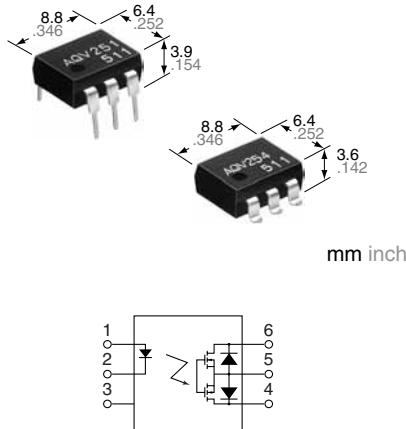


Panasonic

ideas for life

**High sensitivity and low on-resistance.
DIP (1 Form A) 6-pin type.**

**HE PhotoMOS
(AQV25○)**



FEATURES

1. Highly sensitive and low on-resistance
2. Controls various types of loads such as relays, motors, lamps and solenoids.
3. Optical coupling for extremely high isolation
5,000 Vrms I/O isolation available.
4. Low-level off state leakage current
5. Eliminates the need for a power supply to drive the power MOSFET
A power supply used to drive the power MOSFET is unnecessary because of the built-in optoelectronic device. This results in easy circuit design and small PC board area.
6. Low thermal electromotive force
(Approx. 1 μV)

TYPICAL APPLICATIONS

- High-speed inspection machines
- Telephone equipment
- Data communication equipment

RoHS Directive compatibility information
<http://www.mew.co.jp/ac/e/environment/>

TYPES

1. I/O isolation voltage: 1,500 V AC

Output rating*		Part No.				Packing quantity
Through hole terminal	Surface-mount terminal	Tape and reel packing style		Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side	
Load voltage	Load current	Tube packing style		Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side	
40 V	500 mA	AQV251	AQV251A	AQV251AX	AQV251AZ	
60 V	400 mA	AQV252	AQV252A	AQV252AX	AQV252AZ	
100 V	350 mA	AQV255	AQV255A	AQV255AX	AQV255AZ	
200 V	250 mA	AQV257	AQV257A	AQV257AX	AQV257AZ	
250 V	200 mA	AQV253	AQV253A	AQV253AX	AQV253AZ	
400 V	150 mA	AQV254	AQV254A	AQV254AX	AQV254AZ	
1,000 V	30 mA	AQV259	AQV259A	AQV259AX	AQV259AZ	
1,500 V	20 mA	AQV258	AQV258A	AQV258AX	AQV258AZ	

2. I/O isolation voltage: Reinforced 5,000 V

Output rating*		Part No.				Packing quantity
Through hole terminal	Surface-mount terminal	Tape and reel packing style		Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side	
Load voltage	Load current	Tube packing style		Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side	
250 V	200 mA	AQV253H	AQV253HA	AQV253HAX	AQV253HAZ	
400 V	150 mA	AQV254H	AQV254HA	AQV254HAX	AQV254HAZ	

*Indicate the peak AC and DC values.

Note: For space reasons, the SMD terminal shape indicator "A" and the package style indicator "X" or "Z" are not marked on the relay.

HE PhotoMOS (AQV25O)

