



# APSEMI

SPST-NO+NC (1 Form A/B) APW614S  
 SOP-8 Load Voltage:400V Load Current:120mA

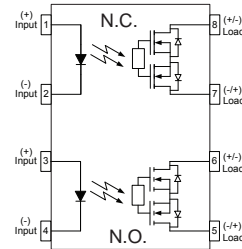


E534710

Parameter	Symbol	Rating	Units
Load Voltage	$V_L$	400	V
Load Current	$I_L$	0.12	A
On-Resistance	$R_{on}$	0.23/0.02	$\Omega$
I/O Breakdown Voltage	$V_{io}$	1500	$V_{rms}$

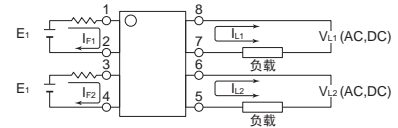


SOP-8

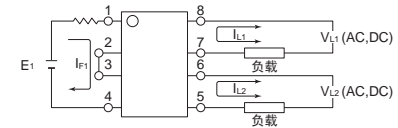


1,3. LED Anode  
 2,4. LED Cathode  
 5,6. Drain (MOS FET)  
 7,8. Drain (MOS FET)

(1) 1a1b 2input



(2) 1a1b 1input



## APSEMI PhotoRelays

APSEMI Photorelays are the most reliable, technically advanced logic-to-power interface devices. Their basic function is to take a low current signal from a microprocessor to control the switching of both AC and DC loads, while providing an isolation barrier between logic and power.

While this function is common to all relays, Photorelays provide distinct advantages over their mechanical counterparts including:

- 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

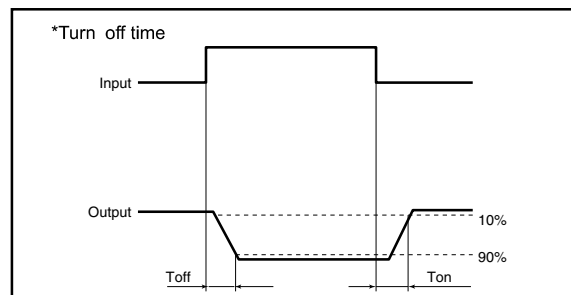
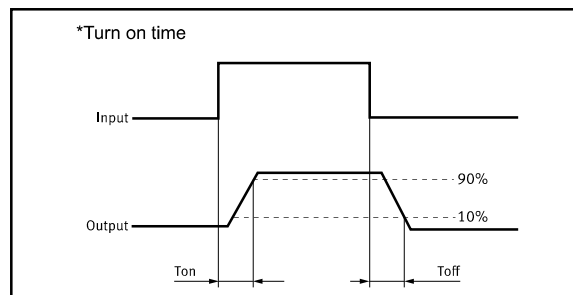
## Applications

These advantages make APSEI Photorelays the ideal choice for:

- 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	120mA	SOP-8	APW614S	2000pcs /reel



**APSEMI**SPST-NO+NC (1 Form A/B) APW614S  
SOP-8 Load Voltage:400V Load Current:120mA**Absolute Maximum Ratings** (Ta = 25°C)

