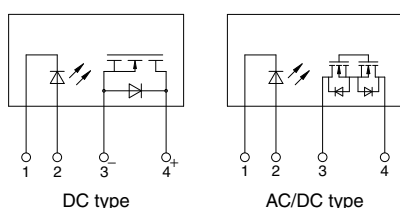
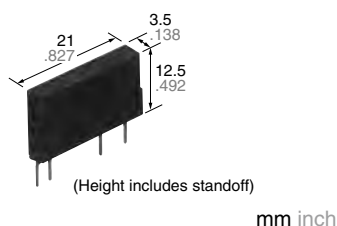


**Slim type with
high capacity up to 4A
DC load type also available**

PhotoMOS®
Power 1 Form A
 (AQZ100, 200)



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				$f = 100$ 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), $V_L = DC$
	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				$I_L = 100$ mA
		Maximum		3.0 mA				$V_L = 10$ V
	LED turn off current	Minimum	I_{Foff}	0.4 mA				$I_L = 100$ mA
		Typical		0.9 mA				$V_L = 10$ V
	LED dropout voltage	Typical	V_F	1.25 V (1.16 V at $I_F = 10$ mA)				$I_F = 50$ mA
		Maximum		1.5 V				
Output	On resistance	Typical	R_{on}	0.05 Ω	0.081 Ω	0.34 Ω	1.06 Ω	$I_F = 10$ mA
		Maximum		0.09 Ω	0.17 Ω	0.55 Ω	1.6 Ω	$I_L = \text{Max.}$ Within 1 s
	Off state leakage current	Maximum	I_{Leak}	10 μ A				$I_F = 0$ 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	$I_F = 10$ mA
		Maximum		5.0 ms				$I_L = 100$ mA
		Typical		3.79 ms	4.50 ms	1.75 ms	2.34 ms	$V_L = 10$ V
		Maximum		10.0 ms				$I_F = 5$ mA $I_L = 100$ mA $V_L = 10$ V
	Turn off time*	Typical	T_{off}	0.15 ms	0.19 ms	0.08 ms	0.08 ms	$I_F = 5$ mA or 10 mA
		Maximum		3.0 ms				$I_L = 100$ mA $V_L = 10$ V
	I/O capacitance	Typical	C_{iso}	0.8 pF				$f = 1$ MHz
		Maximum		1.5 pF				$V_B = 0$ V
	Initial I/O isolation resistance	Minimum	R_{iso}	1,000 M Ω				500 V DC
	Max. operating frequency	Maximum	—	0.5 cps				$I_F = 10$ mA Duty factor = 50% $I_L = \text{Max.}$, $V_L = \text{Max.}$

2. AC/DC type

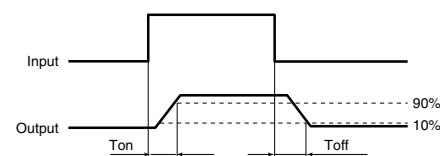
1) Absolute maximum ratings (Ambient temperature: 25°C 77°F)

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				$f = 100$ 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), $V_L = DC$
	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	I _{Fon}	1.0 mA				I _L = 100 mA
		Maximum		3.0 mA				V _L = 10 V
	LED turn off current	Minimum	I _{Foff}	0.4 mA				I _L = 100 mA
		Typical		0.9 mA				V _L = 10 V
	LED dropout voltage	Typical	V _F	1.25 V (1.16 V at I _F = 10 mA)				I _F = 50 mA
		Maximum		1.5 V				
Output	On resistance	Typical	R _{on}	0.11 Ω	0.23 Ω	0.7 Ω	2.1 Ω	I _F = 10 mA
		Maximum		0.18 Ω	0.34 Ω	1.1 Ω	3.2 Ω	I _L =Max. Within 1 s
	Off state leakage current	Maximum	I _{Lleak}	10 μA				I _F = 0 mA V _L = Max.
Transfer characteristics	Turn on time*	Typical	T _{on}	2.46 ms	2.40 ms	1.12 ms	1.65 ms	I _F = 10 mA
		Maximum		5.0 ms				I _L = 100 mA V _L = 10 V
		Typical		5.64 ms	5.65 ms	2.57 ms	3.88 ms	I _F = 5 mA
		Maximum		10.0 ms				I _L = 100 mA V _L = 10 V
	Turn off time*	Typical	T _{off}	0.22 ms	0.21 ms	0.10 ms	0.08 ms	I _F = 5 mA or 10 mA
		Maximum		3.0 ms				I _L = 100 mA V _L = 10 V
	I/O capacitance	Typical	C _{iso}	0.8 pF				f = 1 MHz
		Maximum		1.5 pF				V _B = 0 V
	Initial I/O isolation resistance	Minimum	R _{iso}	1,000 MΩ				500 V DC
	Max. operating frequency	Maximum	—	0.5 cps				I _F = 10 mA Duty factor = 50% I _L = Max., V _L = 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

■ For Dimensions, see Page 61.

■ For Schematic and Wiring Diagrams, see Page 66.

■ For Operate, see Page 71.

■ For Terminology, see Page 73.

■ For Cautions for Use, see Page 74.

■ For Various Applications, see Page 82.

■ For Standards, see Page 340.

■ These products are not designed for automotive use.

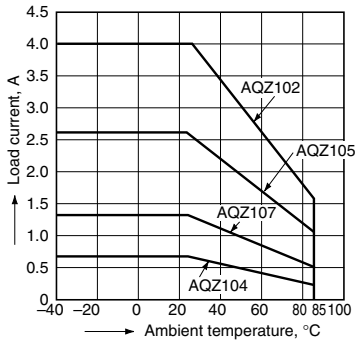
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

For more information, see page 85.

REFERENCE DATA

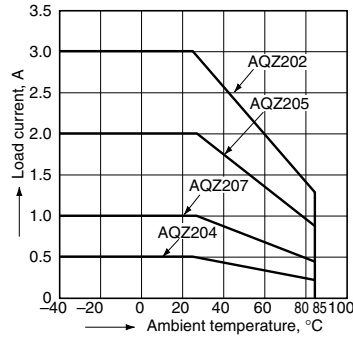
1.-(1) Load current vs. ambient temperature characteristics (DC type)

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



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

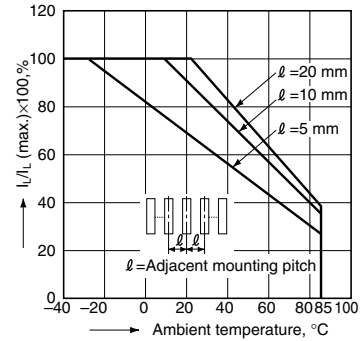
Allowable ambient temperature: -40 to +85°C
-40 to +185°F



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

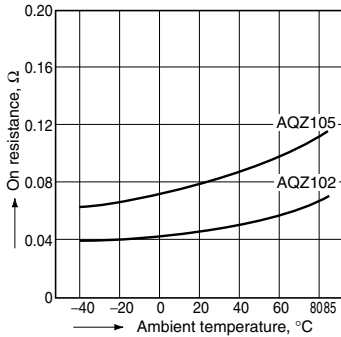
I_L : Load current;

I_L (max.): Maximum continuous load current



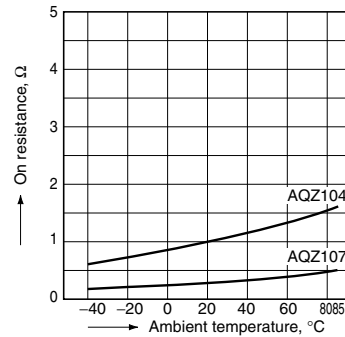
3.-(1) On resistance vs. ambient temperature characteristics (DC type)

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



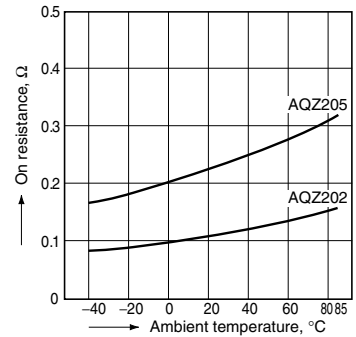
3.-(2) On resistance vs. ambient temperature characteristics (DC type)

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



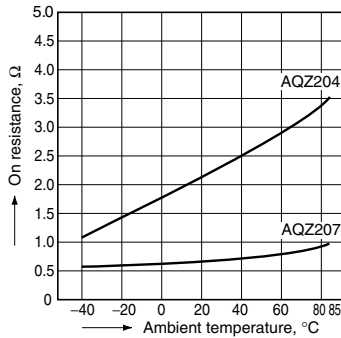
3.-(3) On resistance vs. ambient temperature characteristics (AC/DC type)

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



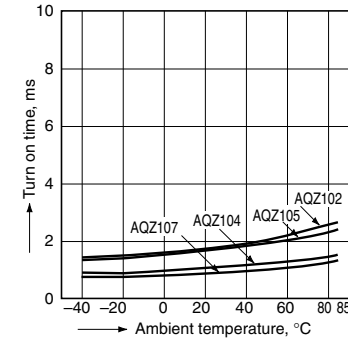
3.-(4) On resistance vs. ambient temperature characteristics (AC/DC type)

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



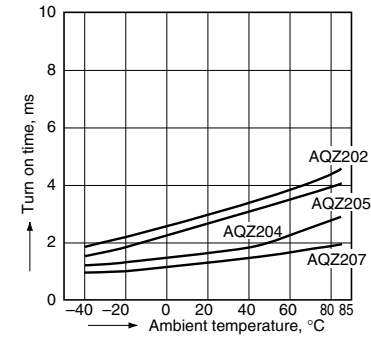
4.-(1) Turn on time vs. ambient temperature characteristics (DC type)

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



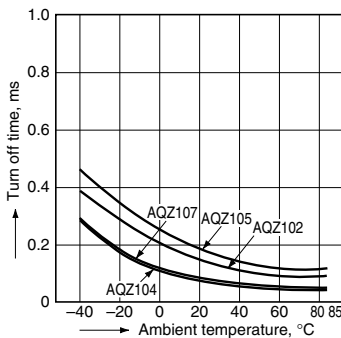
4.-(2) Turn on time vs. ambient temperature characteristics (AC/DC type)

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



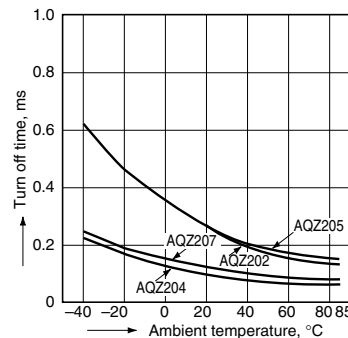
5.-(1) Turn off time vs. ambient temperature characteristics (DC type)

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



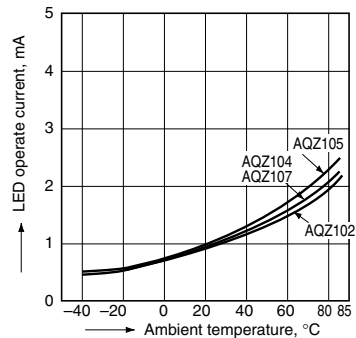
5.-(2) Turn off time vs. ambient temperature characteristics (AC/DC type)

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



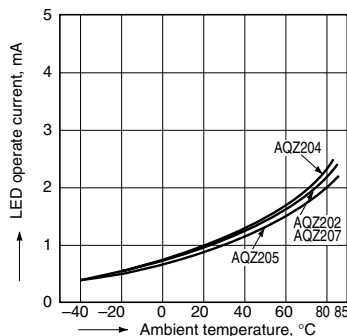
6.-(1) LED operate vs. ambient temperature characteristics (DC type)

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



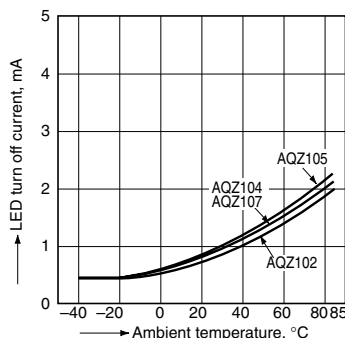
6.-(2) LED operate vs. ambient temperature characteristics (AC/DC type)

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



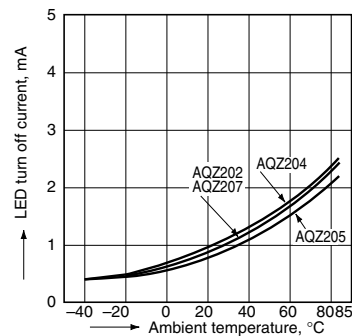
7.-(1) LED turn off current vs. ambient temperature characteristics (DC type)

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



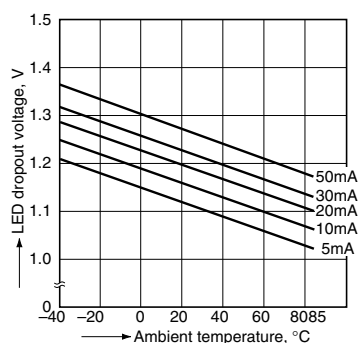
7.-(2) LED turn off current vs. ambient temperature characteristics (AC/DC type)

