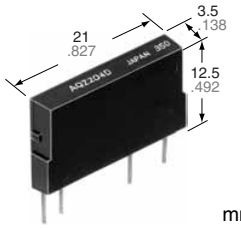
Panasonic
ideas for life

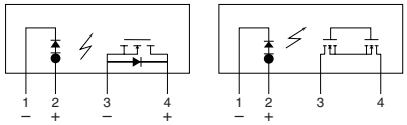
Slim and high capacity up to 3.6A Voltage-driven type

PhotoMOS Relays
1 Form A Voltage-sensitive
(AQZ10○D, 20○D)



mm inch

(Height includes standoff)



DC type AC/DC type

Compliance with RoHS Directive

FEATURES

1. A voltage-sensitive power PhotoMOS relay
Conventional power PhotoMOS relays 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 relay to be voltage-driven.

2. Wide range of input voltages
Allows a wide range of input voltages from 4 to 30 V DC. The relay 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.

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

1 Form A Voltage-sensitive (AQZ10❍D, 20❍D)

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 V AC				
Temperature limits	Operating	T_{opr}	–40°C to +85°C –40°F to +185°F (4 V ≦ V_{IN} ≦ 6 V) –40°C to +75°C –40°F to +167°F (6 V < V_{IN} ≦ 15 V) –40°C to +60°C –40°F to +140°F (15 V < V_{IN} ≦ 30 V)				Non-condensing at low temperatures
	Storage	T_{stg}	–40°C to +100°C –40°F to +212°F				

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

Item			Symbol	AQZ102D	AQZ105D	AQZ107D	AQZ104D	Remarks
Input	Operate voltage	Typical	V_{Fon}	1.4 V				I_L = 100 mA V_L = 10 V
		Maximum		4 V				
	Turn off voltage	Minimum	V_{Foff}	0.8 V				I_L = 100 mA V_L = 10 V
		Typical		1.3 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 I_L = Max. Within 1 s on time
		Maximum		0.09 Ω	0.17 Ω	0.55 Ω	1.6 Ω	
	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 I_L = 100 mA V_L = 10 V
		Maximum		10.0 ms				
	Turn off time*	Typical	T_{off}	0.2 ms		0.1 ms		V_{IN} = 5 V 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
	Maximum operating speed	Maximum	—	0.5 cps				V_{IN}= 5 V Duty factor = 50% I_L×V_L = 200 (VA)
Vibration resistance		Minimum	—	10 to 55 Hz at double amplitude of 3 mm				2 hours for 3 axes
Shock resistance		Minimum	—	4,900 m/s² {500 G}1 ms				3 times for 3 axes

2. AC/DC type

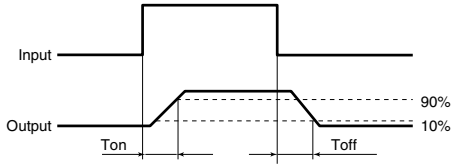
1) Absolute maximum ratings (Ambient temperature: 25°C 77°F)

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 V AC				
Temperature limits	Operating	T_{opr}	–40°C to +85°C –40°F to +185°F (4 V ≦ V_{IN} ≦ 6 V) –40°C to +75°C –40°F to +167°F (6 V < V_{IN} ≦ 15 V) –40°C to +60°C –40°F to +140°F (15 V < V_{IN} ≦ 30 V)				Non-condensing at low temperatures
	Storage	T_{stg}	–40°C to +100°C –40°F to +212°F				

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

Item			Symbol	AQZ202D	AQZ205D	AQZ207D	AQZ204D	Remarks
Input	Operate voltage	Typical	V_{Fon}	1.4 V				I_L = 100 mA V_L = 10 V
		Maximum		4 V				
	Turn off voltage	Minimum	V_{Foff}	0.8 V				I_L = 100 mA V_L = 10 V
		Typical		1.3 V				
	Input current	Typical	I_{IN}	6.5 mA				V_{IN} = 5 V
Output	On resistance	Typical	R_{on}	0.066 Ω	0.180 Ω	0.64 Ω	2.4 Ω	V_{IN} = 5 V I_L = Max. Within 1 s on time
		Maximum		0.18 Ω	0.34 Ω	1.1 Ω	3.2 Ω	
	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 I_L = 100 mA V_L = 10 V
		Maximum		10.0 ms				
	Turn off time*	Typical	T_{off}	0.2 ms		0.1 ms		V_{IN} = 5 V 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
	Maximum operating speed	Maximum	—	0.5 cps				V_{IN}= 5 V Duty factor = 50% I_L×V_L = 200 (VA)
Vibration resistance		Minimum	—	10 to 55 Hz at double amplitude of 3 mm				2 hours for 3 axes
Shock resistance		Minimum	—	4,900 m/s² {500 G}1 ms				3 times for 3 axes

