KAQV27x Series

5PIN N.O TYPE

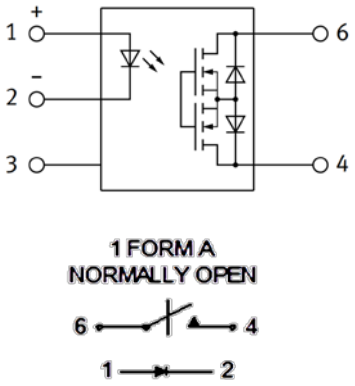
SOLID STATE RELAY- SiC MOSFET OUTPUT

Description

The KAQV27x series is a SPST normally open switch (1 Form A) that is ideally suited for controlling low-level signals and various types of loads.

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 SiC-MOSFET.

Schematic



Features

1. Silicon carbide SiC MOSFET Output
2. High load voltage with low on-resistance
3. Fast reverse recovery time
4. Isolation voltage between input and output Viso : 5,000 Vrms
5. 5-pin DIP and SMD package

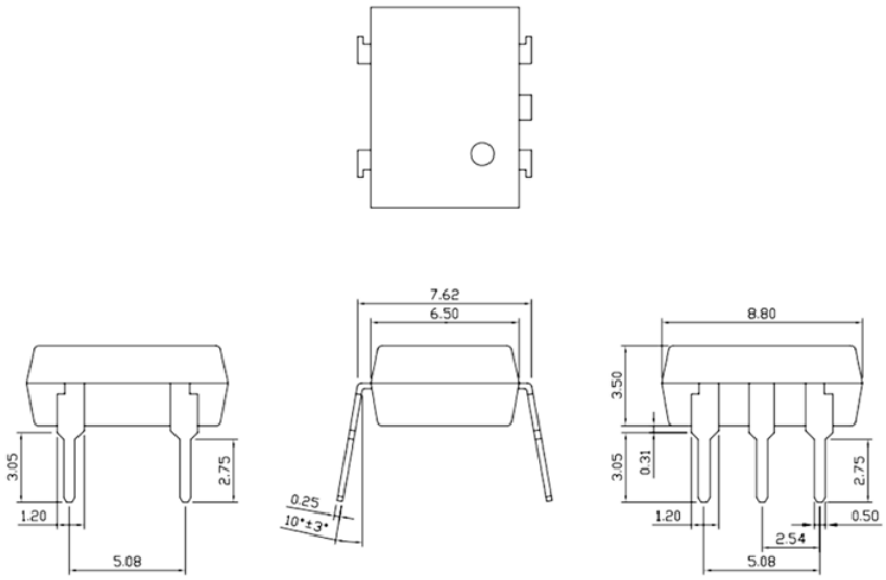
Application

- Industrial Automation
- Battery Management
- Building Automation
- EV Charger
- Measurement Equipment