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



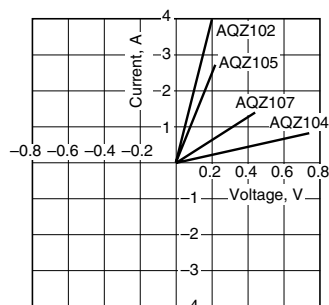
8. LED dropout voltage vs. ambient temperature characteristics

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



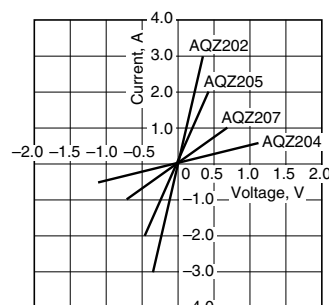
9.-(1) Current vs. voltage characteristics of output at MOS portion (DC type)

Ambient temperature: 25°C 77°F



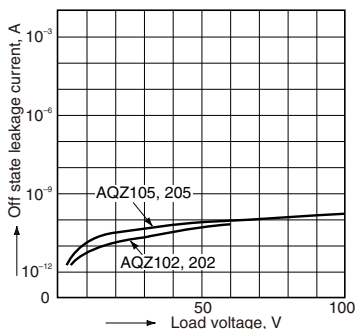
9.-(2) Current vs. voltage characteristics of output at MOS portion (AC/DC type)

Ambient temperature: 25°C 77°F



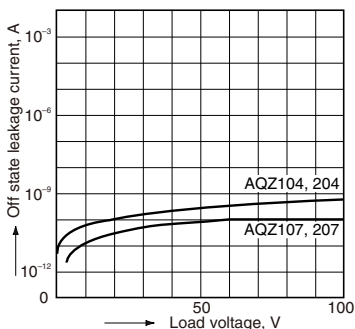
10.-(1) Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



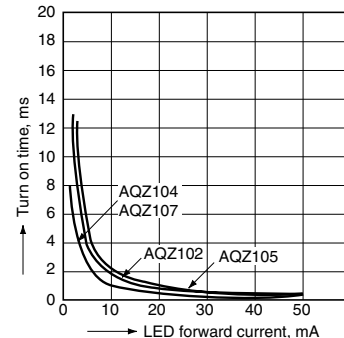
10.-(2) Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



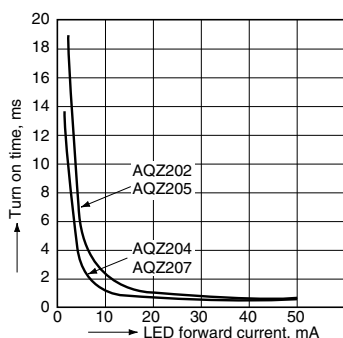
11.-(1) Turn on time vs. LED forward current characteristics (DC type)

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



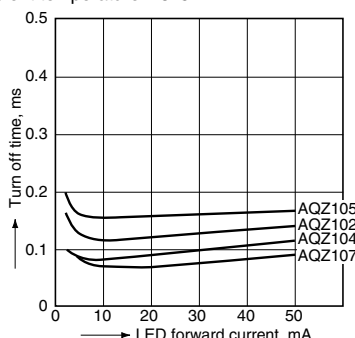
11.-(2) Turn on time vs. LED forward current characteristics (AC/DC type)

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



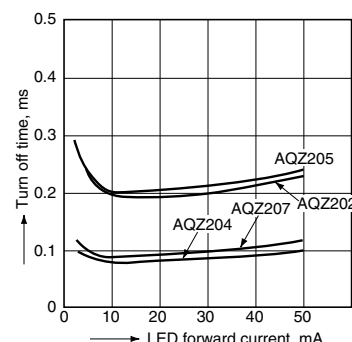
12.-(1) Turn off time vs. LED forward current characteristics (DC type)

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



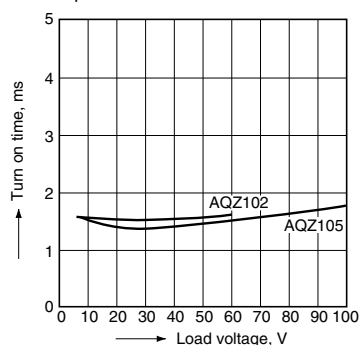
12.-(2) Turn off time vs. LED forward current characteristics (AC/DC type)

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



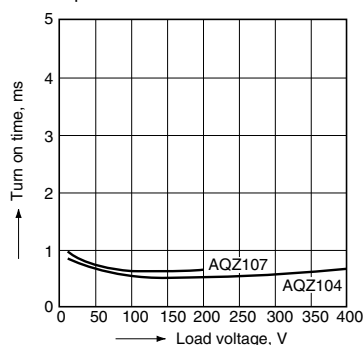
13.-(1) Turn on time vs. load voltage characteristics (DC type)

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



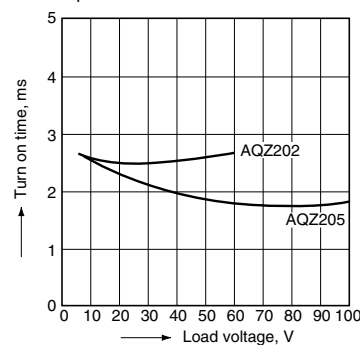
13.-(2) Turn on time vs. load voltage characteristics (DC type)

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



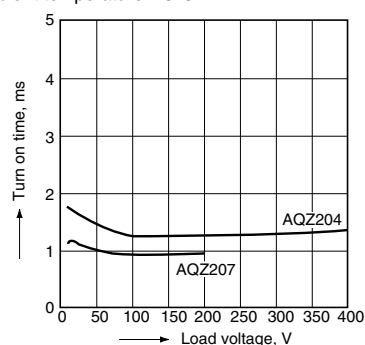
13.-(3) Turn on time vs. load voltage characteristics (AC/DC type)

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



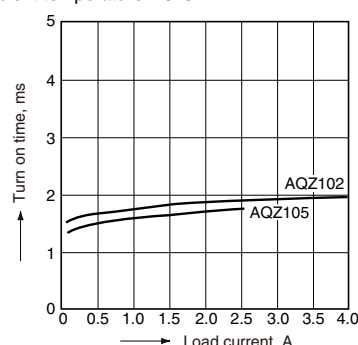
13.-(4) Turn on time vs. load voltage characteristics (AC/DC type)

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



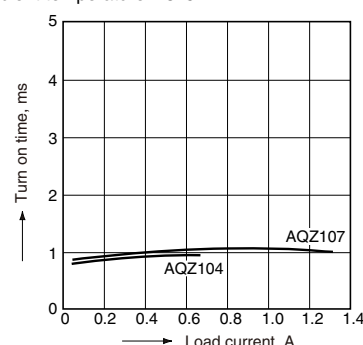
14.-(1) Turn on time vs. load current characteristics (DC type)

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



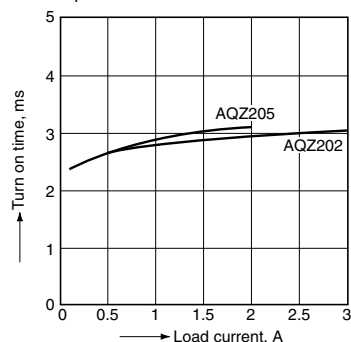
14.-(2) Turn on time vs. load current characteristics (DC type)

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



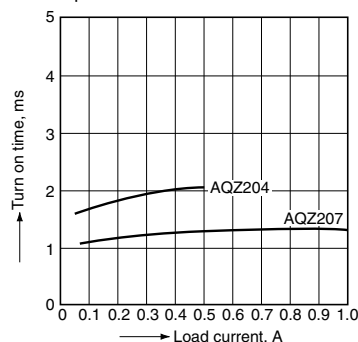
14.-(3) Turn on time vs. load current characteristics (AC/DC type)

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



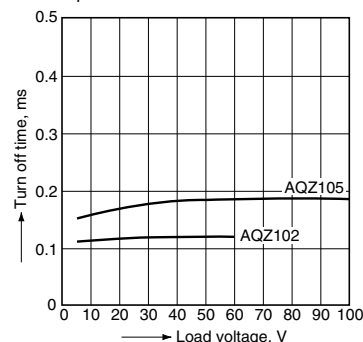
14.-(4) Turn on time vs. load current characteristics (AC/DC type)

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



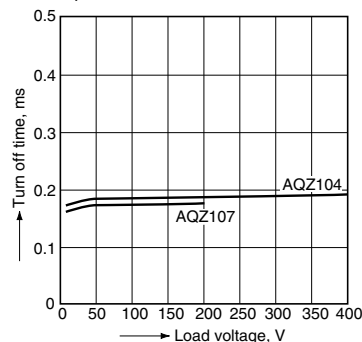
15.-(1) Turn off time vs. load voltage characteristics (DC type)

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



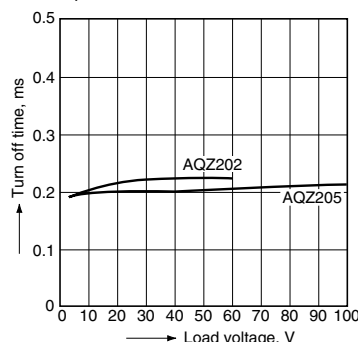
15.-(2) Turn off time vs. load voltage characteristics (DC type)

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



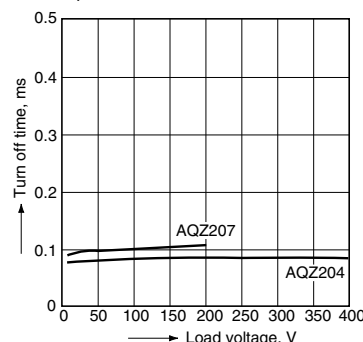
15.-(3) Turn off time vs. load voltage characteristics (AC/DC type)

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



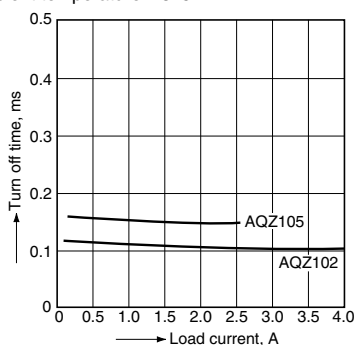
15.-(4) Turn off time vs. load voltage characteristics (AC/DC type)

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



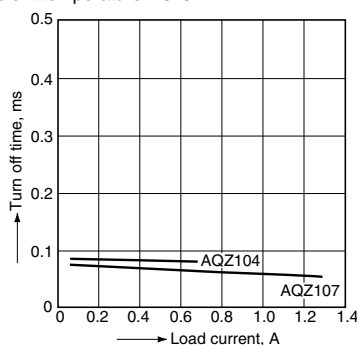
16.-(1) Turn off time vs. load current characteristics (DC type)

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



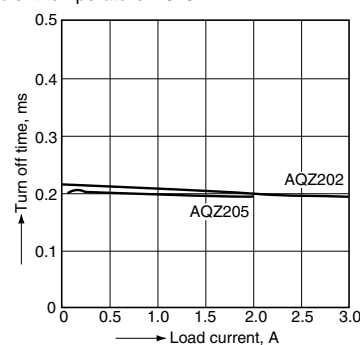
16.-(2) Turn off time vs. load current characteristics (DC type)

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



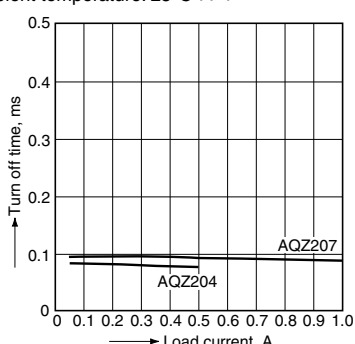
16.-(3) Turn off time vs. load current characteristics (AC/DC type)

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



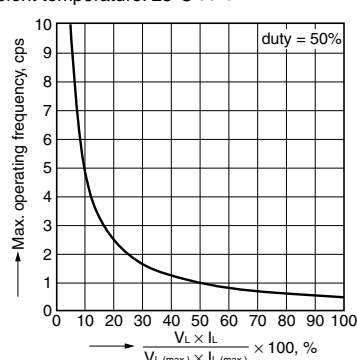
16.-(4) Turn off time vs. load current characteristics (AC/DC type)

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



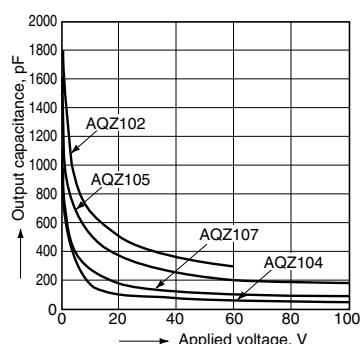
17. Max. operating frequency vs. load voltage/current characteristics

