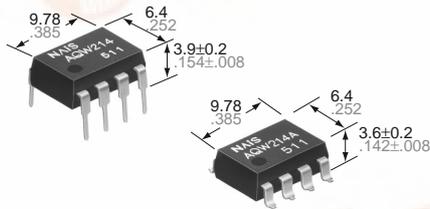




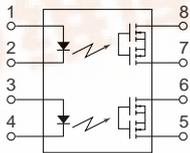
NAIS

GU (General Use) Type [2-Channel (Form A) Type]

PhotoMOS
RELAYS



mm inch



FEATURES

- Compact 8-pin DIP size**
The device comes in a compact (W) 6.4 × (L) 9.78 × (H) 3.9 mm (W) .252×(L) .385×(H) .154 inch, 8-pin DIP size (through hole terminal type).
- Applicable for 2 Form A use as well as two independent 1 Form A use**
- Controls low-level analog signals**
PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.
- High sensitivity, high speed response**
Can control a maximum 0.13 A load current with a 5 mA input current. Fast operation speed of 310 μs (typical). (AQW214)

- Low-level off state leakage current**
The SSR has an off state leakage current of several milliamperes whereas the PhotoMOS relays has only 100 pA even with the rated load voltage of 400 V (AQW214).
- Low-level thermal electromotive force (Approx. 1 μV)**
- Eliminates the need for a counter electromotive force protection diode in the drive circuits on the input side**
- Stable ON resistance.**
- Eliminates the need for a power supply to drive the power MOSFET**

TYPICAL APPLICATIONS

- High-speed inspection machines
- Telephones equipment
- Computer

TYPES

1. AC/DC type

Output rating*		Part No.				Packing quantity	
		Through hole terminal	Surface-mount terminal		Tube		
Load voltage	Load current	Tube packing style		Tape and reel packing style		1 tube contains 40 pcs. 1 batch contains 400 pcs.	1,000 pcs.
60V	350 mA	AQW212	AQW212A	AQW212AX	AQW212AZ		
100 V	300 mA	AQW215	AQW215A	AQW215AX	AQW215AZ		
200 V	160 mA	AQW217	AQW217A	AQW217AX	AQW217AZ		
350 V	120 mA	AQW210	AQW210A	AQW210AX	AQW210AZ		
400 V	100 mA	AQW214	AQW214A	AQW214AX	AQW214AZ		
600 V	40 mA	AQW216	AQW216A	AQW216AX	AQW216AZ		

*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. AC/DC type

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

Item	Symbol	AQW212(A)	AQW215(A)	AQW217(A)	AQW210(A)	AQW214(A)	AQW216(A)	Remarks	
Input	LED forward current	I _F	50 mA						
	LED reverse voltage	V _R	3 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	60 V	100 V	200 V	350 V	400 V	600 V	
	Continuous load current	I _L	0.35 A (0.40A)	0.30 A (0.35 A)	0.16 A (0.2 A)	0.12 A (0.14 A)	0.10 A (0.13 A)	0.04 A (0.05 A)	(): in case of using only 1 channel A connection: Peak AC, DC
	Peak load current	I _{peak}	1.0 A	0.9 A	0.48 A	0.36 A	0.3 A	0.12 A	A connection: 100 ms (1 shot), V _L = DC
	Power dissipation	P _{out}	800 mW						
Total power dissipation	P _T	850 mW							
I/O isolation voltage	V _{iso}	1,500 V AC						Between input and output/ between contact sets	
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						



