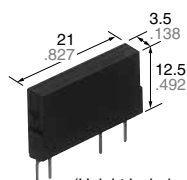




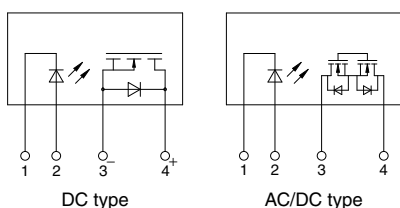
**Slim type with high capacity up to 4A DC load type also available**

**PhotoMOS®  
Power 1 Form A  
(AQZ100, 200)**



(Height includes standoff)

mm inch



**RoHS compliant**

### FEATURES

- 1. Slim SIL4-pin package**  
(W) 3.5 × (D) 21.0 × (H) 12.5 mm  
(W) .138 × (D) .827 × (H) .492 inch  
The compact size of the 4-pin SIL package allows high density mounting.
- 2. Extremely low on-resistance**
- 3. Control low-level signal**  
Power PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.
- 4. Low-level off state leakage current of max. 10 μA**
- 5. High I/O isolation voltage of 2,500 V**
- 6. Eliminates the need for a counter electromotive protection diode in the drive circuit on the input side**
- 7. Eliminates the need for a power supply to drive the power MOSFET**
- 8. No restriction on mounting direction**
- 9. Low thermoelectromotive force**
- 10. Neither noise nor arc at contact**
- 11. Sockets are also available**  
(PA1a-PS, PA1a-PS-H)
- 12. Can be installed on the RT-3 relay terminal (Power PhotoMOS type)**

### TYPICAL APPLICATIONS

- Traffic signals
- Measuring instruments
- Industrial machines

## TYPES

### 1. DC type

	Output rating*		Package	Part No.	Packing quantity	
	Load voltage	Load current			Inner carton	Outer carton
DC only	60 V	4.0 A	SIL4-pin	AQZ102	25 pcs.	500 pcs.
	100 V	2.6 A		AQZ105		
	200 V	1.3 A		AQZ107		
	400 V	0.7 A		AQZ104		

\* Load voltage and current of DC type: DC

### 2. AC/DC type

	Output rating*		Package	Part No.	Packing quantity	
	Load voltage	Load current			Inner carton	Outer carton
AC/DC dual use	60 V	3.0 A	SIL4-pin	AQZ202	25 pcs.	500 pcs.
	100 V	2.0 A		AQZ205		
	200 V	1.0 A		AQZ207		
	400 V	0.5 A		AQZ204		

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

## RATING

### 1. DC type

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

Item		Symbol	AQZ102	AQZ105	AQZ107	AQZ104	Remarks
Input	LED forward current	$I_F$	50 mA				
	LED reverse voltage	$V_R$	5 V				
	Peak forward current	$I_{FP}$	1 A				$f = 100 \text{ Hz}$ , Duty factor = 0.1%
	Power dissipation	$P_{in}$	75 mW				
Output	Load voltage (DC)	$V_L$	60 V	100 V	200 V	400 V	
	Continuous load current (DC)	$I_L$	4.0 A	2.6 A	1.3 A	0.7 A	
	Peak load current	$I_{peak}$	9.0 A	6.0 A	3.0 A	1.5 A	100 ms (1 shot), $V_L = \text{DC}$
	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 -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	AQZ102	AQZ105	AQZ107	AQZ104	Condition
Input	LED operate current	Typical	$I_{Fon}$	1.0 mA				$I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum		3.0 mA				
	LED turn off current	Minimum	$I_{Foff}$	0.4 mA				$I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Typical		0.9 mA				
LED dropout voltage	Typical	$V_F$	1.25 V (1.16 V at $I_F = 10 \text{ mA}$ )				$I_F = 50 \text{ mA}$	
	Maximum		1.5 V					
Output	On resistance	Typical	$R_{on}$	0.05 $\Omega$	0.081 $\Omega$	0.34 $\Omega$	1.06 $\Omega$	$I_F = 10 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s
		Maximum		0.09 $\Omega$	0.17 $\Omega$	0.55 $\Omega$	1.6 $\Omega$	
	Off state leakage current	Maximum	$I_{Leak}$	10 $\mu\text{A}$				$I_F = 0 \text{ mA}$ $V_L = \text{Max.}$
Transfer characteristics	Turn on time*	Typical	$T_{on}$	1.66 ms	1.89 ms	0.83 ms	1.01 ms	$I_F = 10 \text{ mA}$ $I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum		5.0 ms				
		Typical		3.79 ms	4.50 ms	1.75 ms	2.34 ms	
		Maximum		10.0 ms				
	Turn off time*	Typical	$T_{off}$	0.15 ms	0.19 ms	0.08 ms	0.08 ms	$I_F = 5 \text{ mA}$ or 10 mA $I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		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 M $\Omega$				500 V DC	
Max. operating frequency	Maximum	—	0.5 cps				$I_F = 10 \text{ mA}$ Duty factor = 50% $I_L = \text{Max.}$ , $V_L = \text{Max.}$	