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



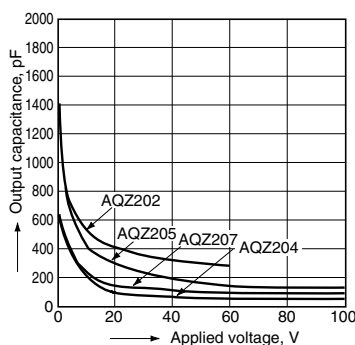
18.-(1) Output capacitance vs. applied voltage characteristics (DC type)

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

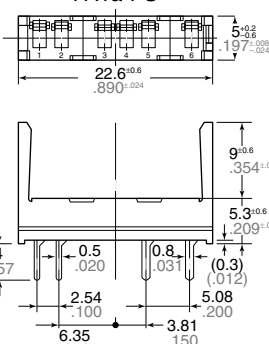


ACCESSORY (mm inch)

Socket

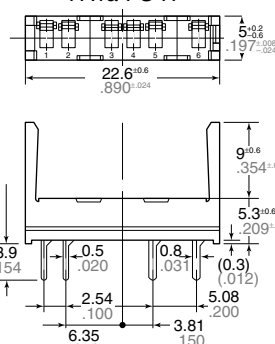


PA1a-PS



Standard type

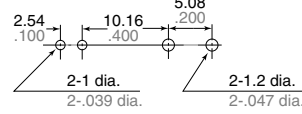
PA1a-PS-H



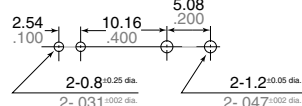
Self clinching type

PC board pattern (BOTTOM VIEW)

Standard type



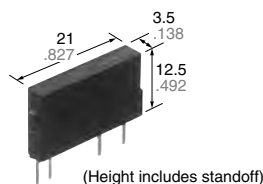
Self clinching type



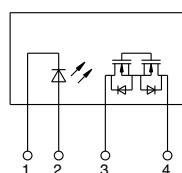
Tolerance: ±0.1 ±0.004

**Normally closed type
in a slim SIL package
Load voltage 400V**

**PhotoMOS[®]
Power 1 Form B
(AQZ404)**



mm inch



RoHS compliant

FEATURES

1. High sensitivity and low on-resistance

Max. 0.5A load can be controlled with 5 mA input current. The on-resistance is low at Typ. 2.8Ω.

2. Normally closed (1 Form B) contact

This has been realized thanks to the built-in MOSFET processed by our proprietary method, DSD (Double-diffused and Selective Doping) method.

3. Slim SIL4-pin package

(W) 3.5 × (D) 21.0 × (H) 12.5 mm

(W) .138 × (D) .827 × (H) .492 inch

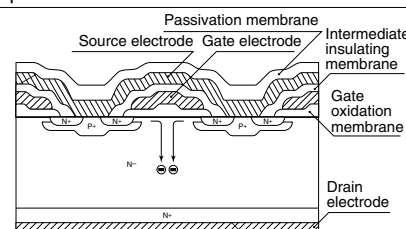
The compact size of the 4-pin SIL package allows high density mounting.

4. Sockets are also available

(PA1a-PS, PA1a-PS-H)

5. Can be installed on the RT-3 relay terminal (Power PhotoMOS type)

Cross section of the normally-closed type of power MOS



TYPICAL APPLICATIONS

- Traffic signals
- Measuring instruments
- Industrial machines

TYPES

	Output rating*		Package	Part No.	Packing quantity	
	Load voltage	Load current			Inner carton	Outer carton
AC/DC dual use	400 V	0.5 A	SIL4-pin	AQZ404	25 pcs	500 pcs

*Indicate the peak AC and DC values.

RATING

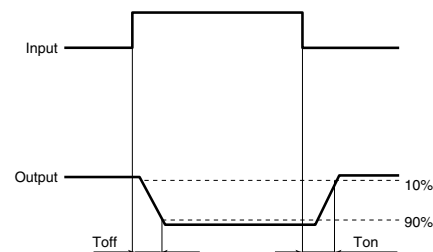
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item		Symbol	AQZ404	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	0.5 A	Peak AC, DC
	Peak load current	I _{peak}	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 −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	AQZ404	Condition	
Input	LED operate (OFF) current	Typical	I _{Foff}	1.0 mA	I _L = 100 mA V _L = 10 V	
		Maximum		3.0 mA		
	LED reverse (ON) current	Minimum	I _{Fon}	0.4 mA	I _L = 100 mA V _L = 10 V	
		Typical		0.9 mA		
	LED dropout voltage	Typical	V _F	1.25 V (1.16 V at I _F = 10 mA)		
		Maximum		1.5 V	I _F = 50 mA	
Output	On resistance	Typical	R _{on}	2.8 Ω	I _F = 0 mA, I _L = Max. Within 1 s	
		Maximum		4.0 Ω		
	Off state leakage current	Maximum	I _{Leak}	10 μA	I _F = 10mA, V _L = Max.	
Transfer characteristics	Operating (OFF) time*	Typical	T _{off}	3.9 ms	I _F = 0 → 10 mA I _L = 100 mA, V _L = 10 V	
		Maximum		7.5 ms		
		Typical		T _{off}	9.4 ms	I _F = 0 → 5 mA I _L = 100 mA, V _L = 10 V
		Maximum			15 ms	
	Reverse (ON) time*	Typical	T _{on}	0.8 ms	I _F = 5 mA → 0 or 10 mA → 0 I _L = 100 mA, V _L = 10 V	
		Maximum		3.0 ms		
	I/O capacitance	Typical	C _{iso}	0.8 pF	f = 1 MHz	
		Maximum		1.5 pF	V _B = 0 V	
	Initial I/O isolation resistance	Minimum	R _{iso}	1,000 MΩ	500 V DC	
Max. operating frequency	Maximum	—	0.5 cps	I _F = 10 mA, Duty factor = 50% I _L =Max., V _L =Max.		

*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
AQZ404	Load voltage (Peak AC)	V_L	—	320	V
	Continuous load current	I_L	—	0.5	A

- For Dimensions, see Page 61.
- For Schematic and Wiring Diagrams, see Page 66.
- For Operate, see Page 71.
- For Terminology, see Page 73.
- For Cautions for Use, see Page 74.
- For Various Applications, see Page 82.
- For Standards, see Page 340.

■ These products are not designed for automotive use.

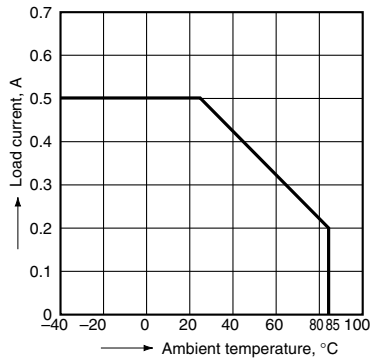
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

For more information, see page 85.

REFERENCE DATA

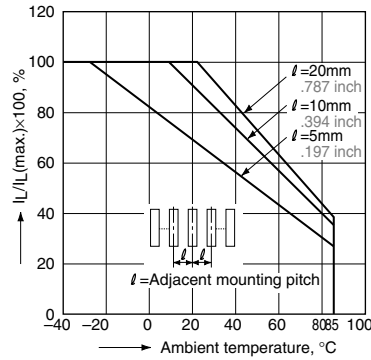
1. Load current vs. ambient temperature characteristics

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



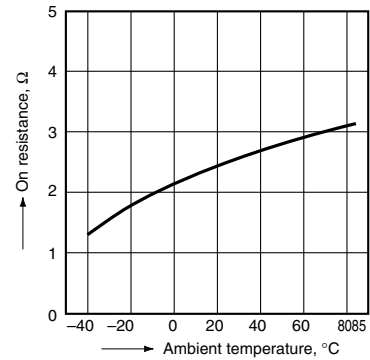
2. Load current vs. ambient temperature characteristics in adjacent mounting

I_L : Load current;
 $I_L(\text{max.})$: Maximum continuous load current



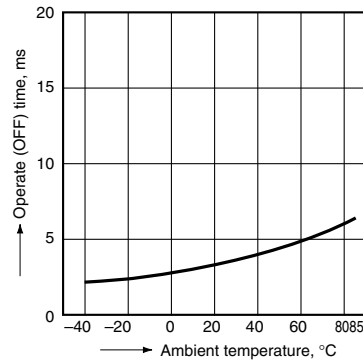
3. On resistance vs. ambient temperature characteristics

LED current: 0 mA; Load voltage: Max. (DC)
 Continuous load current: Max. (DC)



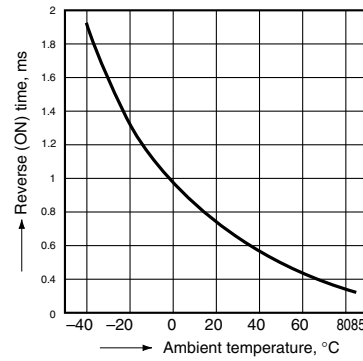
4. Operate (OFF) time vs. ambient temperature characteristics

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



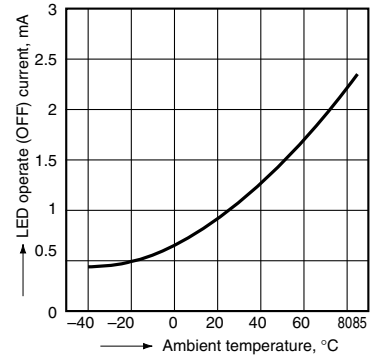
5. Reverse (ON) time vs. ambient temperature characteristics

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



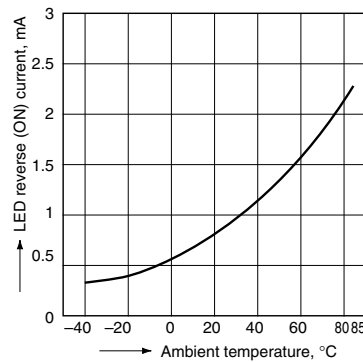
6. LED operate (OFF) current vs. ambient temperature characteristics

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



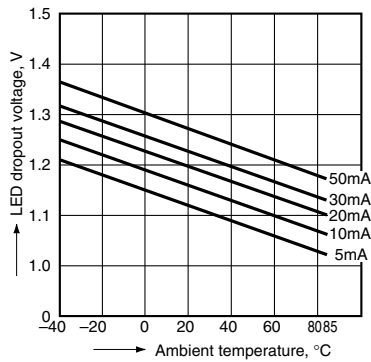
7. LED reverse (ON) current vs. ambient temperature characteristics

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



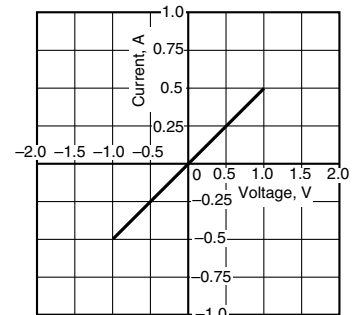
8. LED dropout voltage vs. ambient temperature characteristics

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



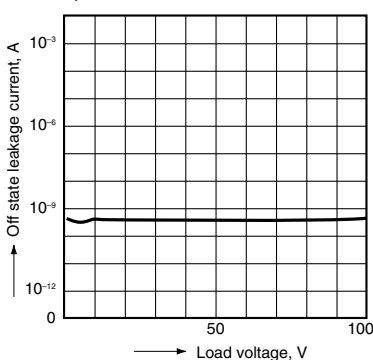
9. Current vs. voltage characteristics of output at MOS portion

Ambient temperature: 25°C 77°F



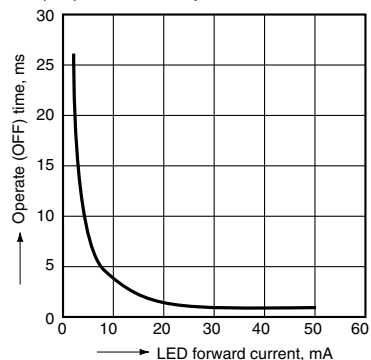
10. Off state leakage current vs. load voltage characteristics

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



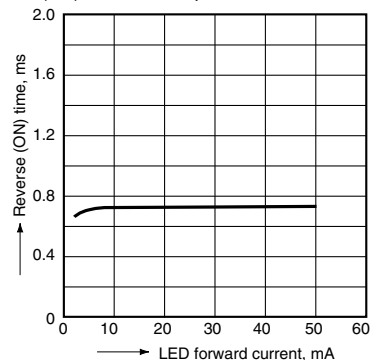
11. Operate (OFF) time vs. LED forward current characteristics

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



12. Reverse (ON) time vs. LED forward current characteristics

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

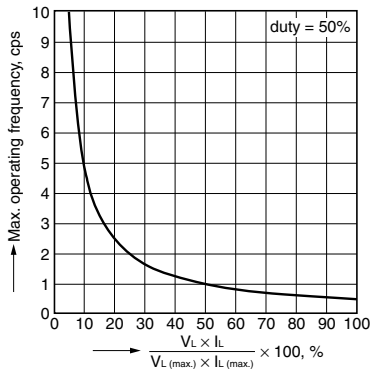


13. Max. operating frequency vs. load voltage/ current characteristics

LED current: 10 mA;

