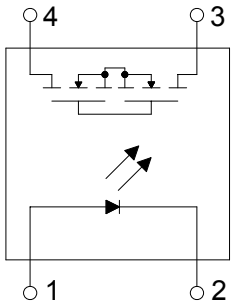
KAQY212SE Series

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

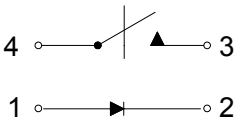
Description

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.

Schematic



1 FORM A
NORMALLY OPEN



Features

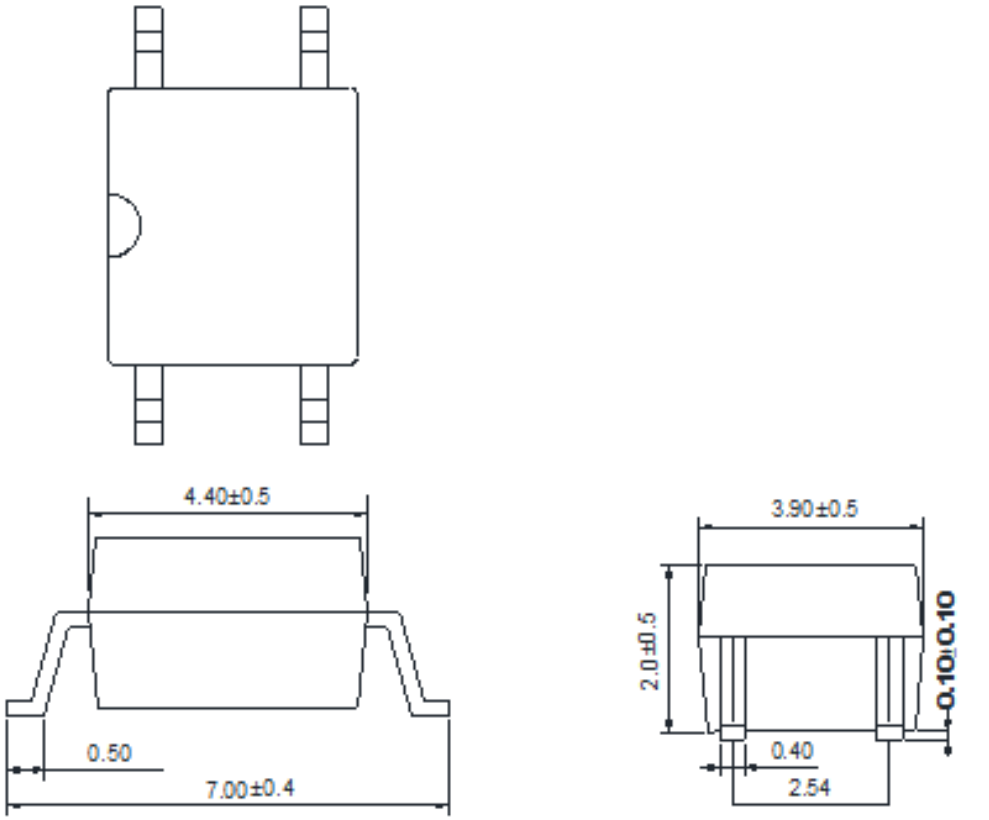
1. Normally open, single pole single throw
2. Control 60V AC or DC Voltage
3. Switch 200mA Loads
4. Controls low-level analog signals
5. High sensitivity, low ON resistance
6. Low-level off-state leakage current
7. High isolation Voltage
8. Pb free and RoHS compliant
9. MSL class 1
10. Agency Approvals：
    - UL Approved (No. E108430): UL508
    - c-UL Approved (No. E108430)
    - FIMKO Approved: EN60065, EN60950

Application

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

● Outside Dimension

Unit：mm



TOLERANCE : ±0.2mm

● Device Marking

Notes：

cosmo
Y212SE
YWW　　Y：Year code / W：Week code

● Absolute Maximum Ratings

(Ta=25℃)

