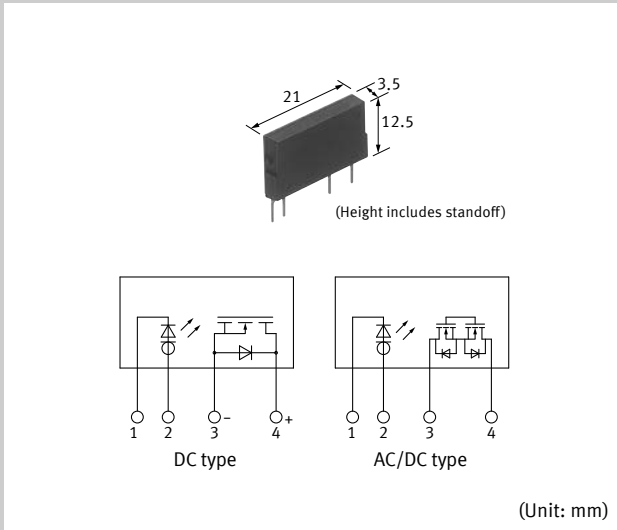


## Power 1 Form A Voltage-sensitive

### Slim and high capacity up to 3.6A Voltage-driven type



#### FEATURES

- A voltage-sensitive power PhotoMOS
- Wide range of input voltages
- Both AC/DC dual types and DC-only types available
- High capacity
- High sensitivity and low on resistance
- Slim SIL4-pin package

#### TYPICAL APPLICATIONS

- Industrial machines
- Traffic signals

Note: Please contact our sales representative for automotive applications of PhotoMOS.

#### TYPES

Category	Output rating*		Part No.	Packing quantity	
	Load voltage	Load current		Inner carton (1-tube)	Outer carton
DC only	60 V	3.6 A	AQZ102D	25 pcs.	500 pcs.
	100 V	2.3 A	AQZ105D		
	200 V	1.1 A	AQZ107D		
	400 V	0.6 A	AQZ104D		
AC/DC dual use	60 V	2.7 A	AQZ202D		
	100 V	1.8 A	AQZ205D		
	200 V	0.9 A	AQZ207D		
	400 V	0.45 A	AQZ204D		

Note: Please refer to the "Cautions for use" regarding the recommended operation load voltage.

\*Load voltage and current of AC/DC type: Peak AC/DC. Load voltage and current of DC type: DC.

**RATING**

**DC type**

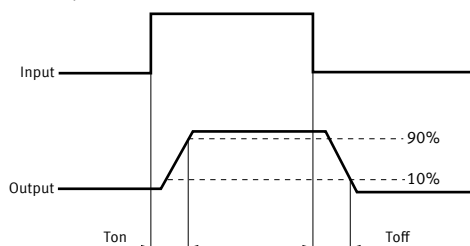
**Absolute maximum ratings (Ambient temperature: 25°C)**

Item		Symbol	AQZ102D	AQZ105D	AQZ107D	AQZ104D	Remarks
Input	Input voltage	$V_{IN}$	30 V				
	Input reverse voltage	$V_{RIN}$	5 V				
	Power dissipation	$P_{in}$	300 mW				
Output	Load voltage (DC)	$V_L$	60 V	100 V	200 V	400 V	
	Continuous load current (DC)	$I_L$	3.6 A	2.3 A	1.1 A	0.6 A	
	Peak load current	$I_{peak}$	9.0 A	6.0 A	3.0 A	1.5 A	100 ms (1 shot), $V_L = DC$
	Power dissipation	$P_{out}$	1.35 W				
Total power dissipation		$P_T$	1.35 W				
I/O isolation voltage		$V_{iso}$	2,500 Vrms				
Ambient temperature (Operating)		$T_{opr}$	-40 to +85°C (4 V ≤ $V_{IN}$ ≤ 6 V) -40 to +75°C (6 V < $V_{IN}$ ≤ 15 V) -40 to +60°C (15 V < $V_{IN}$ ≤ 30 V)				(Avoid icing and condensation)
Ambient temperature (Storage)		$T_{stg}$	-40 to +100°C				