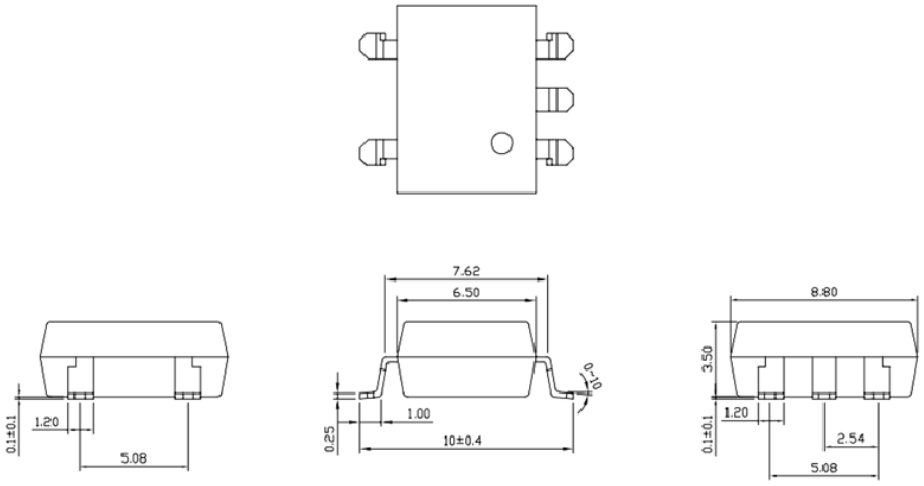
- **Outside Dimension**

Unit：mm

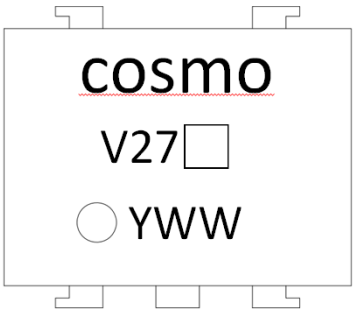
1.Dual-in-line type.



2.Surface mount type.



● Device Marking



Notes：

cosmo
V27□ Part No. V271、V272
YWW Y：Year code / W：Week code

● Absolute Maximum Ratings

(Ta=25℃)

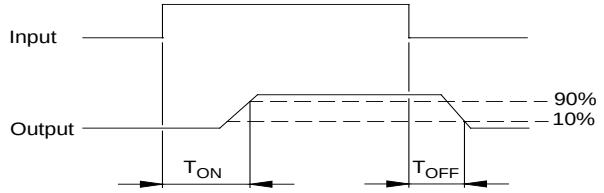
Parameter		Symbol	Rating		Unit
Input	Continuous forward current	I_F	50		mA
	Peak forward current	I_{FP}	1		A
	Reverse voltage	V_R	5		V
	Power dissipation	P_{in}	75		mW
Output	Load voltage(Peak AC or DC)	V_L	V271	1500	V
			V272	1800	
	Continuous load current	I_L	V271	50	mA
			V272	30	
	Peak load current	I_{peak}	80		mA
	Power dissipation	P_{out}	450		mW
Isolation voltage		V_{iso}	5000		Vrms
Total power dissipation		P_t	500		mW
Derate linearly from 25℃		-	2.5		mW/℃
Operating temperature		T_{opr}	-40 to +110		℃
Storage temperature		T_{stg}	-40 to +125		℃
Junction temperature		T_j	125		℃
Soldering temperature 10 seconds		T_{sot}	260		℃

● Electro-optical Characteristics

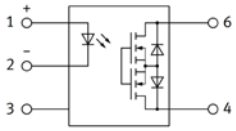
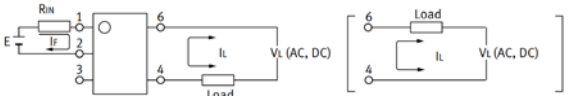
(Ta=25℃)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	V_F	I_F = 10 mA	-	1.2	1.5	V
	Operation input current	I_{FON}	I_L = Max.	-	1.0	3.0	mA
	Recovery input current	I_{FOFF}	I_L = Max.	0.2	-	1.3	mA
Output	On resistance	R_{on}	I_F = 10 mA , I_L = 50mA. Within 1 s	-	25	100	Ω
	Off-state leakage current	I_{LEAK}	I_F = 0 mA ,V_L = 1500V	-	-	1	μA
			I_F = 0 mA ,V_L = 1800V			10	
I/O capacitance		C_{iso}	f = 1 MHz, V_B = 0 V	-	1.3	3	pF
Initial I/O isolation resistance		R_{iso}	500 V DC	1,000	-	-	MΩ
Turn-on time		T_{ON}	I_F=10mA, I_L= Max.	-	0.1	0.5	ms
Turn-off time		T_{OFF}		-	0.4	1.0	ms