RATING

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

Item		Symbol	Type of connection	AQV251(A)	AQV252(A)	AQV255(A)	AQV257(A)	AQV253(A)	AQV254(A)	AQV259(A)	AQV258(A)	AQV253H(A)	AQV254H(A)	Remarks
Input	LED forward current	I_F		50 mA										
	LED reverse voltage	V_R		5 V										
	Peak forward current	I_{FP}		1 A										$f = 100 \text{ Hz}$, Duty factor +0.1%
	Power dissipation	P_{in}		75 mW										
Output	Load voltage (peak AC)	V_L		40 V	60 V	100 V	200 V	250 V	400 V	1,000 V	1,500 V	250 V	400 V	
	Continuous load current	I_L		A	0.5 A	0.4 A	0.35 A	0.25 A	0.2 A	0.15 A	0.03 A	0.02 A	0.2 A	0.15 A
		B		0.7 A	0.6 A	0.45 A	0.35 A	0.3 A	0.18 A	0.04 A	0.025 A	0.3 A	0.18 A	A connection: Peak AC, DC B, C connection: DC
	Peak load current	I_{peak}		C	1.0 A	0.8 A	0.70 A	0.5 A	0.4 A	0.25 A	0.05 A	0.04 A	0.4 A	0.25 A
Power dissipation		P_{out}		360 mW										
Total power dissipation		P_T		410 mW										
I/O isolation voltage		V_{iso}		1,500 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	AQV251(A)	AQV252(A)	AQV255(A)	AQV257(A)	AQV253(A)	AQV254(A)	AQV259(A)	AQV258(A)	AQV253H(A)	AQV254H(A)	Condition				
Input	LED operate current	Typical	I_{Fon}	0.9 mA				1.4 mA				$I_L = \text{Max.}$						
	Maximum	—		3 mA														
Input	LED turn off current	Minimum	I_{loff}	0.4 mA								$I_L = \text{Max.}$						
	Typical	—		0.8 mA				1.3 mA										
Output	LED dropout voltage	Typical	V_F	1.25 V (1.14 V at $I_F = 5 \text{ mA}$)				1.5 V				$I_F = 50 \text{ mA}$						
	Maximum	—																
Output	On resistance	Typical	R_{on}	A	0.6 Ω	0.74 Ω	1.8 Ω	2.6 Ω	5.5 Ω	12.4 Ω	85 Ω	345 Ω	5.5 Ω	12.4 Ω				
		Maximum			1 Ω	1.4 Ω	2.5 Ω	4 Ω	8 Ω	16 Ω	200 Ω	500 Ω	8 Ω	16 Ω				
		Typical	R_{on}	B	0.3Ω	0.37 Ω	0.9 Ω	1.4 Ω	2.7 Ω	6.2 Ω	60 Ω	345 Ω	2.7 Ω	6.2 Ω				
		Maximum			0.5 Ω	0.7 Ω	1.25 Ω	2 Ω	4 Ω	8 Ω	100 Ω	500 Ω	4 Ω	8 Ω				
		Typical	R_{on}	C	0.15 Ω	0.18 Ω	0.45 Ω	0.7 Ω	1.4 Ω	3.1 Ω	30 Ω	160 Ω	1.4 Ω	3.1 Ω				
		Maximum			0.25 Ω	0.35 Ω	0.63 Ω	1 Ω	2 Ω	4 Ω	50 Ω	250 Ω	2 Ω	4 Ω				
	Off state leakage current	Maximum	—	—	1 μA				10 μA				1 μA					
Transfer characteristics	Switching speed	Turn on time*	T_{on}	—	1.7 ms	1.4 ms	0.9 ms	1.5 ms	0.8ms	0.8ms	0.6ms	0.35 ms	2.4ms	1.8ms				
		Maximum			3 ms		2 ms	3 ms	2 ms		1 ms		4 ms	3 ms				
	Turn off time*	Typical	T_{off}	—	0.07 ms		0.09 ms	0.1 ms	0.06 ms	0.05 ms	0.04 ms							
		Maximum			0.2 ms													
	I/O capacitance	Typical	C_{iso}	—	1.3 pF													
	Maximum	—			3 pF													
	Initial I/O isolation resistance	Minimum	R_{iso}	—	1,000 MΩ													

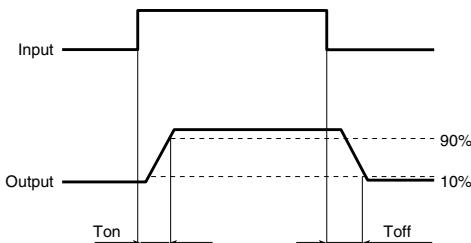
Note: Recommendable LED forward current

For type of connection.

