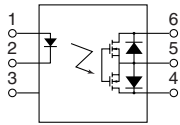
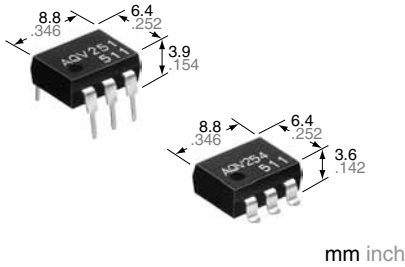


**High sensitivity and low on-resistance.  
DIP (1 Form A) 6-pin type.**

**HE PhotoMOS  
(AQV250)**



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

## FEATURES

- Highly sensitive and low on-resistance**
- Controls various types of loads such as relays, motors, lamps and solenoids.**
- Optical coupling for extremely high isolation**  
5,000 Vrms I/O isolation available.
- Low-level off state leakage current**
- 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.
- Low thermal electromotive force (Approx. 1 μV)**

## TYPICAL APPLICATIONS

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

## 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		
Load voltage	Load current		Tube packing style		Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side	Tube
40 V	500 mA	AQV251	AQV251A	AQV251AX	AQV251AZ	1 tube contains 50 pcs. 1 batch contains 500 pcs.	1,000 pcs.
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		
Load voltage	Load current		Tube packing style		Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side	Tube
250 V	200 mA	AQV253H	AQV253HA	AQV253HAX	AQV253HAZ	1 tube contains 50 pcs. 1 batch contains 500 pcs.	1,000 pcs.
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 (AQV25○)

## RATING

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

Item	Sym- bol	Type of con- nection	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 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	A connection: Peak AC, DC B, C connection: DC
			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	
			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	
Peak load current	$I_{peak}$	1.8 A										A connection: 100 ms (1 shot) $V_L = DC$		
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	Sym- bol	Type of con- nection	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	0.9 mA									1.4 mA	$I_L = \text{Max.}$
		Maximum	3 mA										
	LED turn off current	Minimum	0.4 mA										$I_L = \text{Max.}$
		Typical	0.8 mA									1.3 mA	
LED dropout voltage	Typical	1.25 V (1.14 V at $I_F = 5 \text{ mA}$ )										$I_F = 50 \text{ mA}$	
	Maximum	1.5 V											
Output	On resistance	Typical	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	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time
		Maximum	1 Ω	1.4 Ω	2.5 Ω	4 Ω	8 Ω	16 Ω	200 Ω	500 Ω	8 Ω	16 Ω	
	On resistance	Typical	0.3 Ω	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	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time
		Maximum	0.5 Ω	0.7 Ω	1.25 Ω	2 Ω	4 Ω	8 Ω	100 Ω	500 Ω	4 Ω	8 Ω	
	On resistance	Typical	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	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time
		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	$I_F = 0 \text{ mA}$ $V_L = \text{Max.}$
Transfer characteristics	Switching speed	Turn on time*	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	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$
		Maximum	3 ms		2 ms	3 ms	2 ms		1 ms		4 ms	3 ms	
	Turn off time*	Typical	0.07 ms		0.09 ms	0.1 ms	0.06 ms	0.05 ms	0.04 ms		0.06 ms	0.05 ms	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$
		Maximum	0.2 ms										
I/O capacitance	Typical	1.3 pF										f = 1 MHz $V_B = 0 \text{ V}$	
	Maximum	3 pF											
Initial I/O isolation resistance	Minimum	1,000 MΩ										500 V DC	

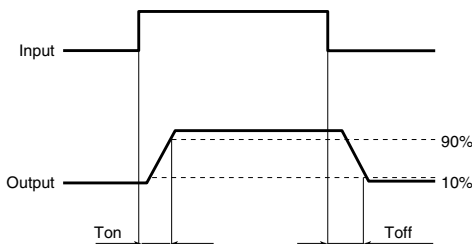
Note: Recommendable LED forward current

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

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

\*Turn on/Turn off time

For type of connection.



