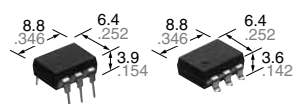


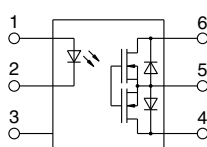
**Normally closed 6-pin type  
of 400V load voltage**

**PhotoMOS®  
GU 1 Form B  
(AQV414)**



(Height includes standoff)

mm inch



**RoHS compliant**

## FEATURES

### 1. Low on-resistance (Typ. 26Ω) 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.

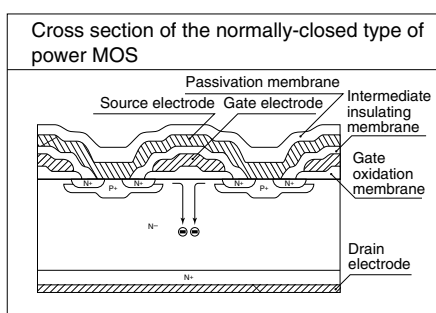
### 2. Controls low-level analog signals

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

### 3. High sensitivity and low on-resistance

Can control max. 0.15 A load current with 5 mA input current.

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



## TYPICAL APPLICATIONS

- Security equipment
- Telephone equipment (Dial pulse)
- Measuring instruments

## TYPES

	Output rating*		Package	Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal				
	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	400 V	120 mA	DIP6-pin	AQV414	AQV414A	AQV414AX	AQV414AZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.

\*Indicate the peak AC and DC values.

Note: The surface mount terminal shape indicator "A" and the packing style indicator "X" or "Z" are not marked on the device.

## RATING

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

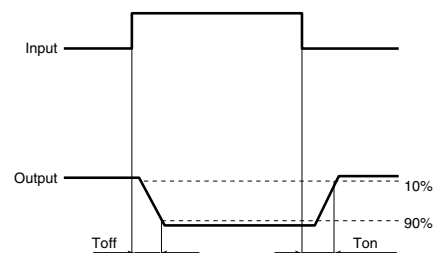
Item		Symbol	Type of connection	AQV414(A)	Remarks
Input	LED forward current	I <sub>F</sub>		50 mA	
	LED reverse voltage	V <sub>R</sub>		5 V	
	Peak forward current	I <sub>FP</sub>		1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>		75 mW	
Output	Load voltage (peak AC)	V <sub>L</sub>		400 V	
	Continuous load current	I <sub>L</sub>	A	0.12 A	A connection: Peak AC, DC B, C connection: DC
			B	0.13 A	
			C	0.15 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>		500 mW	
Total power dissipation		P <sub>T</sub>		550 mW	
I/O isolation voltage		V <sub>iso</sub>		1,500 Vrms	
Ambient temperature	Operating	T <sub>opr</sub>		−40 to +85°C −40 to +185°F	(Non-icing at low temperatures)
	Storage	T <sub>stg</sub>		−40 to +100°C −40 to +212°F	

# GU 1 Form B (AQV414)

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

Item			Symbol	Type of connection	AQV414(A)	Condition
Input	LED operate (OFF) current	Typical	$I_{\text{Foff}}$	—	1.0 mA	$I_L = \text{Max.}$
		Maximum			3.0 mA	
	LED reverse (ON) current	Minimum	$I_{\text{Fon}}$	—	0.4 mA	$I_L = \text{Max.}$
		Typical			0.95 mA	
	LED dropout voltage	Typical	$V_F$	—	1.25 V (1.14 V at $I_F = 5 \text{ mA}$ )	$I_F = 50 \text{ mA}$
Maximum		1.5 V				
Output	On resistance	Typical	$R_{\text{on}}$	A	26 $\Omega$	$I_F = 0 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s
		Maximum			50 $\Omega$	
		Typical	$R_{\text{on}}$	B	20 $\Omega$	$I_F = 0 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s
		Maximum			25 $\Omega$	
		Typical	$R_{\text{on}}$	C	10 $\Omega$	$I_F = 0 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s
		Maximum			12.5 $\Omega$	
	Off state leakage current	Maximum	$I_{\text{Leak}}$	—	1 $\mu\text{A}$	$I_F = 5 \text{ mA}$ $V_L = \text{Max.}$
Transfer characteristics	Operate (OFF) time*	Typical	$T_{\text{off}}$	—	0.47 ms	$I_F = 0 \text{ mA} \rightarrow 5 \text{ mA}$ $I_L = \text{Max.}$
		Maximum			1.0 ms	
	Reverse (ON) time*	Typical	$T_{\text{on}}$	—	0.28 ms	$I_F = 5 \text{ mA} \rightarrow 0 \text{ mA}$ $I_L = \text{Max.}$
		Maximum			1.0 ms	
	I/O capacitance	Typical	$C_{\text{iso}}$	—	0.8 pF	$f = 1 \text{ MHz}$ $V_B = 0 \text{ V}$
		Maximum			1.5 pF	
	Initial I/O isolation resistance	Minimum	$R_{\text{iso}}$	—	1,000 M $\Omega$	500 V DC