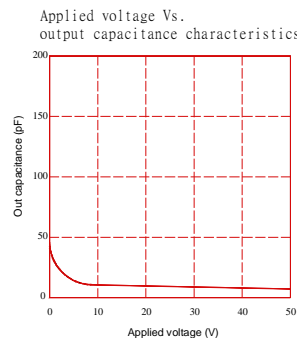
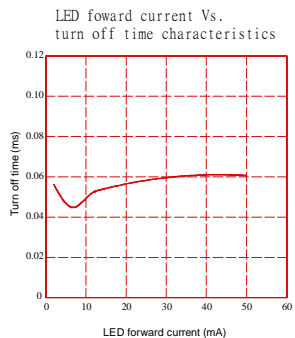
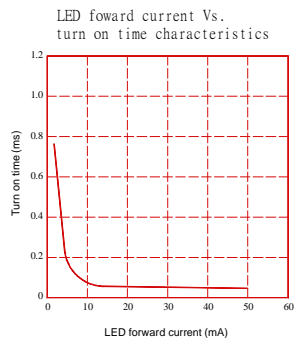
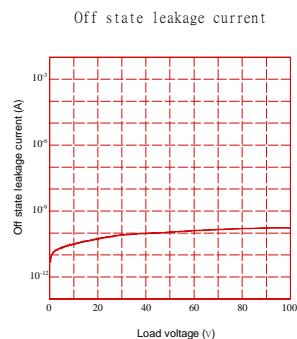
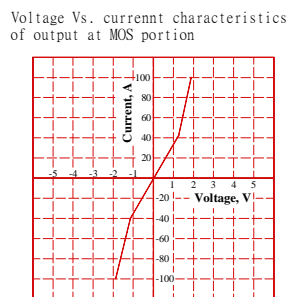
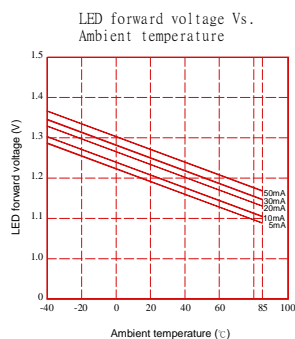
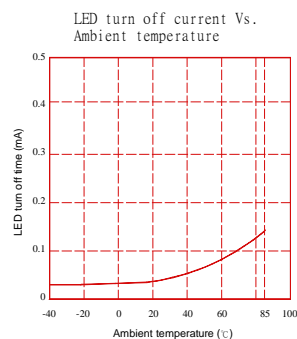
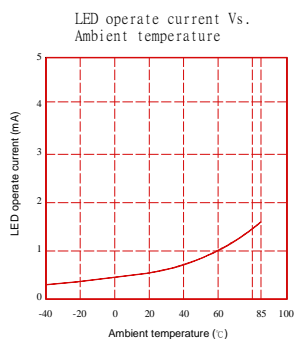
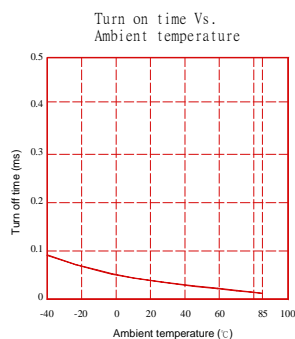
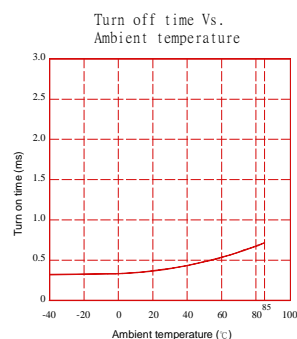
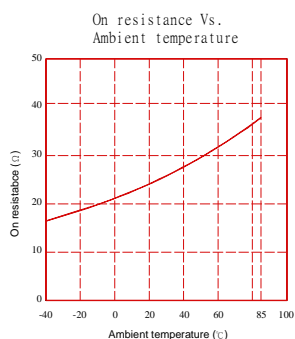
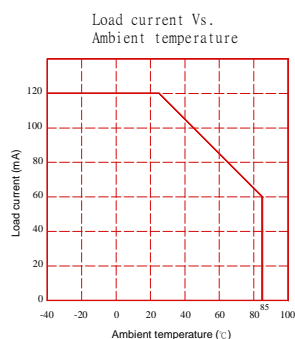
Item		Symbol	Value	Units	Note
Input	Continuous LED Current	IF	50	mA	
	Peak LED Current	IFP	500	mA	f=100Hz, duty=1%
	LED Reverse Voltage	VR	5	V	
	Input Power Dissipation	Pin	75	mW	
Output	Load Voltage	VL	400	V(AC peak or DC)	
	Load Current	IL	120	mA	
	Peak Load Current	IPeak	0.3	A	1ms(1 pulse)
	Output Power Dissipation	Pout	450	mW	
Total Power Dissipation		PT	500	mW	
I/O Breakdown Voltage		VI/O	1500	Vrms	RH=60%, 1min
Operating Temperature		TOpr	-40 to +85	-40 to +85	
Storage Temperature		TStg	-40 to +100	-40 to +100	
Pin Soldering Temperature		TSol	260	260	10 sec max.

**Electrical Characteristics** (Ta = 25°C)

Item		Symbol	MIN.	TYP.	MAX.	Units	Conditions
Input	LED Forward Voltage	VF		1.2	1.4	V	IF=10mA
	Operation LED Current	IF On		0.5	3.0	mA	
	Recovery LED Current	IF Off		0.35	0.5	mA	
	Recovery LED Voltage	VF Off	0.5			V	
Output	On-Resistance	ROn		20	50	Ω	IF=5mA (N.O.) IF=0mA (N.C) IL=100mA Time to flow is within 1 sec.
	Off-State Leakage Current	ILeak			10	uA	IF=0mA (N.O.) IF=5mA (N.C) VL=400V
	Output Capacitance	COut		165		pF	IF=5mA, VL=0, f=1MHz
Transmis sion	Turn-On Time	TOn		0.23(N.O.)	0.5(N.O.)	ms	IF=5mA, IL=50mA
				0.02(N.C.)	1.0(N.C.)		
	Turn-Off Time	TOff		0.03(N.O.)	0.2(N.O.)	ms	
				0.5(N.C.)	3.0(N.C.)		
Coupled	I/O Isolation Resistance	RI/O	10 <sup>10</sup>			Ω	DC500V
	I/O Capacitance	CI/O		0.8		pF	f=1MHz



## Engineering Data



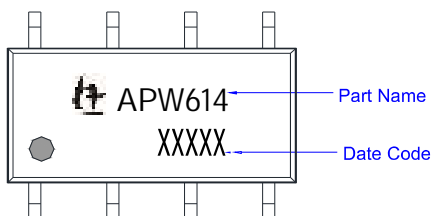


# APSEMI

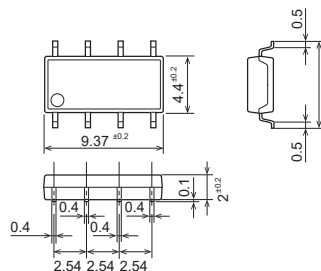
SPST-NO+NC (1 Form A/B) APW614S  
SOP-8 Load Voltage:400V Load Current:120mA