### 2. AC/DC type

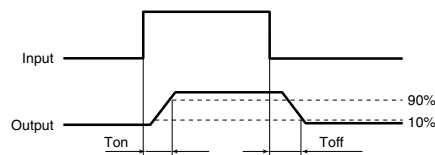
#### 1) Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item		Symbol	AQZ202	AQZ205	AQZ207	AQZ204	Remarks
Input	LED forward current	$I_F$	50 mA				
	LED reverse voltage	$V_R$	5 V				
	Peak forward current	$I_{FP}$	1 A				$f = 100 \text{ Hz}$ , Duty factor = 0.1%
	Power dissipation	$P_{in}$	75 mW				
Output	Load voltage (Peak AC)	$V_L$	60 V	100 V	200 V	400 V	
	Continuous load current	$I_L$	3.0 A	2.0 A	1.0 A	0.5 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), $V_L = \text{DC}$
	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 -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	AQZ202	AQZ205	AQZ207	AQZ204	Condition
Input	LED operate current	Typical	1.0 mA				$I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum	3.0 mA				
	LED turn off current	Minimum	0.4 mA				$I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Typical	0.9 mA				
	LED dropout voltage	Typical	1.25 V (1.16 V at $I_F = 10 \text{ mA}$ )				$I_F = 50 \text{ mA}$
Maximum		1.5 V					
Output	On resistance	Typical	0.11 Ω	0.23 Ω	0.7 Ω	2.1 Ω	$I_F = 10 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s
		Maximum	0.18 Ω	0.34 Ω	1.1 Ω	3.2 Ω	
	Off state leakage current	Maximum	10 μA				$I_F = 0 \text{ mA}$ $V_L = \text{Max.}$
Transfer characteristics	Turn on time*	Typical	2.46 ms	2.40 ms	1.12 ms	1.65 ms	$I_F = 10 \text{ mA}$ $I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum	5.0 ms				
		Typical	5.64 ms	5.65 ms	2.57 ms	3.88 ms	$I_F = 5 \text{ mA}$ $I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum	10.0 ms				
	Turn off time*	Typical	0.22 ms	0.21 ms	0.10 ms	0.08 ms	$I_F = 5 \text{ mA or } 10 \text{ mA}$ $I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum	3.0 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	1,000 MΩ				500 V DC
	Max. operating frequency	Maximum	0.5 cps				$I_F = 10 \text{ mA}$ Duty factor = 50% $I_L = \text{Max.}, V_L = \text{Max.}$

\*Turn on/off 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
AQZ102	Load voltage (DC)	$V_L$	48	V
	Continuous load current (DC)	$I_L$	4.0	A
AQZ105	Load voltage (DC)	$V_L$	80	V
	Continuous load current (DC)	$I_L$	2.6	A
AQZ107	Load voltage (DC)	$V_L$	160	V
	Continuous load current (DC)	$I_L$	1.3	A
AQZ104	Load voltage (DC)	$V_L$	320	V
	Continuous load current (DC)	$I_L$	0.7	A
AQZ202	Load voltage (Peak AC)	$V_L$	48	V
	Continuous load current	$I_L$	3.0	A
AQZ205	Load voltage (Peak AC)	$V_L$	80	V
	Continuous load current	$I_L$	2.0	A
AQZ207	Load voltage (Peak AC)	$V_L$	160	V
	Continuous load current	$I_L$	1.0	A
AQZ204	Load voltage (Peak AC)	$V_L$	320	V
	Continuous load current	$I_L$	0.5	A

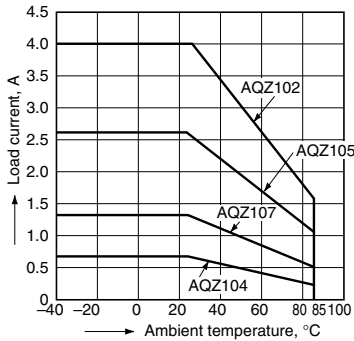
■ These products are not designed for automotive use.

