

**Normally closed (2 Form A)  
DIP6-pin type  
Low on-resistance with  
400V load voltage**

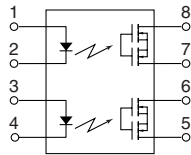
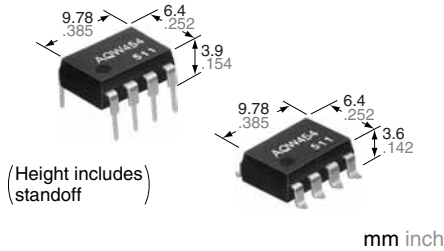
**PhotoMOS<sup>®</sup>  
HE 2 Form B  
(AQW454)**

## FEATURES

- 2 Form B (Normally-closed) type**  
Has been realized thanks to the built-in MOSFET processed by our proprietary method, DSD (Double-diffused and Selective Doping) method.
- Applicable for 2 Form B use as well as two independent 1 Form B use.**
- Controls low-level analog signals**  
PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.
- High sensitivity and low on-resistance**  
Can control max. 0.16 A load current with 5 mA input current. Low on-resistance of typ. 11 Ω.
- Low-level off state leakage current of max. 1 μA**

## TYPICAL APPLICATIONS

- Security equipment
- High-speed inspection machine
- Measuring instruments
- Telecommunication equipment
- Sensing equipment



**RoHS compliant**

## TYPES

	Output rating*		Package	Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal			Tube	Tape and reel
	Load voltage	Load current			Tube packing style	Tape and reel packing style			
AC/DC dual use	400 V	120 mA	DIP8-pin	AQW454	AQW454A	AQW454AX	AQW454AZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs

\*Indicate the peak AC and DC values.

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

## RATING

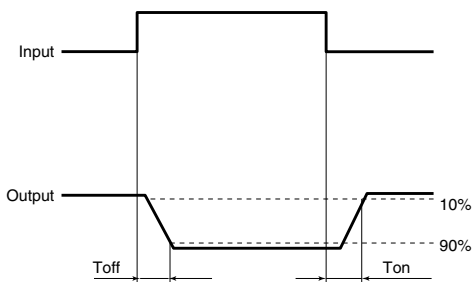
### 1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

	Item	Symbol	AQW454(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)	$V_L$	400 V	
	Continuous load current	$I_L$	0.12 A (0.16 A)	A connection: Peak AC, DC ( ): for one 1b-circuit
	Peak load current	$I_{peak}$	0.36 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	

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

Item		Symbol	AQW454(A)	Condition
Input	LED operate (OFF) current	Typical	0.9 mA	$I_L = \text{Max.}$
		Maximum	3 mA	
	LED reverse (ON) current	Minimum	0.4 mA	$I_L = \text{Max.}$
		Typical	0.8 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	11 $\Omega$	$I_F = 0 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time
		Maximum	16 $\Omega$	
	Off state leakage current	Maximum	1 $\mu\text{A}$	$I_F = 5 \text{ mA}$ $V_L = \text{Max.}$
Transfer characteristics	Operate (OFF) time*	Typical	1.2 ms	$I_F = 0 \text{ mA} \rightarrow 5 \text{ mA}$ $I_L = \text{Max.}$
		Maximum	2 ms	
	Reverse (ON) time*	Typical	0.36 ms	$I_F = 5 \text{ mA} \rightarrow 0 \text{ mA}$ $I_L = \text{Max.}$
		Maximum	1 ms	
	I/O capacitance	Typical	0.8 pF	$f = 1 \text{ MHz}$ $V_B = 0 \text{ V}$
		Maximum	1.5 pF	
Initial I/O isolation resistance	Minimum	$R_{iso}$	1,000 M $\Omega$	500 V DC

\*Operate/Reverse time



## RECOMMENDED OPERATING CONDITIONS

Please obey the following conditions to ensure proper device operation and resetting.

Item	Symbol	Recommended value	Unit
Input LED current	$I_F$	5	mA

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

■ These products are not designed for automotive use.

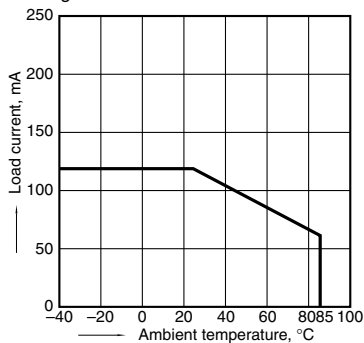
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.  
For more information.

