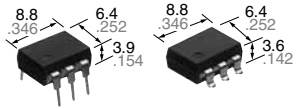




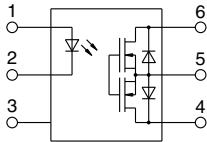
**Normally closed type  
with reinforced insulation**

**PhotoMOS®  
GE 1 Form B  
(AQV410EH)**



(Height includes standoff)

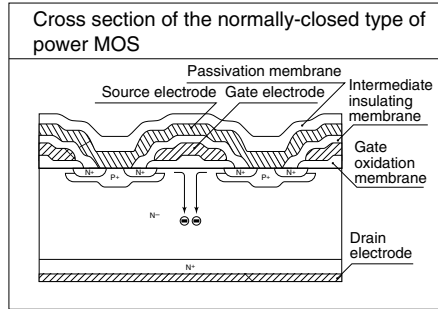
mm inch



**RoHS compliant**

### FEATURES

1. 1 Form B output type
2. 60V type couples high capacity (0.55A) with low on-resistance (Typ. 1Ω).
3. Low on-resistance  
This has been realized thanks to the built-in MOSFET processed by our proprietary method, DSD (Double-diffused and Selective Doping) method.



4. Controls low-level analog signals  
PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

5. High sensitivity and low on-resistance

Can control max. 0.55 A load current with 5 mA input current.  
Low on-resistance of Typ. 1Ω (AQV412EH).

6. Low-level off-state leakage current

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

### TYPICAL APPLICATIONS

- Power supply
- Measuring equipment
- Security equipment
- Telephone equipment
- Sensing equipment

### TYPES

	I/O isolation voltage	Output rating*		Package	Part No.				Packing quantity	
					Through hole terminal	Surface-mount terminal		Tube packing style		
		Tape and reel packing style				Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side		Tube	Tape and reel
		Load voltage	Load current							
AC/DC dual use	5,000 Vrms (Reinforced)	60 V	550 mA	DIP6-pin	AQV412EH	AQV412EHA	AQV412EHAX	AQV412EHAZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.
		350 V	130 mA		AQV410EH	AQV410EHA	AQV410EHAX	AQV410EHAZ		
		400 V	120 mA		AQV414EH	AQV414EHA	AQV414EHAX	AQV414EHAZ		

\*Indicate the peak AC and DC values.

Note: The surface mount terminal shape indicator "A" and the packing style indicator "X" or "Z" are not marked on the device.

**RATING**

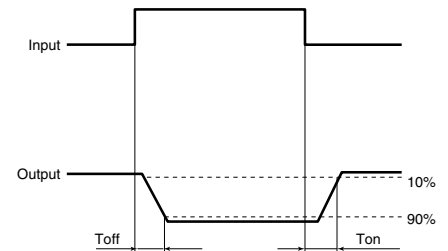
**1. Absolute maximum ratings** (Ambient temperature: 25°C 77°F)

Item	Symbol	Type of connection	AQV412EH(A)	AQV410EH(A)	AQV414EH(A)	Remarks	
Input	LED forward current	$I_F$	50 mA			f = 100 Hz, Duty factor = 0.1%	
	LED reverse voltage	$V_R$	5 V				
	Peak forward current	$I_{FP}$	1 A				
	Power dissipation	$P_{in}$	75 mW				
Load voltage (peak AC)	$V_L$		60 V	350 V	400 V		
Output	Continuous load current	$I_L$	A	0.55 A	0.13 A	0.12 A	A connection: Peak AC, DC B,C connection: DC
			B	0.65 A	0.15 A	0.13 A	
			C	0.8 A	0.17 A	0.15 A	
	Peak load current	$I_{peak}$		1.5 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	$V_{iso}$		5,000 Vrms				
Ambient temperature	Operating	$T_{opr}$	-40 to +85°C -40 to +185°F			(Non-icing at low temperatures)	
	Storage	$T_{stg}$	-40 to +100°C -40 to +212°F				