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

REFERENCE DATA

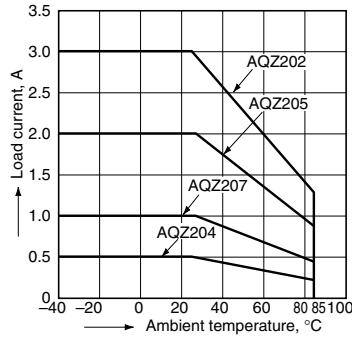
1.-(1) Load current vs. ambient temperature characteristics (DC type)

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



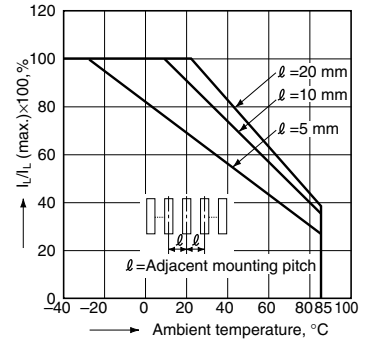
1.-(2) Load current vs. ambient temperature characteristics (AC/DC type)

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



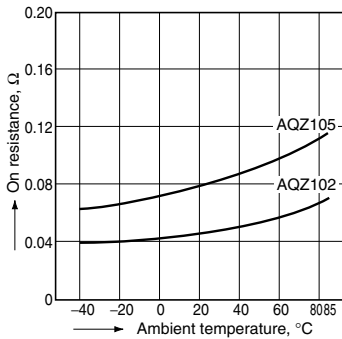
2. Load current vs. ambient temperature characteristics in adjacent mounting

$I_L$ : Load current;  
 $I_L$  (max.): Maximum continuous load current



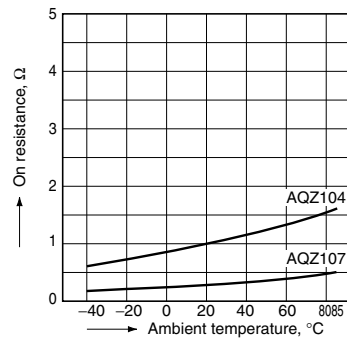
3.-(1) On resistance vs. ambient temperature characteristics (DC type)

LED current: 10 mA;  
Continuous load current: 1.6 A (DC) (AQZ102),  
1.04 A (DC) (AQZ105)



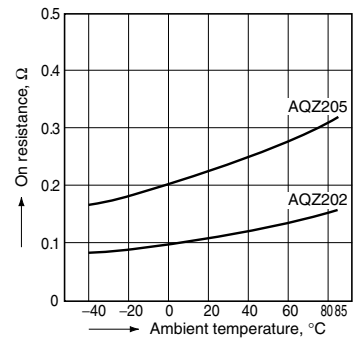
3.-(2) On resistance vs. ambient temperature characteristics (DC type)

LED current: 10 mA;  
Continuous load current: 0.52 A (DC) (AQZ107),  
0.28 A (DC) (AQZ104)



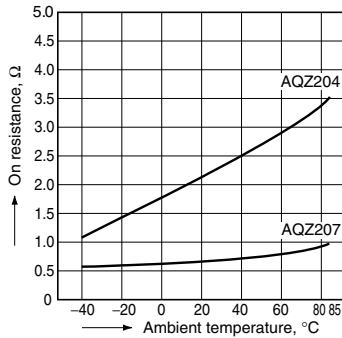
3.-(3) On resistance vs. ambient temperature characteristics (AC/DC type)

LED current: 10 mA;  
Continuous load current: 1.2 A (DC) (AQZ202),  
0.8 A (DC) (AQZ205)



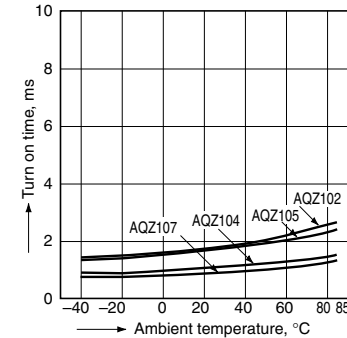
3.-(4) On resistance vs. ambient temperature characteristics (AC/DC type)