*Turn on/off time



RECOMMENDED OPERATING CONDITIONS

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

Item	Symbol	Recommended value	Unit
Input voltage	V_{IN}	5	V

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

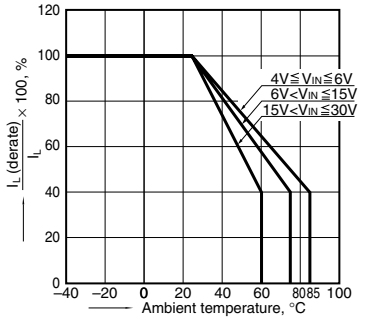
■ These products are not designed for automotive use.
If you are considering to use these products for automotive applications, please contact your local Panasonic Electric Works technical representative.
For more information.

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

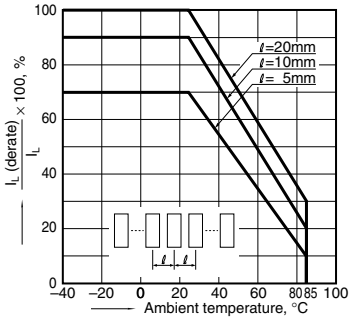
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F;

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



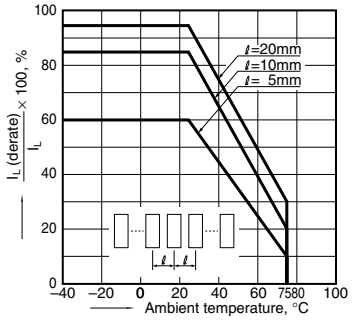
2.-(1) Load current vs. ambient temperature characteristics in adjacent mounting

Input voltage: 4V ≦ V_{IN} ≦ 6V;
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

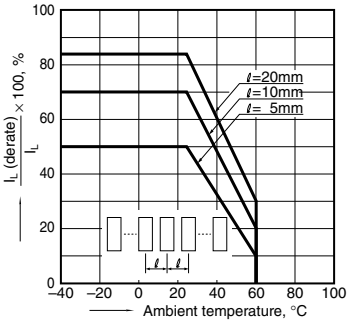
Input voltage: 6V < V_{IN} ≦ 15V;
I_L (derate): Load current (derate); I_L: Absolute maximum ratings of continuous load current; ℓ : Adjacent mounting pitch



1 Form A Voltage-sensitive (AQZ10❍D, 20❍D)

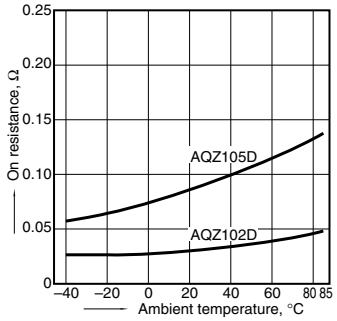
2.-(3) Load current vs. ambient temperature characteristics in adjacent mounting

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



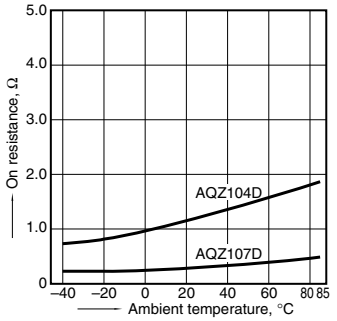
3.-(1) On resistance vs. ambient temperature characteristics (DC type)

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



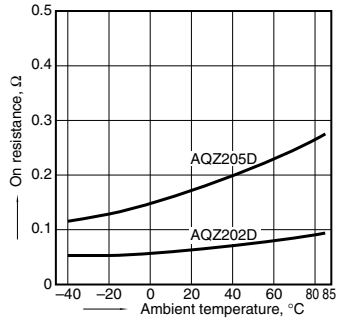
3.-(2) On resistance vs. ambient temperature characteristics (DC type)

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



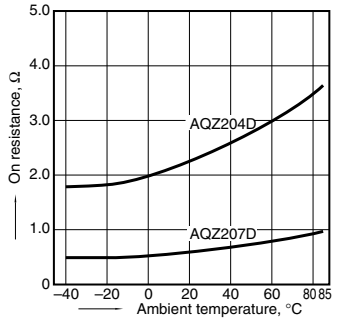
3.-(3) On resistance vs. ambient temperature characteristics (AC/DC type)