AQW210

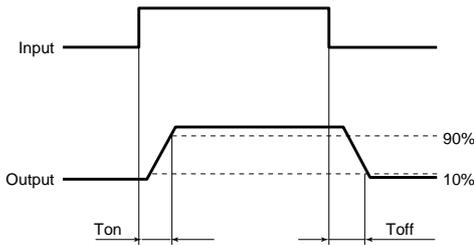
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item		Symbol	AQW212(A)	AQW215(A)	AQW217(A)	AQW210(A)	AQW214(A)	AQW216(A)	Condition
Input	LED operate current	Typical	0.9 mA						$I_L = \text{Max.}$
		Maximum	3 mA						
	LED turn off current	Minimum	0.4 mA						$I_L = \text{Max.}$
		Typical	0.8 mA						
LED dropout voltage	Typical	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	0.83 Ω	2.3 Ω	11 Ω	23 Ω	30 Ω	70 Ω	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 son time
		Maximum	2.5 Ω	4.0 Ω	15 Ω	35 Ω	50 Ω	120 Ω	
	Off state leakage current	Maximum	1 μA						$I_F = 0$ $V_L = \text{Max.}$
Transfer characteristics	Turn on time*	Typical	0.65 ms	0.60 ms	0.25 ms	0.25 ms	0.31 ms	0.28 ms	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$
		Maximum	2 ms	2 ms	1.0 ms	0.5 ms	0.5 ms	0.5 ms	
	Turn off time*	Typical	0.08 ms	0.06 ms	0.05 ms	0.05 ms	0.05 ms	0.04 ms	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$
		Maximum	0.2 ms						
	I/O capacitance	Typical	0.8 pF						$f = 1 \text{ MHz}$ $V_B = 0$
Maximum		1.5 pF							
Initial I/C 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.

*Turn on/Turn off time

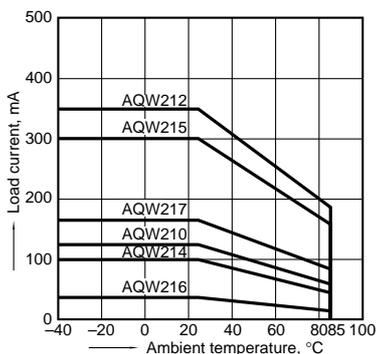


- For Dimensions, see Page 27.
- For Schematic and Wiring Diagrams, see Page 32.
- For Cautions for Use, see Page 36.

REFERENCE DATA

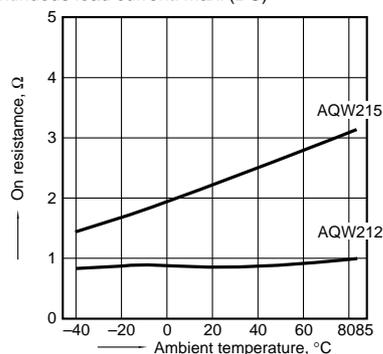
1. Load current vs. ambient temperature characteristics

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



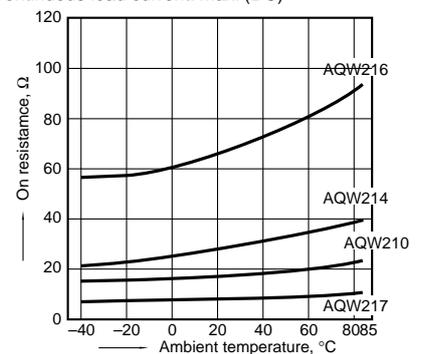
2.-(1) On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



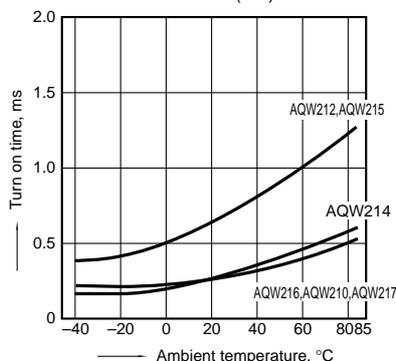
2.-(2) On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



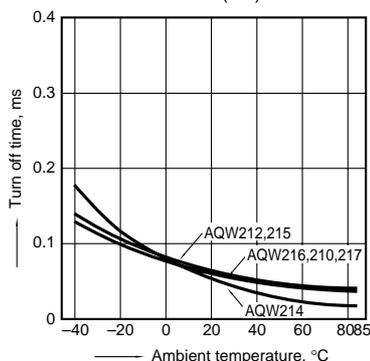
3. Turn on time vs. ambient temperature characteristics