LED current: 10 mA;  
Continuous load current: 0.4 A (DC) (AQZ207),  
0.2 A (DC) (AQZ204)



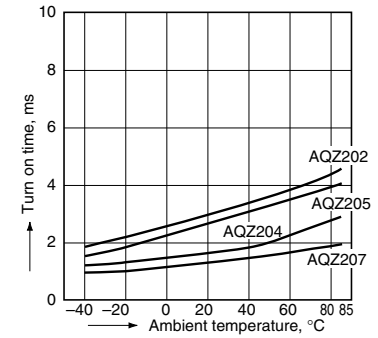
4.-(1) Turn on time vs. ambient temperature characteristics (DC type)

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



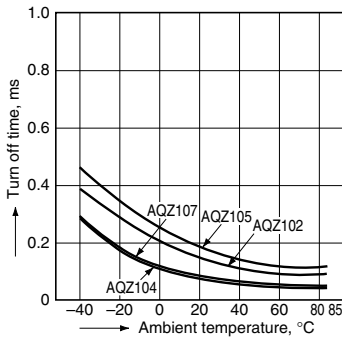
4.-(2) Turn on time vs. ambient temperature characteristics (AC/DC type)

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



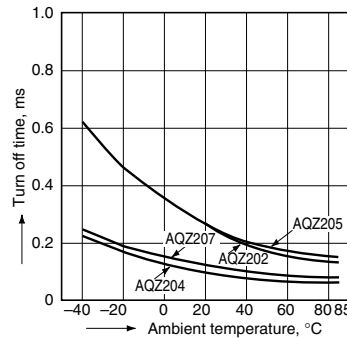
5.-(1) Turn off time vs. ambient temperature characteristics (DC type)

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



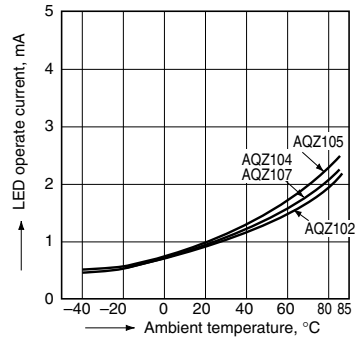
5.-(2) Turn off time vs. ambient temperature characteristics (AC/DC type)

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



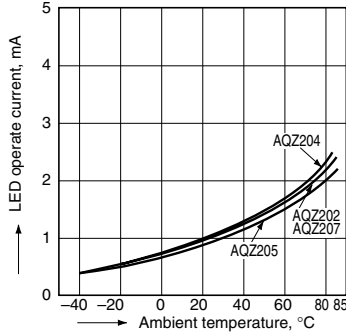
6.-(1) LED operate vs. ambient temperature characteristics (DC type)

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



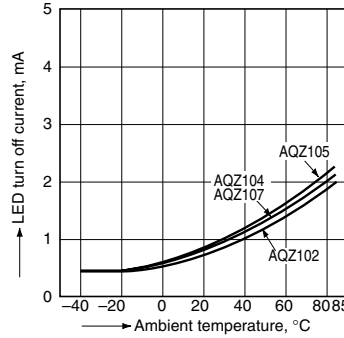
6.-(2) LED operate vs. ambient temperature characteristics (AC/DC type)

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



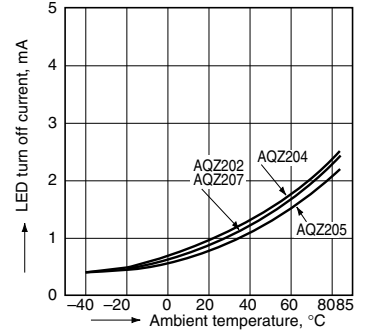
7.-(1) LED turn off current vs. ambient temperature characteristics (DC type)

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



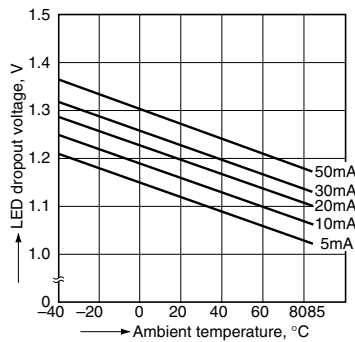
7.-(2) LED turn off current vs. ambient temperature characteristics (AC/DC type)