**Electrical characteristics (Ambient temperature: 25°C)**

Item			Symbol	AQZ102D	AQZ105D	AQZ107D	AQZ104D	Condition
Input	Operate voltage	Typical	$V_{Fon}$	1.4 V				$I_L = 100\text{ mA}$ $V_L = 10\text{ V}$
		Maximum		4 V				
	Turn off voltage	Minimum	$V_{Foff}$	0.8 V				$I_L = 100\text{ mA}$ $V_L = 10\text{ V}$
		Typical		1.3 V				
Input current	Typical	$I_{IN}$	6.5 mA				$V_{IN} = 5\text{ V}$	
Output	On resistance	Typical	$R_{on}$	0.033 Ω	0.090 Ω	0.33 Ω	1.23 Ω	$V_{IN} = 5\text{ V}$ $I_L = \text{Max.}$ Within 1 s
		Maximum		0.09 Ω	0.17 Ω	0.55 Ω	1.6 Ω	
Output	Off state leakage current	Maximum	$I_{Leak}$	10 μA				$V_{IN} = 0\text{ V}$ $V_L = \text{Max.}$
Transfer characteristics	Turn on time*	Typical	$T_{on}$	3.3 ms	2.2 ms	1.5 ms	1.2 ms	$V_{IN} = 5\text{ V}$ $I_L = 100\text{ mA}$ $V_L = 10\text{ V}$
		Maximum		10.0 ms				
	Turn off time*	Typical	$T_{off}$	0.2 ms		0.1 ms		$V_{IN} = 5\text{ V}$ $I_L = 100\text{ mA}$ $V_L = 10\text{ V}$
		Maximum		3.0 ms				
	I/O capacitance	Typical	$C_{iso}$	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 MΩ				500 V DC	
Max. operating frequency	Maximum	-	0.5 cps				$V_{IN} = 5\text{ V}$ duty = 50% $I_L = \text{Max.}$ $V_L = \text{Max.}$	

\*Turn on/Turn off time



■ **Recommended operating conditions (Ambient temperature: 25°C)**

Please use under recommended operating conditions to obtain expected characteristics.

Item		Symbol	Min.	Max.	Unit
Input voltage		$V_{IN}$	5	24	V
AQZ102D	Load voltage (DC)	$V_L$	-	48	V
	Continuous load current (DC)	$I_L$	-	3.6	A
AQZ105D	Load voltage (DC)	$V_L$	-	80	V
	Continuous load current (DC)	$I_L$	-	2.3	A
AQZ107D	Load voltage (DC)	$V_L$	-	160	V
	Continuous load current (DC)	$I_L$	-	1.1	A
AQZ104D	Load voltage (DC)	$V_L$	-	320	V
	Continuous load current (DC)	$I_L$	-	0.6	A

# AC/DC type

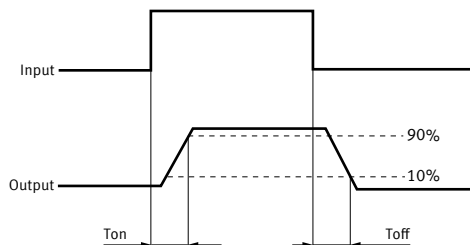
## Absolute maximum ratings (Ambient temperature: 25°C)

Item		Symbol	AQZ202D	AQZ205D	AQZ207D	AQZ204D	Remarks
Input	Input voltage	$V_{IN}$	30 V				
	Input reverse voltage	$V_{RIN}$	5 V				
	Power dissipation	$P_{in}$	300 mW				
Output	Load voltage (peak AC)	$V_L$	60 V	100 V	200 V	400 V	
	Continuous load current	$I_L$	2.7 A	1.8 A	0.9 A	0.45 A	Peak AC, DC
	Peak load current	$I_{peak}$	9.0 A	6.0 A	3.0 A	1.5 A	100 ms (1 shot), $V_L = DC$
	Power dissipation	$P_{out}$	1.6 W				
Total power dissipation		$P_T$	1.6 W				
I/O isolation voltage		$V_{iso}$	2,500 Vrms				
Ambient temperature (Operating)		$T_{opr}$	-40 to +85°C ( $4 V \leq V_{IN} \leq 6 V$ ) -40 to +75°C ( $6 V < V_{IN} \leq 15 V$ ) -40 to +60°C ( $15 V < V_{IN} \leq 30 V$ )				(Avoid icing and condensation)
Ambient temperature (Storage)		$T_{stg}$	-40 to +100°C				