## Dimensions and SOP-8 Package Unit: mm

### Marking



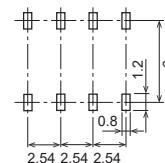
### Surface mount terminal type



### Lable

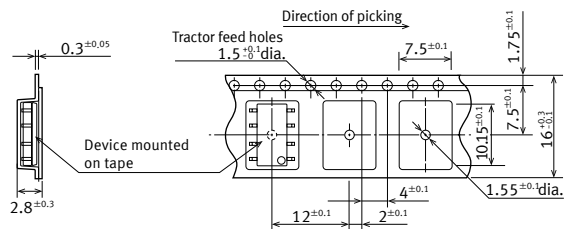


### Recommended mounting pad (Top view)

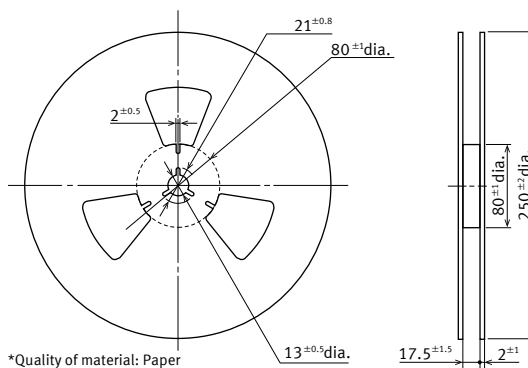


## Tape dimensions ( tape reel )

### Tape dimensions (Unit: mm)



### Dimensions of paper tape reel (Unit: mm)





## Using Methods

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



E1	R1 (Approx)
3.3V	300 $\Omega$
5.0V	600 $\Omega$
12V	1.9K $\Omega$
24V	4.1K $\Omega$

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



## Recommended Operating Conditions

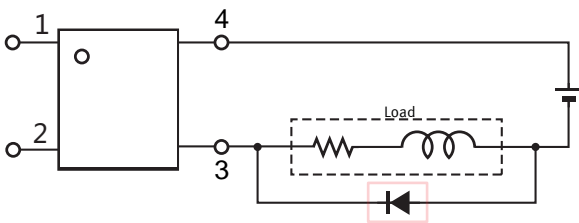
Please obey the following conditions to ensure proper device operation and resetting. Input LED current (Recommended value):

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

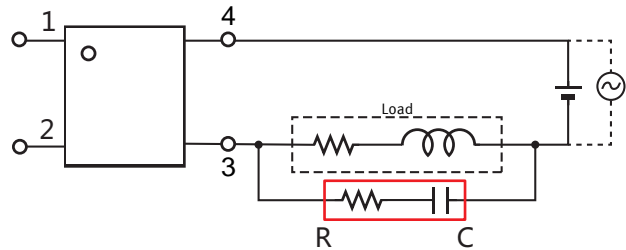
## Protection Circuit

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.

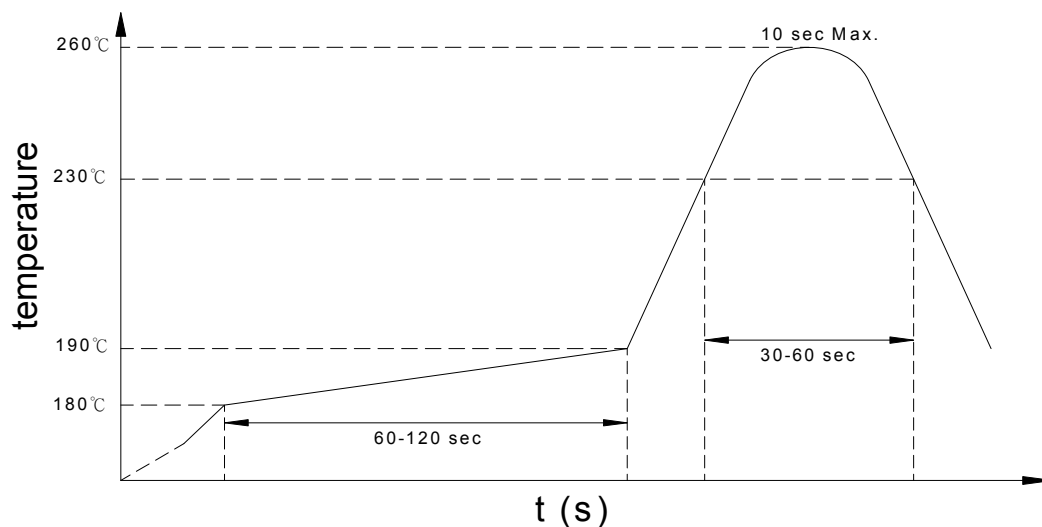


## Recommended Soldering Conditions

### (a) Infrared reflow soldering :

- Peak reflow soldering : 260°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
- 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°C or below (molten solder temperature)
- Time : 10 seconds or less
- Preheating conditions : 120°C 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.



## RESTRICTIONS ON PRODUCT USE

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