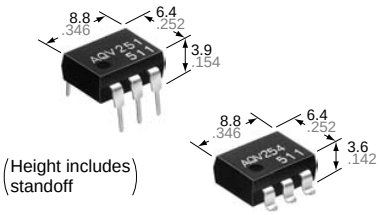
(Standard type) (Reinforced type)

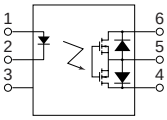
Panasonic
ideas for life

DIP6-pin type with low on-resistance and high cost-performance

PhotoMOS Relays
HE 1 Form A
(AQV25❍)



mm inch



FEATURES

1. Low on-resistance of typ. 0.6Ω (AQV251)
2. Reinforced insulation type of 5,000V I/O isolation available
3. Wide variation of 40V to 1,500V load voltage

TYPICAL APPLICATIONS

- High-speed inspection machines
- Telephone equipment
- Data communication equipment

Compliance with RoHS Directive

TYPES

	I/O isolation	Output rating*		Package	Part No.				Packing quantity	
					Through hole terminal	Surface-mount terminal				
					Tube packing style		Tape and reel packing style		Tube	Tape and reel
		Load voltage	Load current				Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side		
AC/DC dual use	1,500V	40 V	500 mA	DIP6-pin	AQV251	AQV251A	AQV251AX	AQV251AZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.
		60 V	400 mA		AQV252	AQV252A	AQV252AX	AQV252AZ		
		100 V	350 mA		AQV255	AQV255A	AQV255AX	AQV255AZ		
		200 V	250 mA		AQV257	AQV257A	AQV257AX	AQV257AZ		
		250 V	200 mA		AQV253	AQV253A	AQV253AX	AQV253AZ		
		400 V	150 mA		AQV254	AQV254A	AQV254AX	AQV254AZ		
		1,000 V	30 mA		AQV259	AQV259A	AQV259AX	AQV259AZ		
		1,500 V	20 mA		AQV258	AQV258A	AQV258AX	AQV258AZ		
	Reinforced 5,000V	250 V	200 mA		AQV253H	AQV253HA	AQV253HAX	AQV253HAZ		
		400 V	150 mA		AQV254H	AQV254HA	AQV254HAX	AQV254HAZ		

*Indicate the peak AC and DC values.
Note: The surface mount terminal indicator “A” and the packing style indicator “X” or “Z” are not marked on the relay.

RATING

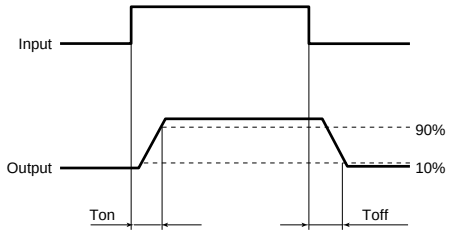
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

