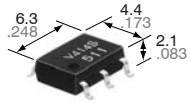
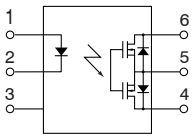
Panasonic
ideas for life

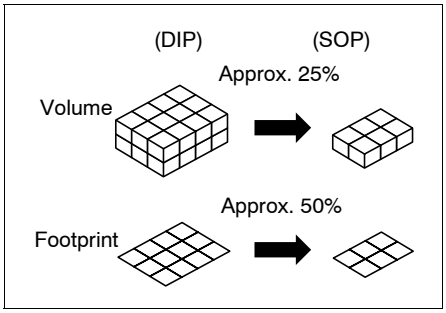
GU (General Use) Type
SOP Series
[1-Channel (Form B) Type]

GU PhotoMOS (AQV414S)



mm inch



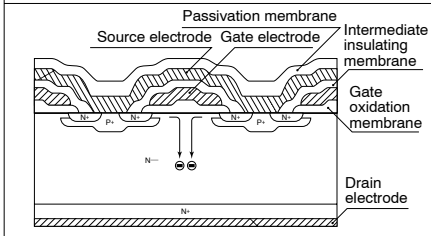


FEATURES

1. 1 channel (Form B) in super miniature design
The device comes in a super-miniature SO package 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 PhotoMOS Relays.

2. Low on resistance (Max. 50 Ω) at 400 V for normally-closed type
has been achieved thanks to the built-in MOSFET processed by our proprietary method, DSD (Double-Diffused and Selective Doping) method.

Cross section of the normally-closed type of power MOS



3. Tape and reel
The device comes standard in a tape and reel (1,000 pcs./reel) to facilitate automatic insertion machines.

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

5. Low-level off state leakage current
In contrast to the SSR with an off state leakage current of several milliamperes, the PhotoMOS relay features a very small off state leakage current of typ. 100 pA even at the rated load voltage of 400 V.

6. Low thermal electromotive force (Approx. 1 μV)

TYPICAL APPLICATIONS

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

TYPES

Type	Output rating*		Package size	Part No.			Packing quantity	
	Load voltage	Load current		Tube packing style	Tape and reel packing style		Tube	Tape and reel
AC/DC type	400V	100mA	SOP6pin	AQV414S	AQV414SX (Picked from the 1/2/3-pin side)	AQV414SZ (Picked from the 4/5/6-pin side)	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, the initial letters of the part number “AQ” the package style indicator “X” or “Z” are not marked on the relay.
(Ex. the label for product number AQV414S is V414S)

RATING

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

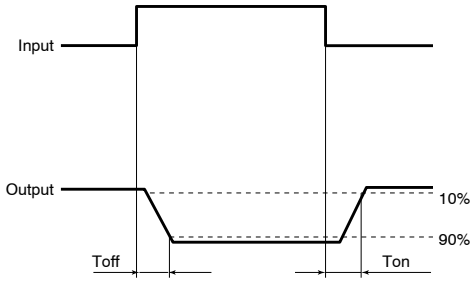
Item		Symbol	Type of connection	AQV414S	Remarks
Input	LED forward current	I_F		50 mA	
	LED reverse voltage	V_R		5 V	
	Peak forward current	I_{FP}		1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}		75 mW	
Output	Load voltage (peak AC)	V_L		400 V	
	Continuous load current	I_L	A	0.10 A	A connection: 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_{Foff}	—	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 Ω	I_F= 0 mA I_L= Max. Within 1 s on time
		Maximum			50 Ω	
		Typical	R_{on}	B	20 Ω	I_F = 0 mA I_L = Max. Within 1 s on time
		Maximum			25 Ω	
		Typical	R_{on}	C	10 Ω	I_F = 0 mA I_L = Max. Within 1 s on time
		Maximum			12.5 Ω	
	Off state leakage current	Maximum	I_{Leak}	—	1 μA	I_F = 5 mA V_L = Max.
Transfer characteristics	Operate (OFF) time*	Typical	T_{off}	—	0.47 ms	I_F= 0 mA › 5 mA V_L = Max.
		Maximum			1.0 ms	
	Reverse (ON) time*	Typical	T_{on}	—	0.28 ms	I_F= 5 mA › 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 MΩ	500 V DC

Note: Recommendable LED forward current I_F = 5mA. Type of connection

*Operate/Reverse time



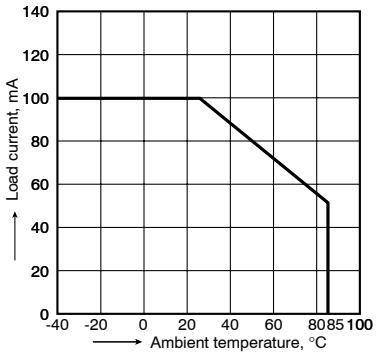
■ Dimensions
■ Schematic and Wiring Diagrams
■ Cautions for Use

