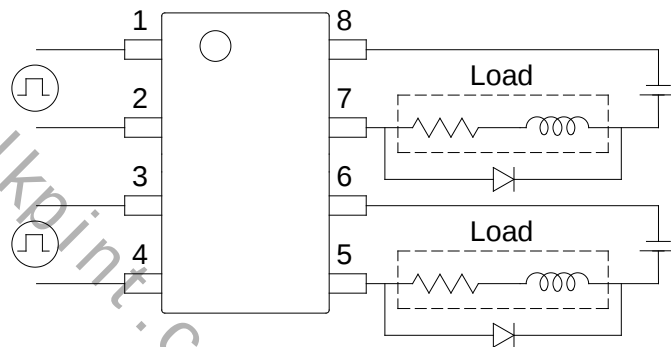


E	R
3.3V	Approx. 330 Ω
5V	Approx. 640 Ω
12V	Approx. 1.9K Ω
15V	Approx. 2.5K Ω
24V	Approx. 4.1K Ω

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 :



R-C Snubber

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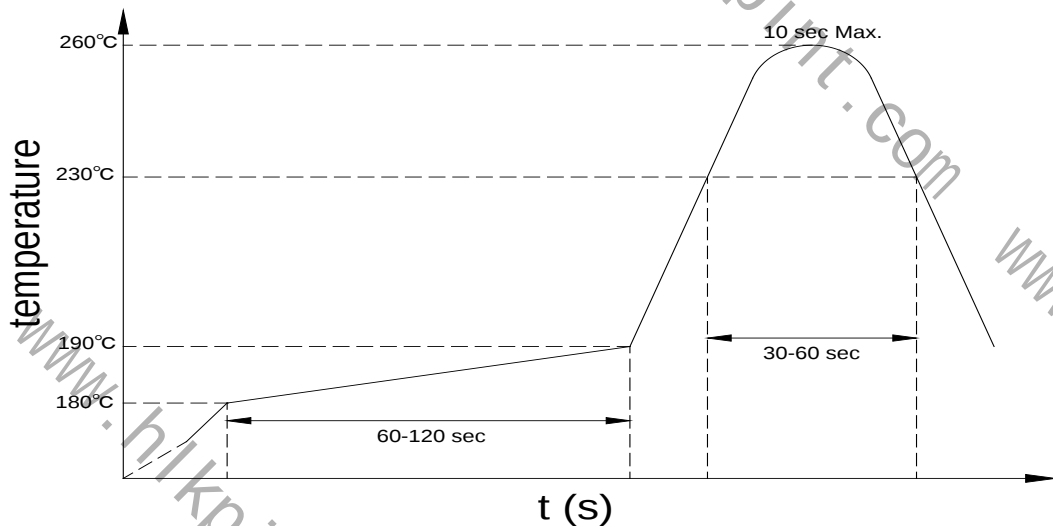
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● Recommended Soldering Conditions

(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.

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● Numbering System

KAQW213 X (Y)

Note :

KAQW213 = Part No.

X = Lead form option (blank 、 S or A)

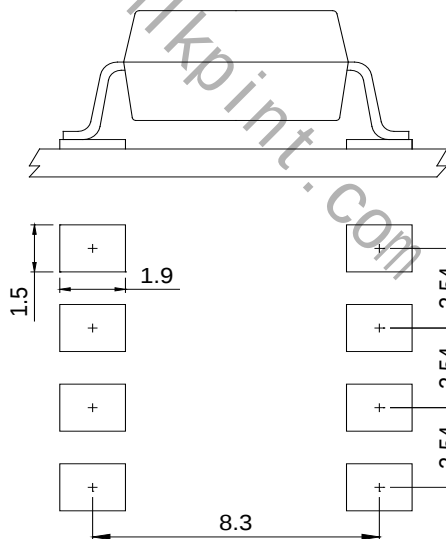
Y = Tape and reel option (TL 、 TR)