## REFERENCE DATA

1. Load current vs. ambient temperature characteristics

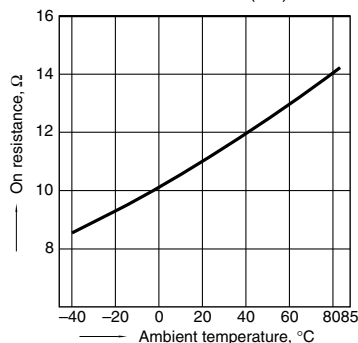
Allowable ambient temperature:  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$   
 $-40^\circ\text{F}$  to  $+185^\circ\text{F}$

When using 2 channels



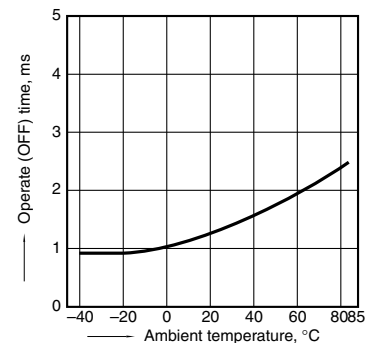
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8; LED current: 0 mA; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC)



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

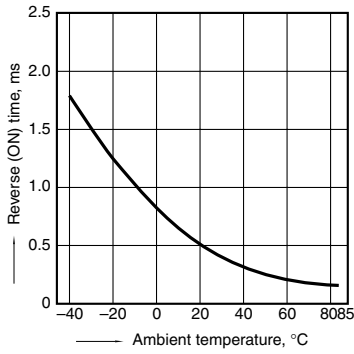
LED current: 5 mA; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC)



# HE 2 Form B (AQW454)

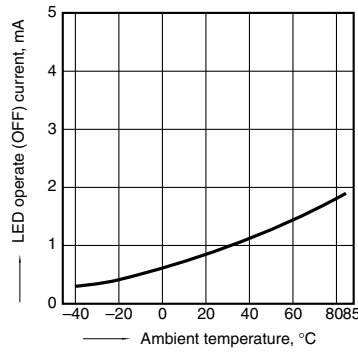
## 4. Reverse (ON) time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 400 V (DC);  
Continuous load current: 120 mA (DC)



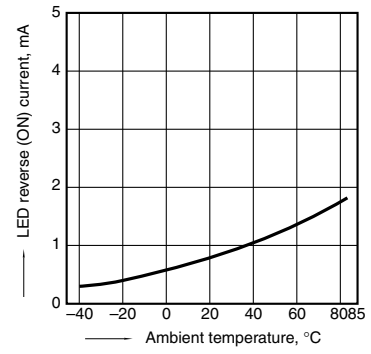
## 5. LED operate (OFF) current vs. ambient temperature characteristics

Load voltage: 400 V (DC);  
Continuous load current: 120 mA (DC)



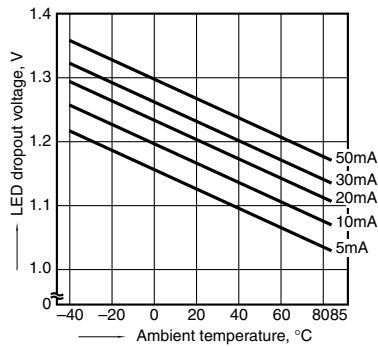
## 6. LED reverse (ON) current vs. ambient temperature characteristics

Load voltage: 400 V (DC);  
Continuous load current: 120 mA (DC)



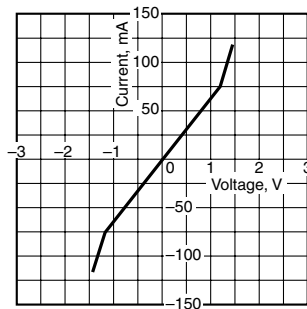
## 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



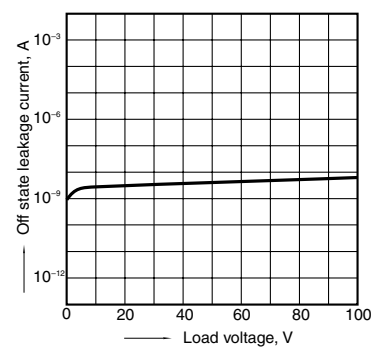
## 8. Current vs. voltage characteristics of output at MOS portion

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



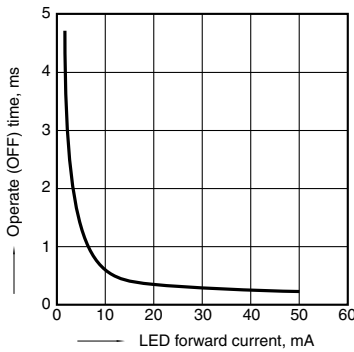
## 9. Off state leakage current vs. load voltage characteristics

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



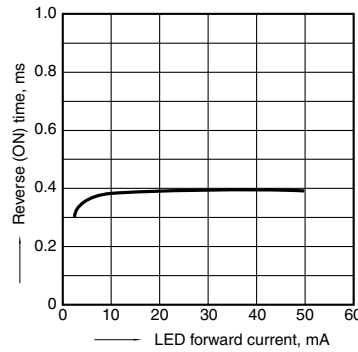
## 10. Operate (OFF) time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC); Ambient temperature: 25°C 77°F



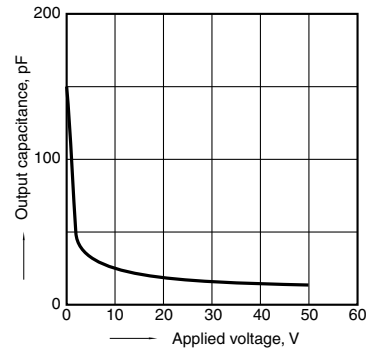
## 11. Reverse (ON) time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC); Ambient temperature: 25°C 77°F



## 12. Output capacitance vs. applied voltage characteristics

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



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