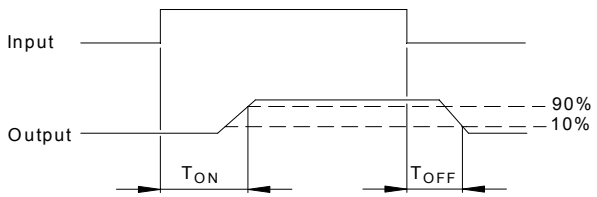
Item		Symbol	Rating	Unit
Input	Continuous forward current	I_F	50	mA
	Peak forward current	I_{FP}	1	A
	Reverse voltage	V_R	5	V
	Power dissipation	P_{in}	100	mW
	Derate linearly from 25℃	-	1.3	mW/℃
Output	Breakdown voltage	V_B	60	V
	Continuous load current	I_L	200	mA
	Power dissipation	P_{out}	500	mW
Isolation voltage		V_{iso}	1500	Vrms
Isolation resistance (Vio=500V)		R_{iso}	$\geqq 10^{10}$	Ω
Total power dissipation		P_t	550	mW
Derate linearly from 25℃		-	2.5	mW/℃
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℃)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	V_F	I_F=10mA	-	1.2	1.5	V
	Operation input current	I_{FON}	V_L=20V, I_L=100mA	-	-	2.0	mA
	Recovery input Voltage	V_{FOFF}	V_L=20V, $I_L \leqq$5μA	0.2	-	-	V
Output	Breakdown voltage	V_B	I_B=50μA	60	-	-	V
	Off-state leakage current	I_{LEAK}	V_L=60V, I_F=0mA	-	0.2	1.0	μA
I/O capacitance		C_{iso}	V_B=0V, f=1MHz	-	6	-	pF
ON resistance		R_{ON}	I_F=10mA, I_L=100mA	-	7	10	Ω
Turn-on time		T_{ON}	I_F=10mA, V_L=20V	-	0.3	1.5	ms
Turn-off time		T_{OFF}	I_L=100mA, t=10ms	-	0.1	1.0	ms

● Turn-on / Turn-off Time



Schematic and Wiring Diagrams

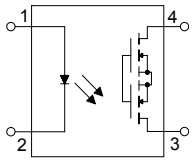
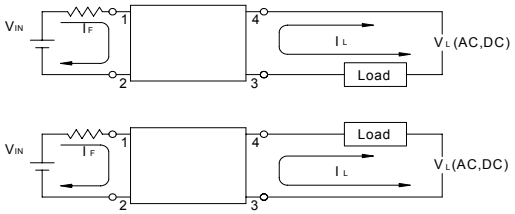
Schematic	Output Configuration	Load	Connection	Wiring Diagrams
	1a	AC DC	-	

