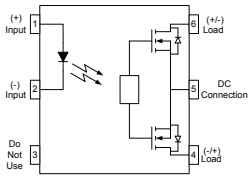
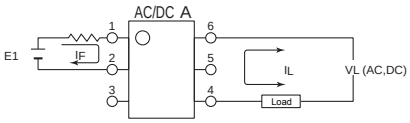
Parameter	Symbol	Rating	Units
Load Voltage	V_L	400	V
Load Current	I_L	0.12	A
On-Resistance	R_{on}	20	Ω
I/O Isolation Voltage	V_{IO}	5000	Vrms

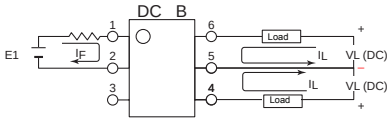

SMD-6


DIP-6

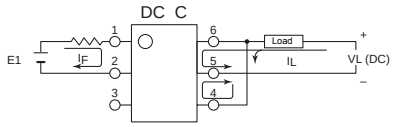


1. LED Anode
2. LED Cathode
4. Drain (MOS FET)
5. Source (MOS FET)
6. Drain (MOS FET)





Also can be used as a "2 a"



SUPSiC PhotoRelays

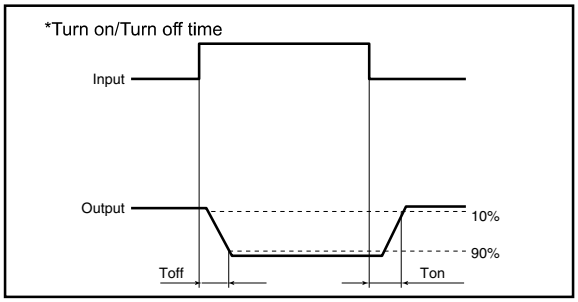
- Long life (No limit on mechanical and electrical lifetime)Bounce-free switching
- Higher speed and high frequency switching
- Higher sensitivity (less power consumption)
- Immunity to EMI or RFI
- No have voltaic arc, bounce, and noise More resistant to vibration and impact AC or DC load switching
- Small package size

Applications

- Telecom/Datacom switching
- Multiplexers
- Meter reading systems
- Data acquisition
- Medical equipment
- Battery monitoring
- I/O Sub-Systems
- Robotics
- Aerospace
- Home/Safety security systems
- Process Control
- Energy Management
- Reed Relay EMR Replacement
- Programmable Controllers

TPYES

Category	Output Rating		Package	Part No.	Packing Quantity
	Load Voltage	Load Current			
AC/DC	400V	0.12A	DIP-6	GAQV414E	50pcs /tube
			SMD-6	GAQV414EH	1000pcs /reel



Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Value	Units	Note
Input	Continuous LED Current	I_F	50	mA	
	Peak LED Current	I_{FP}	500	mA	f=100Hz, duty=1%
	LED Reverse Voltage	V_R	5	V	
	Input Power Dissipation	P_{In}	75	mW	
Output	Load Voltage	V_L	400	V(AC peak or DC)	
	Load Current	I_L	0.12	A	
	Peak Load Current	I_{Peak}	0.3	A	1ms (1 pulse)
	Output Power Dissipation	Pout	500	mW	
Total Power Dissipation		P_T	550	mW	
I/O Isolation Voltage		$V_{I/O}$	5000	Vrms	RH=60%, 1min
Operating Temperature		T_{opr}	-40 to 85	℃	
Storage Temperature		T_{stg}	-40 to 100	℃	
Pin Soldering Temperature		T_{sol}	260	℃	10 sec max.

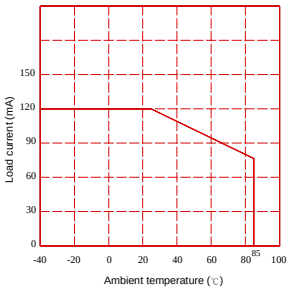
Electrical Characteristics (Ta = 25°C)

Item		Symbol	MIN.	TYP.	MAX.	Units	Conditions
Input	LED Forward Voltage	V_F		1.2	1.4	V	I_F=10mA
	Operation LED Current	I_{Fon}		0.5	2.0	mA	
	Recovery LED Current	I_{Foff}		0.35	0.5	mA	
	Recovery LED Voltage	V_{Foff}	0.5			V	
Output	On-Resistance	R_{on}		20	50	Ω	IF=0mA,IL=50mA, Time to flow is within 1 sec.
	Off-State Leakage Current	I_{Leak}			1.0	uA	V_L=Rating
	Output Capacitance	C_{out}		165		pF	V_L=0, f=1MHz
Transmission	Turn-On Time	T_{on}		0.02	1.0	ms	IF=5mA,IL=50mA
	Turn-Off Time	T_{off}		0.5	3.0	ms	
Coupled	I/O Isolation Resistance	$R_{I/O}$	10^{10}			Ω	DC500V
	I/O Capacitance	$C_{I/O}$		0.8		pF	f=1MHz

