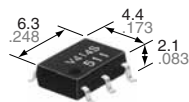
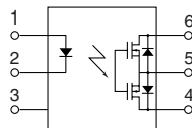


**Normally closed  
SOP6-pin type  
of 400V load voltage**

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



mm inch

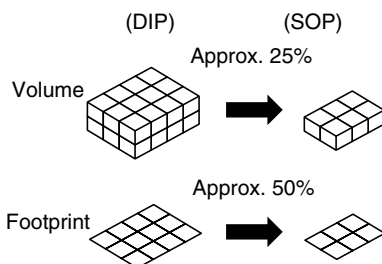


**RoHS compliant**

## FEATURES

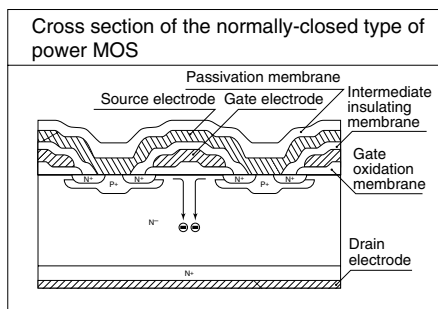
### 1. Miniature SOP6-pin package

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

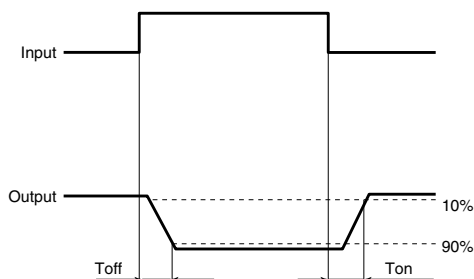
### 1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item		Symbol	Type of connection	AQV414S	Remarks
Input	LED forward current	I <sub>F</sub>		50 mA	
	LED reverse voltage	V <sub>R</sub>		5 V	
	Peak forward current	I <sub>FP</sub>		1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>		75 mW	
Output	Load voltage (peak AC)	V <sub>L</sub>		400 V	
	Continuous load current	I <sub>L</sub>	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 <sub>peak</sub>		0.3 A	A connection: 100 ms (1 shot) V <sub>L</sub> = DC
	Power dissipation	P <sub>out</sub>		450 mW	
	Total power dissipation			P <sub>T</sub>	500 mW
I/O isolation voltage		V <sub>iso</sub>		1,500 V AC	
Temperature limits	Operating	T <sub>opr</sub>		−40°C to +85°C −40°F to +185°F	Non-condensing at low temperatures
	Storage	T <sub>stg</sub>		−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	$I_{\text{Foff}}$	—	0.6 mA	$I_L$ = Max.	
		Maximum			3 mA		
	LED reverse (ON) current	Minimum	$I_{\text{Fon}}$	—	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	$R_{\text{on}}$	A	26 $\Omega$	$I_F$ = 0 mA $I_L$ = Max. Within 1 s on time	
		Maximum			50 $\Omega$		
		Typical	$R_{\text{on}}$	B	20 $\Omega$	$I_F$ = 0 mA $I_L$ = Max. Within 1 s on time	
		Maximum			25 $\Omega$		
		Typical	$R_{\text{on}}$	C	10 $\Omega$	$I_F$ = 0 mA $I_L$ = Max. Within 1 s on time	
		Maximum			12.5 $\Omega$		
	Off state leakage current	Maximum	$I_{\text{Leak}}$	—	1 $\mu\text{A}$	$I_F$ = 5 mA, $V_L$ = Max.	
	Transfer characteristics	Operate (OFF) time*	Typical	$T_{\text{off}}$	—	0.47 ms	$I_F$ = 0 mA $\rightarrow$ 5 mA $V_L$ = Max.
Maximum			1.0 ms				
Reverse (ON) time*		Typical	$T_{\text{on}}$	—	0.28 ms	$I_F$ = 5 mA $\rightarrow$ 0 mA $V_L$ = Max.	
		Maximum			1.0 ms		
I/O capacitance		Typical	$C_{\text{iso}}$	—	0.8 pF	f = 1 MHz $V_B$ = 0 V	
		Maximum			1.5 pF		
Initial I/C isolation resistance	Minimum	$R_{\text{iso}}$	—	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

### ■ For Dimensions.

### ■ For Schematic and Wiring Diagrams.

### ■ For Cautions for Use.

### ■ 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.

For more information.