● Turn-on / Turn-off Time



Schematic and Wiring Diagrams

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

• TYPICAL PERFORMANCE CURVES & TEST CIRCUITS

Fig.1 On Resistance V.S. Ambient temperature

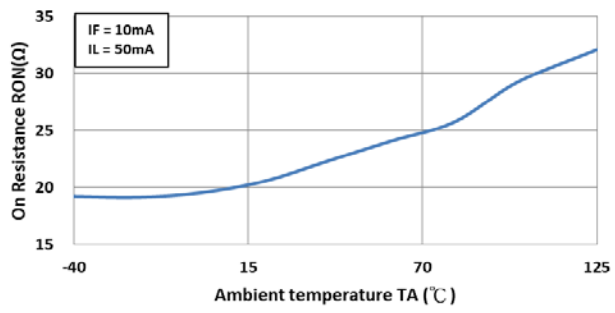


Fig.2 Turn On Time V.S. Ambient temperature

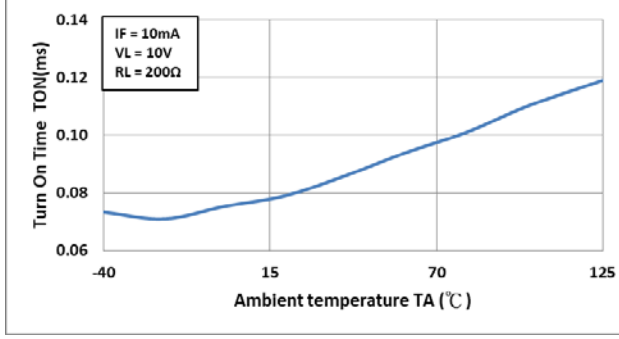


Fig.3 Turn Off Time V.S. Ambient temperature

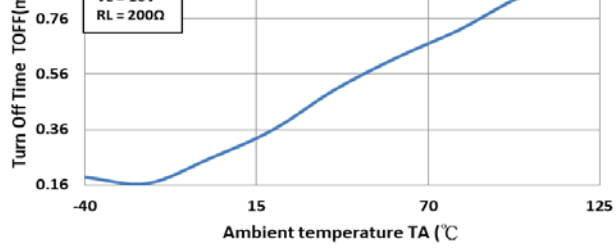


Fig.4 LED Operate Current V.S. Ambient temperature

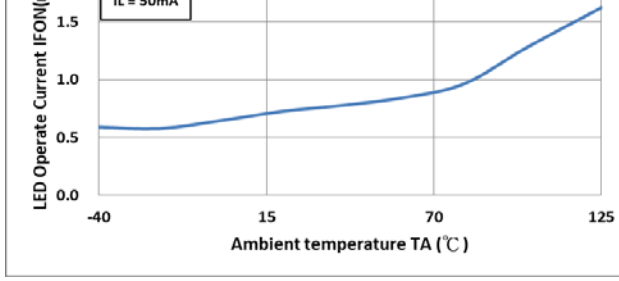