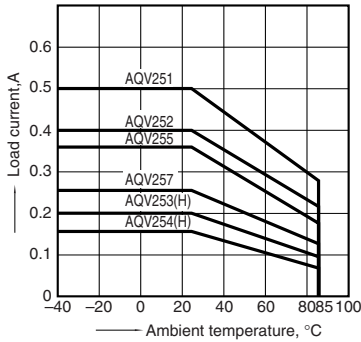
- For Dimensions.
- For Schematic and Wiring Diagrams.
- For Cautions for Use.

## REFERENCE DATA

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

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

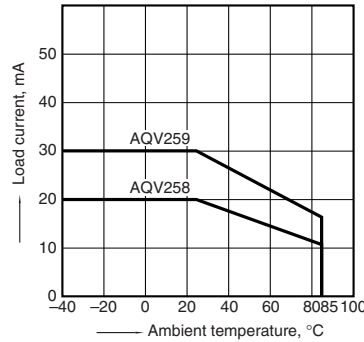
Type of connection: A



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

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

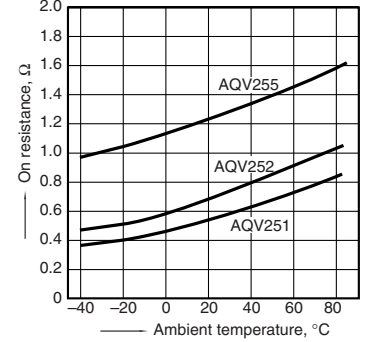
Type of connection: A



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

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

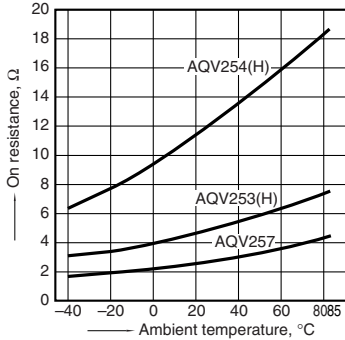
Continuous load current: Max. (DC)



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

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

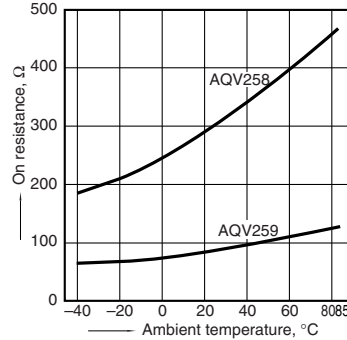
Continuous load current: Max. (DC)



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

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

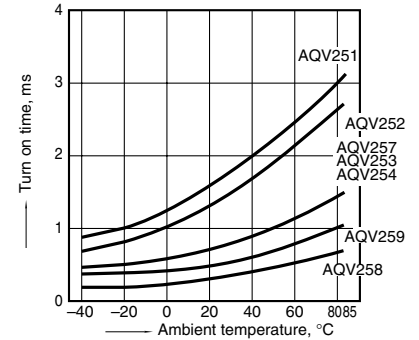
Continuous load current: 30 mA (DC)



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

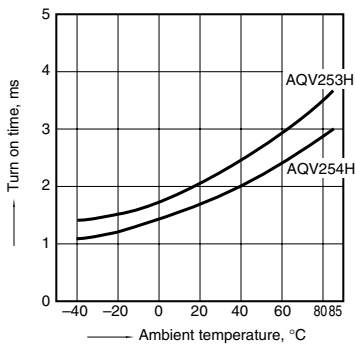
LED current: 5 mA;  
 Load voltage: Max. (DC);

Continuous load current: Max. (DC)



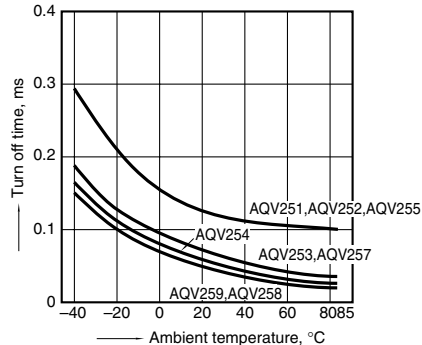
3.-(2) Turn on time vs. ambient temperature characteristics