	Item		Sym-bol	Type of connec-tion	AQV251(A)	AQV252(A)	AQV255(A)	AQV257(A)	AQV253(A)	AQV254(A)	AQV259(A)	AQV258(A)	AQV253H(A)	AQV254H(A)	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		40 V	60 V	100 V	200 V	250 V	400 V	1,000 V	1,500 V	250 V	400 V	
	Continuous load current		I_L	A	0.5 A	0.4 A	0.35 A	0.25 A	0.2 A	0.15 A	0.03 A	0.02 A	0.2 A	0.15 A	A connection: Peak AC, DC B, C connection: DC
				B	0.7 A	0.6 A	0.45 A	0.35 A	0.3 A	0.18 A	0.04 A	0.025 A	0.3 A	0.18 A	
				C	1.0 A	0.8 A	0.70 A	0.5 A	0.4 A	0.25 A	0.05 A	0.04 A	0.4 A	0.25 A	
	Peak load current		I_{peak}		1.8 A	1.5 A	1.0 A	0.75 A	0.6 A	0.5 A	0.09 A	0.06 A	0.6 A	0.5 A	A connection: 100 ms (1 shot) V_L = DC
	Power dissipation		P_{out}		360 mW										
Total power dissipation			P_T		410 mW										
I/O isolation voltage			V_{iso}		1,500 V AC								5,000 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	Type of connection	AQV251(A)	AQV252(A)	AQV255(A)	AQV257(A)	AQV253(A)	AQV254(A)	AQV259(A)	AQV258(A)	AQV253H(A)	AQV254H(A)	Condition
Input	LED operate current	Typical	I_{Fon}	—	0.9 mA								1.4 mA		I_L = Max.
		Maximum			3 mA										
	LED turn off current	Minimum	I_{Foff}	—	0.4 mA										I_L = Max.
		Typical			0.8 mA								1.3 mA		
	LED dropout voltage	Typical	V_F	—	1.25 V (1.14 V at I_F = 5 mA)										I_F = 50 mA
		Maximum			1.5 V										
Output	On resistance	Typical	R_{on}	A	0.6 Ω	0.74 Ω	1.8 Ω	2.6 Ω	5.5 Ω	12.4 Ω	85 Ω	345 Ω	5.5 Ω	12.4 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
		Maximum			1 Ω	1.4 Ω	2.5 Ω	4 Ω	8 Ω	16 Ω	200 Ω	500 Ω	8 Ω	16 Ω	
		Typical	R_{on}	B	0.3Ω	0.37 Ω	0.9 Ω	1.4 Ω	2.7 Ω	6.2 Ω	60 Ω	345 Ω	2.7 Ω	6.2 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
		Maximum			0.5 Ω	0.7 Ω	1.25 Ω	2 Ω	4 Ω	8 Ω	100 Ω	500 Ω	4 Ω	8 Ω	
		Typical	R_{on}	C	0.15 Ω	0.18 Ω	0.45 Ω	0.7 Ω	1.4 Ω	3.1 Ω	30 Ω	160 Ω	1.4 Ω	3.1 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
		Maximum			0.25 Ω	0.35 Ω	0.63 Ω	1 Ω	2 Ω	4 Ω	50 Ω	250 Ω	2 Ω	4 Ω	
	Off state leakage current	Maximum	I_{Leak}	—	1 μA						10 μA		1 μA		I_F = 0 mA V_L = Max.
Transfer characteristics	Turn on time*	Typical	T_{on}	—	1.7 ms	1.4 ms	0.9 ms	1.5 ms	0.8ms	0.8ms	0.6ms	0.35 ms	2.4ms	1.8ms	I_F = 5 mA I_L = Max.
		Maximum			3 ms		2 ms	3 ms	2 ms		1 ms		4 ms	3 ms	
	Turn off time*	Typical	T_{off}	—	0.07 ms		0.09 ms	0.1 ms	0.06 ms	0.05 ms	0.04 ms		0.06 ms	0.05 ms	I_F = 5 mA I_L = Max.
		Maximum			0.2 ms										
	I/O capacitance	Typical	C_{iso}	—	1.3 pF										f = 1 MHz V_B = 0 V
		Maximum			3 pF										
	Initial I/O isolation resistance	Minimum	R_{iso}	—	1,000 MΩ										500 V DC

*Turn on/Turn off time



RECOMMENDED OPERATING CONDITIONS

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

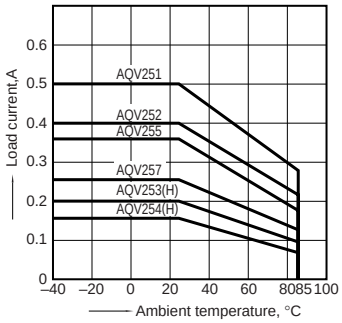
Item	Symbol	Recommended value	Unit
Input LED current	I_F	Standard type: 5 Reinforced insulation type: 5 to 10	mA

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

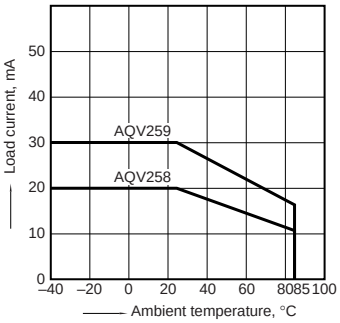
■ These products are not designed for automotive use.
If you are considering to use these products for automotive applications, please contact your local Panasonic Electric Works technical representative.
For more information

REFERENCE DATA

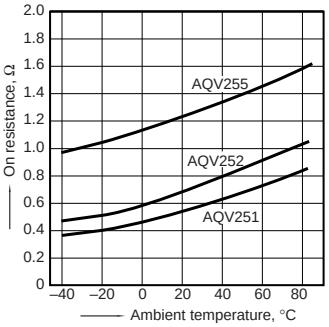
1.-(1) Load current vs. ambient temperature characteristics
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F ;
Type of connection: A



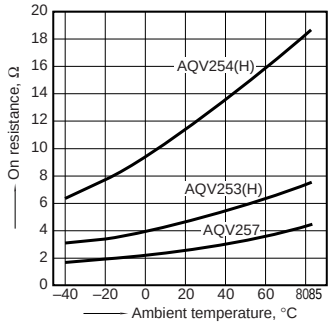
1.-(2) Load current vs. ambient temperature characteristics
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F ;
Type of connection: A



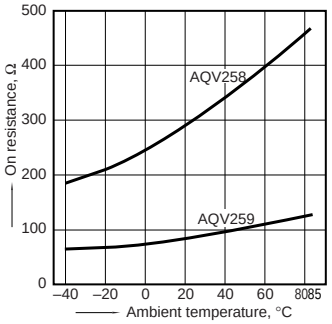
2.-(1) On resistance vs. ambient temperature characteristics
Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: Max. (DC)