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



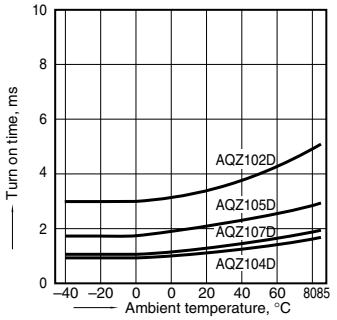
3.-(4) On resistance vs. ambient temperature characteristics (AC/DC type)

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



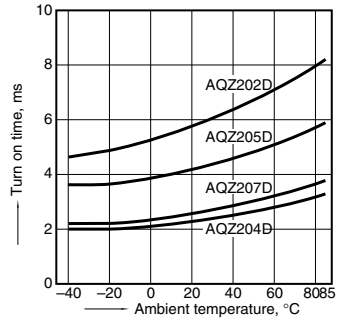
4.-(1) Turn on time vs. ambient temperature characteristics (DC type)

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



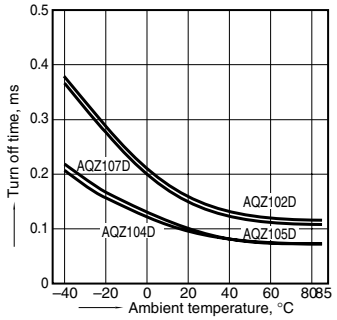
4.-(2) Turn on time vs. ambient temperature characteristics (AC/DC type)

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



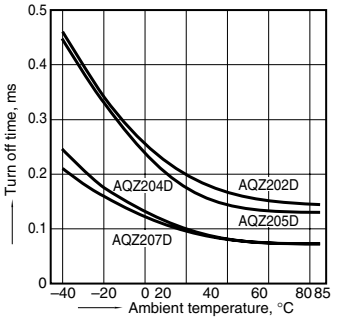
5.-(1) Turn off time vs. ambient temperature characteristics (DC type)

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



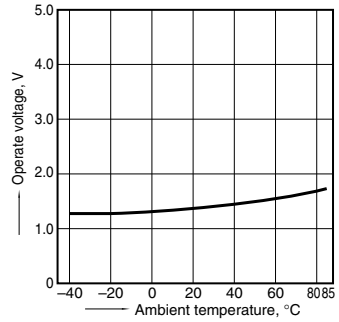
5.-(2) Turn off time vs. ambient temperature characteristics (AC/DC type)

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



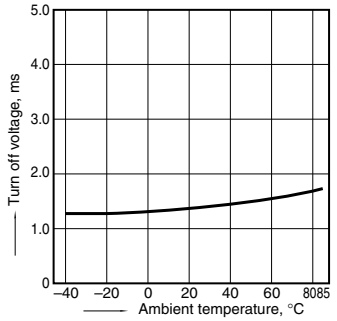
6. Operate voltage vs. ambient temperature characteristics

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



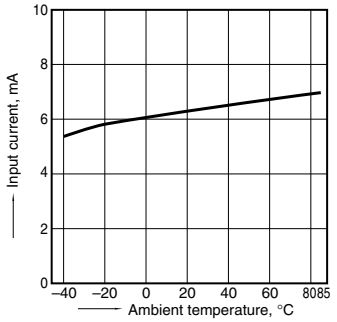
7. Turn off voltage vs. ambient temperature characteristics

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

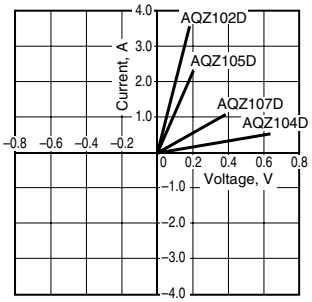


8. Input current vs. ambient temperature characteristics

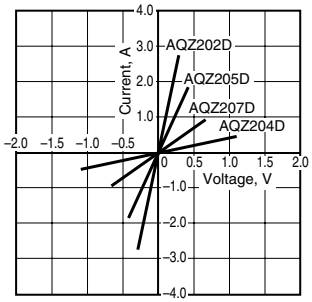
Input voltage: 5 V



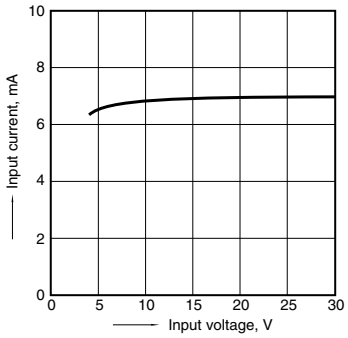
9.-(1) Current vs. voltage characteristics of output at MOS portion (DC type)
Ambient temperature: 25°C 77°F