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



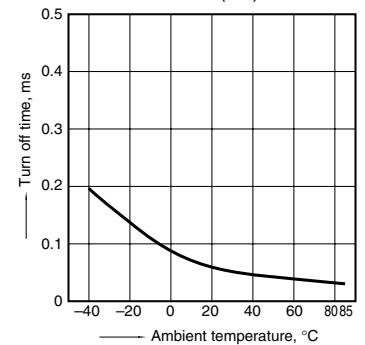
4.-(1) Turn off time vs. ambient temperature characteristics

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



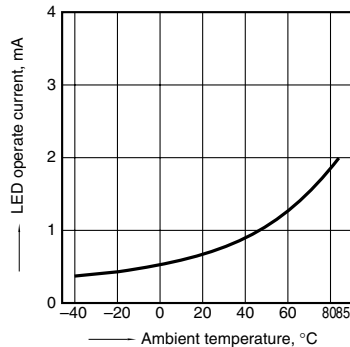
4.-(2) Turn off time vs. ambient temperature characteristics

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



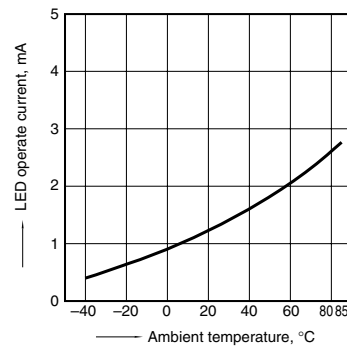
5.-(1) LED operate current vs. ambient temperature characteristics

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



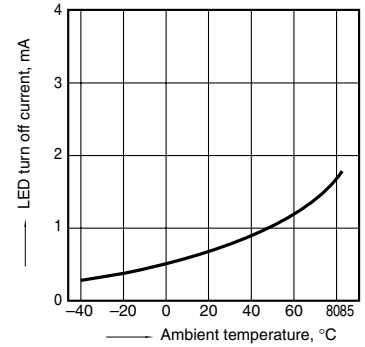
5.-(2) LED operate current vs. ambient temperature characteristics

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



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

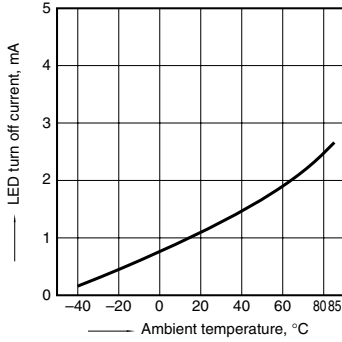
Sample: AQV251, AQV252, AQV253, AQV254, AQV259;  
 Load voltage: Max. (DC);  
 Continuous load current: Max. (DC)



# HE PhotoMOS (AQV25○)

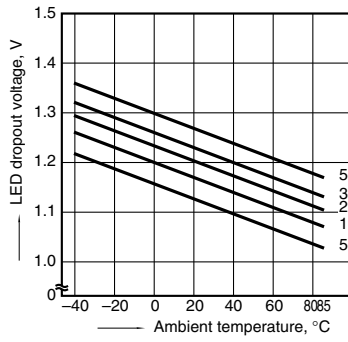
## 6.-(2) LED turn off current vs. ambient temperature characteristics

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



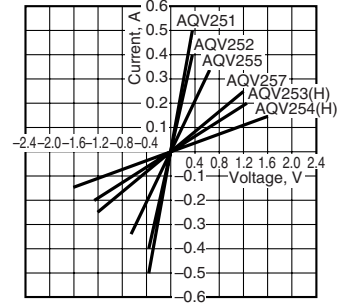
## 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



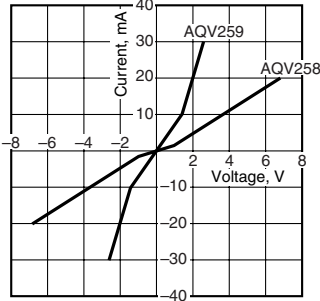
## 8.-(1) Current vs. voltage characteristics of output at MOS portion