## Electrical characteristics (Ambient temperature: 25°C)

Item		Symbol	AQZ202D	AQZ205D	AQZ207D	AQZ204D	Condition
Input	Operate voltage	Typical	1.4 V				$I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum	4 V				
	Turn off voltage	Minimum	0.8 V				$I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Typical	1.3 V				
Input current	Typical	$I_{IN}$ 6.5 mA				$V_{IN} = 5 \text{ V}$	
Output	On resistance	Typical	0.066 $\Omega$	0.180 $\Omega$	0.64 $\Omega$	2.4 $\Omega$	$V_{IN} = 5 \text{ V}$ $I_L = \text{Max.}$ Within 1 s
		Maximum	0.18 $\Omega$	0.34 $\Omega$	1.1 $\Omega$	3.2 $\Omega$	
	Off state leakage current	Maximum	$I_{Leak}$ 10 $\mu\text{A}$				$V_{IN} = 0 \text{ V}$ $V_L = \text{Max.}$
Transfer characteristics	Turn on time*	Typical	5.8 ms	4.2 ms	2.7 ms	2.3 ms	$V_{IN} = 5 \text{ V}$ $I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum	10 ms				
	Turn off time*	Typical	0.2 ms		0.1 ms		$V_{IN} = 5 \text{ V}$ $I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum	3 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
Max. operating frequency	Maximum	-				0.5 cps $V_{IN} = 5 \text{ V}$ duty = 50% $I_L = \text{Max.}$ $V_L = \text{Max.}$	

\*Turn on/Turn off time



**Recommended operating conditions (Ambient temperature: 25°C)**

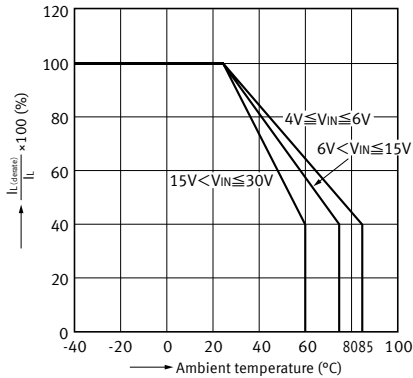
Please use under recommended operating conditions to obtain expected characteristics.

Item	Symbol	Min.	Max.	Unit	
Input voltage					
	$V_{IN}$	5	24	V	
AQZ202D	Load voltage (Peak AC)	$V_L$	-	48	V
	Continuous load current	$I_L$	-	2.7	A
AQZ205D	Load voltage (Peak AC)	$V_L$	-	80	V
	Continuous load current	$I_L$	-	1.8	A
AQZ207D	Load voltage (Peak AC)	$V_L$	-	160	V
	Continuous load current	$I_L$	-	0.9	A
AQZ204D	Load voltage (Peak AC)	$V_L$	-	320	V
	Continuous load current	$I_L$	-	0.45	A

**REFERENCE DATA**

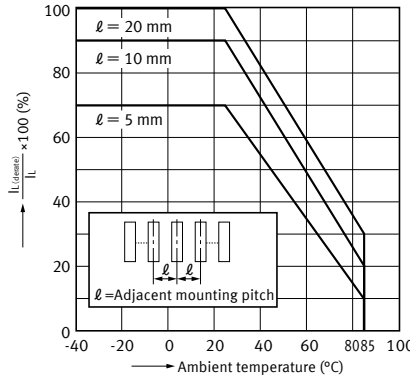
**1. Load current vs. ambient temperature characteristics**

Allowable ambient temperature: -40 to +85°C;  
 $V_{IN}$ : Input voltage;  $I_L$  (derate): Load current (derate);  
 $I_L$ : Absolute maximum ratings of continuous load current



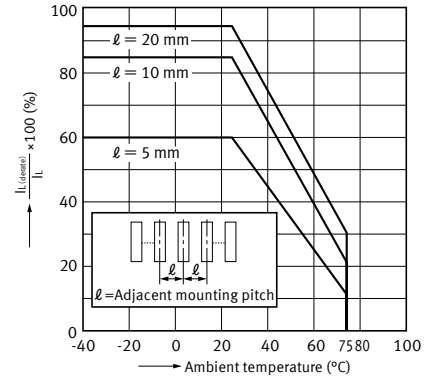
**2-1. Load current vs. ambient temperature characteristics in adjacent mounting**