\*Operate/Reverse time



## 3. Recommended operating conditions (Ambient temperature: 25°C 77°F)

Please use under recommended operating conditions to obtain expected characteristics.

Item		Symbol	Min.	Max.	Unit
LED current		$I_F$	5	30	mA
AQV414(A)	Load voltage (Peak AC)	$V_L$	—	320	V
	Continuous load current (A connection)	$I_L$	—	0.12	A

■ These products are not designed for automotive use.

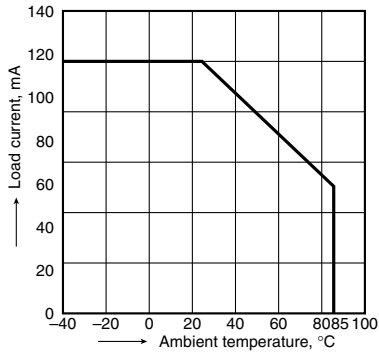
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

## REFERENCE DATA

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

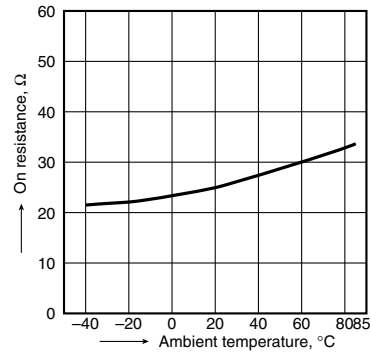
Allowable ambient temperature:  $-40$  to  $+85^{\circ}\text{C}$   
 $-40$  to  $+185^{\circ}\text{F}$

Type of connection: A



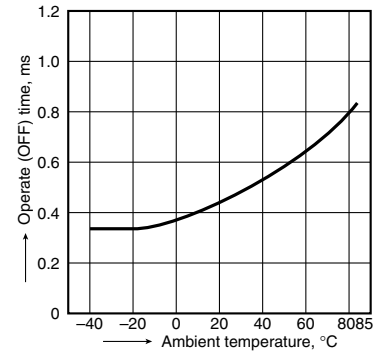
### 2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;  
 LED current: 0 mA;  
 Continuous load current: 120 mA (DC)



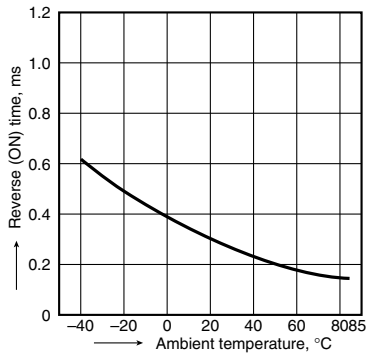
### 3. Operate (OFF) time vs. ambient temperature characteristics

LED current: 5 mA;  
 Load voltage: 400 V (DC);  
 Continuous load current: 120 mA (DC)



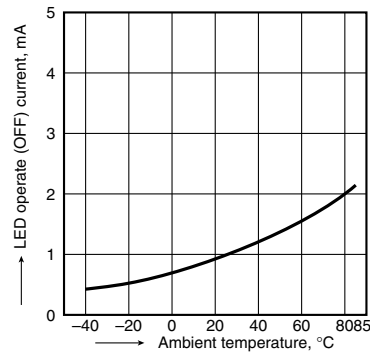
### 4. Reverse (ON) time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 400 V (DC);  
 Continuous load current: 120 mA (DC)



