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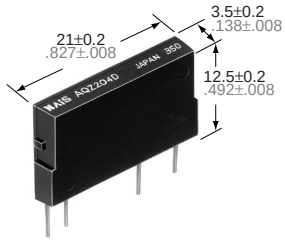
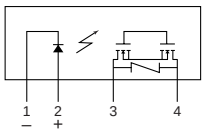
POWER PhotoMOS RELAYS with Internal Varistor

PhotoMOS RELAYS





FEATURES

1. Power PhotoMOS relay with internal varistor
An internal varistor on the output side protects the output MOSFET from the reverse voltage from an external voltage surge or inductive load.

2. High capacity PhotoMOS relay
Supports control of minute loads to a maximum 3.0 A. Suitable for output control.

3. Supports both AC and DC
Bi-directional control so there is no need to differentiate according to the load as in conventional SSR's.

4. Can be placed on-board the 4-unit relay (power photoMOS relay type)

5. Ideal for inductive loads
Ideal for inductive loads such as motors, solenoids, and electro-magnetic contactors.

6. High sensitivity, low ON resistance
Can control a maximum 3.0 A load with a 5 mA input current. Low On resistance of 0.18 Ω (AQZ202V).

7. Compact slim-type 4-pin SIL
(W) 3.5×(L) 21.0×(H) 12.5 mm (W) .138×(L) .827×(H) .492 inch . The compact 73.5mm² size of the 4-pin SIL package allows high density mounting.

8. Sockets also available

9. Promoting the CE making
(Please inquire for further details.)

TYPES

AC/DC type

Output rating			Part No.	Packing quantity	
Load voltage (Effective Vrms)		Load current		Inner carton	Outer carton
17 V AC	22 V DC	3.0 A	AQZ202V	25 pcs.	500 pcs.
30 V AC	38 V DC	2.0 A	AQZ205V		
60 V AC	85 V DC	1.0 A	AQZ207V		
140 V AC	180 V DC	0.5 A	AQZ204V		

Note: Refer to the recommended load voltage.

RATING

AC/DC type

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

Item			Symbol	AQZ202V	AQZ205V	AQZ207V	AQZ204V	Remarks
Input	LED forward current		I_F	50 mA				
	LED reverse voltage		V_R	3 V				
	Peak forward current		I_{FP}	1 A				f = 100 Hz, Duty factor = 0.1%
	Power dissipation		P_{in}	75 mW				
Output	Load voltage	AC	V_L	17 V	30 V	60 V	140 V	Effective Vrms
		DC		22 V	38 V	85 V	180 V	
	Continuous load current (Peak AC)		I_L	3.0 A	2.0 A	1.0 A	0.5 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}	1.6 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				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	AQZ202V	AQZ205V	AQZ207V	AQZ204V	Remarks
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}	0.4 mA				I_L = 100 mA V_L = 10 V
			Typical		0.9 mA				
	LED dropout voltage		Typical	V_F	1.16 V (1.25 V at I_F = 50 mA)				I_F = 10 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 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}	1 mA				I_F = 0 V_L = Max. DC
Transfer characteristics	Switching speed	Turn on time*	Typical	T_{on}	2.46 ms	2.40 ms	1.12 ms	1.65 ms	I_F = 10 mA I_L = 100 mA V_L = 10 V
			Maximum		5.0 ms				
			Typical		5.64 ms	5.65 ms	2.57 ms	3.88 ms	I_F = 5 mA I_L = 100 mA V_L = 10 V
			Maximum		10.0 ms				
		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 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
			Maximum		1.5 pF				
	Initial I/O isolation resistance		Minimum	R_{iso}	1,000 MΩ				500 V DC
	Maximum operating frequency		Maximum	—	1.0 cps				I_F = 10 mA Duty factor = 50% I_L= Max., V_L = Max.
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

3) Internal varistor characteristics

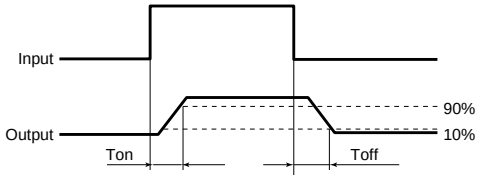
Item	AQZ202V	AQZ205V	AQZ207V	AQZ204V
Varistor voltage	27 V	47 V	100 V	220 V
Maximum energy	0.5 J	1.0 J	2.0 J	4.5 J

Note: When using the relay to absorb the reverse voltage during inductive load switching, make sure the load is within the inductance range given in the internal varistor characteristics data below, rather than the energy resistance range for the internal varistor. Note, the inductance range will differ if the switching frequency is higher than the rate given for the characteristics data conditions.

Note: Recommendable LED forward current I_F = 5 to 10 mA.

For type of connection, see page 35.