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



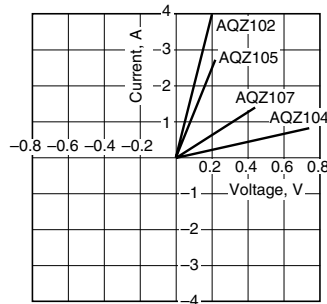
8. LED dropout voltage vs. ambient temperature characteristics

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



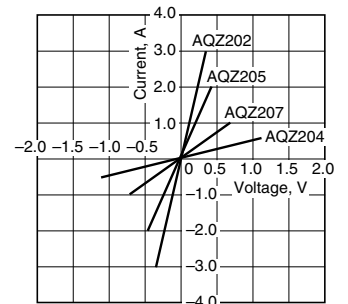
9.-(1) Current vs. voltage characteristics of output at MOS portion (DC type)

Ambient temperature: 25°C 77°F



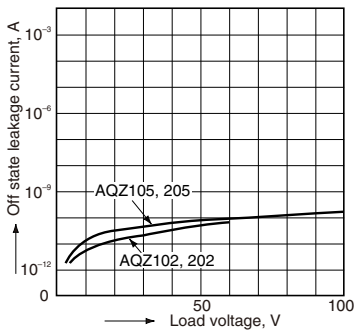
9.-(2) Current vs. voltage characteristics of output at MOS portion (AC/DC type)

Ambient temperature: 25°C 77°F



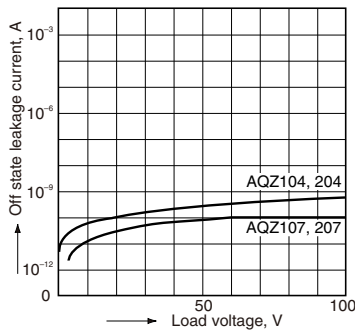
10.-(1) Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



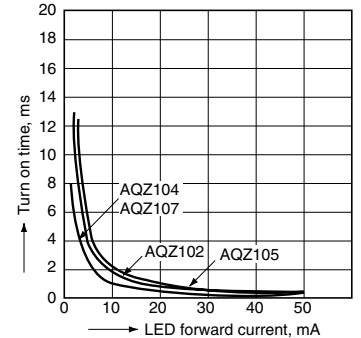
10.-(2) Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



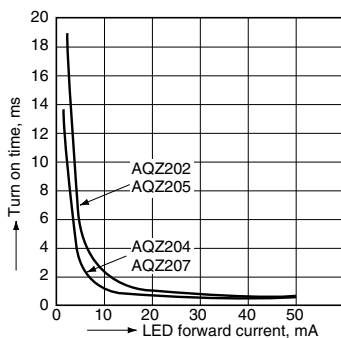
11.-(1) Turn on time vs. LED forward current characteristics (DC type)

Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC);  
Ambient temperature: 25°C 77°F



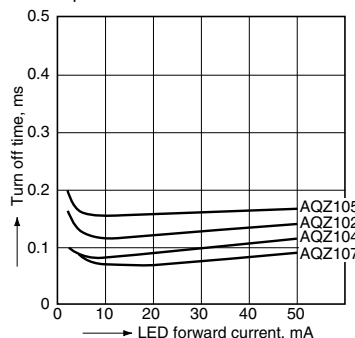
11.-(2) Turn on time vs. LED forward current characteristics (AC/DC type)

Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC);  
Ambient temperature: 25°C 77°F



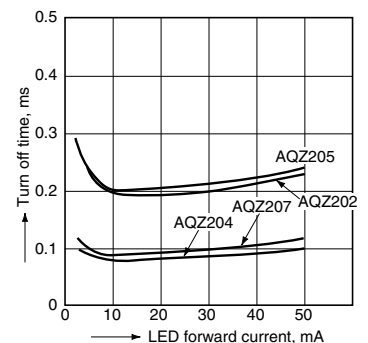
12.-(1) Turn off time vs. LED forward current characteristics (DC type)

Measured portion: between terminals 4 and 6;  
Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC);  
Ambient temperature: 25°C 77°F



