



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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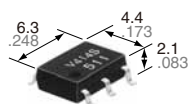
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



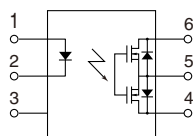


**Normally closed  
SOP6-pin type  
of 400V load voltage**

**PhotoMOS<sup>®</sup>  
GU SOP 1 Form B  
(AQV414S)**



mm inch

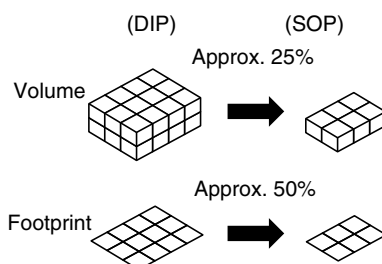


**RoHS compliant**

### FEATURES

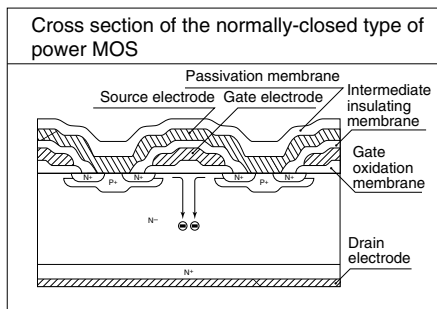
#### 1. Miniature SOP6-pin package

The device comes in a small SOP measuring (W) 4.4 × (L) 6.3 × (H) 2.1 mm (W) .173 × (L) .248 × (H) .083 inch approx. 25% of the volume and 50% of the footprint size of DIP type.



#### 2. Low on-resistance (typ. 26 Ω) for normally-closed type

This has been achieved thanks to the built-in MOSFET processed by our proprietary method, DSD (Double-Diffused and Selective Doping) method.



#### 3. Controls low-level analog signals

PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

#### 4. Low-level off state leakage current of max. 1 μA

### TYPICAL APPLICATIONS

- Telephones
- Measuring instruments
- Computers
- Industrial robots
- High-speed inspection machines

### TYPES

	Output rating*		Package	Part No.			Packing quantity	
	Load voltage	Load current		Tube packing style	Tape and reel packing style		Tube	Tape and reel
					Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side		
AC/DC dual use	400V	100mA	SOP6-pin	AQV414S	AQV414SX	AQV414SZ	1 tube contains: 75 pcs. 1 batch contains: 1,500 pcs.	1,000 pcs.

\* Indicate the peak AC and DC values.

Note: For space reasons, only "V41S" is marked on the product. The two initial letters of the part number "AQ" and the packing style indicator "X" or "Z" have been omitted.

## RATING

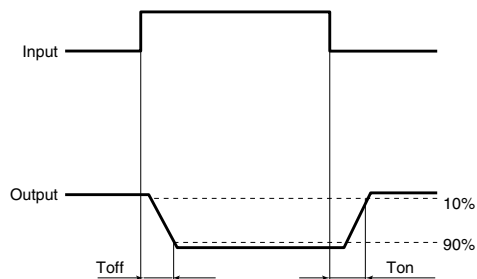
### 1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item	Symbol	Type of connection	AQV414S	Remarks	
Input	LED forward current	$I_F$	50 mA		
	LED reverse voltage	$V_R$	5 V		
	Peak forward current	$I_{FP}$	1 A	f = 100 Hz, Duty factor = 0.1%	
	Power dissipation	$P_{in}$	75 mW		
Output	Load voltage (peak AC)	$V_L$	400 V		
	Continuous load current	$I_L$	A	0.10 A	A connection: Peak AC, DC B, C connection: DC
			B	0.11 A	
			C	0.12 A	
	Peak load current	$I_{peak}$		0.3 A	A connection: 100 ms (1 shot) $V_L = DC$
	Power dissipation	$P_{out}$		450 mW	
	Total power dissipation	$P_T$		500 mW	
I/O isolation voltage	$V_{iso}$		1,500 V AC		
Temperature limits	Operating	$T_{opr}$	-40°C to +85°C -40°F to +185°F	Non-condensing at low temperatures	
	Storage	$T_{stg}$	-40°C to +100°C -40°F to +212°F		