Fig.1 Load Current vs. Ambient Temperature

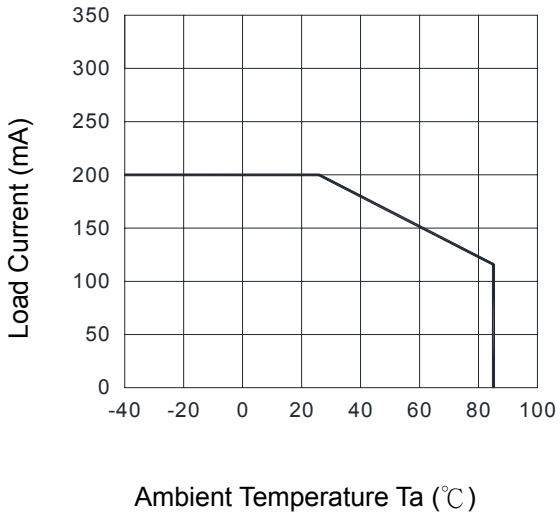


Fig.2 On Resistance vs. Ambient Temperature

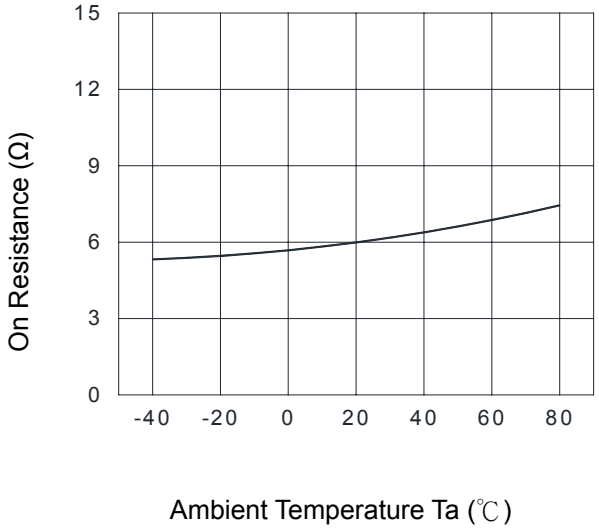


Fig.3 Turn-on Time vs. Ambient Temperature

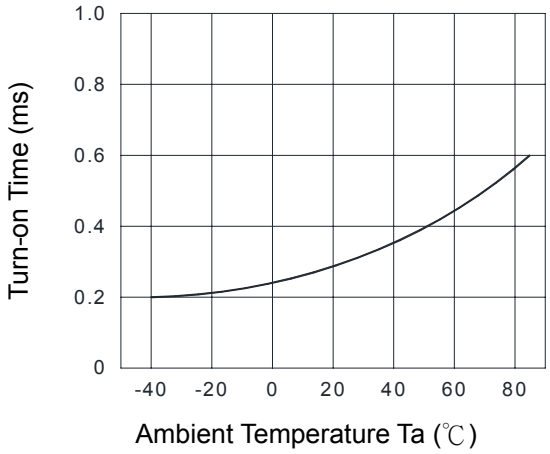


Fig.4 Turn-off Time vs. Ambient Temperature

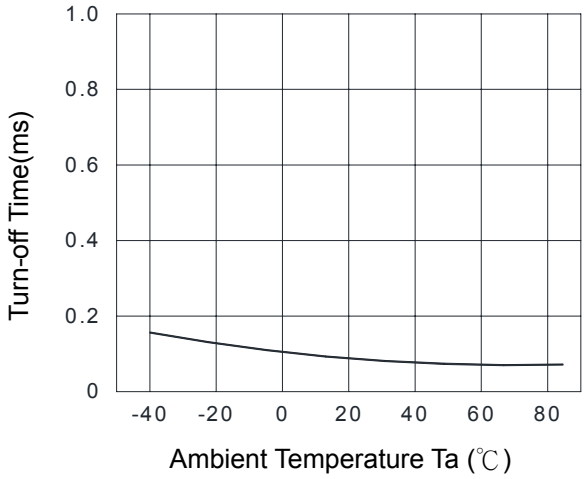


Fig.5 LED Operate Current vs. Ambient Temperature

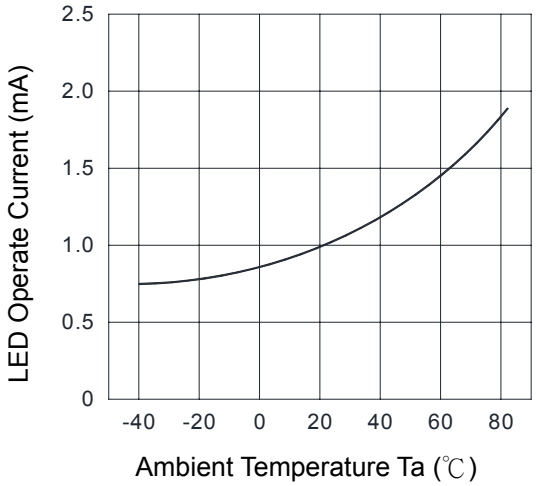


Fig.6 Output Capacitance vs. Applied Voltage