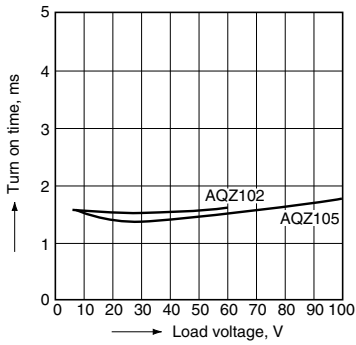
12.-(2) Turn off time vs. LED forward current characteristics (AC/DC type)

Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC);  
Ambient temperature: 25°C 77°F



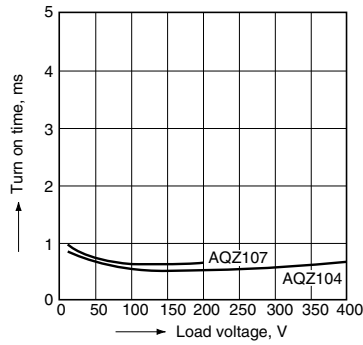
13.-(1) Turn on time vs. load voltage characteristics (DC type)

LED current: 10 mA;  
Continuous load current: 100 mA;  
Ambient temperature: 25°C 77°F



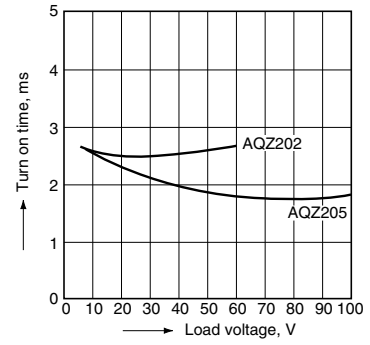
13.-(2) Turn on time vs. load voltage characteristics (DC type)

LED current: 10 mA;  
Continuous load current: 100 mA;  
Ambient temperature: 25°C 77°F



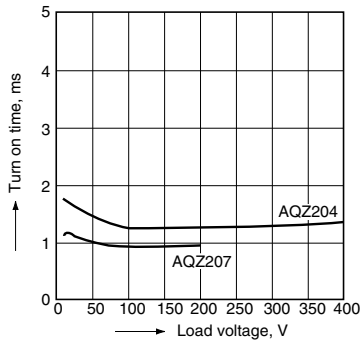
13.-(3) Turn on time vs. load voltage characteristics (AC/DC type)

LED current: 10 mA;  
Continuous load current: 100 mA;  
Ambient temperature: 25°C 77°F



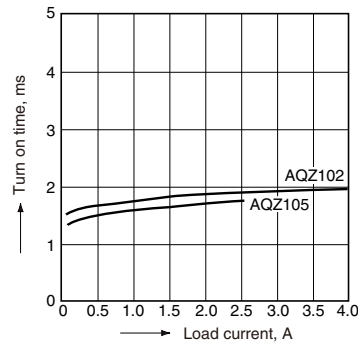
13.-(4) Turn on time vs. load voltage characteristics (AC/DC type)

LED current: 10 mA;  
Continuous load current: 100 mA;  
Ambient temperature: 25°C 77°F



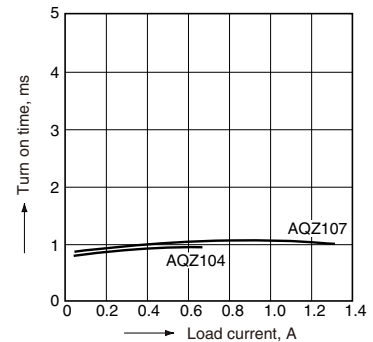
14.-(1) Turn on time vs. load current characteristics (DC type)

LED current: 10 mA;  
Load voltage: 10 V (DC);  
Ambient temperature: 25°C 77°F



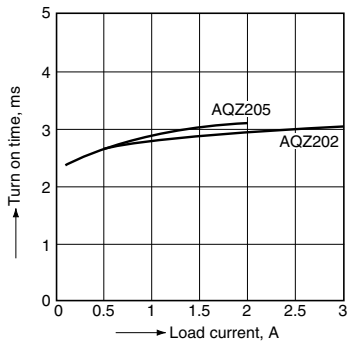
14.-(2) Turn on time vs. load current characteristics (DC type)

LED current: 10 mA;  
Load voltage: 10 V (DC);  
Ambient temperature: 25°C 77°F



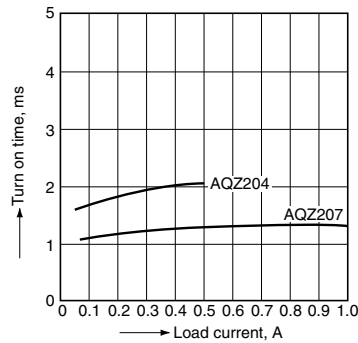
14.-(3) Turn on time vs. load current characteristics (AC/DC type)

