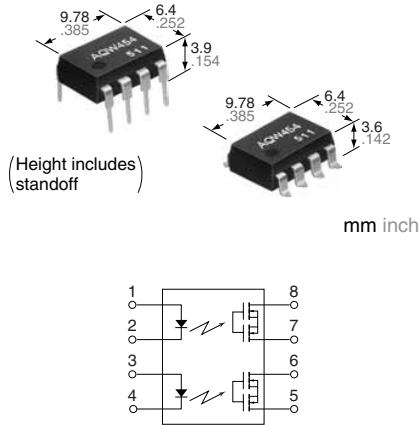


**Normally closed (2 Form A)  
DIP6-pin type  
Low on-resistance with  
400V load voltage**

**PhotoMOS Relays  
HE 2 Form B  
(AQW454)**



**Compliance with RoHS Directive**

## 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 relays 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

## TYPES

	Output rating*		Package	Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal				
	Load voltage	Load current			Tube packing style		Tape and reel packing style		Tube
AC/DC dual use	400 V	120 mA	AQW454	AQW454A	AQW454AX	AQW454AZ	1 tube contains: 40 pcs. 1 batch contains: 400 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 relay.

## RATING

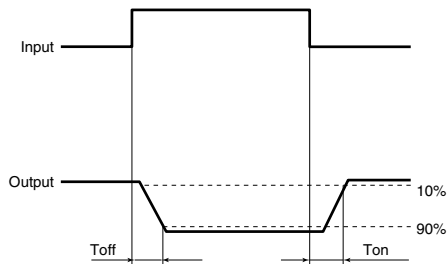
### 1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

	Item	Symbol	AQW454(A)	Remarks
Input	LED forward current	I <sub>F</sub>	50 mA	
	LED reverse voltage	V <sub>R</sub>	5 V	
	Peak forward current	I <sub>FP</sub>	1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>	75 mW	
Output	Load voltage (peak AC)	V <sub>L</sub>	400 V	
	Continuous load current	I <sub>L</sub>	0.12 A (0.16 A)	A connection: Peak AC, DC ( ) : for one 1b-circuit
	Peak load current	I <sub>peak</sub>	0.36 A	A connection: 100 ms (1 shot), V <sub>L</sub> = DC
	Power dissipation	P <sub>out</sub>	800 mW	
Total power dissipation		P <sub>T</sub>	850 mW	
I/O isolation voltage		V <sub>iso</sub>	1,500 V AC	Between input and output/between contact sets
Temperature limits	Operating	T <sub>opr</sub>	-40°C to +85°C -40°F to +185°F	Non-condensing at low temperatures
	Storage	T <sub>stg</sub>	-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 relay 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.

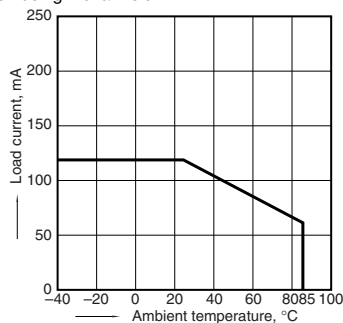
If you are considering to use these products for automotive applications, please contact your local Panasonic Electric Works technical representative.  
For more information.

## REFERENCE DATA

1. Load current vs. ambient temperature characteristics

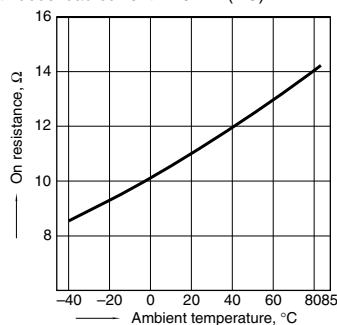
Allowable ambient temperature:  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$   
 $-40^\circ\text{F}$  to  $+185^\circ\text{F}$