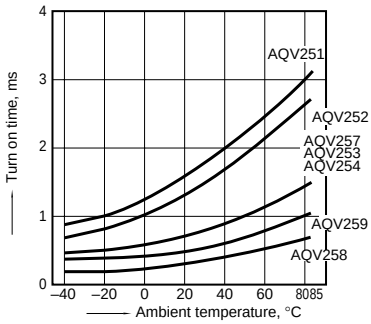
2.-(2) On resistance vs. ambient temperature characteristics
Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: Max. (DC)



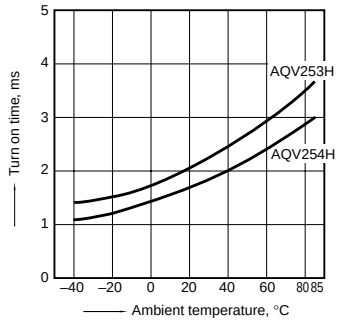
2.-(3) On resistance vs. ambient temperature characteristics
Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: 30 mA (DC)



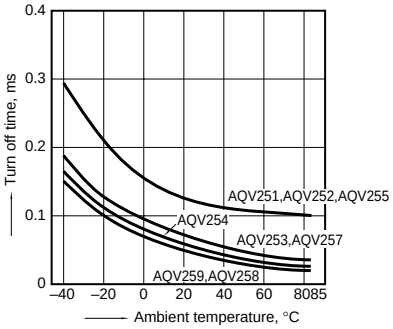
3.-(1) Turn on time vs. ambient temperature characteristics
LED current: 5 mA;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



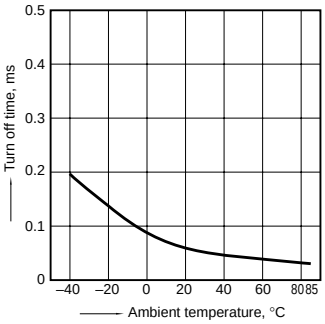
3.-(2) Turn on time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



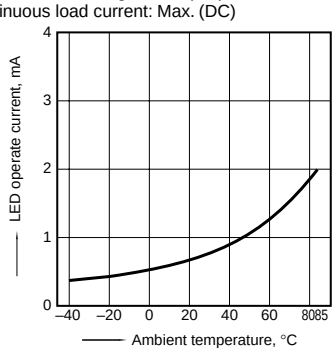
4.-(1) Turn off time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



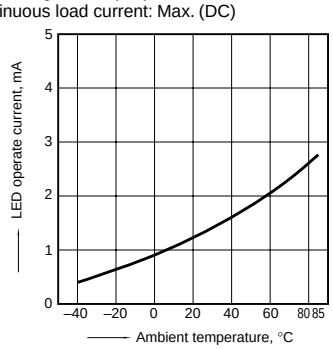
4.-(2) Turn off time vs. ambient temperature characteristics
Sample: AQV253H, AQV254H
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



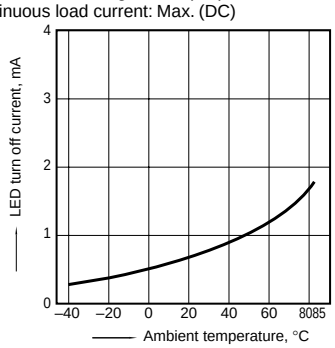
5.-(1) LED operate current vs. ambient temperature characteristics
Sample: AQV251, AQV252, AQV253, AQV254, AQV259; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



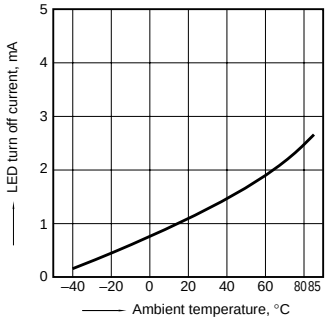
5.-(2) LED operate current vs. ambient temperature characteristics
Sample: AQV253H,AQV254H;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



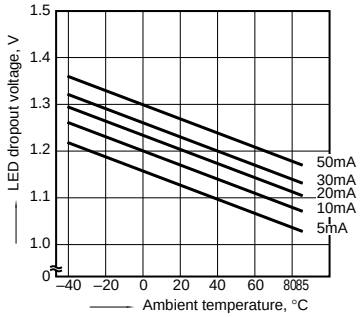
6. -(1) LED turn off current vs. ambient temperature characteristics
Sample: AQV251, AQV252, AQV253, AQV254, AQV259; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



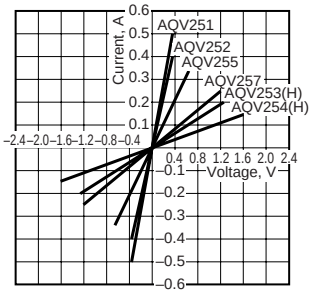
6.-(2) LED turn off current vs. ambient temperature characteristics
Sample: AQV251, AQV252, AQV253, AQV254, AQV259; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