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



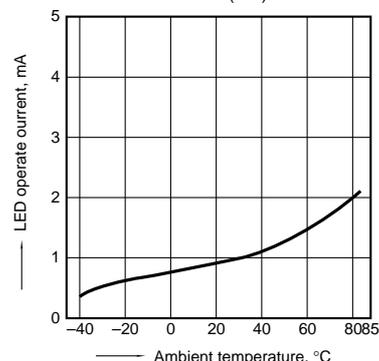
4. Turn off time vs. ambient temperature characteristics

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



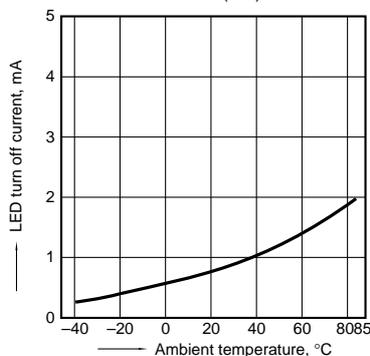
5. LED operate current vs. ambient temperature characteristics

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



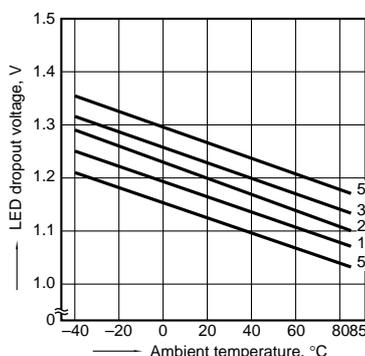
6. LED turn off current vs. ambient temperature characteristics

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



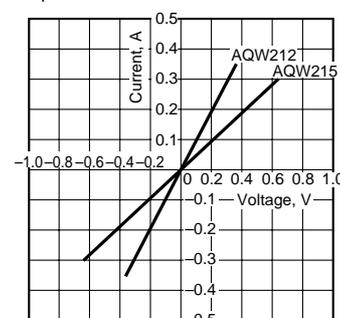
7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types;
LED current: 5 to 50 mA



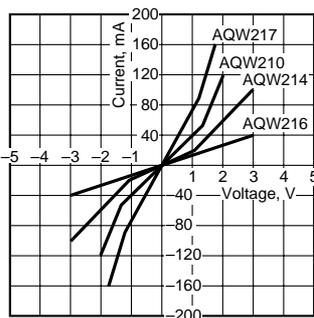
8.-(1) Voltage vs. current characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



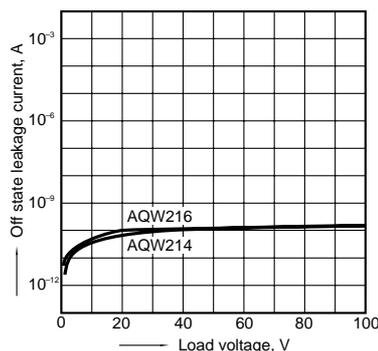
8.-(2) Voltage vs. current characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



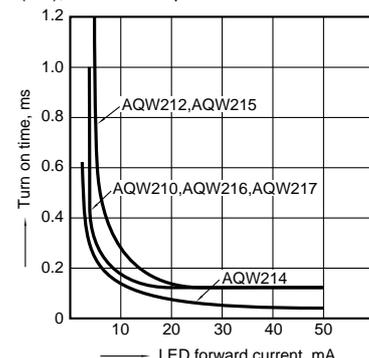
9. Off state leakage current

Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



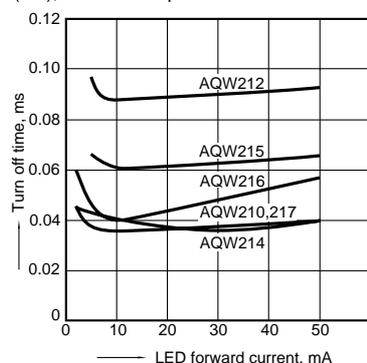
10. LED forward current vs. turn on time characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



11. LED forward current vs. turn off time characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
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 5 and 6, 7 and 8;
Frequency: 1 MHz;
Ambient temperature: 25°C 77°F