### 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item	Symbol	Type of connection	AQV414S	Remarks		
Input	LED operate (OFF) current	Typical	$I_{off}$	0.6 mA	$I_L = Max.$	
		Maximum		3 mA		
	LED reverse (ON) current	Minimum	$I_{fon}$	0.4 mA	$I_L = Max.$	
		Typical		0.55 mA		
LED dropout voltage	Typical	$V_F$	—	1.25 V (1.14 V at $I_F = 5 mA$ )	$I_F = 50 mA$	
	Maximum			1.5 V		
Output	On resistance	Typical	$R_{on}$	A	26 $\Omega$	$I_F = 0 mA$ $I_L = Max.$ Within 1 s on time
		Maximum				
		Typical	$R_{on}$	B	20 $\Omega$	$I_F = 0 mA$ $I_L = Max.$ Within 1 s on time
		Maximum			25 $\Omega$	
		Typical	$R_{on}$	C	10 $\Omega$	$I_F = 0 mA$ $I_L = Max.$ Within 1 s on time
		Maximum			12.5 $\Omega$	
Off state leakage current	Maximum	$I_{Leak}$	—	1 $\mu A$	$I_F = 5 mA, V_L = Max.$	
Transfer characteristics	Operate (OFF) time*	Typical	$T_{off}$	—	0.47 ms	$I_F = 0 mA \rightarrow 5 mA$ $V_L = Max.$
		Maximum			1.0 ms	
	Reverse (ON) time*	Typical	$T_{on}$	—	0.28 ms	$I_F = 5 mA \rightarrow 0 mA$ $V_L = Max.$
		Maximum			1.0 ms	
	I/O capacitance	Typical	$C_{iso}$	—	0.8 pF	f = 1 MHz $V_B = 0 V$
		Maximum			1.5 pF	
Initial I/C isolation resistance	Minimum	$R_{iso}$	—	1,000 M $\Omega$	500 V DC	

\*Operate/Reverse time



## RECOMMENDED OPERATING CONDITIONS

Please obey the following conditions to ensure proper device operation and resetting.

Item	Symbol	Recommended value	Unit
Input LED current	$I_F$	5	mA

■ These products are not designed for automotive use.

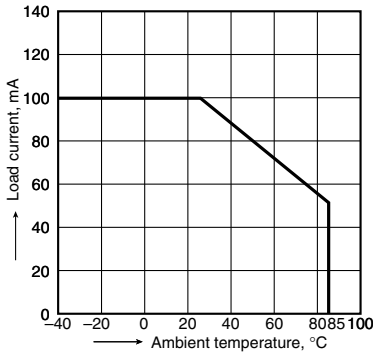
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

## REFERENCE DATA

### 1. Load current vs. ambient temperature characteristics

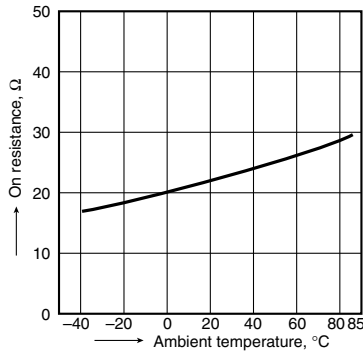
Allowable ambient temperature:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
 $-40^{\circ}\text{F}$  to  $+185^{\circ}\text{F}$

Type of connection: A



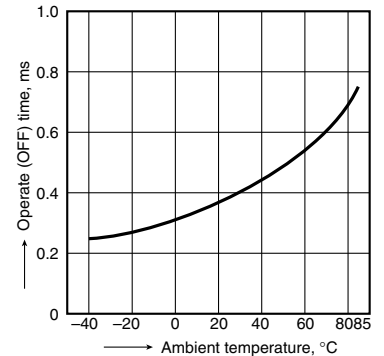
### 2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;  
 LED current: 0 mA;  
 Continuous load current: 100 mA (DC)



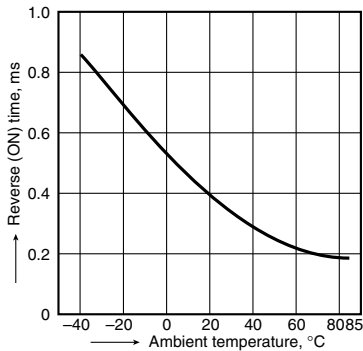
### 3. Operate (OFF) time vs. ambient temperature characteristics

LED current: 5 mA;  
 Load voltage: 400 V (DC);  
 Continuous load current: 100 mA (DC)