Ambient temperature: 25°C 77°F

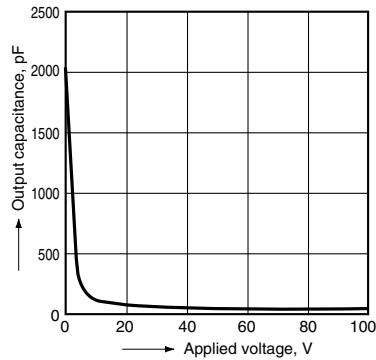
V_L : Load voltage, V_L (Max.): Max. rated load voltage
 I_L : Load current, I_L (Max.): Max. rated continuous load current



14. Output capacitance vs. applied voltage characteristics

LED current: 10 mA; Frequency: 1 MHz;

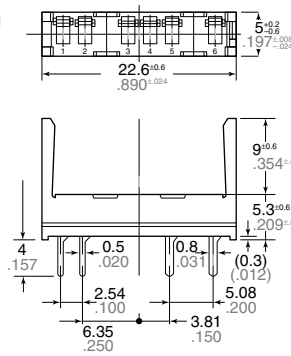
Ambient temperature: 25°C 77°F



ACCESSORY (mm inch)

Socket

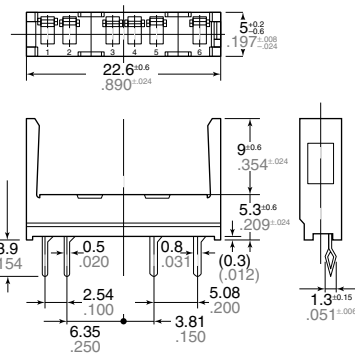
PA1a-PS



Standard type

General Tolerance: $\pm 0.3 \pm .012$

PA1a-PS-H

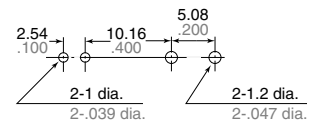


Self clinching type

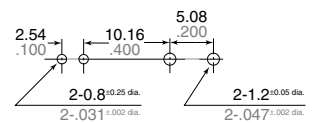
General Tolerance: $\pm 0.3 \pm .012$

PC board pattern (BOTTOM VIEW)

Standard type

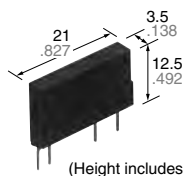


Self clinching type

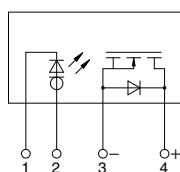
Tolerance: $\pm 0.1 \pm .004$

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

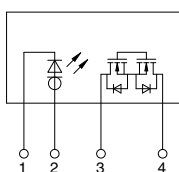
PhotoMOS[®]
Power 1 Form A
 Voltage-sensitive (AQZ100D, 200D)



mm inch



DC type



AC/DC type

RoHS compliant

FEATURES

1. A voltage-sensitive power PhotoMOS

Conventional power PhotoMOS are connected externally to an input limiting resistor in order to obtain the appropriate LED current. Adding an internal constant-current element renders the input limiting resistor unnecessary, making it possible for the PhotoMOS to be voltage-driven.

2. Wide range of input voltages

Allows a wide range of input voltages from 4 to 30 V DC. The PhotoMOS can be used in 5 V, 12 V or 24 V DC systems.

3. Both AC/DC dual types and DC-only types available

The AC/DC dual type is capable of bi-directional control, and unlike conventional SSRs, does not have to be used differently depending on the load. The DC-only type is well suited for control of DC solenoids and DC motors.

4. High capacity

Supports the various types of load control, from very small loads to a max. 2.7 A for the AC/DC dual type, max. 3.6 A for the DC-only type.

5. High sensitivity and low on-resistance

Max. 3.6 A load can be controlled with the min. input voltage of 4 V DC. The on-resistance is also low at Typ. 0.033 Ω (AQZ102D).

6. 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.

TYPICAL APPLICATIONS

- Industrial machines
- Traffic signals

TYPES

1. DC type

	Output rating*		Package	Part No.	Packing quantity	
	Load voltage	Load current			Inner carton	Outer carton
DC only	60 V	3.6 A	SIL4-pin	AQZ102D	25 pcs.	500 pcs.
	100 V	2.3 A		AQZ105D		
	200 V	1.1 A		AQZ107D		
	400 V	0.6 A		AQZ104D		

* 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	2.7 A	SIL4-pin	AQZ202D	25 pcs.	500 pcs.
	100 V	1.8 A		AQZ205D		
	200 V	0.9 A		AQZ207D		
	400 V	0.45 A		AQZ204D		

* 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	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 $+85^{\circ}C$ -40 to $+185^{\circ}F$ ($4 V \leq V_{IN} \leq 6 V$) -40 to $+75^{\circ}C$ -40 to $+167^{\circ}F$ ($6 V < V_{IN} \leq 15 V$) -40 to $+60^{\circ}C$ -40 to $+140^{\circ}F$ ($15 V < V_{IN} \leq 30 V$)				(Non-icing at low temperatures)
	Storage	T_{stg}	-40 to $+100^{\circ}C$ -40 to $+212^{\circ}F$				

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

Item			Symbol	AQZ102D	AQZ105D	AQZ107D	AQZ104D	Condition
Input	Operate voltage	Typical	V _{Fon}	1.4 V				I _L = 100 mA
		Maximum		4 V				V _L = 10 V
	Turn off voltage	Minimum	V _{Foff}	0.8 V				I _L = 100 mA
		Typical		1.3 V				V _L = 10 V
	Input current	Typical	I _{IN}	6.5 mA				V _{IN} = 5 V
Output	On resistance	Typical	R _{on}	0.033 Ω	0.090 Ω	0.33 Ω	1.23 Ω	V _{IN} = 5 V
		Maximum		0.09 Ω	0.17 Ω	0.55 Ω	1.6 Ω	I _L = Max. Within 1 s
	Off state leakage current	Maximum	I _{Leak}	10 μA				V _{IN} = 0 V V _L = Max.
Transfer characteristics	Turn on time*	Typical	T _{on}	3.3 ms	2.2 ms	1.5 ms	1.2 ms	V _{IN} = 5 V
		Maximum		10.0 ms				I _L = 100 mA V _L = 10 V
	Turn off time*	Typical	T _{off}	0.2 ms		0.1 ms		V _{IN} = 5 V
		Maximum		3.0 ms				I _L = 100 mA V _L = 10 V
	I/O capacitance	Typical	C _{iso}	0.8 pF				f = 1 MHz
		Maximum		1.5 pF				V _B = 0 V
	Initial I/O isolation resistance	Minimum	R _{iso}	1,000 MΩ				500 V DC
	Max. operating frequency	Maximum	—	0.5 cps				V _{IN} = 5 V Duty factor = 50% I _L = Max., V _L = Max.

2. AC/DC type**1) Absolute maximum ratings (Ambient temperature: 25°C 77°F)**

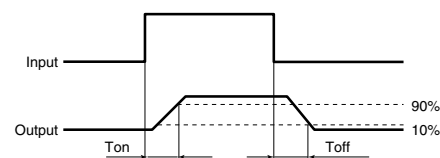
Item		Symbol	AQZ202D	AQZ205D	AQZ207D	AQZ204D	Remarks
Input	Input voltage	V_{IN}	30 V				
	Input reverse voltage	V_{RIN}	5 V				
	Power dissipation	P_{in}	300 mW				
Output	Load voltage (peak AC)	V_L	60 V	100 V	200 V	400 V	
	Continuous load current	I_L	2.7 A	1.8 A	0.9 A	0.45 A	Peak AC, DC
	Peak load current	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 $+85^{\circ}C$ -40 to $+185^{\circ}F$ ($4 V \leq V_{IN} \leq 6 V$) -40 to $+75^{\circ}C$ -40 to $+167^{\circ}F$ ($6 V < V_{IN} \leq 15 V$) -40 to $+60^{\circ}C$ -40 to $+140^{\circ}F$ ($15 V < V_{IN} \leq 30 V$)				(Non-icing at low temperatures)
	Storage	T_{stg}	-40 to $+100^{\circ}C$ -40 to $+212^{\circ}F$				

Power 1 Form A Voltage-sensitive (AQZ100D, 200D)

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

Item			Symbol	AQZ202D	AQZ205D	AQZ207D	AQZ204D	Condition
Input	Operate voltage	Typical	V _{Fon}	1.4 V				I _L = 100 mA
		Maximum		4 V				V _L = 10 V
	Turn off voltage	Minimum	V _{Foff}	0.8 V				I _L = 100 mA
		Typical		1.3 V				V _L = 10 V
	Input current	Typical	I _{IN}	6.5 mA				V _{IN} = 5 V
Output	On resistance	Typical	R _{ton}	0.066 Ω	0.180 Ω	0.64 Ω	2.4 Ω	V _{IN} = 5 V
		Maximum		0.18 Ω	0.34 Ω	1.1 Ω	3.2 Ω	I _L = Max. Within 1 s
	Off state leakage current	Maximum	I _{Leak}	10 μA				V _{IN} = 0 V V _L = Max.
Transfer characteristics	Turn on time*	Typical	T _{on}	5.8 ms	4.2 ms	2.7 ms	2.3 ms	V _{IN} = 5 V
		Maximum		10.0 ms				I _L = 100 mA V _L = 10 V
	Turn off time*	Typical	T _{off}	0.2 ms		0.1 ms		V _{IN} = 5 V
		Maximum		3.0 ms				I _L = 100 mA V _L = 10 V
	I/O capacitance	Typical	C _{iso}	0.8 pF				f = 1 MHz
		Maximum		1.5 pF				V _B = 0 V
	Initial I/O isolation resistance	Minimum	R _{iso}	1,000 MΩ				500 V DC
Max. operating frequency	Maximum	—	0.5 cps				V _{IN} = 5 V Duty factor = 50% I _L = Max. V _L = 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
AQZ102D	Input voltage	V_{IN}	5	24	V
	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
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

■ For Dimensions, see Page 61.

■ For Schematic and Wiring Diagrams, see Page 66.

■ For Operate, see Page 71.

■ For Terminology, see Page 73.

■ For Cautions for Use, see Page 74.

■ For Various Applications, see Page 82.

■ For Standards, see Page 340.

■ 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.

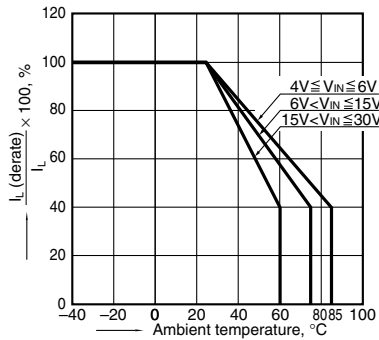
For more information, see page 85.

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

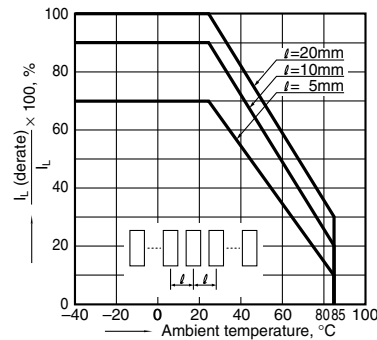
Allowable ambient temperature: -40 to $+85^{\circ}\text{C}$
 -40 to $+185^{\circ}\text{F}$;

V_{IN} : Input voltage; I_L (derate): Load current (derate); I_L : Absolute maximum ratings of continuous load current



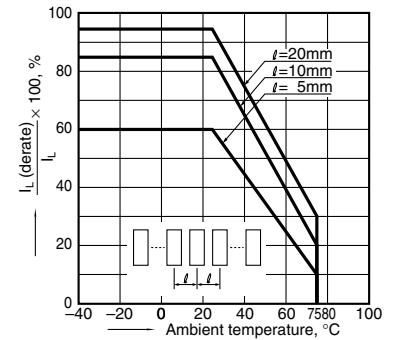
2.-(1) Load current vs. ambient temperature characteristics in adjacent mounting

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



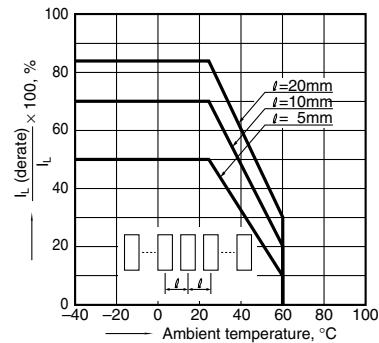
2.-(2) Load current vs. ambient temperature characteristics in adjacent mounting