LED current: 10 mA;  
Load voltage: 10 V (DC);  
Ambient temperature: 25°C 77°F



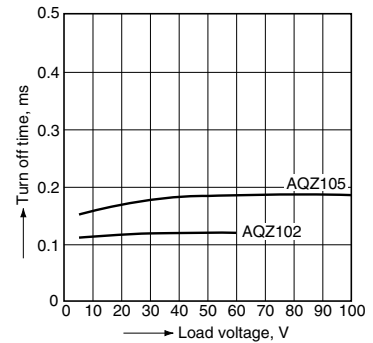
14.-(4) Turn on time vs. load current characteristics (AC/DC type)

LED current: 10 mA;  
Load voltage: 10 V (DC);  
Ambient temperature: 25°C 77°F



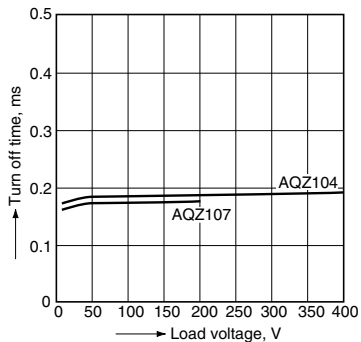
15.-(1) Turn off time vs. load voltage characteristics (DC type)

LED current: 10 mA;  
Continuous load current: 100 mA;  
Ambient temperature: 25°C 77°F



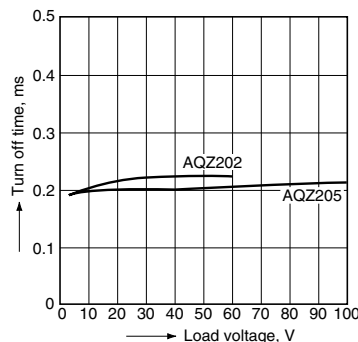
15.-(2) Turn off time vs. load voltage characteristics (DC type)

LED current: 10 mA;  
Continuous load current: 100 mA;  
Ambient temperature: 25°C 77°F



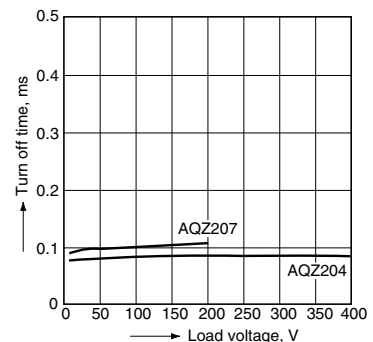
15.-(3) Turn off time vs. load voltage characteristics (AC/DC type)

LED current: 10 mA;  
Continuous load current: 100 mA;  
Ambient temperature: 25°C 77°F



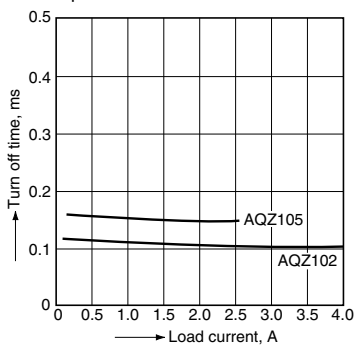
15.-(4) Turn off time vs. load voltage characteristics (AC/DC type)

LED current: 10 mA;  
Continuous load current: 100 mA;  
Ambient temperature: 25°C 77°F



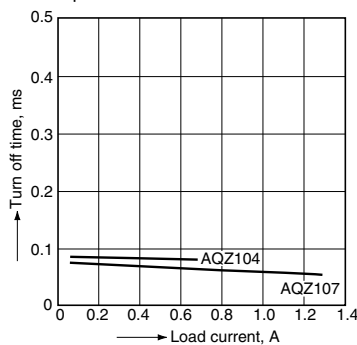
16.-(1) Turn off time vs. load current characteristics (DC type)