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



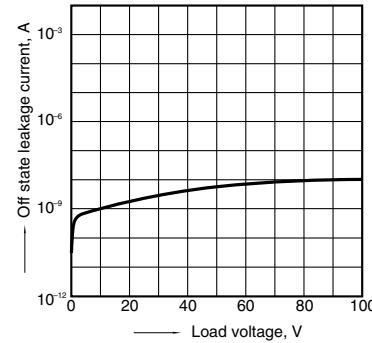
## 8.-(2) Current vs. voltage characteristics of output at MOS portion

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



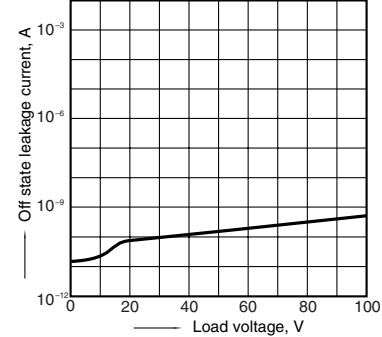
## 9.-(1). Off state leakage current vs. load voltage characteristics

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



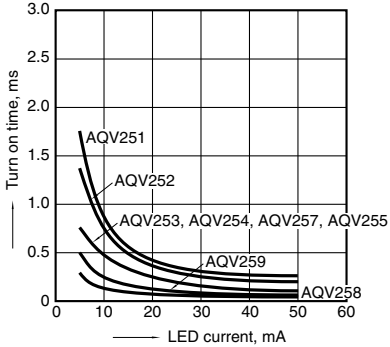
## 9.-(2). Off state leakage current vs. load voltage characteristics

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



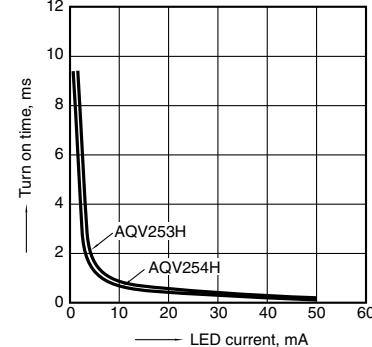
## 10.-(1). Turn on time vs. LED forward current characteristics

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



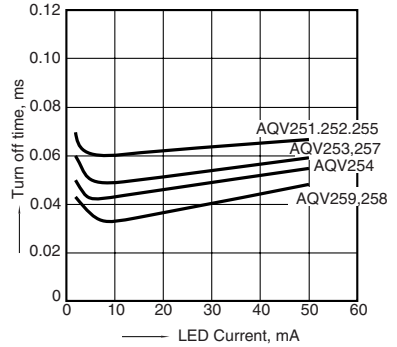
## 10.-(2). Turn on time vs. LED forward current characteristics

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



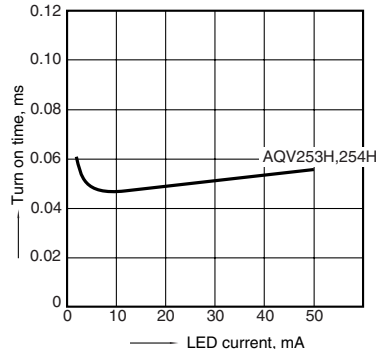
## 11.-(1). Turn off time vs. LED forward current characteristics

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



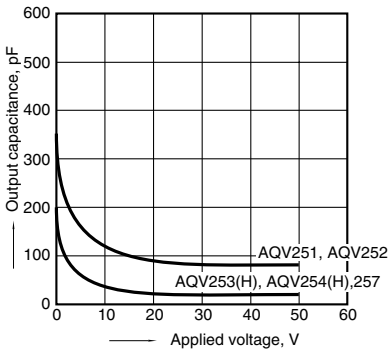
## 11.-(2). Turn off time vs. LED forward current characteristics

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

