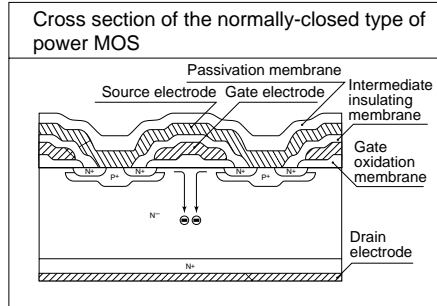
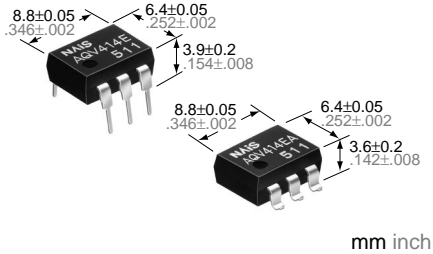


NAIS

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

PhotoMOS RELAYS



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 (AQV414E).

5. Reinforced insulation 5,000 V type also available.
 More than 0.4 mm internal insulation distance between inputs and outputs. Conforms to EN41003, EN60950 (reinforced insulation).

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 0.13 A load current with a 5 mA input current. Low ON resistance of 18 Ω (AQV410EH). Stable operation because there are no metallic contact parts.

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.

TYPICAL APPLICATIONS

- Security equipment
- 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
AC/DC type	1,500 V AC (Standard)			400 V		120 mA	AQV414E		
		5,000 V AC (Reinforced)	350 V		130 mA			AQV410EH	AQV410EHA
	400 V			120 mA		AQV414EH	AQV414EHA		

*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	AQV414E(A)	AQV410EH(A)	AQV414EH(A)	Remarks
Input	LED forward current	I _F	/	50 mA			f = 100 Hz, Duty factor = 0.1%
	LED reverse voltage	V _R		3 V			
	Peak forwrd current	I _{FP}		1 A			
	Power dissipation	P _{in}		75 mW			
Output	Load voltage (peak AC)	V _L	/	400 V	350 V	400 V	A connection: Peak AC, DC B,C connection: DC
	Continuous load current	I _L	A	0.12 A	0.13 A	0.12 A	
			B	0.13 A	0.15 A	0.13 A	
			C	0.15 A	0.17 A	0.15 A	
	Peak load current	I _{peak}	/	0.3 A	0.4 A	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	5,000 V AC	5,000 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			

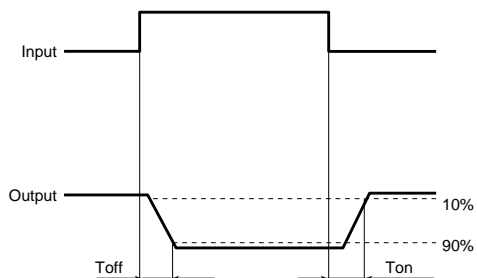
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item			Symbol	Type of connection	AQV414E(A)	AQV410EH(A)	AQV414EH(A)	Condition
Input	LED operate (OFF) current	Typical	I _{Off}	—	1.45 mA	1.9 mA	1.75 mA	I _L = Max.
		Maximum			3.0 mA			
	LED reverse (ON) current	Minimum	I _{Fon}	—	0.3 mA	0.4 mA	0.3 mA	I _L = Max.
		Typical			1.40 mA	1.8 mA	1.70 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	18 Ω	25.2 Ω	I _F = 0 mA I _L = Max. Within 1 s on time
		Maximum			50 Ω	35 Ω	50 Ω	
		Typical	R _{on}	B	20 Ω	13 Ω	19 Ω	I _F = 0 mA I _L = Max. Within 1 s on time
		Maximum			25 Ω	17.5 Ω	25 Ω	
	Typical	R _{on}	C	10 Ω	6.5 Ω	10 Ω	I _F = 0 mA I _L = Max. Within 1 s on time	
	Maximum			12.5 Ω	8.8 Ω	12.5 Ω		
Off state leakage current	Maximum	I _{Leak}	—	1 μA	10 μA	10 μA	I _F = 5 mA V _L = Max.	
Transfer characteristics	Switching speed	Operate (OFF) time*	T _{off}	—	0.7 ms	1.5 ms	1.3 ms	I _F = 0 mA → 5 mA
					Maximum	2.0 ms	3.0 ms	3.0 ms
		Reverse (ON) time*	T _{on}	—	0.1 ms	0.3 ms	0.3 ms	I _F = 5 mA → 0 mA
					Maximum	1.0 ms	1.5 ms	1.5 ms
	I/O capacitance	Typical	C _{iso}	—	0.8 pF	0.8 pF	0.8 pF	f = 1 MHz
Maximum		1.5 pF			V _B = 0			
Initial I/O isolation resistance	Minimum	R _{iso}	—	1,000 MΩ			500 V DC	

Note: Recommendable LED forward current
Standard type I_F = 5 mA
Reinforced type I_F = 5 to 10 mA

For type of connection, see Page 445.

*Operate/Reverse time



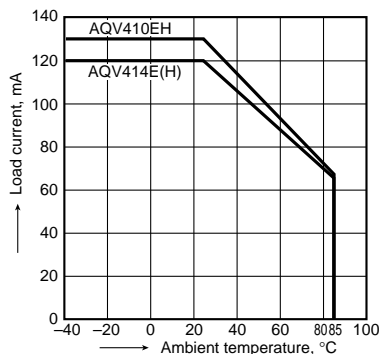
- For Dimensions, see Page 440.
- For Schematic and Wiring Diagrams, see Page 445.
- For Cautions for Use, see Page 449.