When using 2 channels



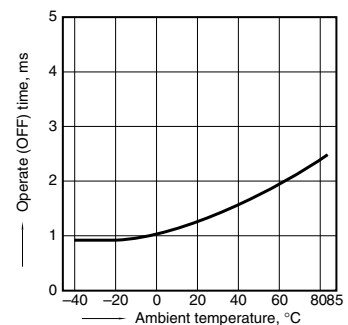
2. On resistance vs. ambient temperature characteristics

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

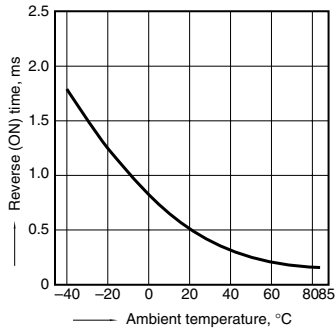
LED current: 5 mA; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC)



# HE 2 Form B (AQW454)

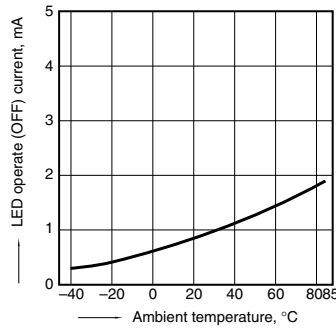
## 4. Reverse (ON) time vs. ambient temperature characteristics

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



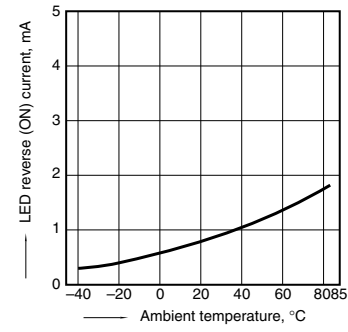
## 5. LED operate (OFF) current vs. ambient temperature characteristics

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



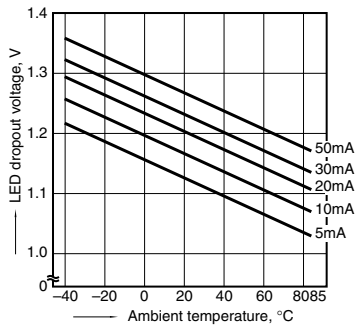
## 6. LED reverse (ON) current vs. ambient temperature characteristics

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



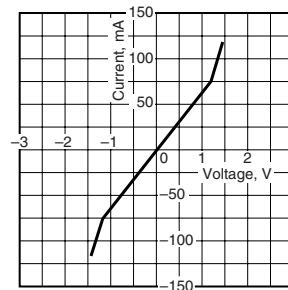
## 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



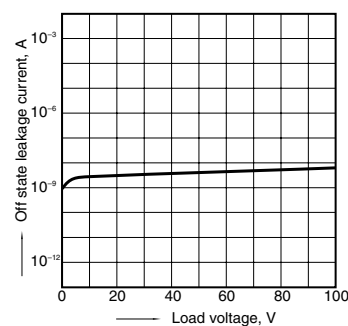
## 8. Current vs. voltage characteristics of output at MOS portion

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



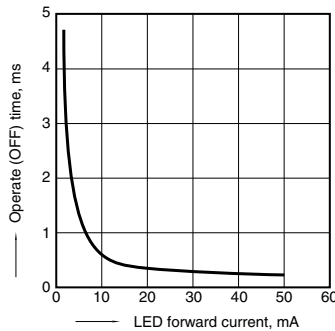
## 9. Off state leakage current vs. load voltage characteristics

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



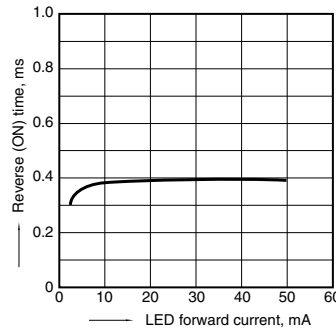
## 10. Operate (OFF) time vs. LED forward current characteristics

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