Fig.5 LED Turn Off Current V.S. Ambient temperature

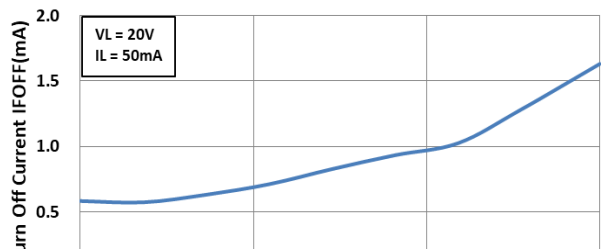


Fig.6 Forward Voltage V.S. Ambient temperature

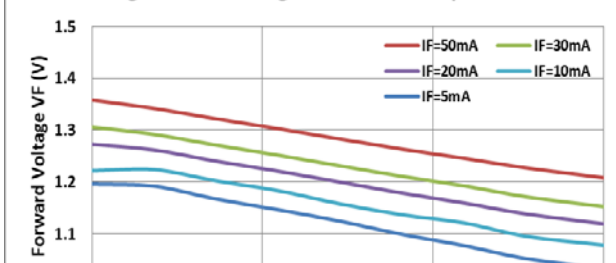


Fig.7 Load Current V.S. Load Voltage

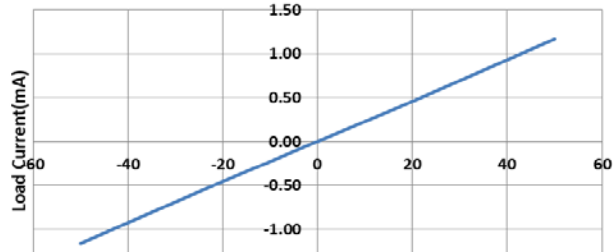
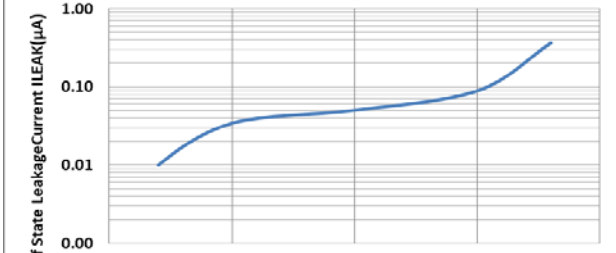
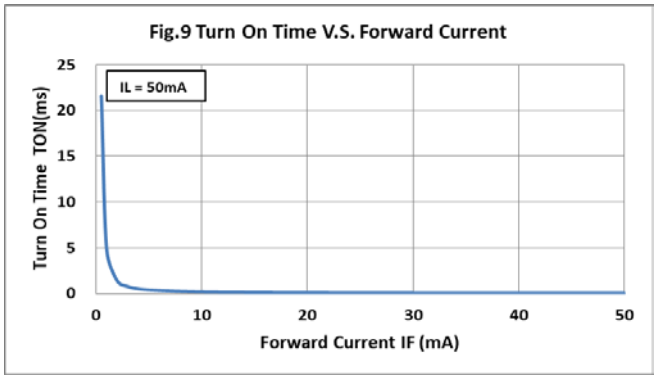
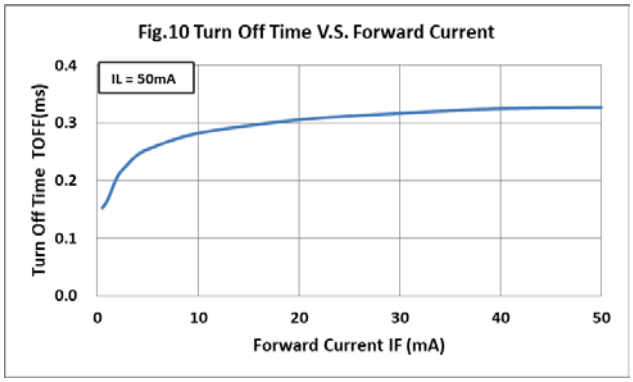


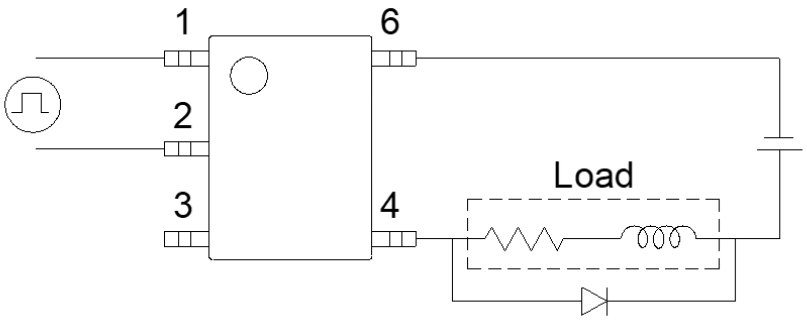
Fig.8 Off State LeakageCurrent V.S. Load Voltage