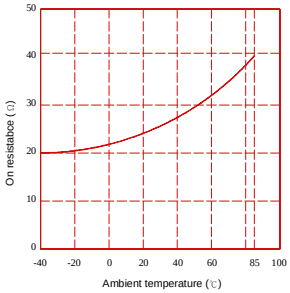
Please obey the following conditions to ensure proper device operation and resetting. Input LED current (Recommended value): IF ≥5mA and ≤30mA

Engineering Data

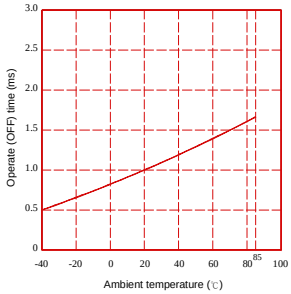
Load current Vs.
Ambient temperature



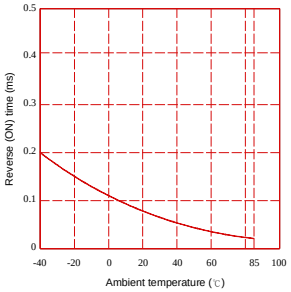
On resistance Vs.
Ambient temperature



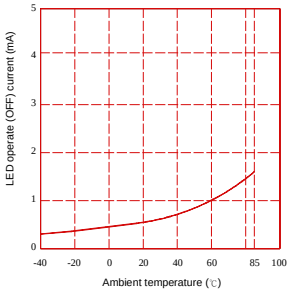
Operate (OFF) time Vs.
Ambient temperature



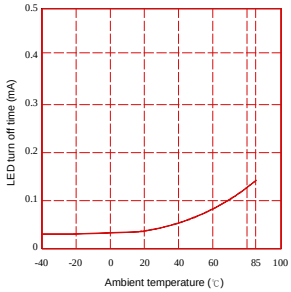
Reverse (ON) time Vs.
Ambient temperature



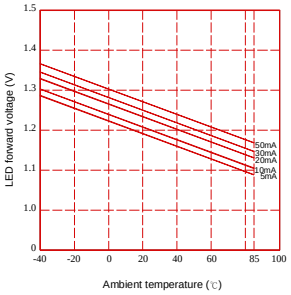
LED operate (OFF) current Vs.
Ambient temperature



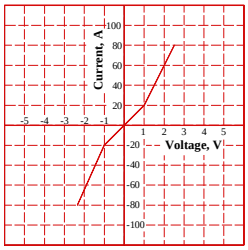
LED turn off current Vs.
Ambient temperature



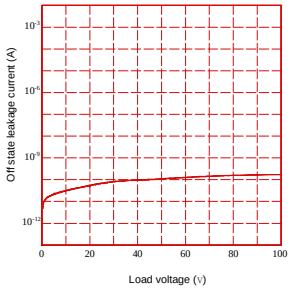
LED forward voltage Vs.
Ambient temperature



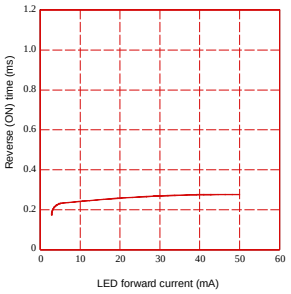
Voltage Vs. currennt characteristics
of output at MOS portion



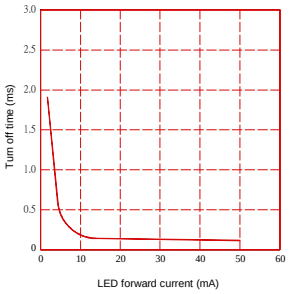
Off state leakage current Vs.
Load voltage characteristics



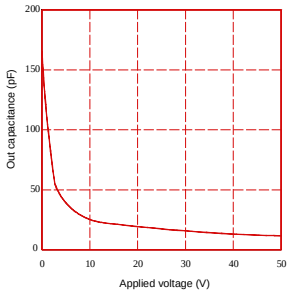
LED foward current Vs.
Reverse (ON) time characteristics



