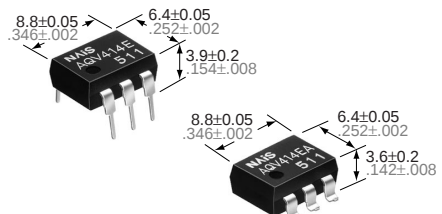


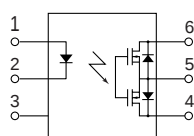
NAIS

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

PhotoMOS RELAYS



mm inch



FEATURES

1. Low on resistance for normally-closed type

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

2. Controls low-level analog signals

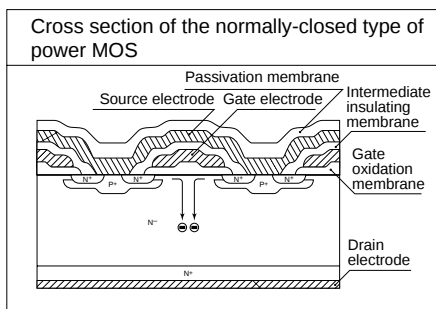
PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

3. High sensitivity, low ON resistance

Can control a maximum 0.15 A load current with a 5 mA input current.

4. Low-level off state leakage current

The SSR has an off state leakage current of several milliamperes, whereas the PhotoMOS relay has only 100 pA even with the rated load voltage of 400 V.



TYPICAL APPLICATIONS

- Telephone equipment (Dial pulse)
- Measuring equipment

TYPES

Type	I/O isolation voltage	Output rating*		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 type	1,500 V AC	400 V	120 mA	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: For space reasons, the package type indicator "X" and "Z" are omitted from the seal.

RATING

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

Item		Symbol	Type of connection	AQV414(A)	Remarks
Input	LED forward current	I _F		50 mA	
	LED reverse voltage	V _R		3 V	
	Peak forwrd 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	0.12 A	A connection: Peak AC, DC B,C connection: DC
			B	0.13 A	
			C	0.15 A	
	Peak load current	I _{peak}		0.3 A	A connection: 100 ms (1 shot), V _L = DC
	Power dissipation	P _{out}		500 mW	
Total power dissipation		P _T		550 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	

AQV414

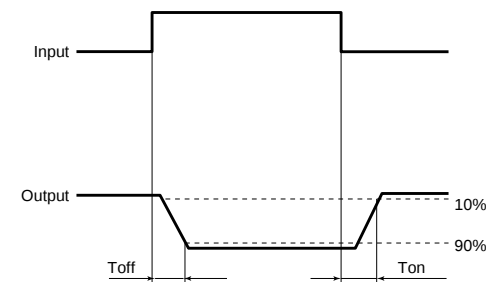
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item			Symbol	Type of connection	AQV414(A)	Condition
Input	LED operate (OFF) current	Typical	I_{Foff}	—	1.0 mA	$I_L = 120 \text{ mA}$
		Maximum			3.0 mA	
	LED reverse (ON) current	Minimum	I_{Fon}	—	0.4 mA	$I_L = 120 \text{ mA}$
		Typical			0.95 mA	
	LED dropout voltage	Typical	V_F	—	1.14 V (1.25 V at $I_F = 50 \text{ mA}$)	$I_F = 5 \text{ mA}$
		Maximum			1.5 V	
Output	On resistance	Typical	R_{on}	A	26 Ω	$I_F = 0 \text{ mA}$ $I_L = 120 \text{ mA}$ Within 1 s on time
		Maximum			50 Ω	
		Typical	R_{on}	B	20 Ω	$I_F = 0 \text{ mA}$ $I_L = 120 \text{ mA}$ Within 1 s on time
		Maximum			25 Ω	
		Typical	R_{on}	C	10 Ω	$I_F = 0 \text{ mA}$ $I_L = 120 \text{ mA}$ Within 1 s on time
		Maximum			12.5 Ω	
Transfer characteristics	Off state leakage current		Maximum	I_{Leak}	—	1 μA $I_F = 5 \text{ mA}$ $V_L = 400 \text{ V}$
	Switching speed	Operate (OFF) time*	Typical	T_{off}	—	0.47 ms $I_F = 0 \text{ mA} \rightarrow 5 \text{ mA}$ $I_L = 120 \text{ mA}$
		Maximum				1.0 ms
		Reverse (ON) time*	Typical	T_{on}	—	0.28 ms $I_F = 5 \text{ mA} \rightarrow 0 \text{ mA}$ $I_L = 120 \text{ mA}$
		Maximum				1.0 ms
	I/O capacitance		Typical	C_{iso}	—	0.8 pF $f = 1 \text{ MHz}$ $V_B = 0$
			Maximum			1.5 pF
	Initial I/O isolation resistance		Minimum	R_{iso}	—	1,000 M Ω 500 V DC

Note: Recommendable LED forward current $I_F = 5 \text{ mA}$.

For type of connection, see Page 32.

*Operate/Reverse time



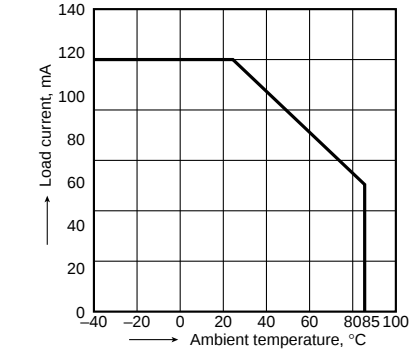
- For Dimensions, see Page 27.
- For Schematic and Wiring Diagrams, see Page 32.
- For Cautions for Use, see Page 36.