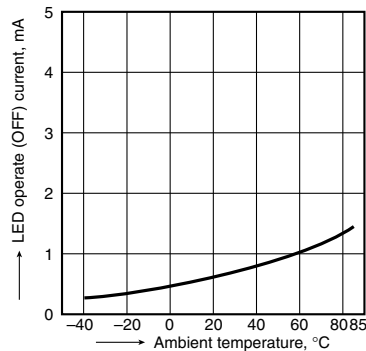
### 4. Reverse (ON) time vs. ambient temperature characteristics

LED current: 50 mA;  
 Load voltage: 400 V (DC);  
 Continuous load current: 100 mA (DC)



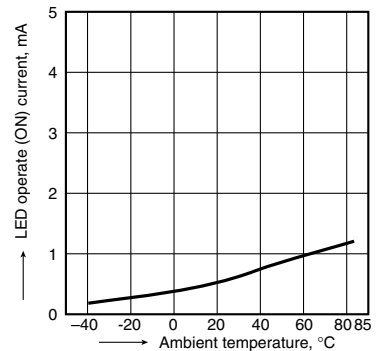
### 5. LED operate (OFF) current vs. ambient temperature characteristics

Load voltage: 400 V (DC);  
 Continuous load current: 100 mA (DC)



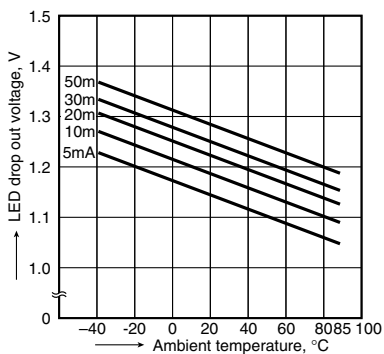
### 6. LED reverse (ON) current vs. ambient temperature characteristics

Load voltage: 400 V (DC);  
 Continuous load current: 100 mA (DC)



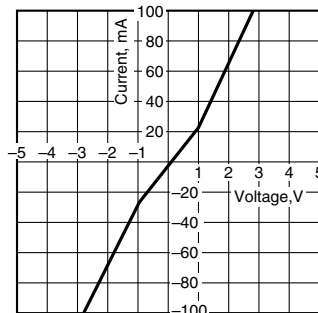
### 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



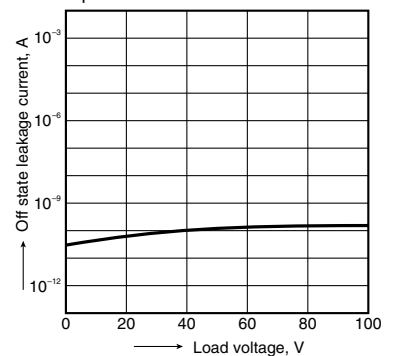
### 8. Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 4 and 6;  
 Ambient temperature:  $25^{\circ}\text{C}$   $77^{\circ}\text{F}$



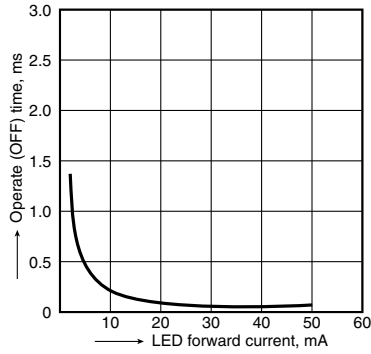
### 9. Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 4 and 6;  
 LED current: 5 mA;  
 Ambient temperature:  $25^{\circ}\text{C}$   $77^{\circ}\text{F}$



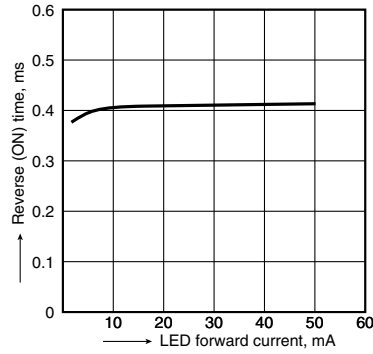
## 10. Operate (OFF) time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6;  
 Load voltage: 400 V (DC); Continuous load current:  
 100 mA (DC); Ambient temperature: 25°C 77°F



## 11. Reverse (ON) time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6;  
 Load voltage: 400 V (DC); Continuous load current:  
 100 mA (DC); Ambient temperature: 25°C 77°F



## 12. Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 4 and 6;  
 LED current: 5 mA; Frequency: 1 MHz;  
 Ambient temperature: 25°C 77°F