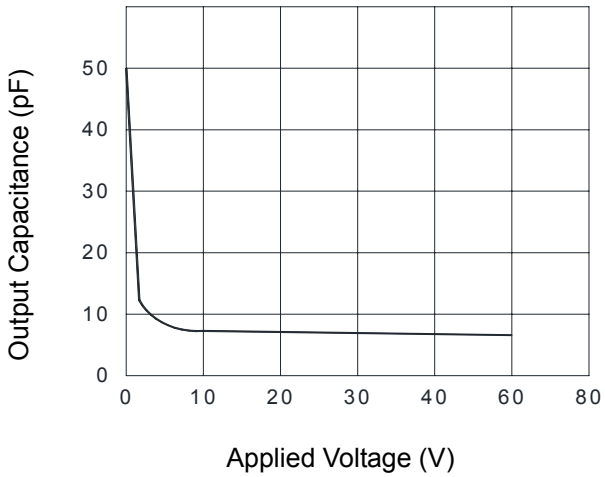


Fig.7 LED Dropout Voltage vs. Ambient Temperature

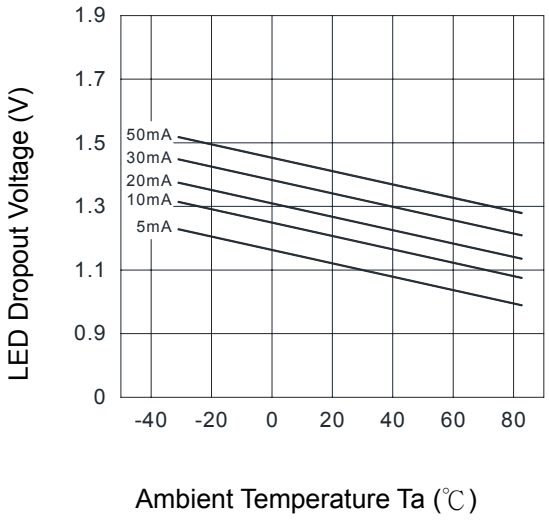


Fig.8 Voltage vs. Current Characteristics of Output at MOSFET Portion

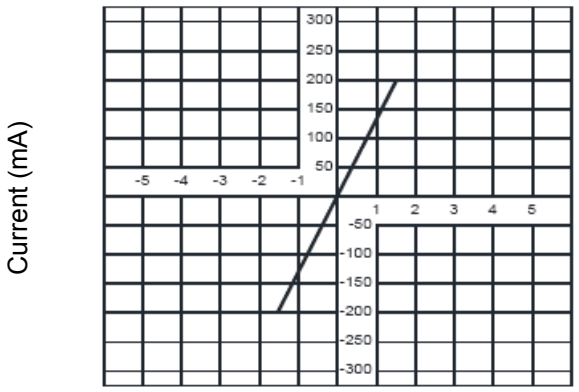


Fig.9 Turn-on Time vs. LED Forward Current

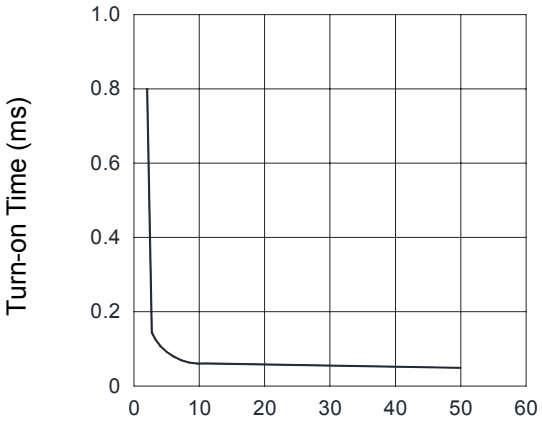


Fig.10 Off-state Leakage Current vs. Load Voltage

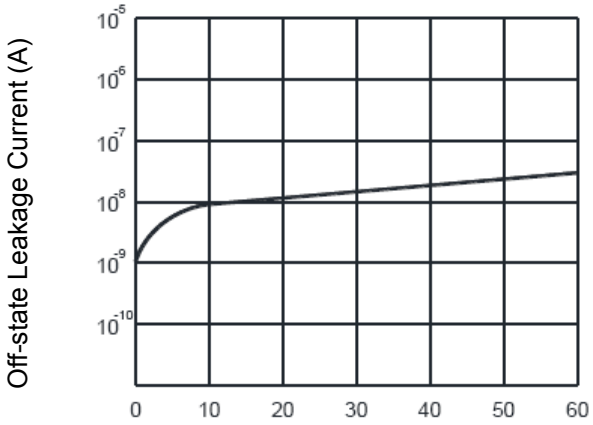


Fig.11 Turn-on Time vs. LED Forward Current

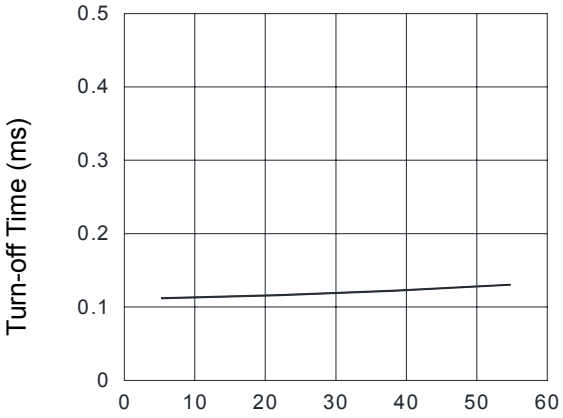