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

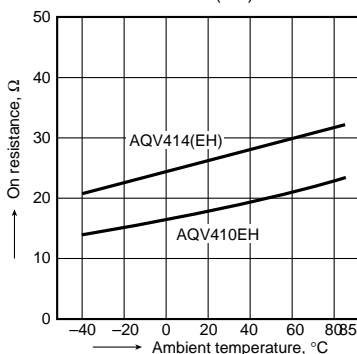
Allowable ambient temperature: -40°C to +85°C
-40°F to +185°F

Type of connection: A



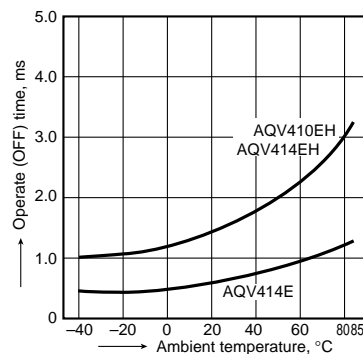
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;
LED current: 0 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



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

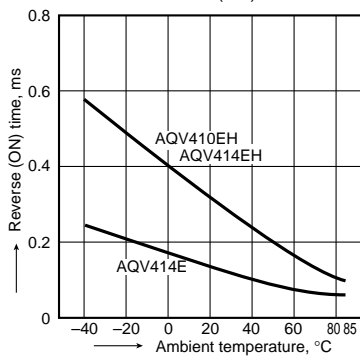
LED current: 5mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



AQV414E, AQV410EH

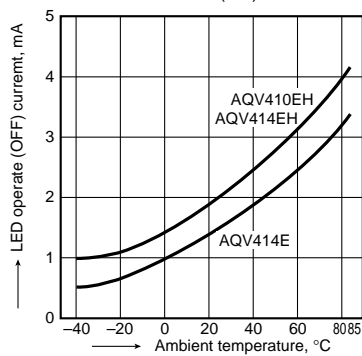
4. Reverse (ON) time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: Max. (DC); Continuous load current: Max. (DC)



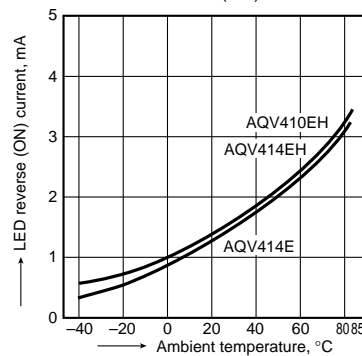
5. LED operate (OFF) current vs. ambient temperature characteristics

Load voltage: Max. (DC); Continuous load current: Max. (DC)



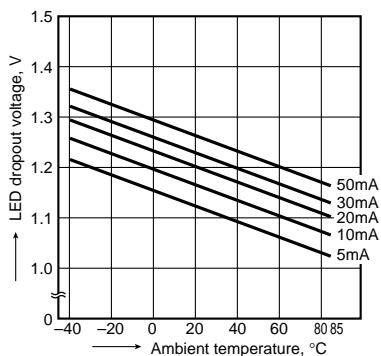
6. LED reverse (ON) current vs. ambient temperature characteristics

Load voltage: Max. (DC); Continuous load current: Max. (DC)



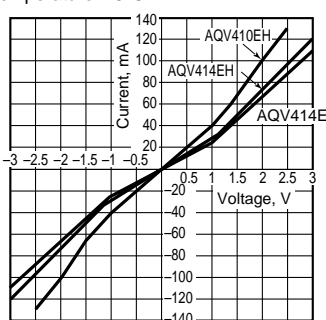
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



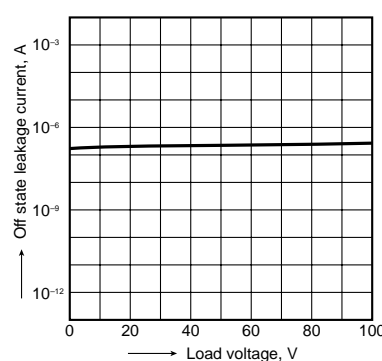
8. Voltage vs. current characteristics of output at MOS portion

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



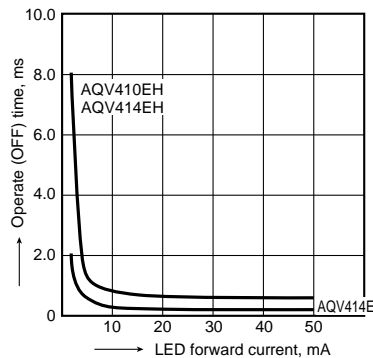
9. Off state leakage current

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



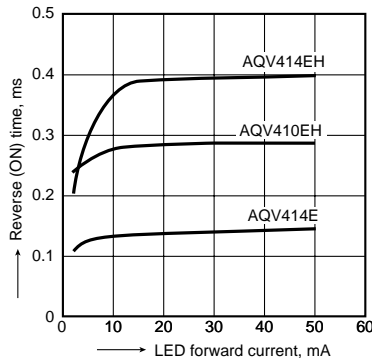
10. LED forward current vs. operate (OFF) time characteristics

Measured portion: between terminals 4 and 6; Load voltage: Max. (DC); Continuous load current: Max. (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: Max. (DC); Continuous load current: Max. (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