LED foward current Vs.
Operate (OFF) time characteristics



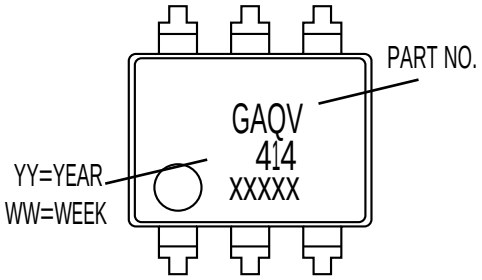
Applied voltage Vs.
output capacitance characteristics



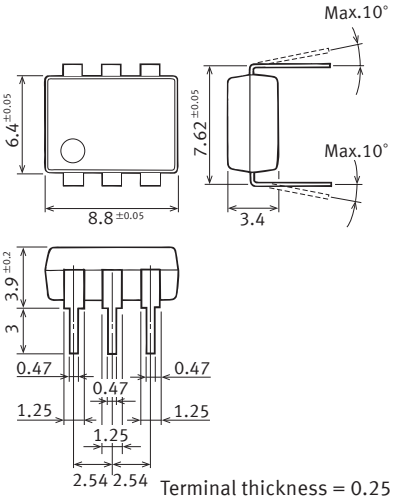
Dimensions and DIP-6 Package

Unit: mm

Marking

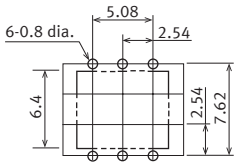


Through hole terminal type



Terminal thickness = 0.25
General tolerance: ±0.1

PC board pattern (Bottom view)

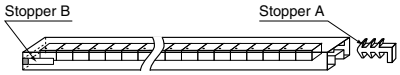


Tolerance: ±0.1

DIP Tape dimensions

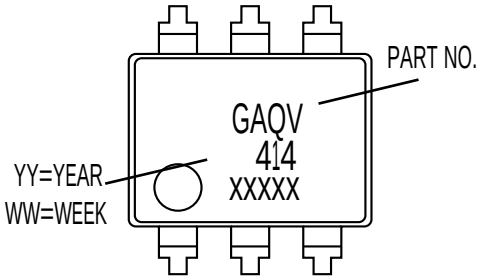
Unit : mm

Devices are packaged in a tube so that pin No. 1 is on the stopper B side. Observe correct orientation when mounting them on PC boards.

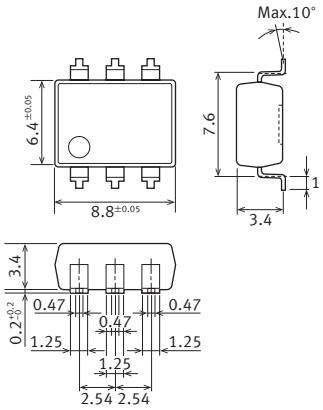


Dimensions and SMD-6 Package Unit: mm

Marking

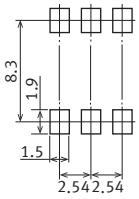


Surface mount terminal type



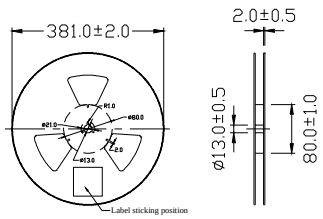
Terminal thickness = 0.25
General tolerance: ±0.1

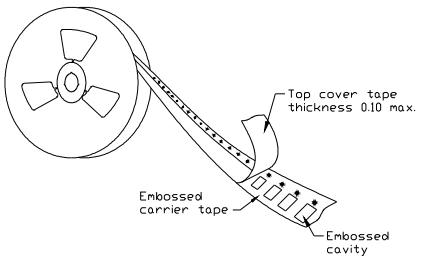
Recommended mounting pad
(Top view)

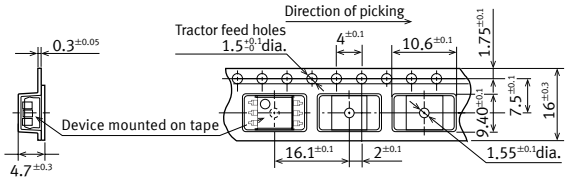


Tolerance: ±0.1

Tape dimensions (tape reel)

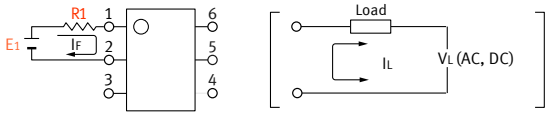






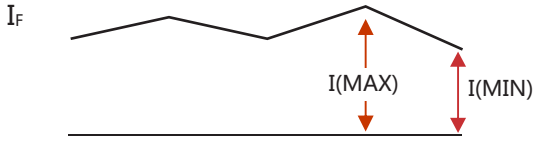
Using Methods

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



E1	R1 (Approx)
3.3V	300 Ω
5.0V	600 Ω
12V	1.9KΩ
24V	4.1KΩ

LED forward current must be more than 5mA , at I(MIN) ,and less than 30mA , at I(MAX).