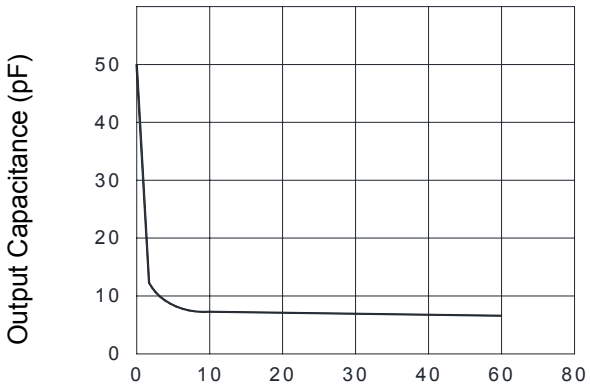


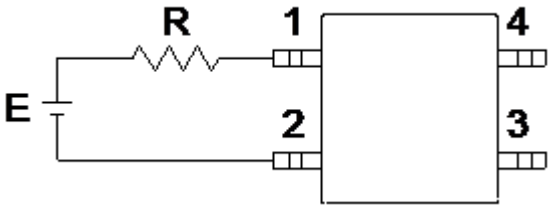
Fig.12 Output Capacitance vs. Applied Voltage



LED Forward Current (mA)　　Applied Voltage (V)

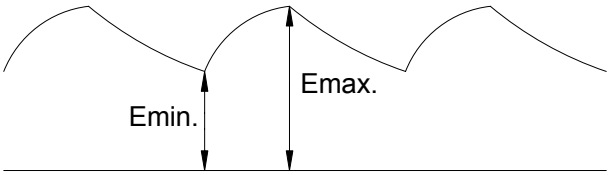
● Using Methods

Examples of resistance value to control LED forward current (I_F=1mA)

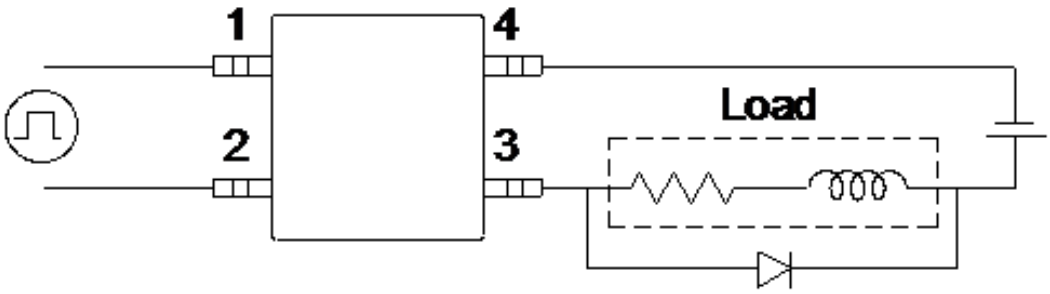


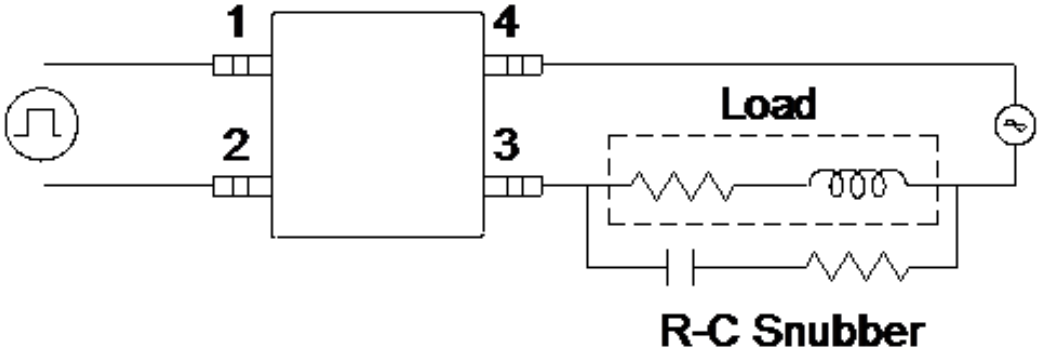
E	R
3.3V	Approx. 720 Ω
5V	Approx. 1.5K Ω
12V	Approx. 4.5K Ω
15V	Approx. 6.0K Ω
24V	Approx. 9.5K Ω