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

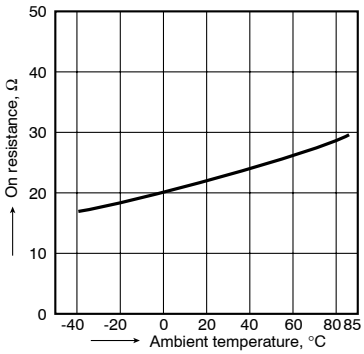
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F

Type of connection: A



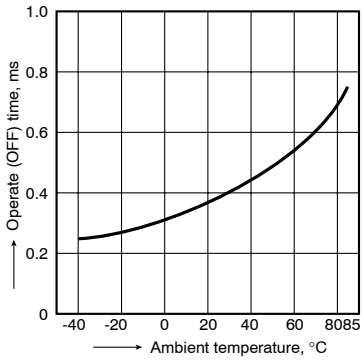
2. On resistance vs. ambient temperature characteristics

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



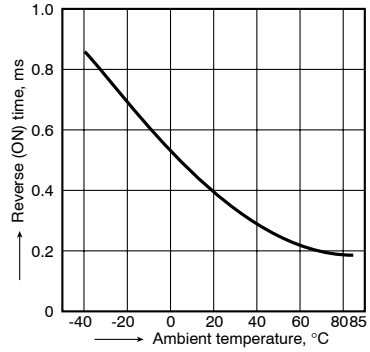
3. Operate (OFF) time vs. ambient temperature characteristics

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



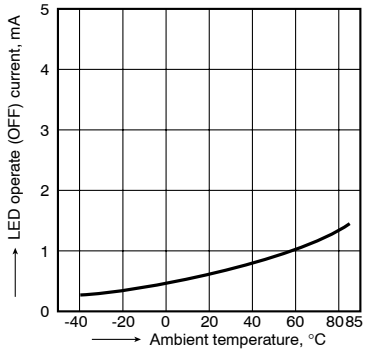
4. Reverse (ON) time vs. ambient temperature characteristics

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



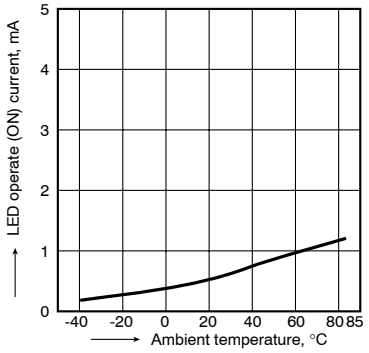
5. LED operate (OFF) current vs. ambient temperature characteristics

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



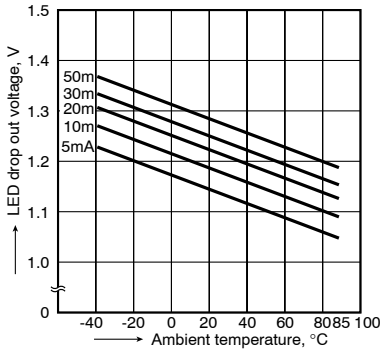
6. LED reverse (ON) current vs. ambient temperature characteristics

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



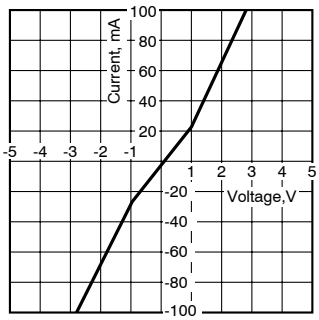
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



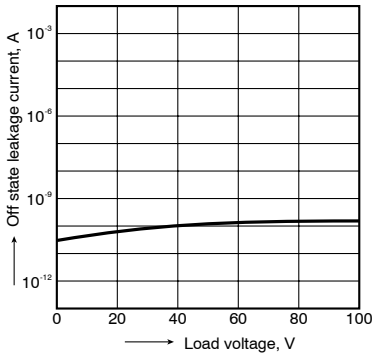
8. Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



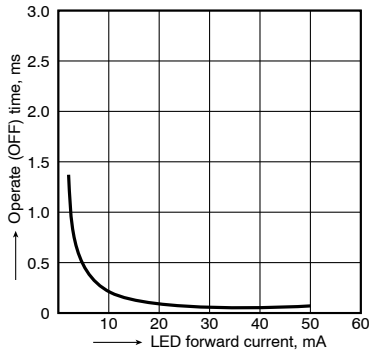
9. Off state leakage current vs. load voltage characteristics

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



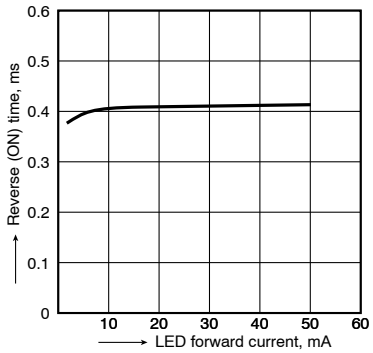
10. Operate (OFF) time vs. LED forward current characteristics

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