Recommended Operating Conditions

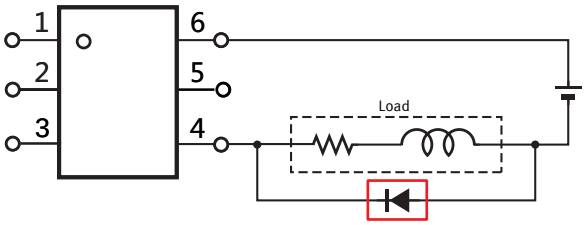
Please obey the following conditions to ensure proper device operation and resetting. Input LED current (Recommended value):

Characteristic	Symbol	Min	Typ.	Max	Unit
Forward current	I_F	5.0	7.0	30	mA

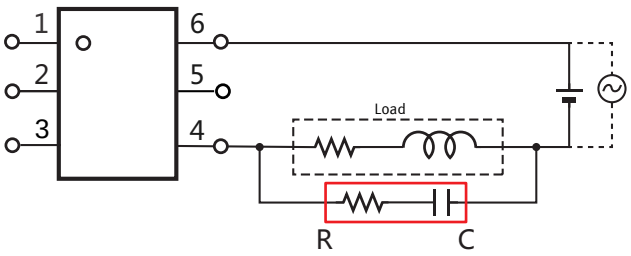
Protection Circuit

Output spike voltages:if an inductive load generates spike voltages which exceed heabsolute maximum rating, the spike voltage shall be limited.

Clamp diode is connected in parallel with the load.
Absorb capacity with external diode.



CR Snubber is connected in parallel with the load.
Absorb capacity with buffer capacity.



When adding diodes, buffer circuits (C-R), and other protections, they need to be installed near the MOS RELAY to be effective.
Adding protection elements may result in a slow reset time, so adjust them according to the actual situation before use.

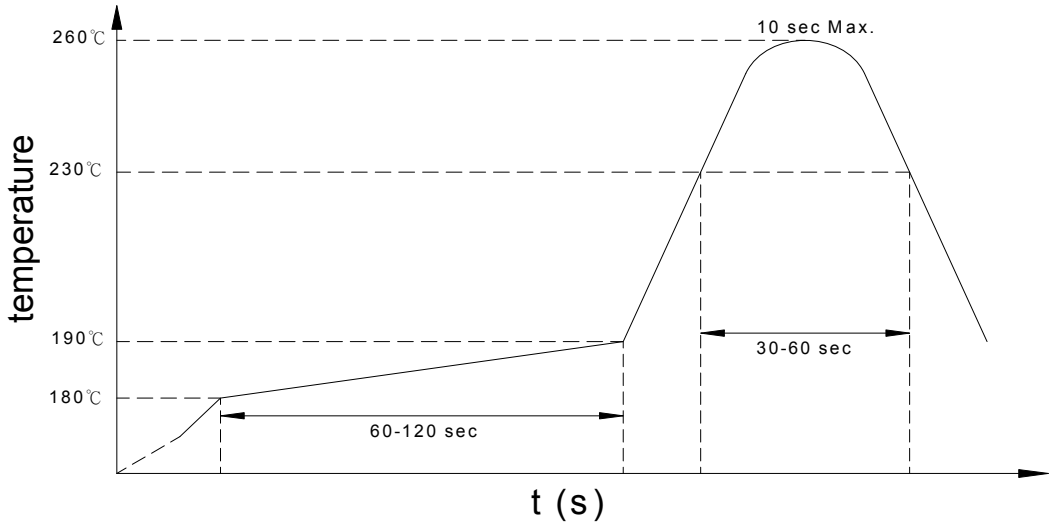
Note: When developing designs using this product, perform the expected performance of the equipment under the operating conditions recommended by the guidelines in this document. Continuous use under heavy loads (including, but not limited to, the application of high temperatures/current/voltage and significant changes in temperature, etc.) may result in deterioration of the reliability of this product.

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
- Time(s) of reflow： 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)
- Time(s) of reflow： 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.