LED current: 10 mA;  
Load voltage: 10 V (DC);  
Ambient temperature: 25°C 77°F



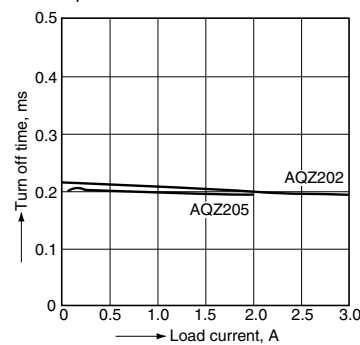
16.-(2) Turn off time vs. load current characteristics (DC type)

LED current: 10 mA;  
Load voltage: 10 V (DC);  
Ambient temperature: 25°C 77°F



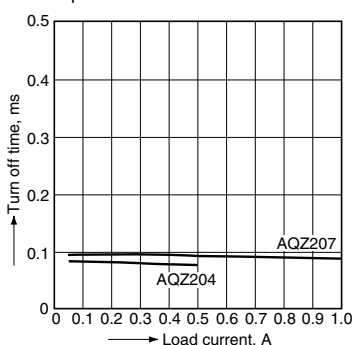
16.-(3) Turn off time vs. load current characteristics (AC/DC type)

LED current: 10 mA;  
Load voltage: 10 V (DC);  
Ambient temperature: 25°C 77°F



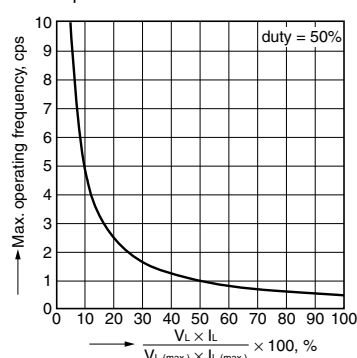
16.-(4) Turn off time vs. load current characteristics (AC/DC type)

LED current: 10 mA;  
Load voltage: 10 V (DC);  
Ambient temperature: 25°C 77°F



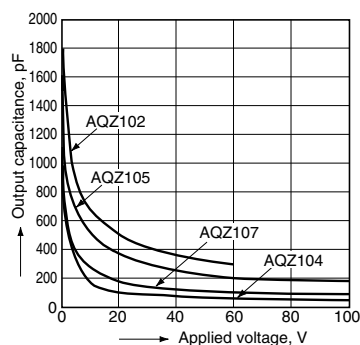
17. Max. operating frequency vs. load voltage/current characteristics

Sample: All types;  
LED current: 10 mA;  
Ambient temperature: 25°C 77°F



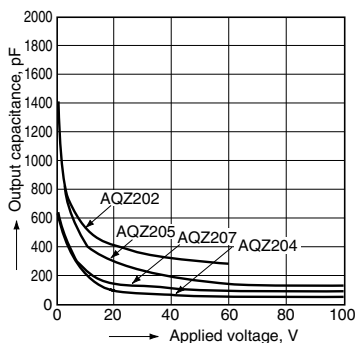
18.-(1) Output capacitance vs. applied voltage characteristics (DC type)

Frequency: 1 MHz;  
Ambient temperature: 25°C 77°F



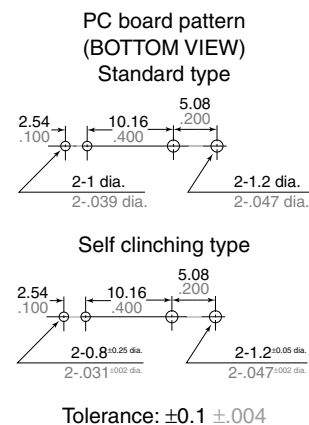
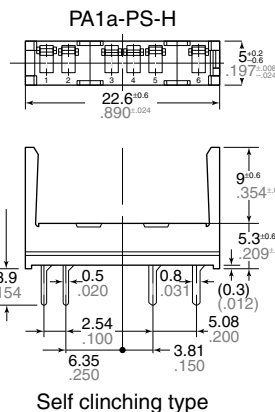
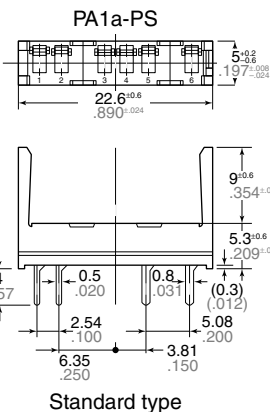
18.-(2) Output capacitance vs. applied voltage characteristics (AC/DC type)

Frequency: 1 MHz;  
Ambient temperature: 25°C 77°F



## ACCESSORY (mm inch)

### Socket



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