Input voltage:  $4V \leq V_{IN} \leq 6V$ ;  
 $I_L$  (derate): Load current (derate);  
 $I_L$ : Absolute maximum ratings of continuous load current;



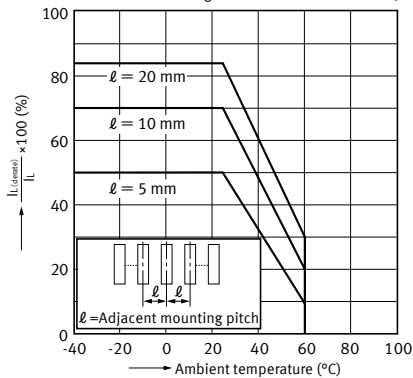
**2-2. Load current vs. ambient temperature characteristics in adjacent mounting**

Input voltage:  $6V \leq V_{IN} \leq 15V$ ;  
 $I_L$  (derate): Load current (derate);  
 $I_L$ : Absolute maximum ratings of continuous load current;



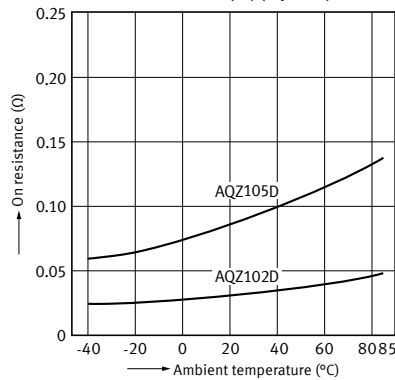
**2-3. Load current vs. ambient temperature characteristics in adjacent mounting**

Input voltage:  $15V \leq V_{IN} \leq 30V$ ;  
 $I_L$  (derate): Load current (derate);  
 $I_L$ : Absolute maximum ratings of continuous load current;



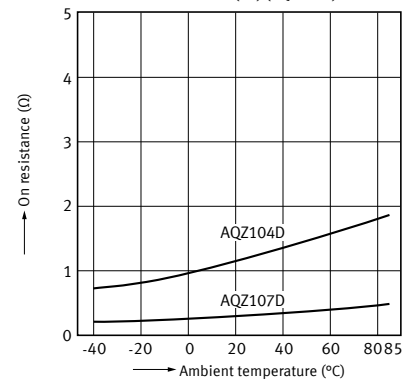
**3-1. On resistance vs. ambient temperature characteristics (DC type)**

Input voltage: 5 V;  
 Continuous load current: 3.6 A (DC) (AQZ102D)  
 2.3 A (DC) (AQZ105D)



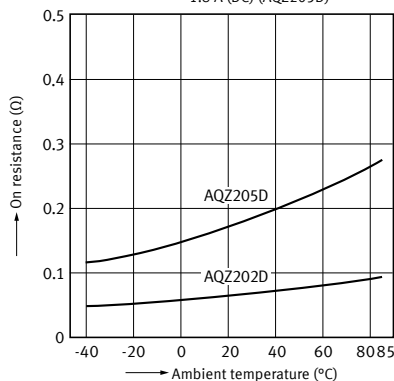
**3-2. On resistance vs. ambient temperature characteristics (DC type)**

Input voltage: 5 V;  
 Continuous load current: 1.1 A (DC) (AQZ107D)  
 0.6 A (DC) (AQZ104D)



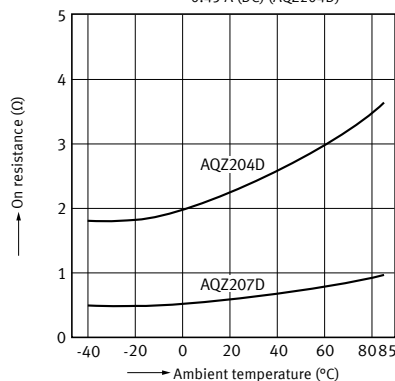
3-3. On resistance vs. ambient temperature characteristics (AC/DC type)

