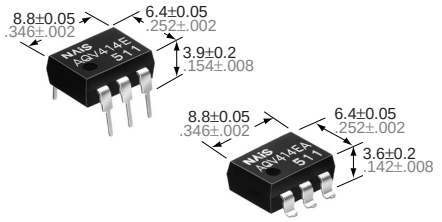
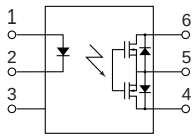
NAiS

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

PhotoMOS RELAYS



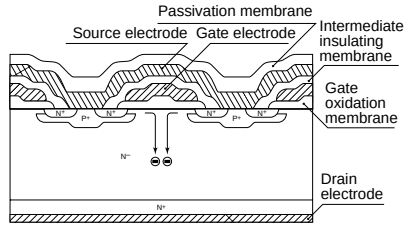
mm inch



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.

Cross section of the normally-closed type of power MOS



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

- Telepone 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	

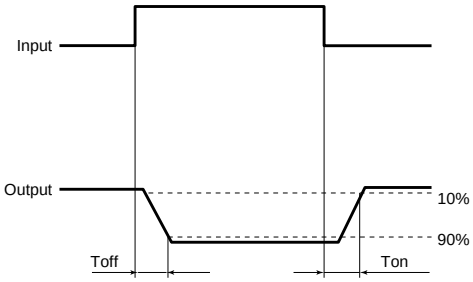
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

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

Note: Recommendable LED forward current I_F= 5 mA.

For type of connection, see Page 32.

*Operate/Reverse time



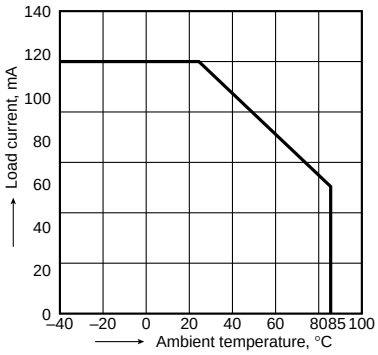
■ **For Dimensions, see Page 27.**
■ **For Schematic and Wiring Diagrams, see Page 32.**
■ **For Cautions for Use, see Page 36.**

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

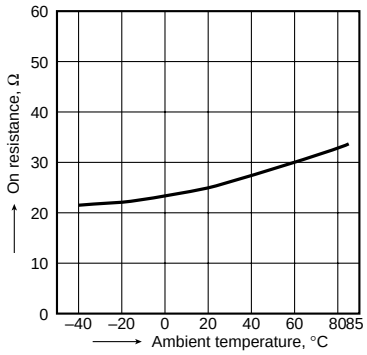
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F

Type of connection: A



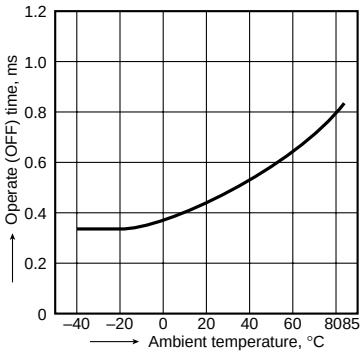
2. On resistance vs. ambient temperature characteristics

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



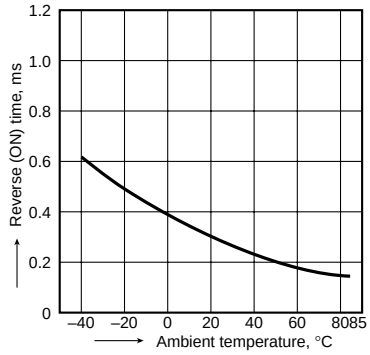
3. Operate (OFF) time vs. ambient temperature characteristics