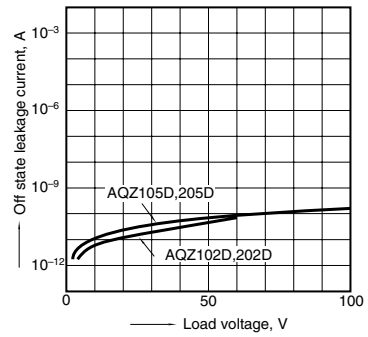
9.-(2) Current vs. voltage characteristics of output at MOS portion (AC/DC type)
Ambient temperature: 25°C 77°F



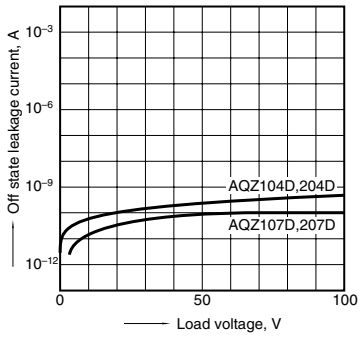
10. Input current vs. input voltage characteristics
Ambient temperature: 25°C 77°F



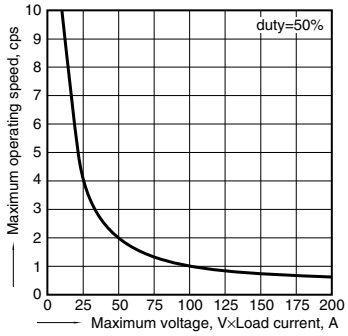
11.-(1) Off state leakage current vs. load voltage characteristics
Ambient temperature: 25°C 77°F



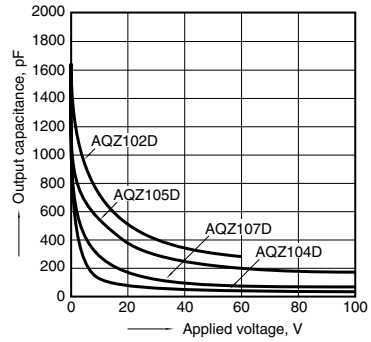
11.-(2) Off state leakage current vs. load voltage characteristics
Ambient temperature: 25°C 77°F



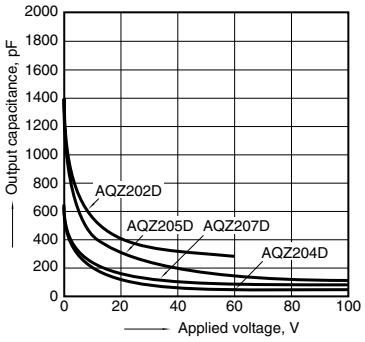
12. Maximum operating speed vs. load voltage × load current characteristics
Input voltage: 5V; Ambient temperature: 25°C 77°F



13.-(1) Output capacitance vs. applied voltage characteristics (DC type)
Frequency: 1 MHz; Ambient temperature: 25°C 77°F

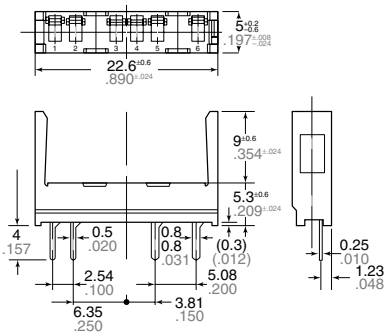


13.-(2) Output capacitance vs. applied voltage characteristics (AC/DC type)
Frequency: 1 MHz; Ambient temperature: 25°C 77°F

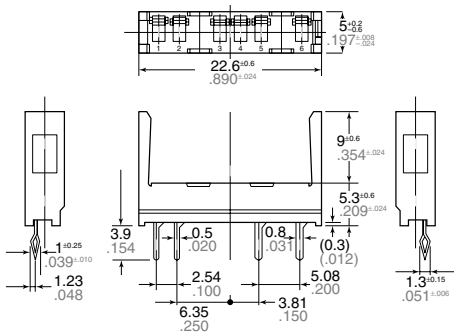


ACCESSORY (mm inch)

Socket

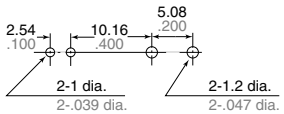


PA1a-PS

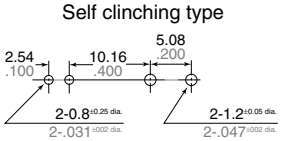


PA1a-PS-H

PC board pattern (BOTTOM VIEW)
Standard type



Self clinching type



Tolerance: ±0.1 ±.004