Standard type: $I_F = 5 \text{ mA}$

Reinforced type: $I_F = 5 \text{ to } 10 \text{ mA}$

*Turn on/Turn off time



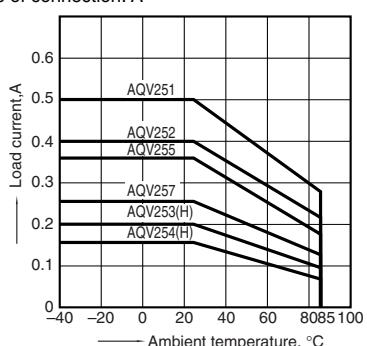
- For Dimensions.
- For Schematic and Wiring Diagrams.
- For Cautions for Use.

REFERENCE DATA

1.-(1) Load current vs. ambient temperature characteristics

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

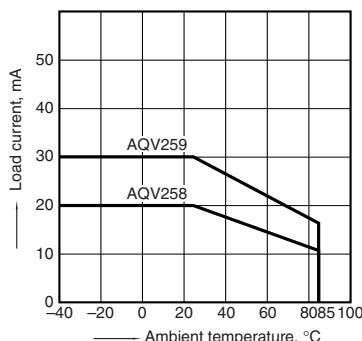
Type of connection: A



1.-(2) Load current vs. ambient temperature characteristics

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

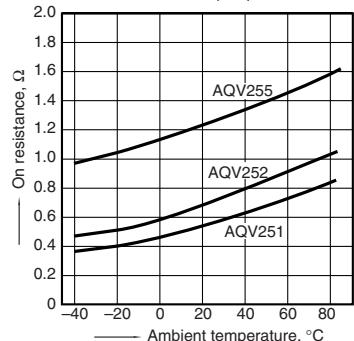
Type of connection: A



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

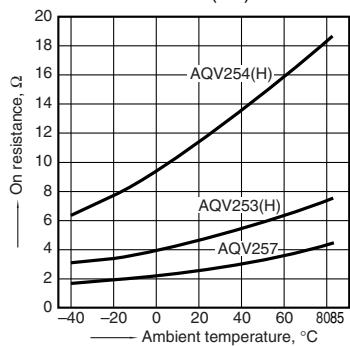
Measured portion: between terminals 4 and 6;
LED current: 5 mA;

Continuous load current: Max. (DC)



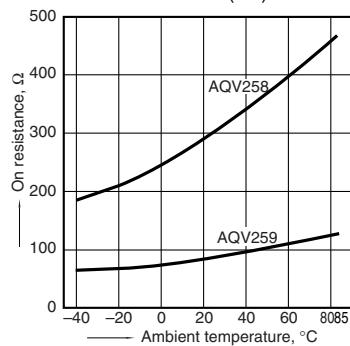
2.-(2) On resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: Max. (DC)



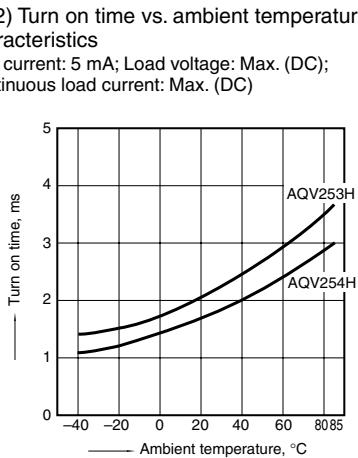
2.-(3) On resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: 30 mA (DC)



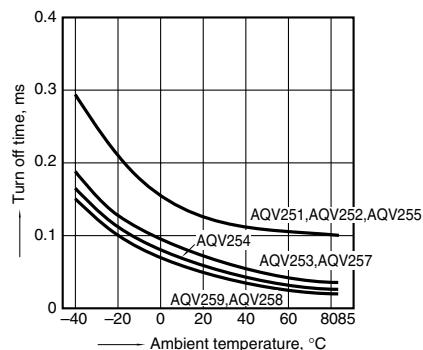
3.-(1) Turn on time vs. ambient temperature characteristics

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



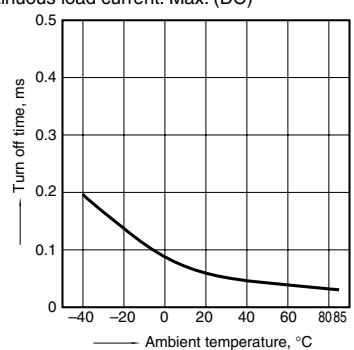
4.-(1) Turn off time vs. ambient temperature characteristics