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



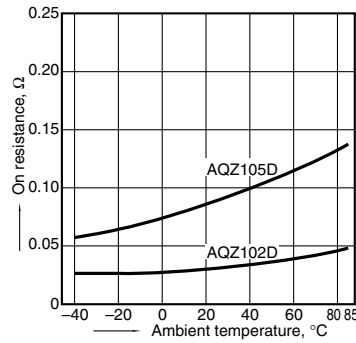
2.-(3) Load current vs. ambient temperature characteristics in adjacent mounting

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



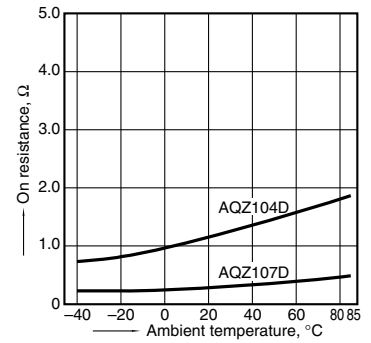
3.-(1) On resistance vs. ambient temperature characteristics (DC type)

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



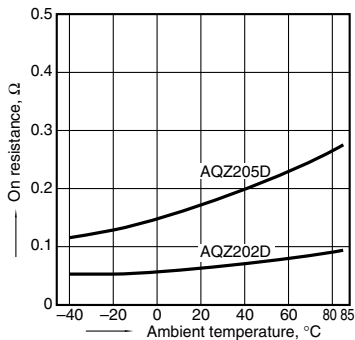
3.-(2) On resistance vs. ambient temperature characteristics (DC type)

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



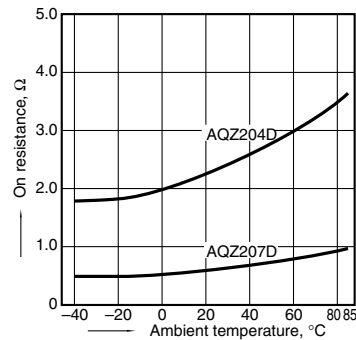
3.-(3) On resistance vs. ambient temperature characteristics (AC/DC type)

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



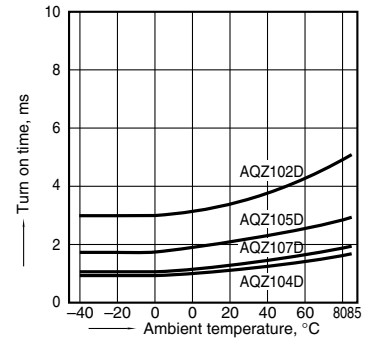
3.-(4) On resistance vs. ambient temperature characteristics (AC/DC type)

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)

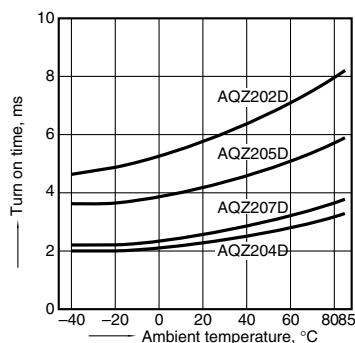
Input voltage: 5 V; Load voltage: 10 V (DC);
 Continuous load current: 100 mA (DC)



Power 1 Form A Voltage-sensitive (AQZ100D, 200D)

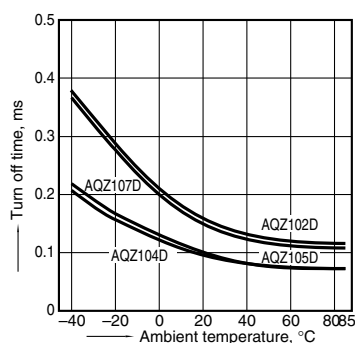
4.-(2) Turn on time vs. ambient temperature characteristics (AC/DC type)

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



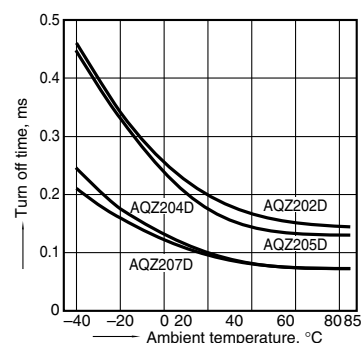
5.-(1) Turn off time vs. ambient temperature characteristics (DC type)

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



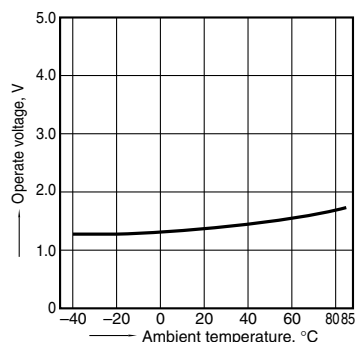
5.-(2) Turn off time vs. ambient temperature characteristics (AC/DC type)

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



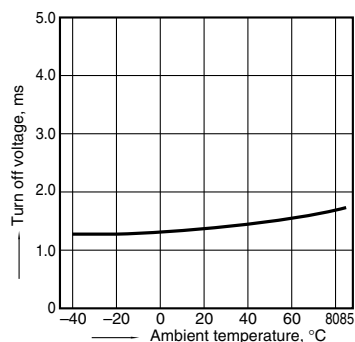
6. Operate voltage vs. ambient temperature characteristics

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



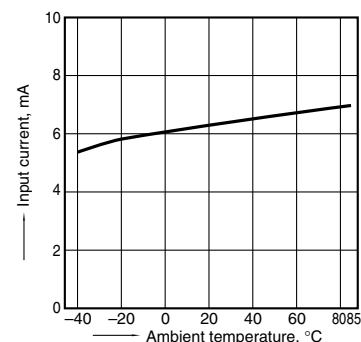
7. Turn off voltage vs. ambient temperature characteristics

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



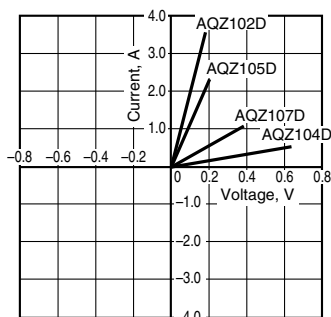
8. Input current vs. ambient temperature characteristics

Input voltage: 5 V



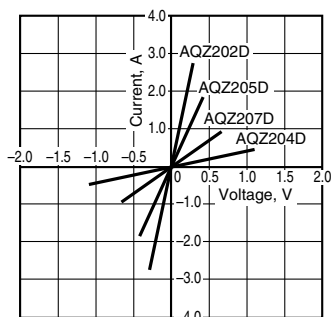
9.-(1) Current vs. voltage characteristics of output at MOS portion (DC type)

Ambient temperature: 25°C 77°F



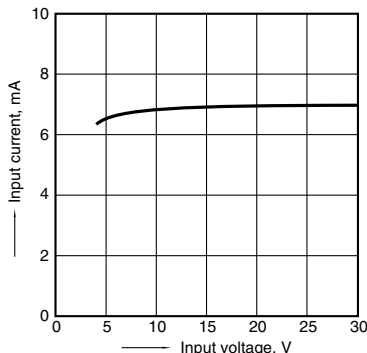
9.-(2) Current vs. voltage characteristics of output at MOS portion (AC/DC type)

Ambient temperature: 25°C 77°F



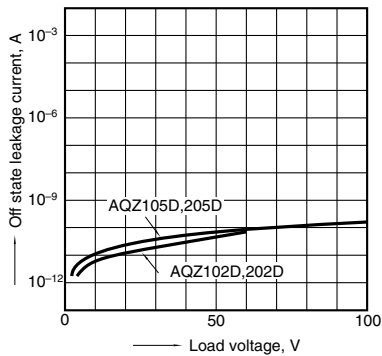
10. Input current vs. input voltage characteristics

Ambient temperature: 25°C 77°F



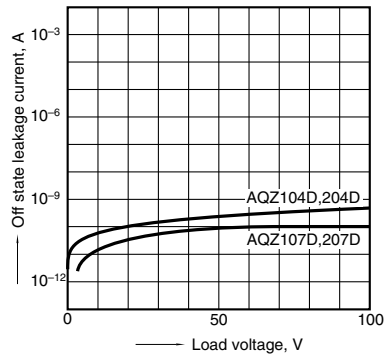
11.-(1) Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



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

Ambient temperature: 25°C 77°F

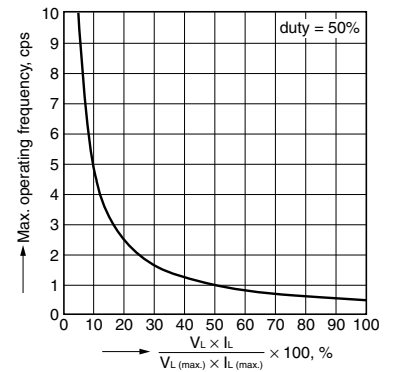


12. Max. operating frequency vs. load voltage/current characteristics

Sample: All types; LED current: 10 mA;

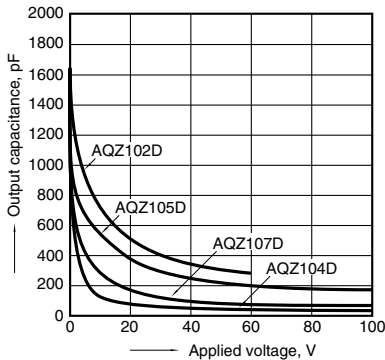
Ambient temperature: 25°C 77°F

V_L: Load voltage, V_L (Max.): Max. rated load voltage
I_L: Load current, I_L (Max.): Max. rated continuous load current



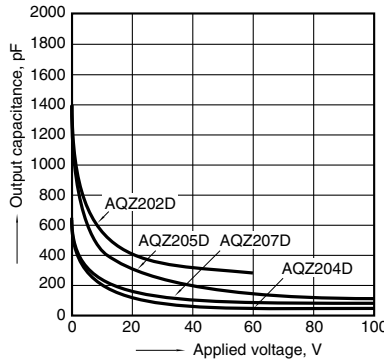
13.-(1) Output capacitance vs. applied voltage characteristics (DC type)

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



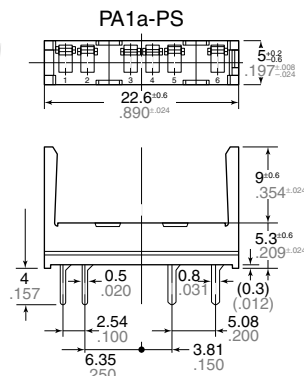
13.-(2) Output capacitance vs. applied voltage characteristics (AC/DC type)

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

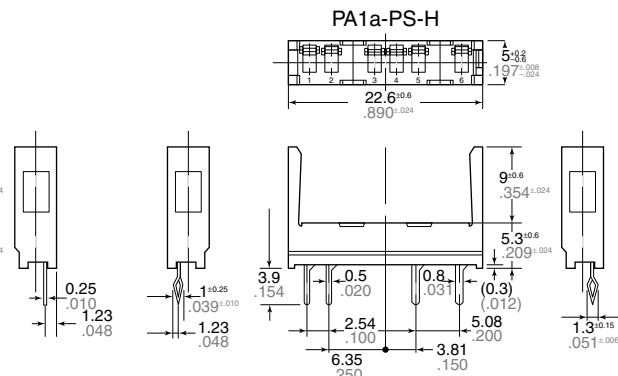


ACCESSORY (mm inch)

Socket



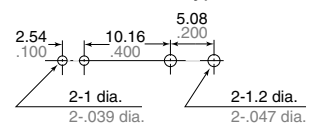
Standard type



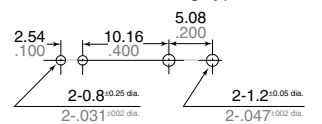
Self clinching type

PC board pattern (BOTTOM VIEW)

Standard type



Self clinching type



Tolerance: $\pm 0.1 \pm .004$

**High capacity up to 6A
in a slim SIL package**

**PhotoMOS[®]
Power 1 Form A
High Capacity (AQZ26○)**

FEATURES

1. High capacity type power PhotoMOS.

Can switch a wide range of currents and voltages. Can control various types of loads, from very small loads to a max. 6A AC/DC current for sequencers, motors, and lamps.

2. Low on-resistance and high sensitivity.

Low on-resistance of less than Typ. 0.036Ω (AQZ262). High sensitivity LED operate current of Typ. 1 mA.

3. AC/DC dual use

Bi-directional control is possible. There is no need to differentiate depending on the load as was necessary with the conventional SSR.

4. 4-pin SIL type

(L) 43.0 mm $\times$ (W) 9.0 mm $\times$ (H) 32.0 mm
(L) 1.693 inch $\times$ (W) .354 inch $\times$ (H) 1.260 inch.