Input voltage: 5 V;  
Continuous load current: 2.7 A (DC) (AQZ202D)  
1.8 A (DC) (AQZ205D)



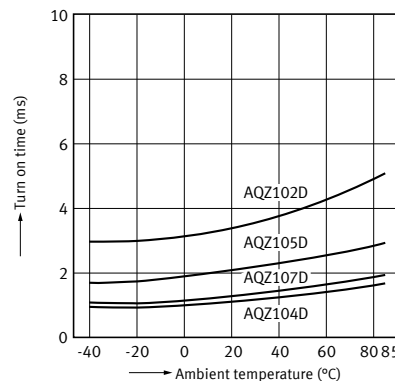
3-4. On resistance vs. ambient temperature characteristics (AC/DC type)

Input voltage: 5 V;  
Continuous load current: 0.9 A (DC) (AQZ207D)  
0.45 A (DC) (AQZ204D)



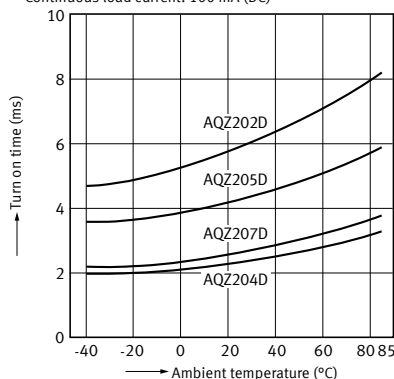
4-1. Turn on time vs. ambient temperature characteristics (DC type)

Input voltage: 5 V; Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC)



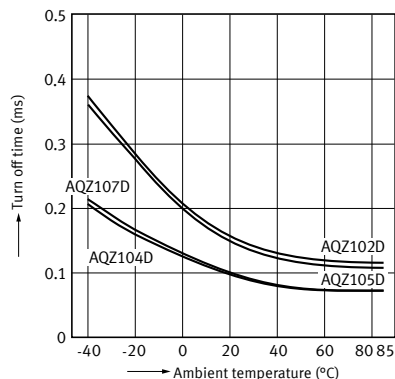
4-2. Turn on time vs. ambient temperature characteristics (AC/DC type)

Input voltage: 5 V;  
Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC)



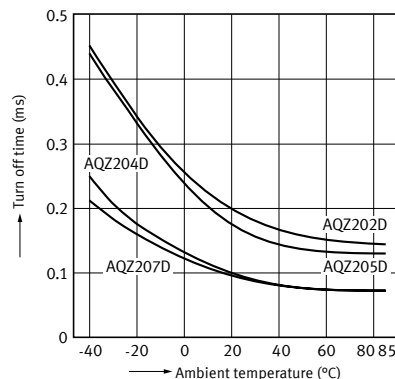
5-1. Turn off time vs. ambient temperature characteristics (DC type)

Input voltage: 5 V; Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC)



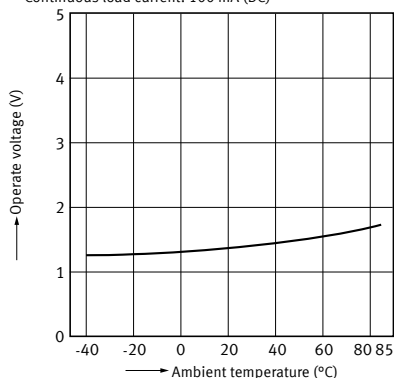
5-2. Turn off time vs. ambient temperature characteristics (AC/DC type)

Input voltage: 5 V; Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC)



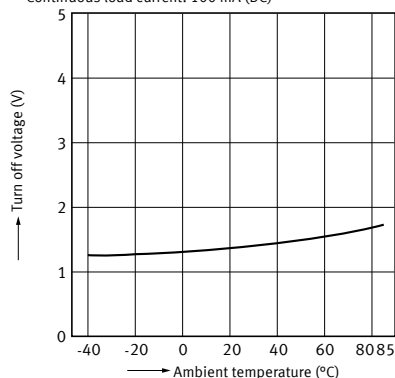
6. Operate voltage vs. ambient temperature characteristics

Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC)