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



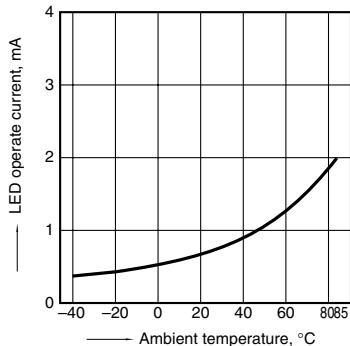
4.-(2) Turn off time vs. ambient temperature characteristics

Sample: AQV253H, AQV254H
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



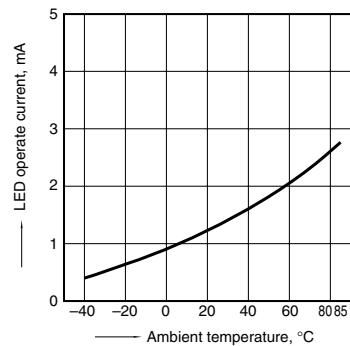
5.-(1) LED operate current vs. ambient temperature characteristics

Sample: AQV251, AQV252, AQV253, AQV254, AQV259; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



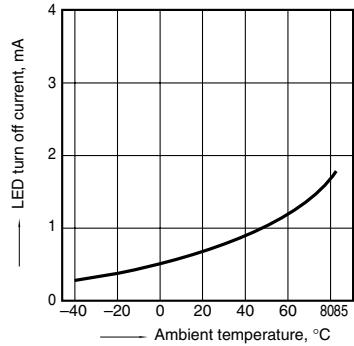
5.-(2) LED operate current vs. ambient temperature characteristics

Sample: AQV253H, AQV254H; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



6.-(1) LED turn off current vs. ambient temperature characteristics

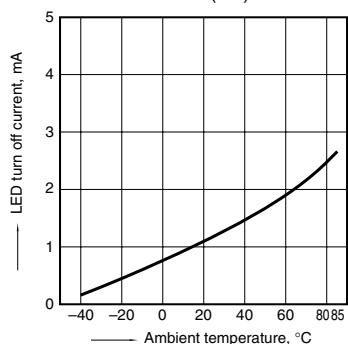
Sample: AQV251, AQV252, AQV253, AQV254, AQV259; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



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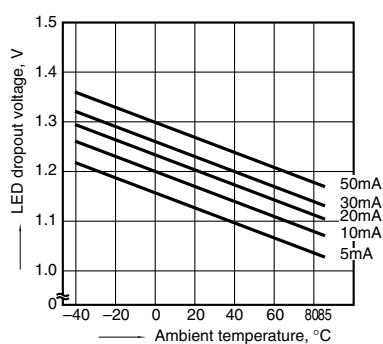
6.-{(2)} LED turn off current vs. ambient temperature characteristics

Sample: AQV251, AQV252, AQV253, AQV254, AQV259; Load voltage: Max. (DC); Continuous load current: Max. (DC)



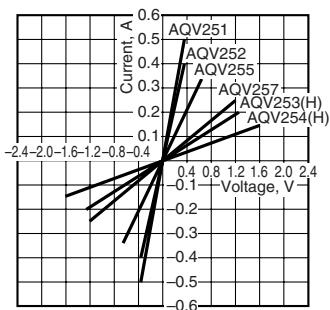
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



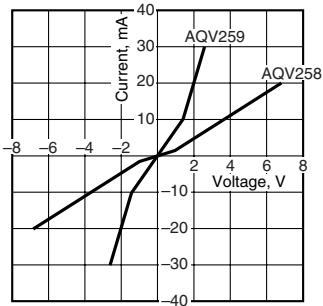
8.-{(1)} Current vs. voltage characteristics of output at MOS portion