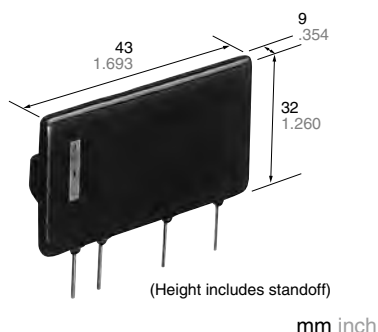
5. Low-level off state leakage current of max. 10 μ A

6. Controls low-level analog signals

The triac, photocoupler, or SSR cannot be used to control signals of less than several hundred mV. The high capacity type power PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

TYPICAL APPLICATIONS

- Mercury relay replacement
- Compact motors, lamps, heaters
- OA equipment



RoHS compliant

TYPES

	Output rating*		Package	Part No.	Packing quantity	
	Load voltage	Load current			Inner carton	Outer carton
AC/DC dual use	60 V	6.0 A	SIL4-pin	AQZ262	20 pcs	200 pcs
	400 V	1.0 A		AQZ264		

* Indicate the peak AC and DC values.

RATING

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

Item		Symbol	AQZ262	AQZ264	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	400 V	
	Continuous load current	I_L	6.0 A	1.0 A	Peak AC, DC
	Peak load current	I_{peak}	10.0 A	3.0 A	100 ms (1shot), $V_L = \text{DC}$
	Power dissipation	P_{out}	3.0 W		
Total power dissipation		P_T	3.0 W		
I/O isolation voltage		V_{iso}	1,500 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)

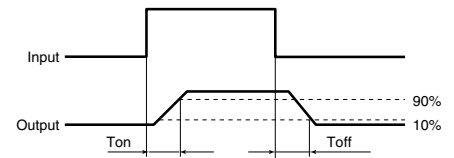
Item			Symbol	AQZ262	AQZ264	Condition
Input	LED operate current	Typical	I_{Fon}	1.0 mA		$I_L = 100 \text{ mA}$
		Maximum		3.0 mA		$V_L = 10 \text{ V}$
	LED turn off current	Minimum	I_{Foff}	0.4 mA		$I_L = 100 \text{ mA}$
		Typical		0.9 mA		$V_L = 10 \text{ V}$
	LED dropout voltage	Typical	V_F	1.25 V (1.16 V at $I_F = 10 \text{ mA}$)		$I_F = 50 \text{ mA}$
		Maximum		1.5 V		
Output	On resistance	Typical	R_{on}	0.036 Ω	1.0 Ω	$I_F = 10 \text{ mA}$
		Maximum		0.05 Ω	1.4 Ω	$I_L = \text{max.}$ Within 1 s
	Off state leakage current	Maximum	I_{Leak}	10 μA		$I_F = 0 \text{ mA}$ $V_L = \text{max.}$
Transfer characteristics	Turn on time*	Typical	T_{on}	5 ms	4 ms	$I_F = 10 \text{ mA}$
		Maximum		10 ms		$I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
	Turn off time*	Typical	T_{off}	0.32 ms	0.14 ms	$I_F = 10 \text{ mA}$
		Maximum		3.0 ms		$I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
	I/O capacitance	Typical	C_{iso}	2.0 pF		$f = 1 \text{ MHz}$
		Maximum		4.0 pF		$V_B = 0 \text{ V}$
	Initial I/O isolation resistance	Minimum	R_{iso}	1,000 M Ω		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	10	30	mA
AQZ262	Load voltage (Peak AC)	V_L	—	48	V
	Continuous load current	I_L	—	6.0	A
AQZ264	Load voltage (Peak AC)	V_L	—	320	V
	Continuous load current	I_L	—	1.0	A

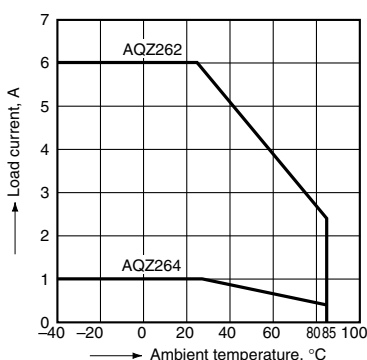
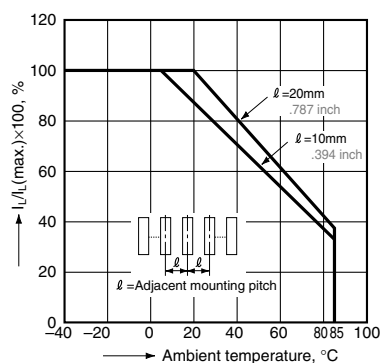
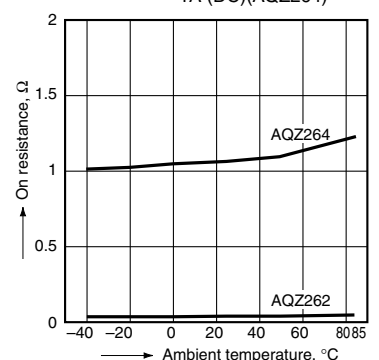


- For Dimensions, see Page 61.
- For Schematic and Wiring Diagrams, see Page 66.
- For Operate, see Page 71.
- For Terminology, see Page 73.
- For Cautions for Use, see Page 74.
- For Various Applications, see Page 82.
- For Standards, see Page 340.

■ 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.

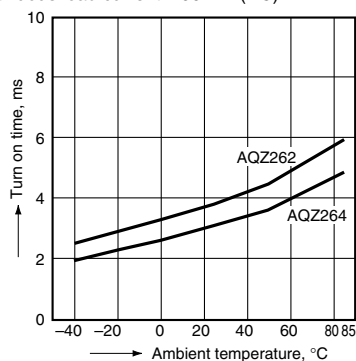
For more information, see page 85.

REFERENCE DATA**1. Load current vs. ambient temperature characteristics**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;
 $I_L (\text{max.})$: Maximum continuous load current**3. On resistance vs. ambient temperature characteristics**LED current: 10 mA;
Continuous load current: 6A (DC)(AQZ262)
1A (DC)(AQZ264)

Power 1 Form A High Capacity (AQZ26○)

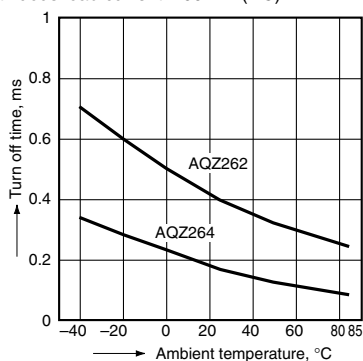
4. Turn on time vs. ambient temperature characteristics

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



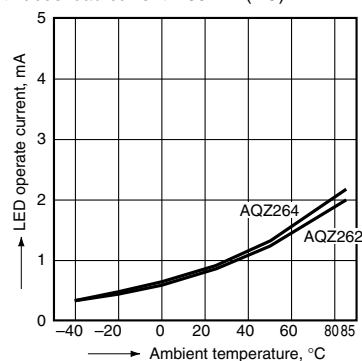
5. Turn off time vs. ambient temperature characteristics

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



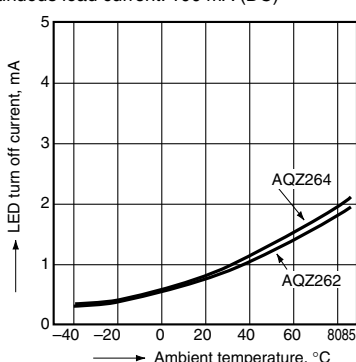
6. LED operate vs. ambient temperature characteristics

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



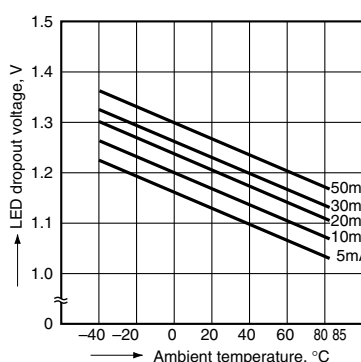
7. LED turn off current vs. ambient temperature characteristics

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



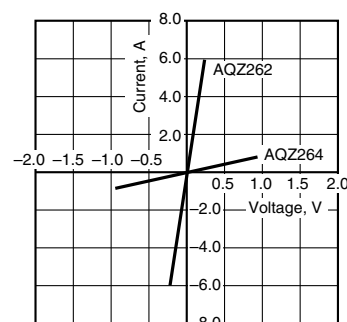
8. LED dropout voltage vs. ambient temperature characteristics

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



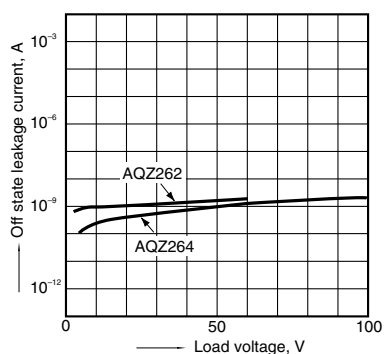
9. Current vs. voltage characteristics of output at MOS portion

Ambient temperature: 25°C 77°F



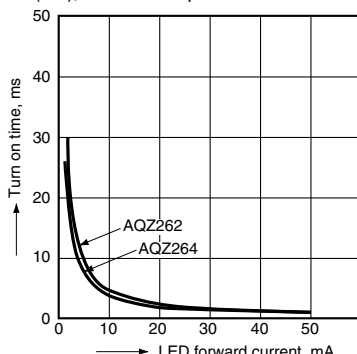
10. Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



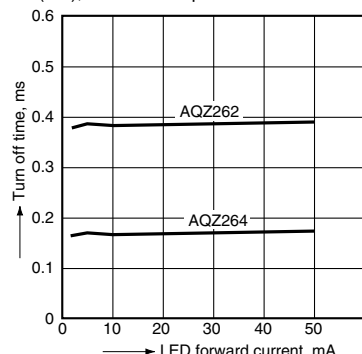
11. Turn on time vs. LED forward current characteristics

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



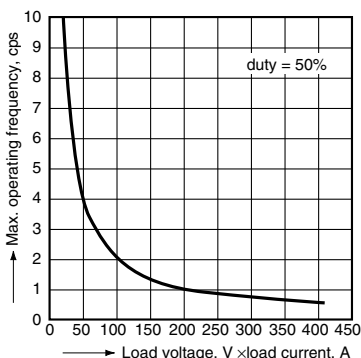
12. Turn off time vs. LED forward current characteristics

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



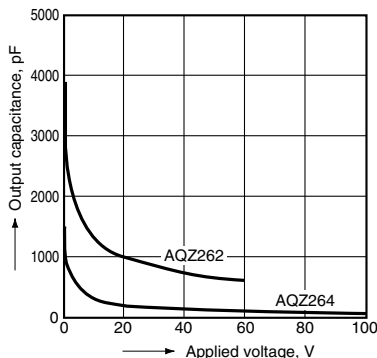
13. Max. operating frequency vs. load voltage/current characteristics

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



14. Output capacitance vs. applied voltage characteristics

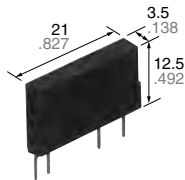
Frequency: 10 KHz; Ambient temperature: 25°C 77°F



**High capacity up to 6A
in a slim SIL package**

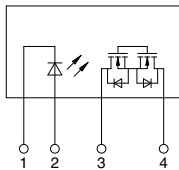
PhotoMOS®
Power 1 Form A
High Capacity (AQZ200G)

New



(Height includes
standoff)

mm inch



RoHS compliant

FEATURES

1. High capacity type power PhotoMOS.

Can switch a wide range of currents and voltages. Can control various types of loads, from very small loads to a max. 6A AC/DC current for sequencers, motors, and lamps.

2. Low on-resistance and high sensitivity.

Low on-resistance of less than Typ. 0.015Ω (AQZ202G). High sensitivity LED operate current of Typ. 1 mA.

3. AC/DC dual use

Bi-directional control is possible. There is no need to differentiate depending on the load as was necessary with the conventional SSR.

4. Slim SIL 4-pin package

(L) 21.0 mm $\times$ (W) 3.5 mm $\times$ (H) 12.5 mm
(L) .827 inch $\times$ (W) .138 inch $\times$ (H) .492 inch

The compact size of the 4-pin SIL package allows high density mounting

5. Low-level off state leakage current of max. 10 μ A

6. Controls low-level analog signals

The triac, photocoupler, or SSR cannot be used to control signals of less than several hundred mV. The high capacity type power PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

TYPICAL APPLICATIONS

- Traffic signals
- Measuring instruments
- Industrial machines
- Mercury relay replacement

TYPES

	Output rating*		Package	Part No.	Packing quantity	
	Load voltage	Load current			Inner carton	Outer carton
AC/DC dual use	60 V	6.0 A	SIL4-pin	AQZ202G	25 pcs.	500 pcs.
	200 V	2.0 A		AQZ207G		

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

* Load voltage and current: Indicate the peak AC and DC values.