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

Item	Symbol	Type of connection	AQV412EH(A)	AQV410EH(A)	AQV414EH(A)	Condition		
Input	LED operate (OFF) current	Typical	1.9 mA			$I_L = Max.$		
		Maximum	3.0 mA					
	LED reverse (ON) current	Minimum	0.4 mA			$I_L = Max.$		
		Typical	1.8 mA					
LED dropout voltage	Typical	$V_F$	1.25 V (1.14 V at $I_F = 5 mA$ )			$I_F = 50 mA$		
	Maximum		1.5 V					
Output	On resistance	Typical	$R_{on}$	A	1 Ω	18 Ω	25.2 Ω	$I_F = 0 mA$ $I_L = Max.$ Within 1 s
					Maximum	2.5 Ω	35 Ω	
		Typical	$R_{on}$	B	0.55 Ω	13 Ω	19 Ω	
					Maximum	1.3 Ω	17.5 Ω	
	Typical	$R_{on}$	C	0.3 Ω	6.5 Ω	10 Ω	$I_F = 0 mA$ $I_L = Max.$ Within 1 s	
				Maximum	0.7 Ω	8.8 Ω		12.5 Ω
Off state leakage current	Maximum	$I_{Leak}$	10 μA			$I_F = 5 mA$ $V_L = Max.$		
Transfer characteristics	Operate (OFF) time*	Typical	$T_{off}$	—	3 ms	1.5 ms	1.3 ms	$I_F = 0 mA \rightarrow 5 mA$ $I_L = Max.$
		Maximum			8 ms	3.0 ms		
	Reverse (ON) time*	Typical	$T_{on}$	—	0.3 ms			$I_F = 5 mA \rightarrow 0 mA$ $I_L = Max.$
		Maximum			1.5 ms			
I/O capacitance	Typical	$C_{iso}$	—	0.8 pF			f = 1 MHz $V_B = 0 V$	
	Maximum			1.5 pF				
Initial I/O isolation resistance	Minimum	$R_{iso}$	1,000 MΩ			500 V DC		

\*Operate/Reverse time



**3. Recommended operating conditions** (Ambient temperature: 25°C 77°F)

Please use under recommended operating conditions to obtain expected characteristics.

Item	Symbol	Min.	Max.	Unit
LED current	$I_F$	5	30	mA
AQV412EH(A) Load voltage (Peak AC)	$V_L$	—	48	V
AQV412EH(A) Continuous load current (A connection)	$I_L$	—	0.55	A
AQV410EH(A) Load voltage (Peak AC)	$V_L$	—	280	V
AQV410EH(A) Continuous load current (A connection)	$I_L$	—	0.13	A
AQV414EH(A) Load voltage (Peak AC)	$V_L$	—	320	V
AQV414EH(A) Continuous load current (A connection)	$I_L$	—	0.12	A

■ These products are not designed for automotive use.

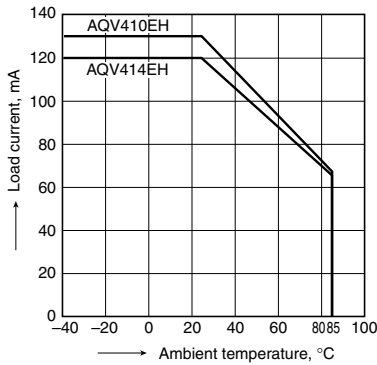
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

## REFERENCE DATA

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

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

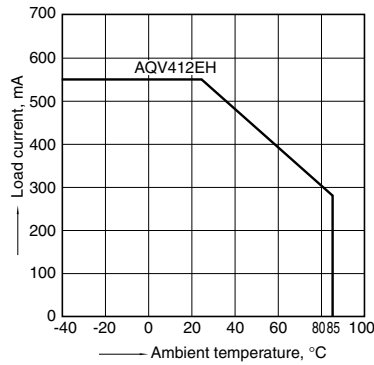
Type of connection: A



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

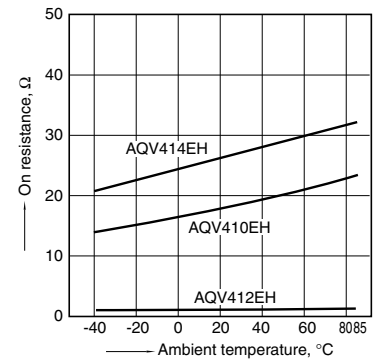
Allowable ambient temperature: -40 to +85°C  
-40 to +185°F

Type of connection: A



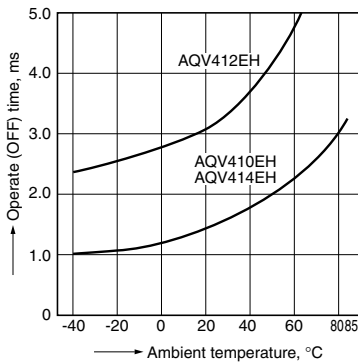
### 2. On resistance vs. ambient temperature characteristics

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



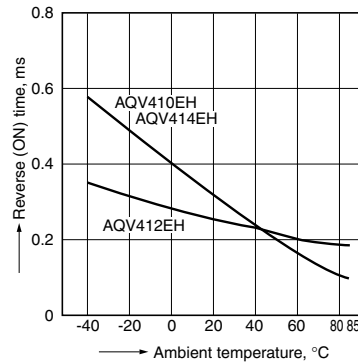
### 3. Operate (OFF) time vs. ambient temperature characteristics