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



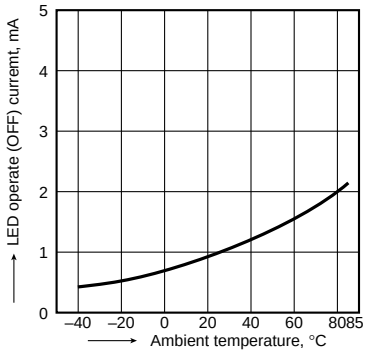
4. Reverse (ON) time vs. ambient temperature characteristics

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



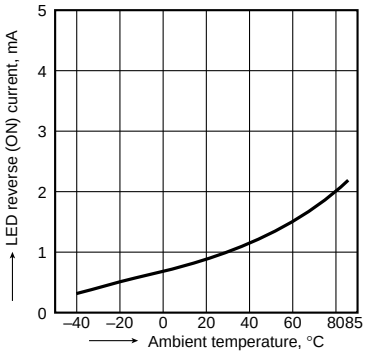
5. LED operate (OFF) current vs. ambient temperature characteristics

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



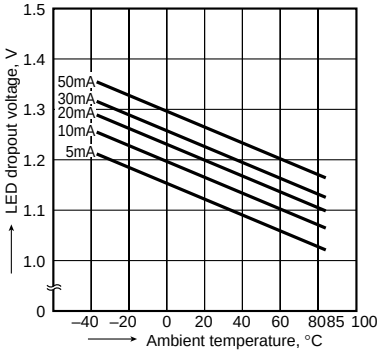
6. LED reverse (ON) current vs. ambient temperature characteristics

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



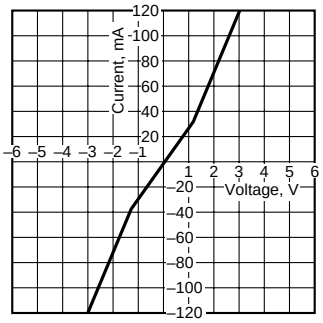
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



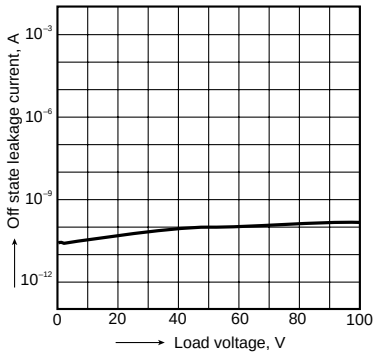
8. Voltage vs. current characteristics of output at MOS portion

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



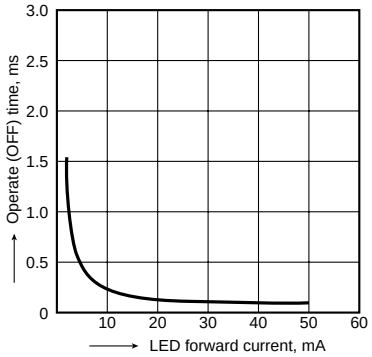
9. Off state leakage current

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



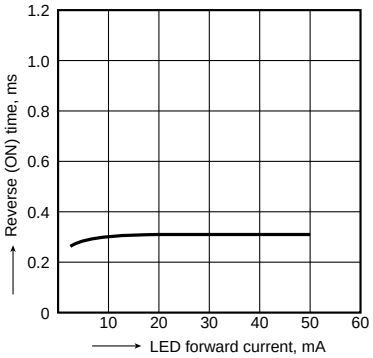
10. LED forward current vs. operate (OFF) time characteristics

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



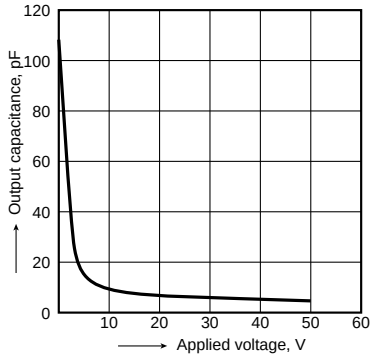
11. LED forward current vs. reverse (ON) time characteristics

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



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