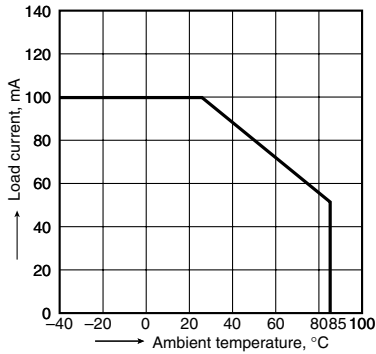
# GU SOP 1 Form B (AQV414S)

## REFERENCE DATA

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

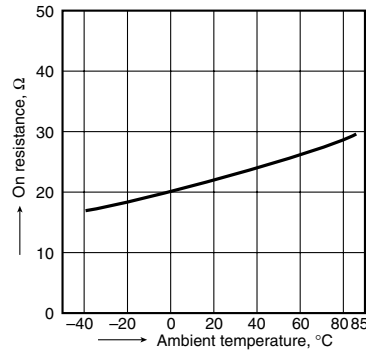
Allowable ambient temperature:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
 $-40^{\circ}\text{F}$  to  $+185^{\circ}\text{F}$

Type of connection: A



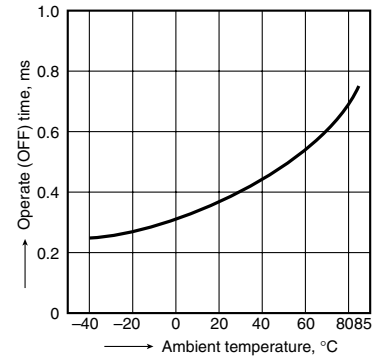
### 2. On resistance vs. ambient temperature characteristics

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



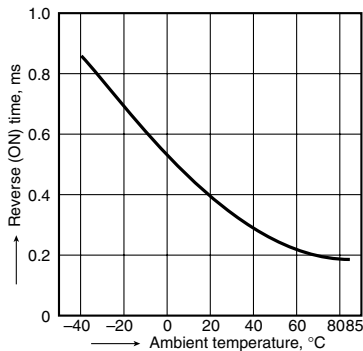
### 3. Operate (OFF) time vs. ambient temperature characteristics

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



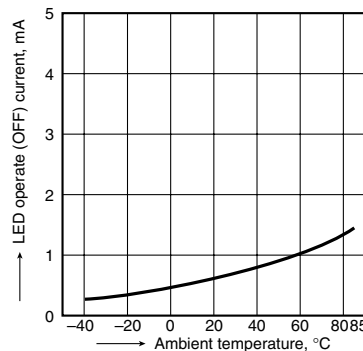
### 4. Reverse (ON) time vs. ambient temperature characteristics

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



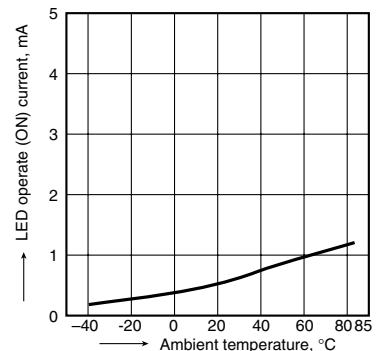
### 5. LED operate (OFF) current vs. ambient temperature characteristics

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



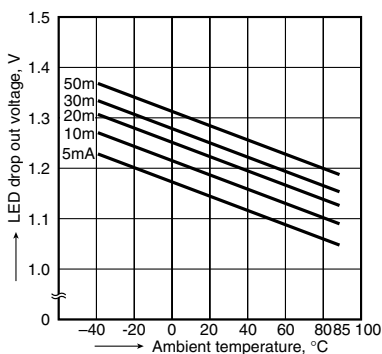
### 6. LED reverse (ON) current vs. ambient temperature characteristics

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



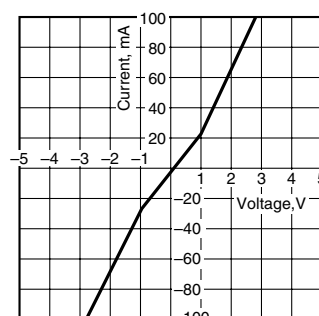
### 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



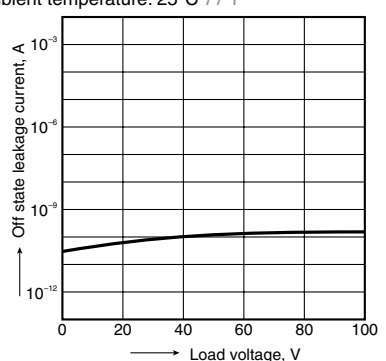
### 8. Current vs. voltage characteristics of output at MOS portion

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



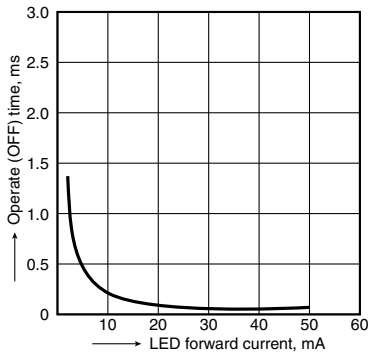
### 9. Off state leakage current vs. load voltage characteristics

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



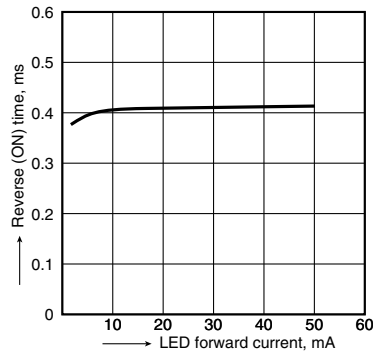
## 10. Operate (OFF) time vs. LED forward current characteristics

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;  
Frequency: 1 MHz;  
Ambient temperature: 25°C 77°F