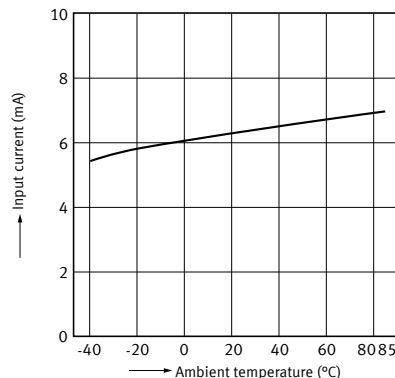
7. Turn off voltage vs. ambient temperature characteristics

Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC)

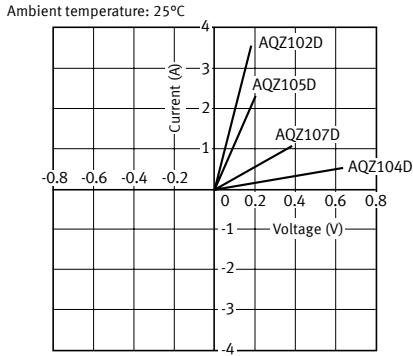


8. Input current vs. ambient temperature characteristics

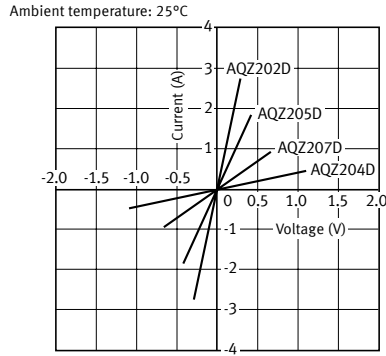
Input voltage: 5 V



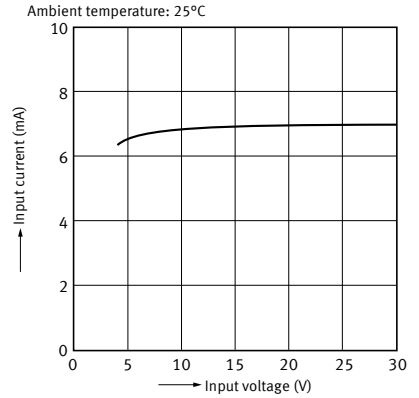
9-1. Current vs. voltage characteristics of output at MOS portion (DC type)



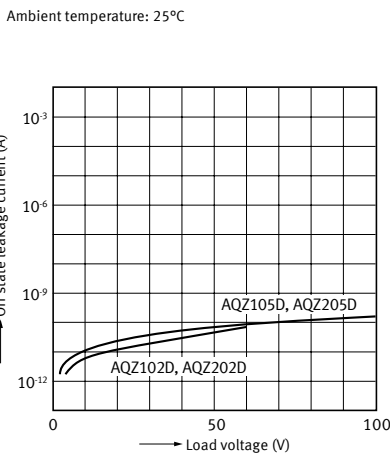
9-2. Current vs. voltage characteristics of output at MOS portion (AC/DC type)



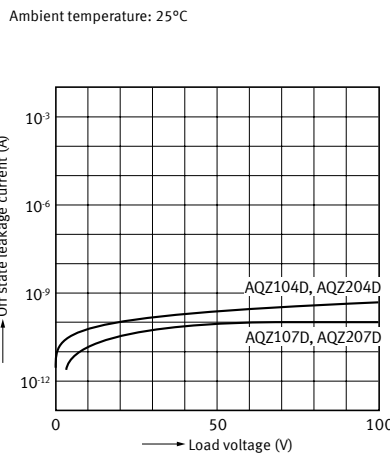
10. Input current vs. input voltage characteristics



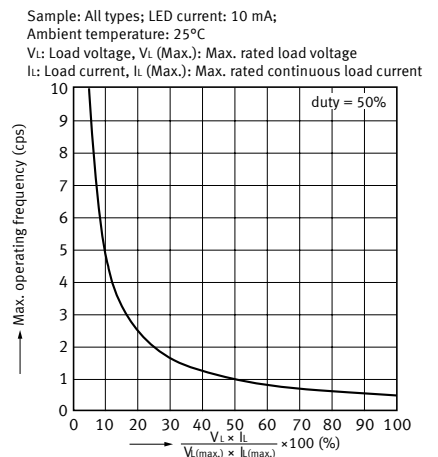
11-1. Off state leakage current vs. load voltage characteristics