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：





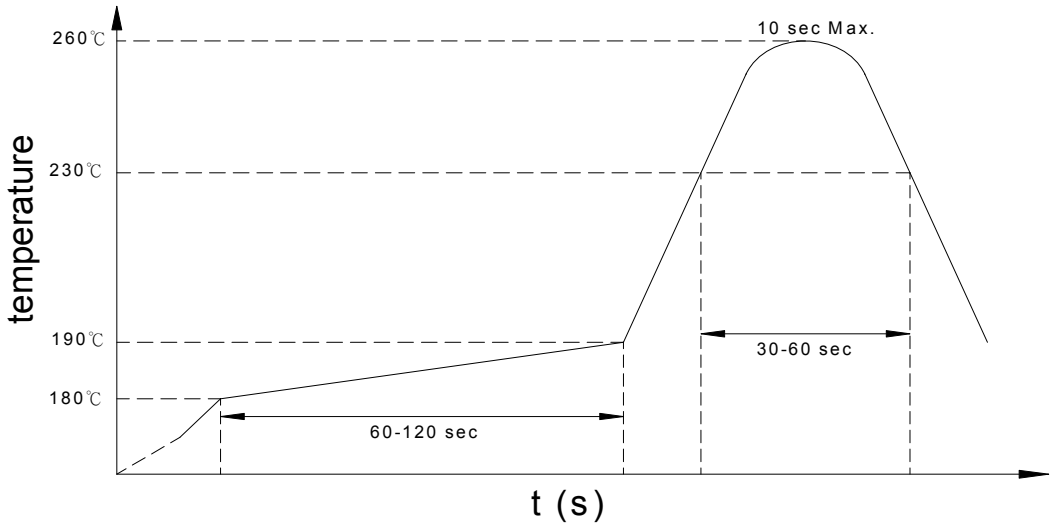
R-C Snubber

Recommended Soldering Conditions

(a) Infrared reflow soldering：

■ Peak reflow soldering：	260℃ or below (package surface temperature)
■ Time of peak reflow temperature:	10 sec
■ Time of temperature higher than 230℃：	30-60 sec
■ Time to preheat temperature from 180~190℃：	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℃ or below (molten solder temperature)
■ Time：	10 seconds or less
■ Preheating conditions:	120℃ 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**

KAQY212SE (X)

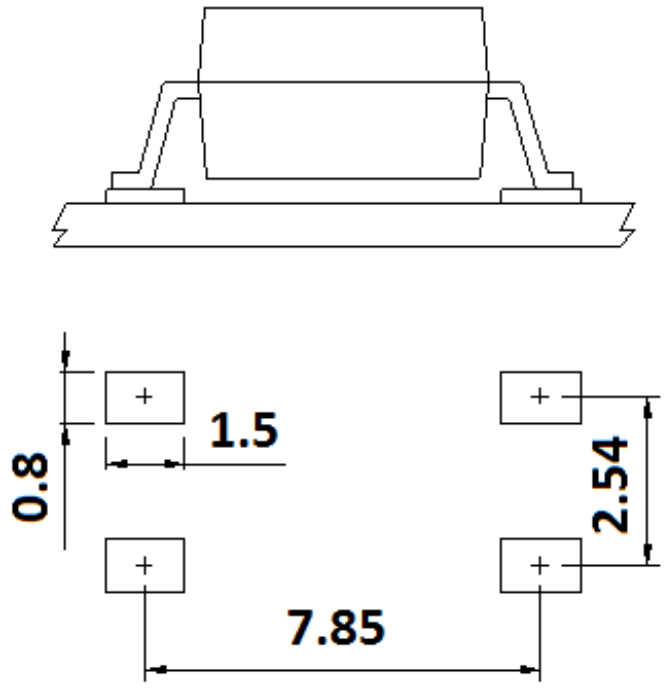
Note：

KAQY212SE = Part No.