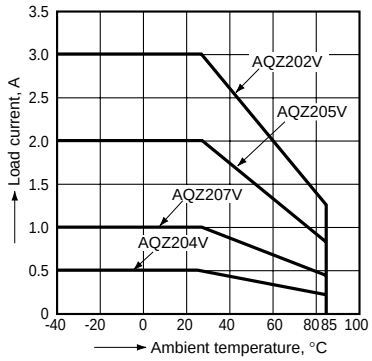
*Turn on/off time



REFERENCE DATA

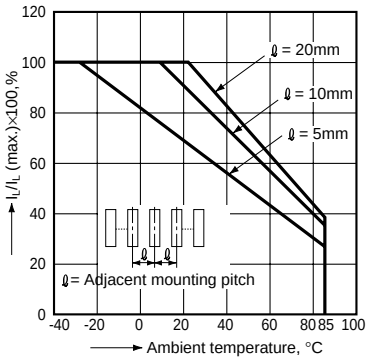
1. Load current vs. ambient temperature characteristics

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



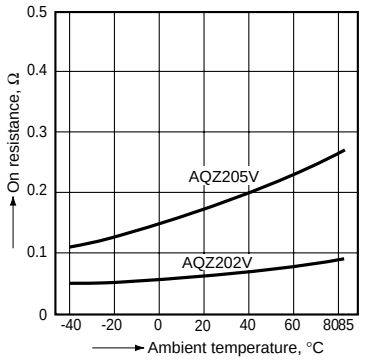
2. Load current vs. ambient temperature characteristics in adjacent mounting

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



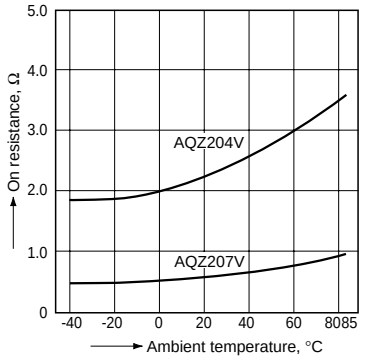
3.-(1) On resistance vs. ambient temperature characteristics

LED current: 10 mA;
Continuous load current: 3.0 A (DC) (AQZ202V),
2.0 A (DC) (AQZ205V),



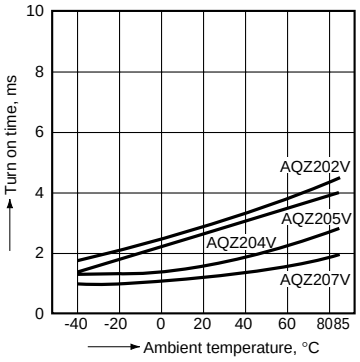
3.-(2) On resistance vs. ambient temperature characteristics

LED current: 10 mA;
Continuous load current: 3.0 A (DC) (AQZ202V),
2.0 A (DC) (AQZ205V),



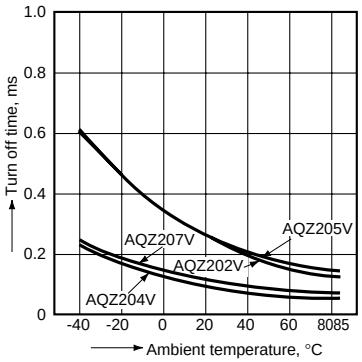
4. Turn on time vs. ambient temperature characteristics

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



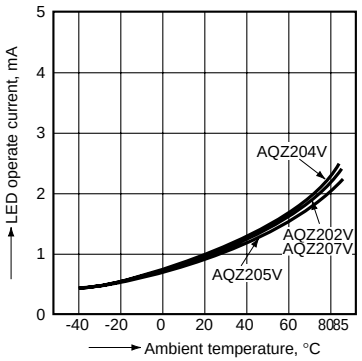
5. Turn off time vs. ambient temperature characteristics

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



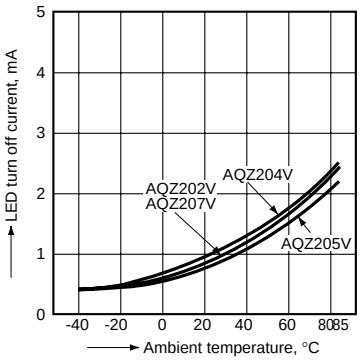
6. LED operate vs. ambient temperature characteristics

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



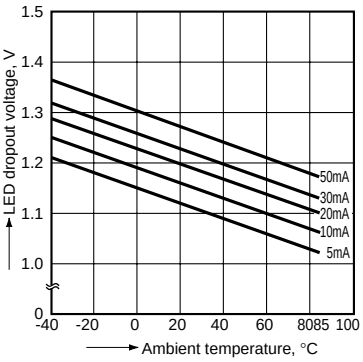
7. LED turn off current vs. ambient temperature characteristics

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



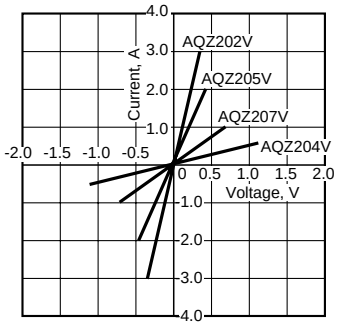
8. LED dropout voltage vs. ambient temperature characteristics