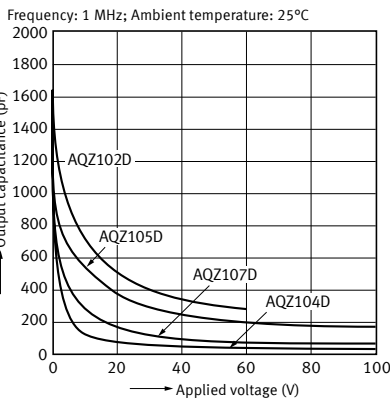
11-2. Off state leakage current vs. load voltage characteristics



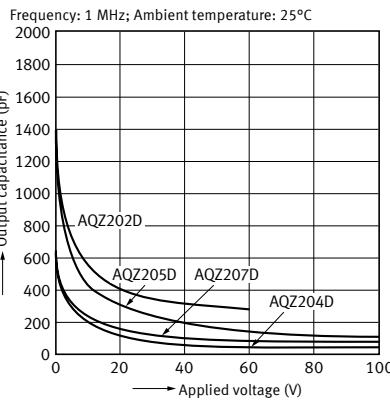
12. Max. operating frequency vs. load voltage and load current characteristics



13-1. Output capacitance vs. applied voltage characteristics (DC type)



13-2. Output capacitance vs. applied voltage characteristics (AC/DC type)



# PhotoMOS Power 1 Form A Voltage-sensitive

## DIMENSIONS

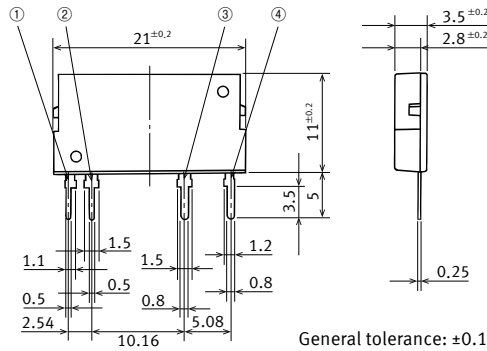
**CAD** The CAD data of the products with a "CAD" mark can be downloaded from our Website.

Unit: mm

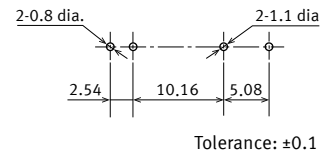
### CAD



### External dimensions



### PC board pattern (BOTTOM VIEW)



- AC/DC type  
 ① Input: DC-  
 ② Input: DC+  
 ③ Output: DC or AC  
 ④ Output: DC or AC
- DC type  
 ① Input: DC-  
 ② Input: DC+  
 ③ Output: DC-  
 ④ Output: DC+

General tolerance: ±0.1

## SCHEMATIC AND WIRING DIAGRAMS

Schematic	Output configuration	Load type	Connection	Wiring diagram
	1 Form A	DC	-	
		AC/DC	-	

## SAFETY STANDARDS

Part No.	UL (Recognized)		CSA (Certified)		Remarks
	File No. (Standard No.)	Contact rating	File No. (Standard No.)	Contact rating	
DC only	AQZ102D	3.6A 60V DC	(Certified by C-UL)		VDE approved (Nr. 40051981)
	AQZ105D	2.3A 100V DC			
	AQZ107D	1.1A 200V DC			
	AQZ104D	0.6A 400V DC			
AC/DC dual use	AQZ202D	2.7A 60V AC (peak) 2.7A 60V DC			
	AQZ205D	1.8A 100V AC (peak) 1.8A 100V DC			
	AQZ207D	0.9A 200V AC (peak) 0.9A 200V DC			
	AQZ204D	0.45A 400V AC (peak) 0.45A 400V DC			

Note: For the latest information on compliance with safety standards, please refer to our website.



Please refer to **"the latest product specifications"** when designing your product.

•Requests to customers:

<https://industrial.panasonic.com/ac/e/salespolicies/>

---

Please contact .....

**Panasonic Corporation**

Electromechanical Control Business Division

■1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8506, Japan  
[industrial.panasonic.com/ac/e/](http://industrial.panasonic.com/ac/e/)

**Panasonic**<sup>®</sup>

©Panasonic Corporation 2020