X = Tape and reel option (TLD、TRU)

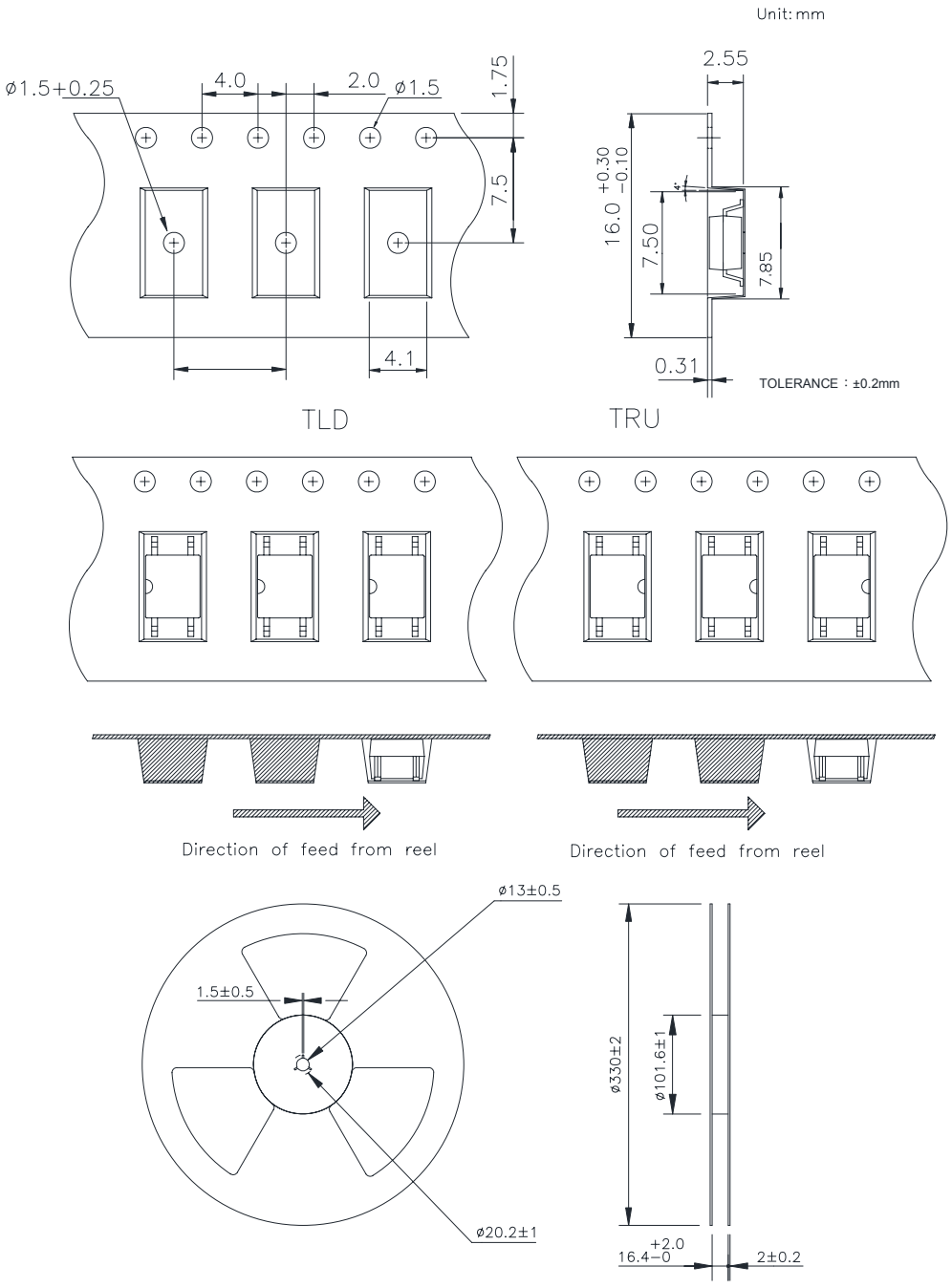
Option	Description	Packing quantity
SE (TLD)	small outline for surface mount type package + TLD tape & reel option	3000 units per reel
SE (TRU)	small outline for surface mount type package + TRU tape & reel option	3000 units per reel

- **Recommended Pad Layout for Surface Mount Lead Form**



Unit：mm

● 4-pin SOP Carrier Tape & Reel



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