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



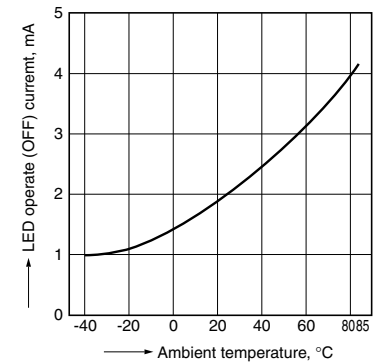
### 4. Reverse (ON) time vs. ambient temperature characteristics

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



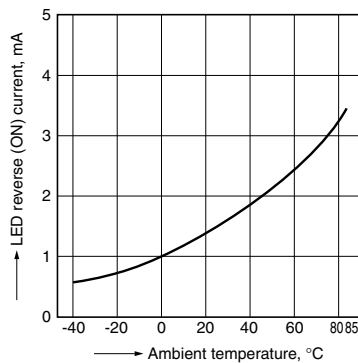
### 5. LED operate (OFF) current vs. ambient temperature characteristics

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



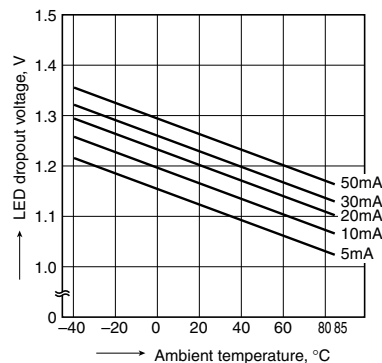
### 6. LED reverse (ON) current vs. ambient temperature characteristics

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



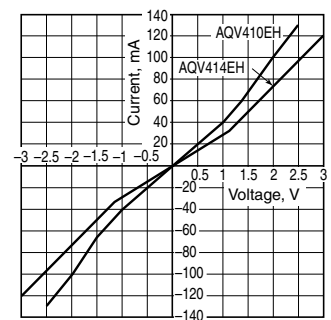
### 7. LED dropout voltage vs. ambient temperature characteristics

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



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

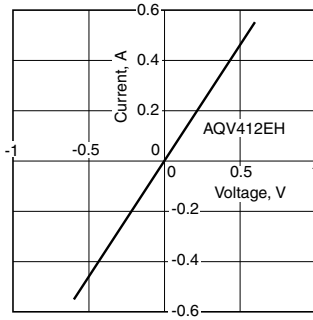
Measured portion: between terminals 4 and 6;  
Ambient temperature: 25°C 77°F



# GE 1 Form B (AQV410EH)

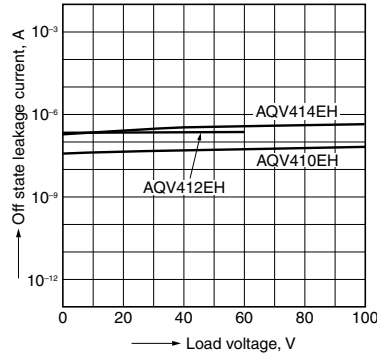
## 8-(2). Current vs. voltage characteristics of output at MOS portion

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



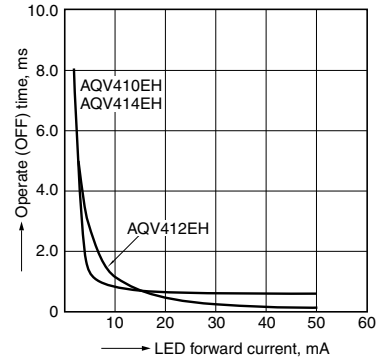
## 9. Off state leakage current vs. load voltage characteristics

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



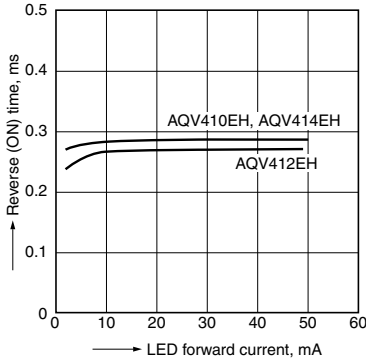
## 10. Operate (OFF) time vs. LED forward current characteristics

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



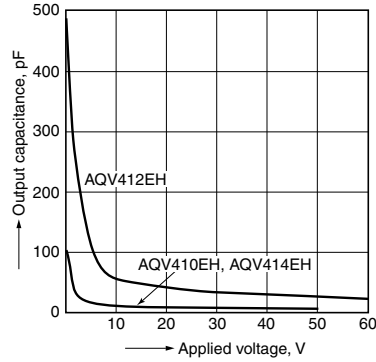
## 11. Reverse (ON) time vs. LED forward current characteristics

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



## 12. Output capacitance vs. applied voltage characteristics

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



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Please contact .....

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