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



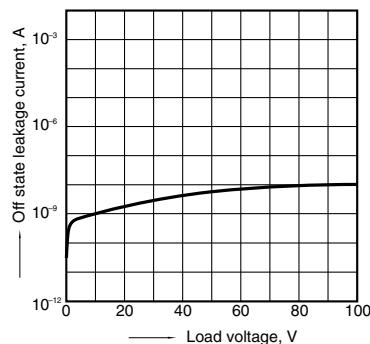
8.-{(2)} Current vs. voltage characteristics of output at MOS portion

Sample: AQV259; Measured portion: between terminals 4 and 6; Ambient temperature: 25°C 77°F



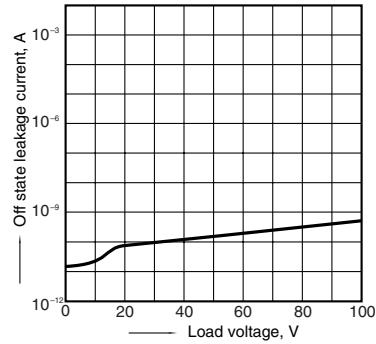
9.-{(1)} Off state leakage current vs. load voltage characteristics

Sample: AQV259; Measured portion: between terminals 4 and 6; Ambient temperature: 25°C 77°F



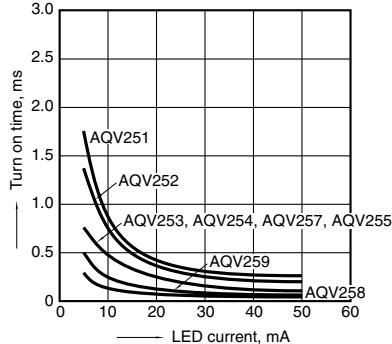
9.-{(2)} Off state leakage current vs. load voltage characteristics

Sample: AQV254H; Measured portion: between terminals 4 and 6; Ambient temperature: 25°C 77°F



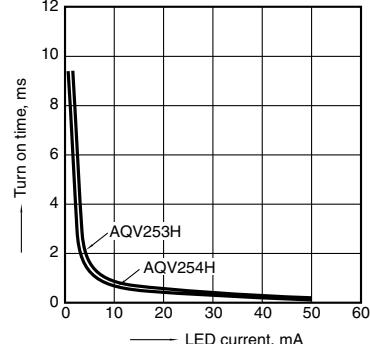
10.-{(1)} Turn on time vs. LED forward current characteristics

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



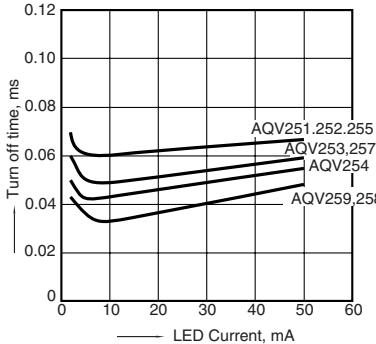
10.-{(2)} Turn on time vs. LED forward current characteristics

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



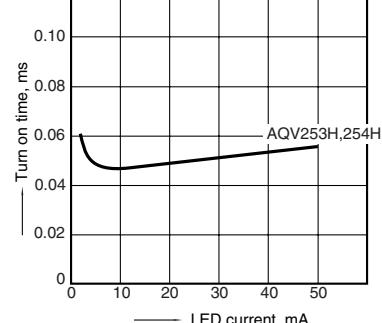
11.-{(1)} Turn off time vs. LED forward current characteristics

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



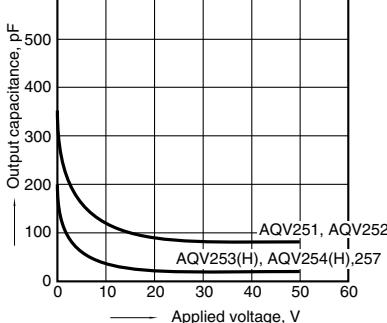
11.-{(2)} Turn off time vs. LED forward current characteristics

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



12.-{(1)} Output capacitance vs. applied voltage characteristics

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



12.-{(2)} Output capacitance vs. applied voltage characteristics

Sample: AQV259; Measured portion: between terminals 4 and 6; Frequency: 1 MHz; Ambient temperature: 25°C 77°F