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

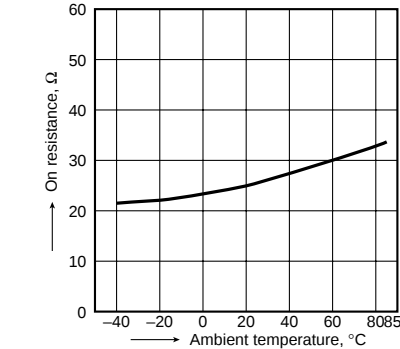
Allowable ambient temperature: -40°C to +85°C
-40°F to +185°F

Type of connection: A



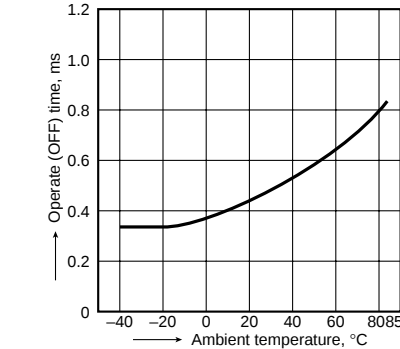
2. On resistance vs. ambient temperature characteristics

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



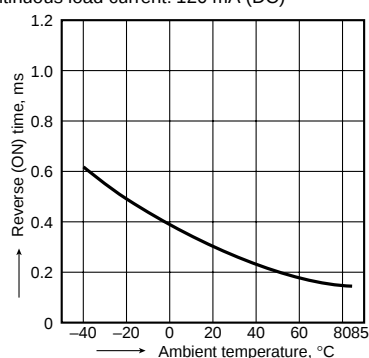
3. Operate (OFF) time vs. ambient temperature characteristics

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



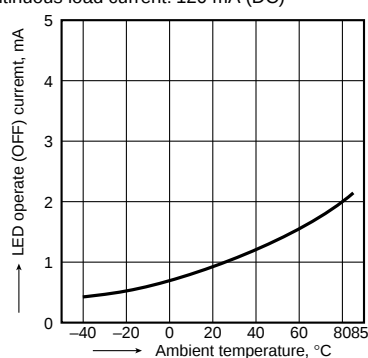
4. Reverse (ON) time vs. ambient temperature characteristics

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



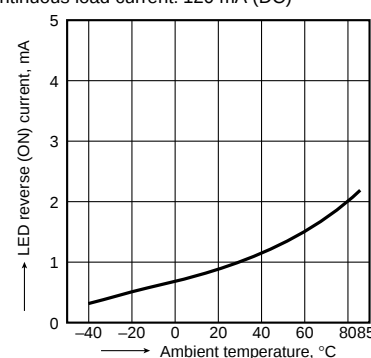
5. LED operate (OFF) current vs. ambient temperature characteristics

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



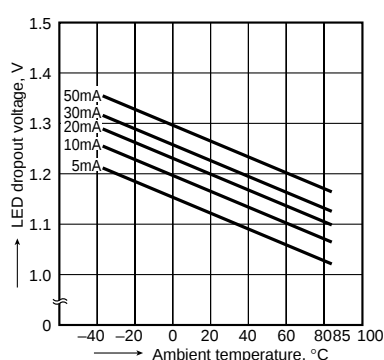
6. LED reverse (ON) current vs. ambient temperature characteristics

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



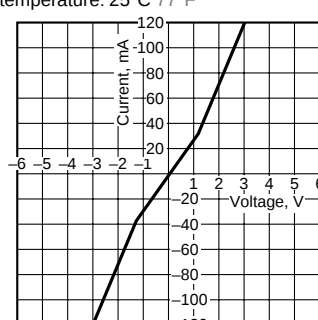
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



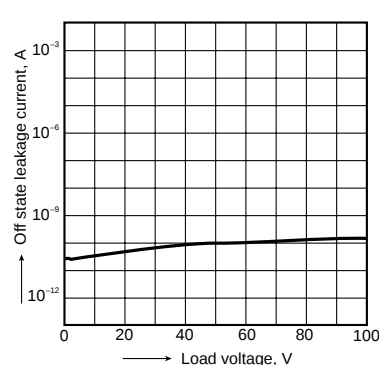
8. Voltage vs. current characteristics of output at MOS portion

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



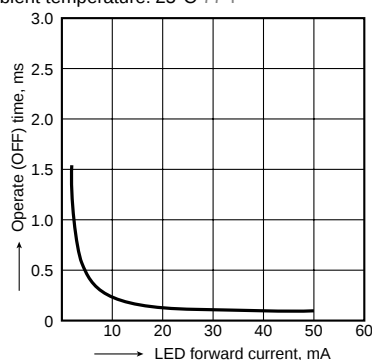
9. Off state leakage current

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



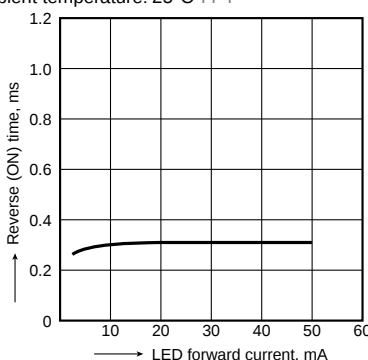
10. LED forward current vs. operate (OFF) time characteristics

Measured portion: between terminals 4 and 6;
Load voltage: 400 V (DC);
Continuous load current: 120 mA (DC);
Ambient temperature: 25°C 77°F



11. LED forward current vs. reverse (ON) time characteristics

Measured portion: between terminals 4 and 6;
Load voltage: 400 V (DC);
Continuous load current: 120 mA (DC);
Ambient temperature: 25°C 77°F



12. Applied voltage vs. output capacitance characteristics

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