Option	Description	Packing quantity
A (TL)	surface mount type package + TL tape & reel option	1000 units per reel
A (TR)	surface mount type package + TR tape & reel option	1000 units per reel

● Recommended Pad Layout for Surface Mount Lead Form

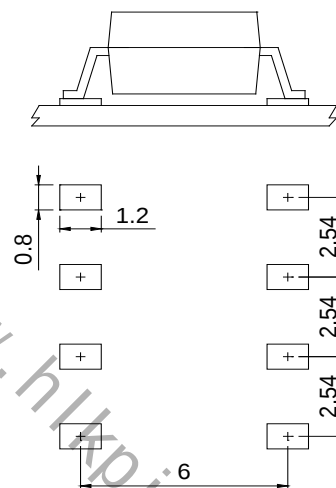
1. Surface mount type.

8-pin SMD



2. Small outline for surface mount type.

8-pin SOP



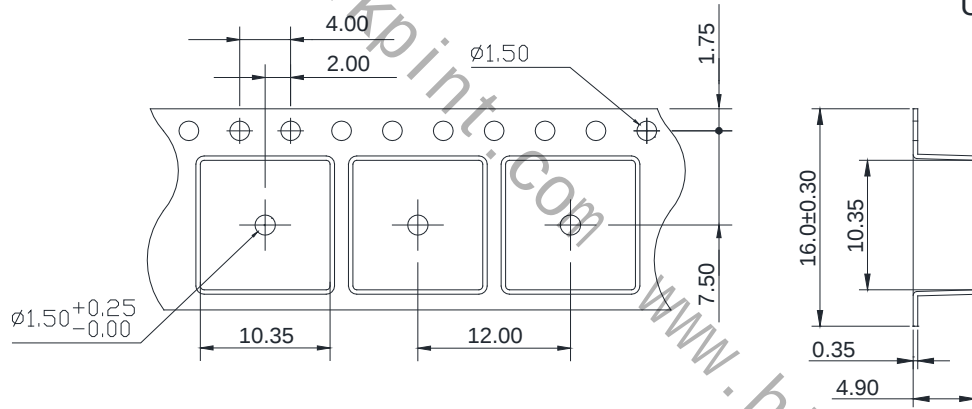
Unit : mm

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● 8-pin SMD Carrier Tape & Reel

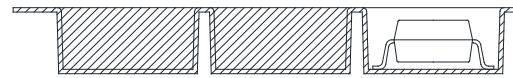
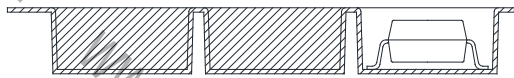
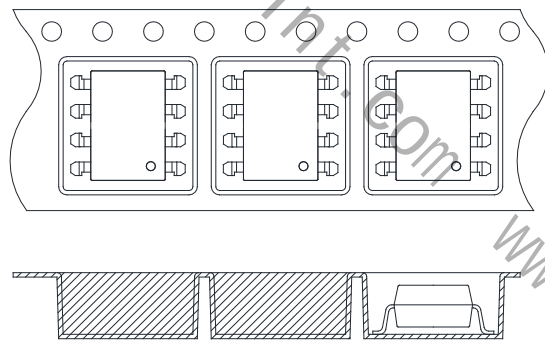
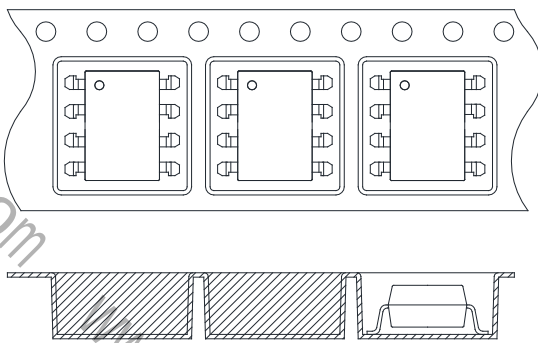
Unit : mm



TOLERANCE : $\pm 0.2\text{mm}$

TL

TR



Direction of feed from reel



Direction of feed from reel