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



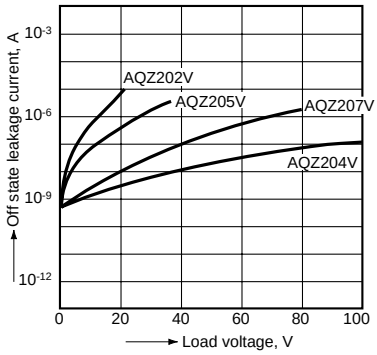
9. Voltage vs. current characteristics of output at MOS portion

Ambient temperature: 25°C 77°F



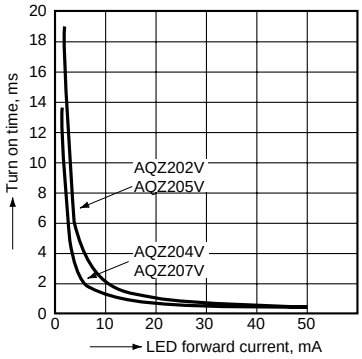
10. Off state leakage current

Ambient temperature: 25°C 77°F



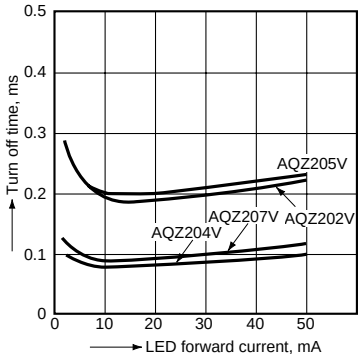
11. LED forward current vs. turn on time characteristics

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



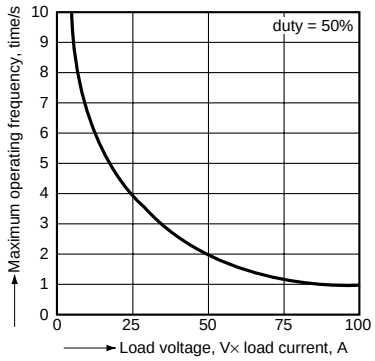
12. LED forward current vs. turn off time characteristics

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



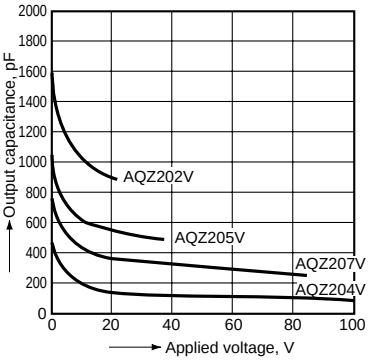
13. Maximum operating frequency vs. load voltage/current characteristics

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

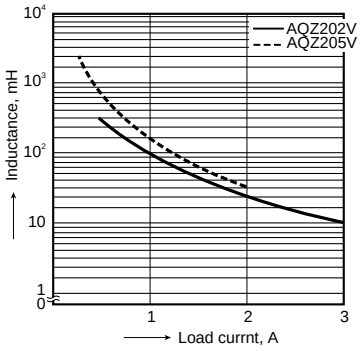


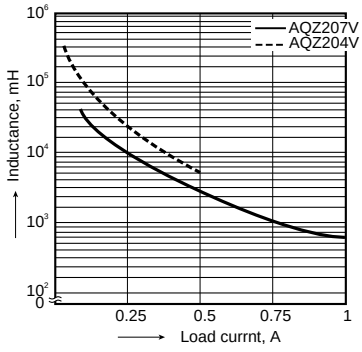
14. Applied voltage vs. output capacitance characteristics

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



15. Data for internal varistor characteristic
Operating frequency: 1 Hz
No. of operations: 10^6 max.



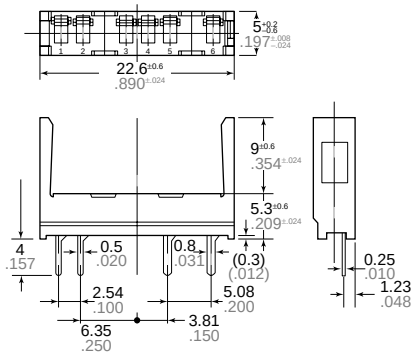


ACCESSORY

mm inch

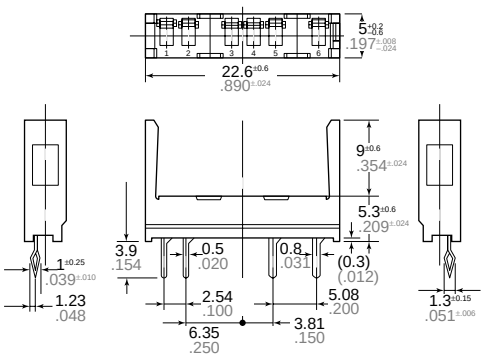
For more details, please consult our nearest office.

Socket Standard type



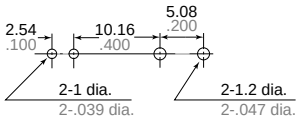
PA1a-PS

Self clinching type

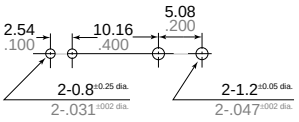


PA1a-PS-H

PC board pattern
(BOTTOM VIEW)
Standard type



Self clinching type



Tolerance: ±0.1 ±.004