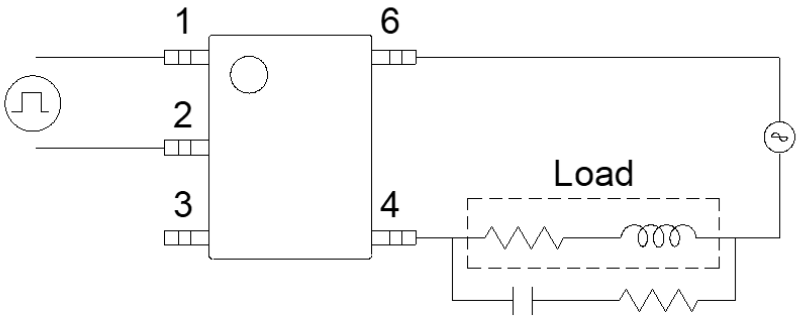






- **Using Methods**





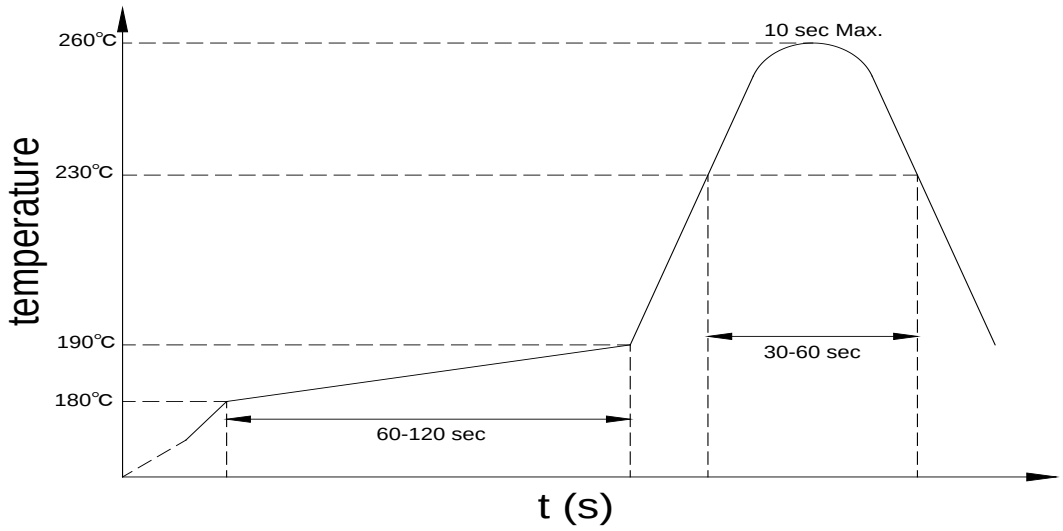
R-C Snubber

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**

KAQV271 X (Y)

Notes:

KAQV271 = Part No.

X = Lead form option (blank or A)

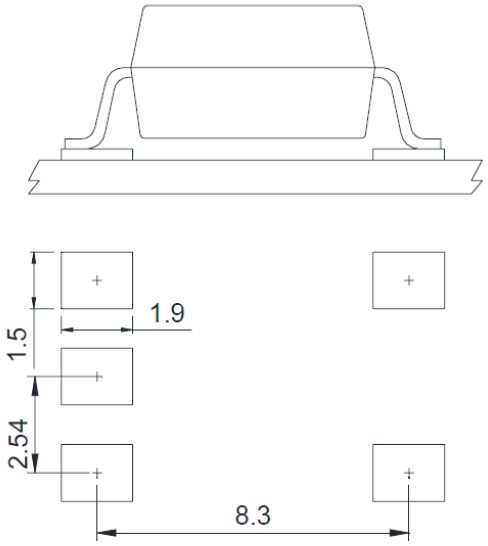
Y = Tape and reel option (TL、TR)