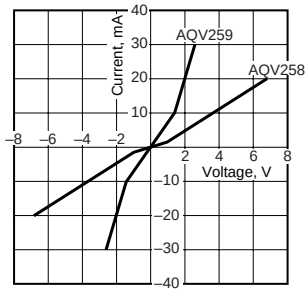
7. LED dropout voltage vs. ambient temperature characteristics
LED current: 5 to 50 mA



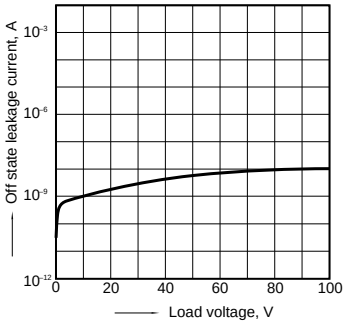
8.-(1) Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



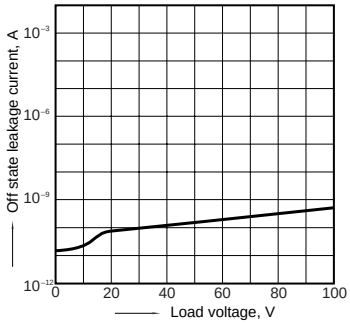
8.-(2) Current vs. voltage characteristics of output at MOS portion
Sample: AQV259
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



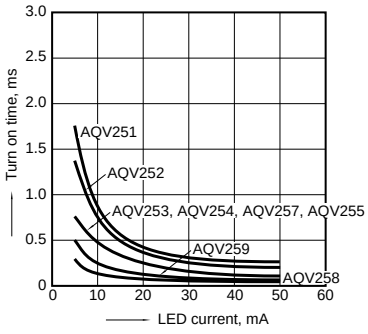
9-(1). Off state leakage current vs. load voltage characteristics
Sample: AQV259;
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



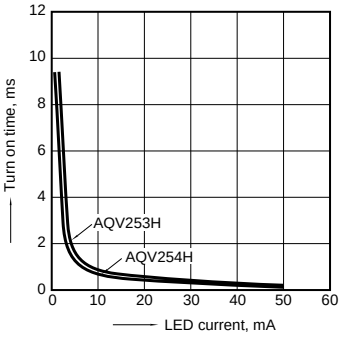
9-(2). Off state leakage current vs. load voltage characteristics
Sample: AQV254H;
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



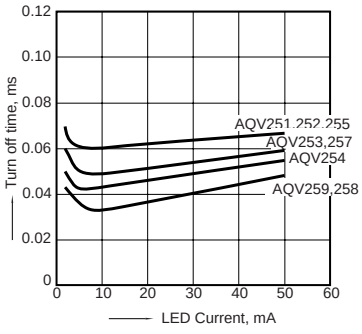
10-(1). Turn on time vs. LED forward current characteristics
Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC); Continuous load current:
Max. (DC); Ambient temperature: 25°C 77°F



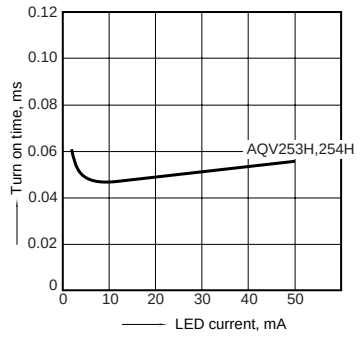
10-(2). Turn on time vs. LED forward current characteristics
Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC); Continuous load current:
Max. (DC); Ambient temperature: 25°C 77°F



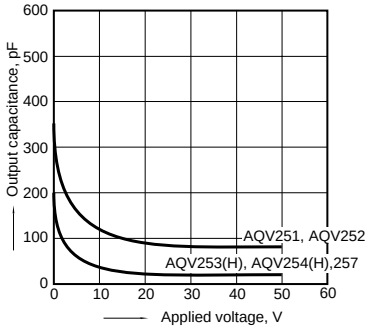
11-(1). Turn off time vs. LED forward current characteristics
Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC); Continuous load current:
Max. (DC); Ambient temperature: 25°C 77°F



11-(2). Turn off time vs. LED forward current characteristics
Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC); Continuous load current:
Max. (DC); Ambient temperature: 25°C 77°F



12.-(1) Output capacitance vs. applied voltage characteristics
Measured portion: between terminals 4 and 6;
Frequency: 1 MHz;
Ambient temperature: 25°C 77°F



12.-(2) Output capacitance vs. applied voltage characteristics
Sample: AQV259;
Measured portion: between terminals 4 and 6;
Frequency: 1 MHz; Ambient temperature: 25°C 77°F