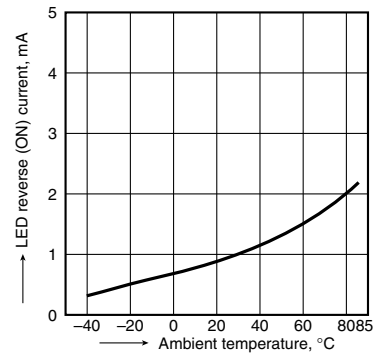
### 5. LED operate (OFF) current vs. ambient temperature characteristics

Load voltage: 400 V (DC);  
 Continuous load current: 120 mA (DC)



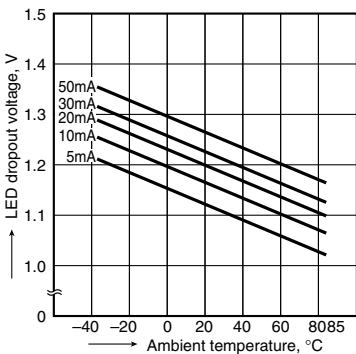
### 6. LED reverse (ON) current vs. ambient temperature characteristics

Load voltage: 400 V (DC);  
 Continuous load current: 120 mA (DC)



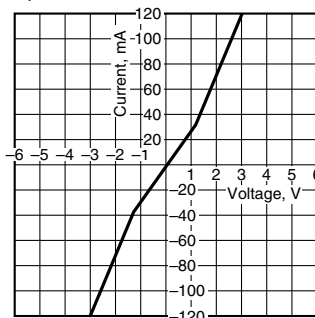
### 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



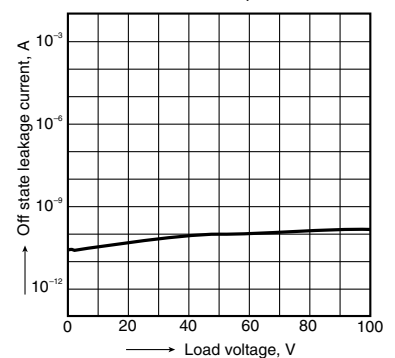
### 8. Current vs. voltage characteristics of output at MOS portion

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



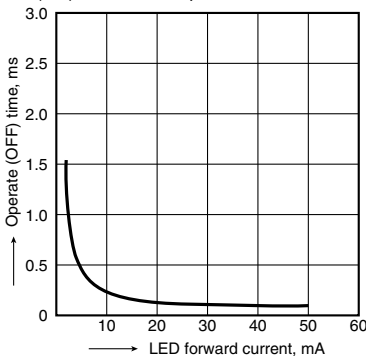
### 9. Off state leakage current vs. load voltage characteristics

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



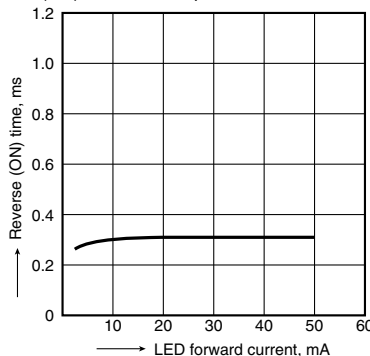
### 10. Operate (OFF) time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6;  
 Load voltage: 400 V (DC); Continuous load current: 120 mA (DC); Ambient temperature:  $25^{\circ}\text{C}$   $77^{\circ}\text{F}$



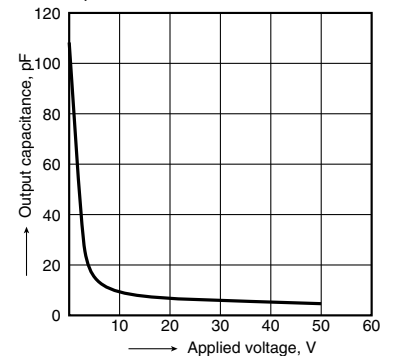
### 11. Reverse (ON) time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6;  
 Load voltage: 400 V (DC); Continuous load current: 120 mA (DC); Ambient temperature:  $25^{\circ}\text{C}$   $77^{\circ}\text{F}$



### 12. Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 4 and 6;  
 LED current: 5 mA; Frequency: 1 MHz;  
 Ambient temperature:  $25^{\circ}\text{C}$   $77^{\circ}\text{F}$



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