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

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

1. Surface mount type.

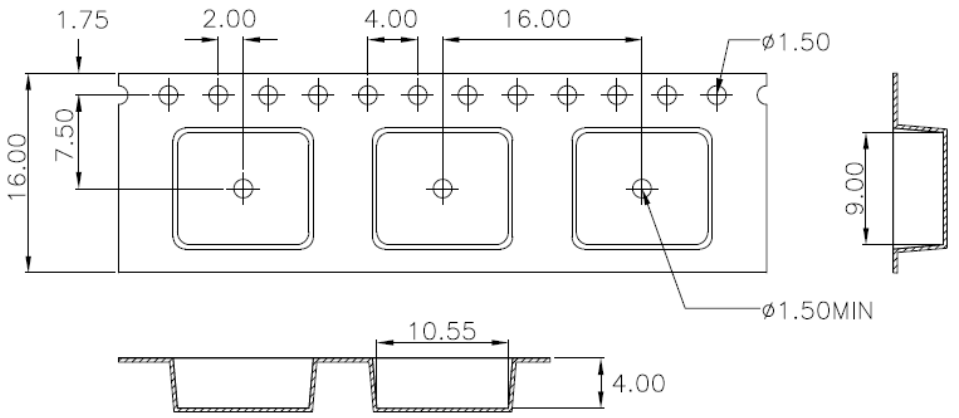
5-pin SMD



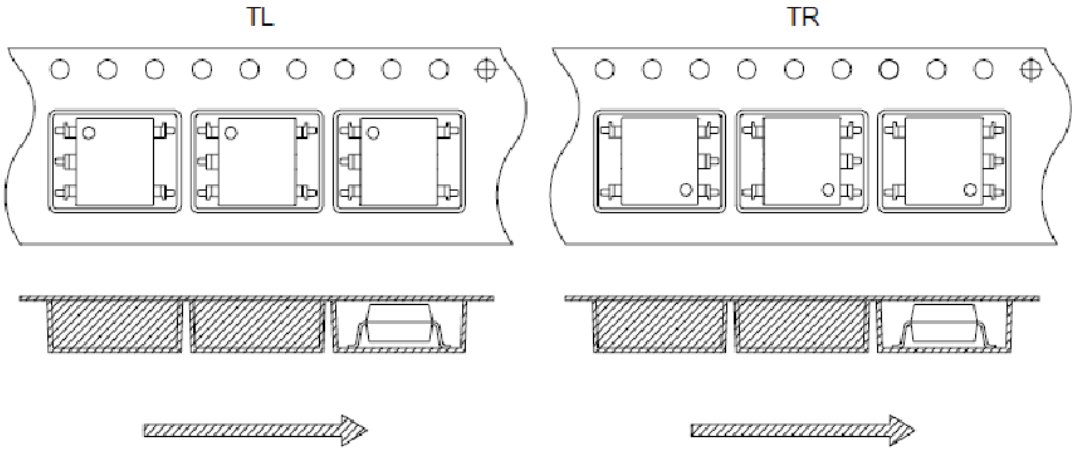
Unit：mm

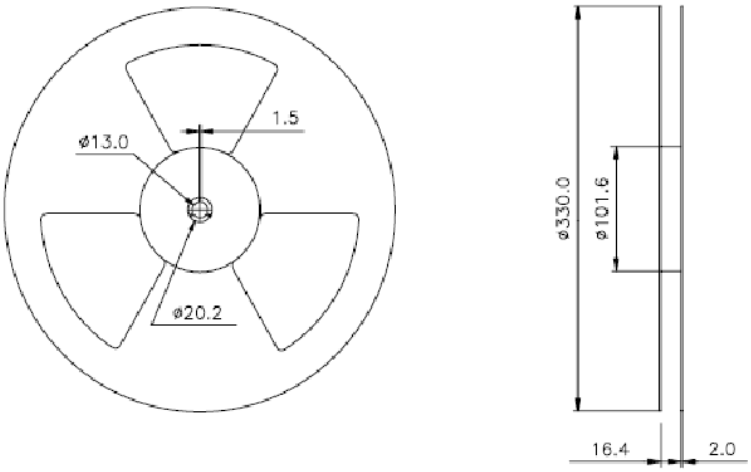
- **6-pin SMD Carrier Tape & Reel**

Unit：mm



TOLERANCE：±0.2mm





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