RATING

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

Item		Symbol	AQZ202G	AQZ207G	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	200 V	
	Continuous load current	I_L	6.0 A	2.0 A	Peak AC, DC
	Peak load current	I_{peak}	12.0 A	6.0 A	100 ms (1shot), $V_L = \text{DC}$
	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)

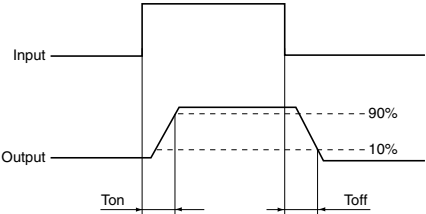
Item			Symbol	AQZ202G	AQZ207G	Condition
Input	LED operate current	Typical	I _{Fon}	1.0 mA		I _L = 100 mA V _L = 10 V
		Maximum		3.0 mA		
	LED turn off current	Minimum	I _{Foff}	0.2 mA		I _L = 100 mA V _L = 10 V
		Typical		0.9 mA		
	LED dropout voltage	Typical	V _F	1.25 V (1.16 V at I _F = 10 mA)		I _F = 50 mA
		Maximum		1.5 V		
Output	On resistance	Typical	R _{on}	0.015 Ω	0.18 Ω	I _F = 10 mA I _L = Max. Within 1 s
		Maximum		0.03 Ω	0.35 Ω	
	Off state leakage current	Maximum	I _{Leak}	10 μA		I _F = 0 mA V _L = Max.
Transfer characteristics	Turn on time*	Typical	T _{on}	3.8 ms	2.5 ms	I _F = 10 mA I _L = 100 mA V _L = 10 V
		Maximum		10 ms		
	Turn off time*	Typical	T _{off}	0.2 ms		I _F = 10 mA I _L = 100 mA V _L = 10 V
		Maximum		3.0 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
	Max. operating frequency	Maximum	—	0.5 cps		I _F = 10 mA Duty factor = 50% I _L = Max., V _L = Max.

*Turn on/Turn 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	10	30	mA
AQZ202G	Load voltage (Peak AC)	V _L	—	48	V
	Continuous load current	I _L	—	6.0	A
AQZ207G	Load voltage (Peak AC)	V _L	—	160	V
	Continuous load current	I _L	—	2.0	A



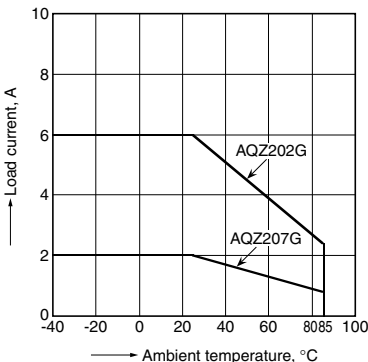
- For Dimensions, see Page 61.
- For Schematic and Wiring Diagrams, see Page 66.
- For Operate, see Page 71.
- For Terminology, see Page 73.
- For Cautions for Use, see Page 74.
- For Various Applications, see Page 82.
- For Standards, see Page 340.

■ 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, see page 85.

REFERENCE DATA

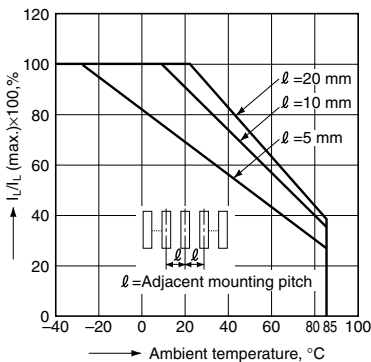
1. Load current vs. ambient temperature characteristics

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



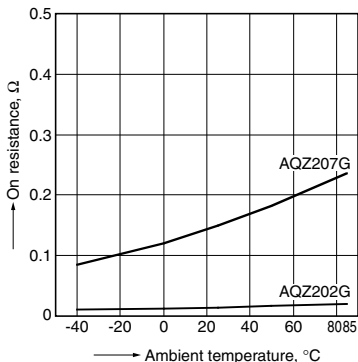
2. Load current vs. ambient temperature characteristics in adjacent mounting

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



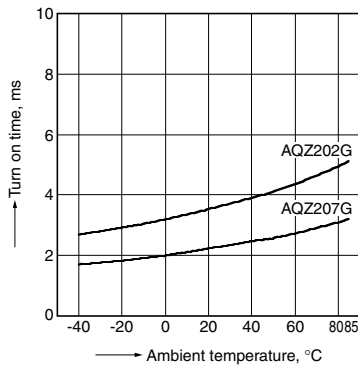
3. On resistance vs. ambient temperature characteristics

LED current: 10 mA;
Continuous load current: 6 A (DC) (AQZ202G),
2 A (DC) (AQZ207G)



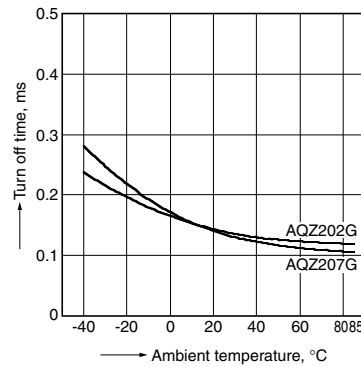
4. Turn on time vs. ambient temperature characteristics

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



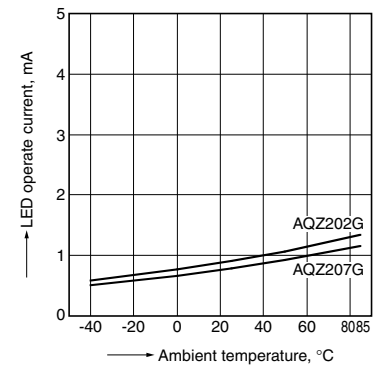
5. Turn off time vs. ambient temperature characteristics

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



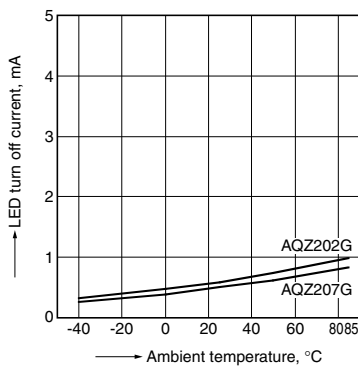
6. LED operate current vs. ambient temperature characteristics

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



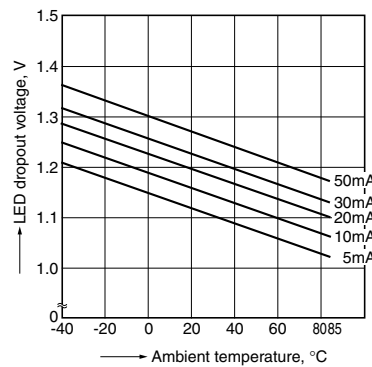
7. LED turn off current vs. ambient temperature characteristics

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



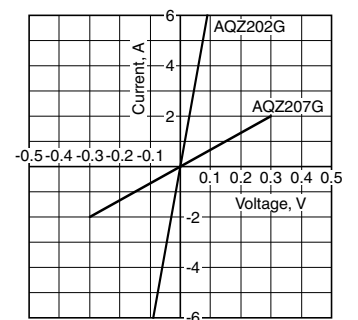
8. LED dropout voltage vs. ambient temperature characteristics

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



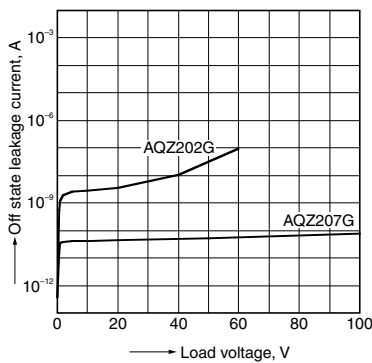
9. Current vs. voltage characteristics of output at MOS portion

Ambient temperature: 25°C 77°F



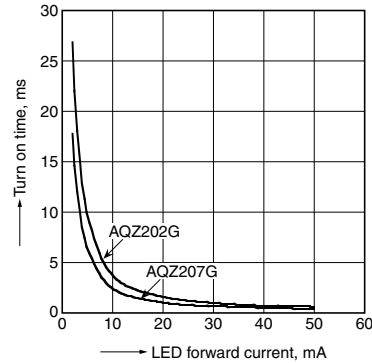
10. Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



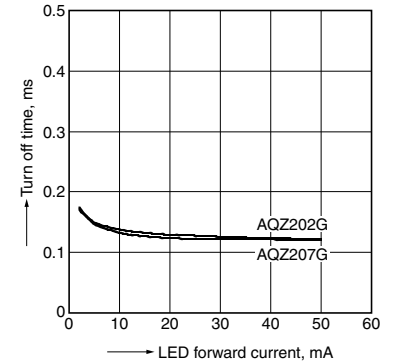
11. Turn on time vs. LED forward current characteristics

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



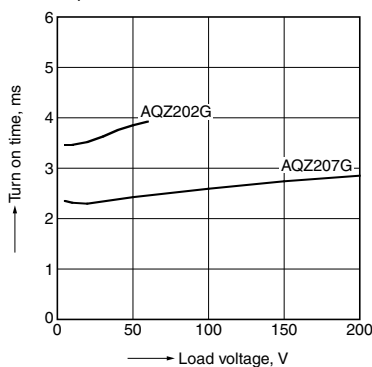
12. Turn off time vs. LED forward current characteristics

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



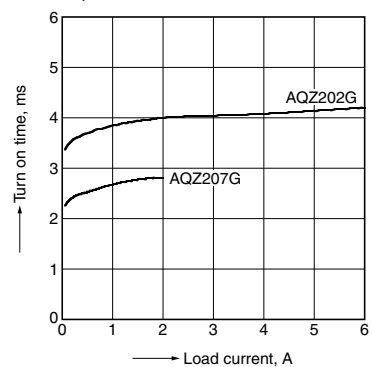
13. Turn on time vs. load voltage characteristics

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



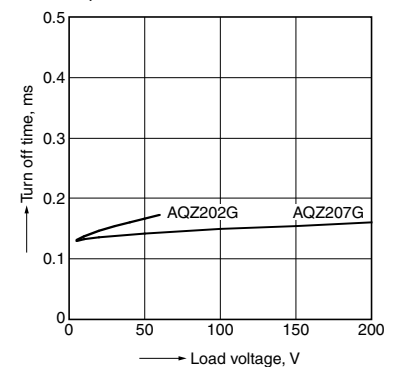
14. Turn on time vs. load current characteristics

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

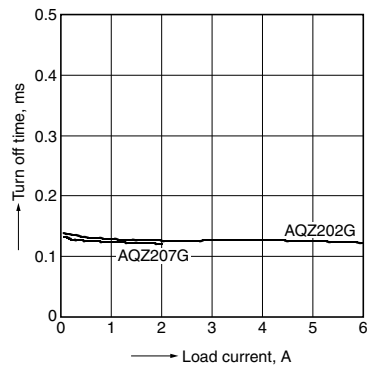


15. Turn off time vs. load voltage characteristics

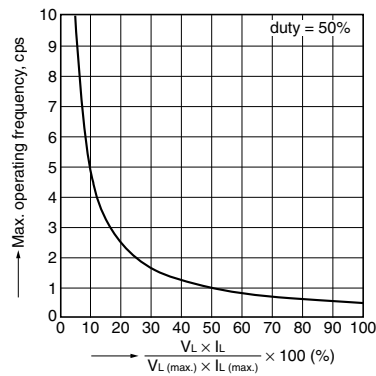
LED current: 10 mA;
Continuous load current: 100 mA;
Ambient temperature: 25°C 77°F



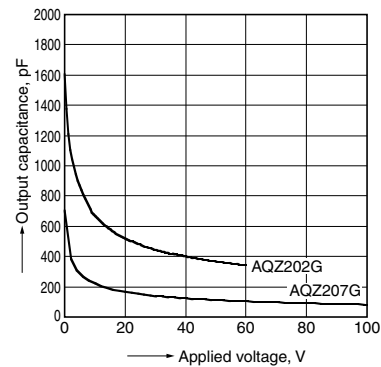
16. Turn off time vs. load current characteristics
LED current: 10 mA;
Load voltage: 10 V (DC);
Ambient temperature: 25°C 77°F



17. Max. operating frequency vs. load voltage/
current characteristics
Sample: All types; LED current: 10 mA;
Ambient temperature: 25°C 77°F
 V_L : Load voltage, V_L (Max.): Max. rated load voltage
 I_L : Load current, I_L (Max.): Max. rated continuous load
current

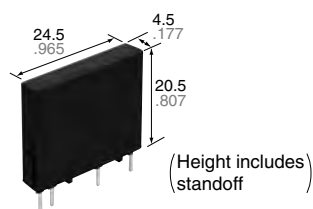


18. Output capacitance vs. applied voltage
characteristics
Frequency: 1 MHz;
Ambient temperature: 25°C 77°F

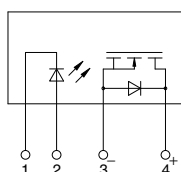


**Max. high capacity 10A
in a slim SIL package**

PhotoMOS®
Power 1 Form A
DC High Capacity (AQZ19○)



mm inch



RoHS compliant

FEATURES

1. High capacity type power PhotoMOS.

Can switch a wide range of currents and voltages. Can control various types of loads, from very small loads to a max. 10 A DC current for sequencers, motors, and lamps.

2. Low on-resistance and high sensitivity.

Low on-resistance of less than Typ. 8 mΩ (AQZ192). High sensitivity LED operate current of Typ. 0.7 mA.

3. 4-pin SIL type (Thickness: Max. 4.5 mm .177 inch) (L) 24.5 mm × (W) 4.5 mm × (H) 20.5 mm (L) .965 inch × (W) .177 inch × (H) .807 inch.

4. Low-level off state leakage current of max. 10 μA

5. Controls low-level analog signals

The triac, photocoupler, or SSR cannot be used to control signals of less than several hundred mV. The high capacity type power PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

TYPICAL APPLICATIONS

- Photovoltaic power generation system
- Battery system
- Measuring instruments
- Power supply unit
- Industrial machines

TYPES

	Output rating*		Package	Part No.	Packing quantity	
	Load voltage	Load current			Inner carton	Outer carton
DC only	60 V	10 A	SIL4-pin	AQZ192	20 pcs	500 pcs
	200 V	5 A		AQZ197		

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

*Load voltage and load current of DC type: DC

RATING

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

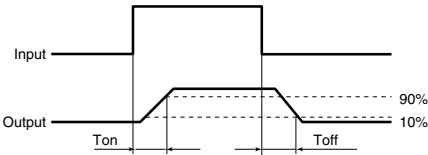
Item		Symbol	AQZ192	AQZ197	Remarks
Input	LED forward current	I_F	50 mA		
	LED reverse voltage	V_R	5 V		
	Peak forward current	I_{FP}	1 A		$f = 100\text{Hz}$, Duty factor = 0.1%
	Power dissipation	P_{in}	75 mW		
Output	Load voltage (DC)	V_L	60 V	200 V	
	Continuous load current (DC)	I_L	10 A	5 A	
	Peak load current	I_{peak}	30 A	15 A	100 ms (1shot), $V_L = \text{DC}$
	Power dissipation	P_{out}	2.0 W		
Total power dissipation		P_T	2.0 W		
I/O isolation voltage		V_{iso}	3,000 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		

Power 1 Form A DC High Capacity (AQZ19)

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

Item			Symbol	AQZ192	AQZ197	Condition
Input	LED operate current	Typical	I _{Fon}	0.7 mA		I _L = 100 mA V _L = 10 V
		Maximum		3.0 mA		
	LED turn off current	Minimum	I _{Foff}	0.2 mA		
		Typical		0.5 mA		
	LED dropout voltage	Typical	V _F	1.35 V (1.17 V at I _F = 10 mA)		I _F = 50 mA
		Maximum		1.5 V		
Output	On resistance	Typical	R _{on}	8 mΩ	31 mΩ	I _F = 10 mA, I _L = Max. Within 1 s
		Maximum		15 mΩ	50 mΩ	
	Off state leakage current	Maximum	I _{Leak}	10 μA		I _F = 0 mA, V _L = Max.
Transfer characteristics	Turn on time*	Typical	T _{on}	1.0 ms	0.7 ms	I _F = 10 mA, I _L = 100 mA, V _L = 10 V
		Maximum		3.0 ms		
	Turn off time*	Typical	T _{off}	0.11 ms	0.05 ms	I _F = 10 mA, I _L = 100 mA, V _L = 10 V
		Maximum		1.0 ms		
	I/O capacitance	Typical	C _{iso}	1.3 pF		f = 1 MHz, V _B = 0 V
		Maximum		3.0 pF		
	Initial I/O isolation resistance	Minimum	R _{iso}	1,000 MΩ		500 V DC
	Max. operating frequency	Maximum	—	0.5 cps		I _F = 10 mA, Duty factor = 50%, V _L = Max., I _L = 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	10	30	mA
AQZ192	Load voltage (Peak AC)	V _L	—	48	V
	Continuous load current	I _L	—	10	A
AQZ197	Load voltage (Peak AC)	V _L	—	160	V
	Continuous load current	I _L	—	5	A

- For Dimensions, see Page 61.
- For Schematic and Wiring Diagrams, see Page 66.
- For Operate, see Page 71.
- For Terminology, see Page 73.
- For Cautions for Use, see Page 74.
- For Various Applications, see Page 82.
- For Standards, see Page 340.

■ These products are not designed for automotive use.

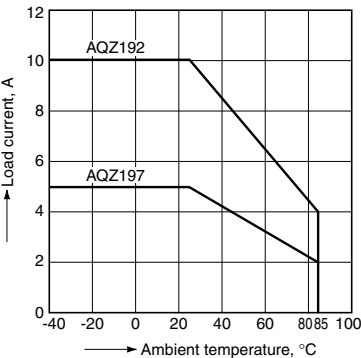
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

For more information, see page 85.

REFERENCE DATA

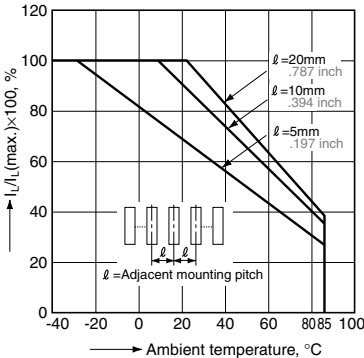
1. Load current vs. ambient temperature characteristics

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



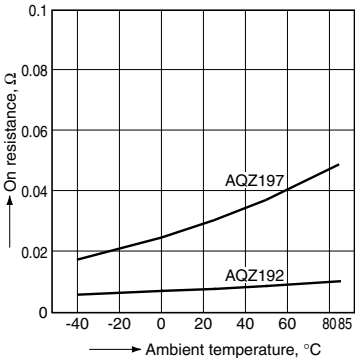
2. Load current vs. ambient temperature characteristics in adjacent mounting

Sample: All types
I_L: Load current;
I_L (max.): Maximum continuous load current



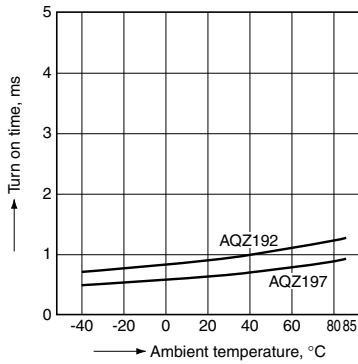
3. On resistance vs. ambient temperature characteristics

LED current: 10 mA;
Continuous load current: 10 A DC (AQZ192)
5 A DC (AQZ197)



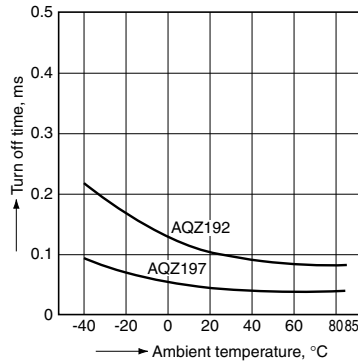
4. Turn on time vs. ambient temperature characteristics

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



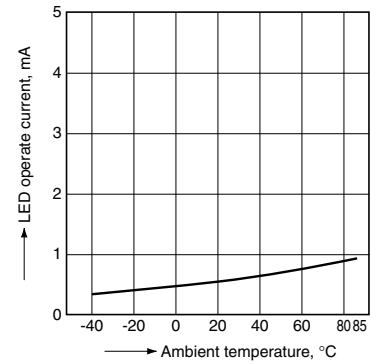
5. Turn off time vs. ambient temperature characteristics

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



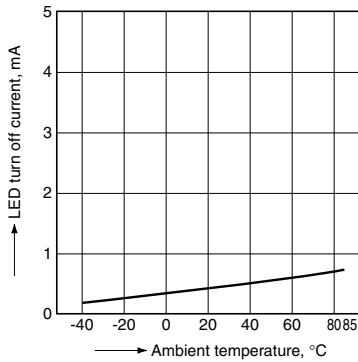
6. LED operate current vs. ambient temperature characteristics

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



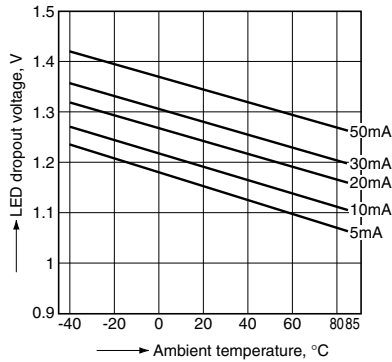
7. LED turn off current vs. ambient temperature characteristics

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



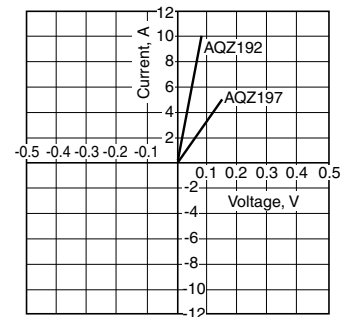
8. LED dropout voltage vs. ambient temperature characteristics

Sample: All types
LED current: 5 to 50 mA



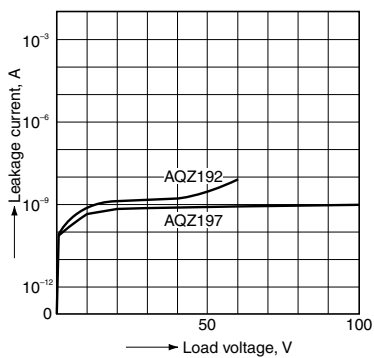
9. Current vs. voltage characteristics of output at MOS portion

Ambient temperature: 25°C 77°F



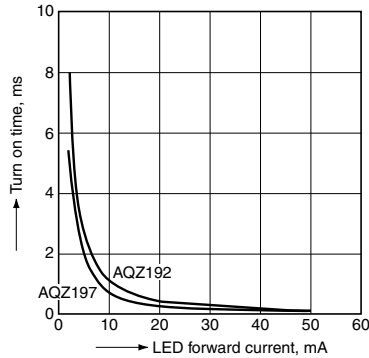
10. Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



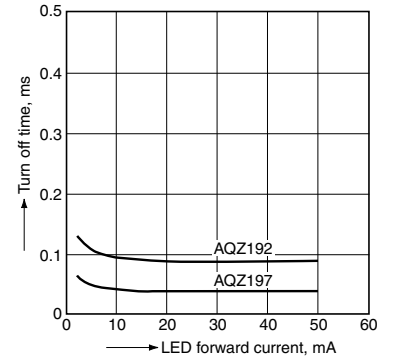
11. Turn on time vs. LED forward current characteristics

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



12. Turn off time vs. LED forward current characteristics

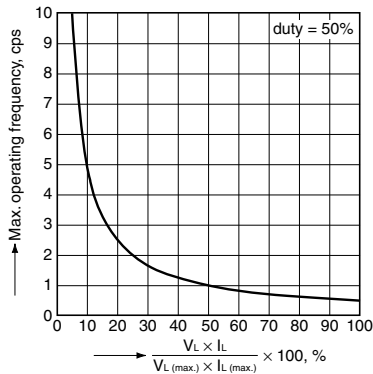
Load voltage: 10 V (DC);
Continuous load current: 100 mA (DC);
Ambient temperature: 25°C 77°F



Power 1 Form A DC High Capacity (AQZ19)

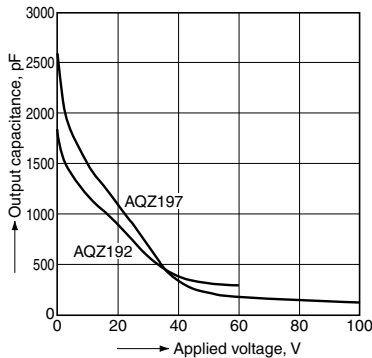
13. Max. operating frequency vs. load voltage/ current characteristics

Sample: All types; LED current: 10 mA;
Ambient temperature: 25°C 77°F
V_L: Load voltage, V_L (Max.): Max. rated load voltage
I_L: Load current, I_L (Max.): Max. rated continuous load current



14. Output capacitance vs. applied voltage characteristics

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

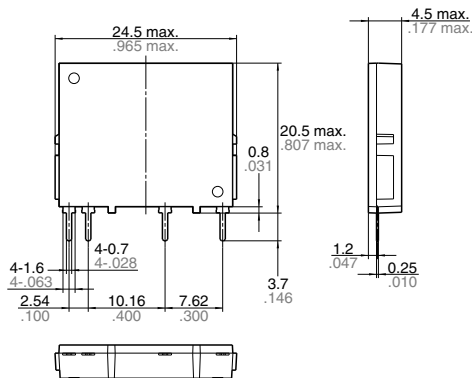


DIMENSIONS (mm inch)

CAD

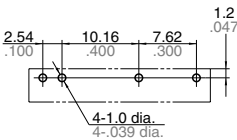
The CAD data of the products with a **CAD** mark can be downloaded from: <http://industrial.panasonic.com/ac/e/>

External dimensions



General tolerance: $\pm 0.2 \pm .008$

PC board pattern (Bottom view)



Tolerance: $\pm 0.1 \pm .004$

Schematic

