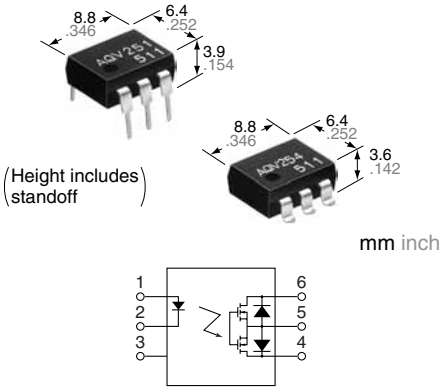
(Standard type) (Reinforced type, excluding AQV256H)

Panasonic
ideas for life

Both low on-resistance and good cost-performance achieved.

PhotoMOS®
HE 1 Form A
(AQV25○)



RoHS compliant

FEATURES

1. Wide variation of 40V, 60V, 100V, 200V, 250V, 400V, 600V, 1,000V and 1,500V load voltage
2. Low on-resistance of typ. 0.6Ω (AQV251)
3. Reinforced insulation type of 5,000V I/O isolation available

TYPICAL APPLICATIONS

- Measuring instruments
- Data communication equipment
- Telephone equipment
- Automatic meter reading device

TYPES

	I/O isolation	Output rating*		Package	Part No.				Packing quantity	
					Through hole terminal	Surface-mount terminal				
		Load voltage	Load current		Tube packing style		Tape and reel packing style: Picked from the 1/2/3-pin side	Tape and reel packing style: Picked from the 4/5/6-pin side	Tube	Tape and reel
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		
		New 600 V	130 mA		AQV256H	AQV256HA	AQV256HAX	AQV256HAZ		

*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 device.

Datasheet Cloud

RATING

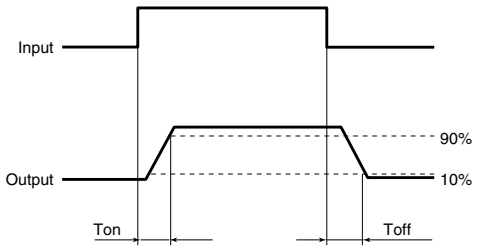
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

	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)	AQV256H(A)	Remarks
Input	LED forward current		I_F		50 mA											
Input	LED reverse voltage		V_R		5 V											
Input	Peak forward current		I_{FP}		1 A											f = 100 Hz, Duty factor +0.1%
Input	Power dissipation		P_{in}		75 mW											
Output	Load voltage (peak AC)		V_L		40V	60V	100V	200V	250V	400V	1,000V	1,500V	250V	400V	600V	
Output	Continuous load current		I_L	A	0.5A	0.4A	0.35A	0.25A	0.2A	0.15A	0.03A	0.02A	0.2A	0.15A	0.13A	A connection: Peak AC, DC B, C connection: DC
Output	Continuous load current			B	0.7A	0.6A	0.45A	0.35A	0.3A	0.18A	0.04A	0.025A	0.3A	0.18A	0.14A	
Output	Continuous load current			C	1.0A	0.8A	0.70A	0.5A	0.4A	0.25A	0.05A	0.04A	0.4A	0.25A	0.16A	
Output	Peak load current		I_{peak}		1.8A	1.5A	1.0A	0.75A	0.6A	0.5A	0.09A	0.06A	0.6A	0.5A	0.4A	A connection: 100 ms (1 shot) V_L = DC
Output	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
Temperature limits		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)	AQV256H(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	20 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	30 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	15 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	20 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	7.5 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	10 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	0.8 ms		0.6 ms	0.35 ms	2.4 ms	1.8 ms	1.2 ms	I_F = 5 mA I_L = Max.
		Maximum			3 ms		2 ms	3 ms	2 ms		1 ms		4 ms	3ms		
	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	0.06 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 device operation and resetting.

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

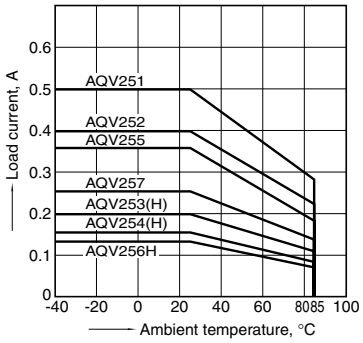
■ For Dimensions.
■ For Schematic and Wiring Diagrams.
■ For Cautions for Use.

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

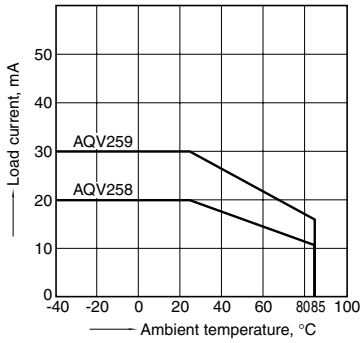
■ Continual DC bias (for AQV258⁂, AQV259⁂)
In cases in which a continual DC bias is applied between the input and output, the output-side MOS-FET may deteriorate due to the voltage. Therefore, please verify operation of the actual design before using. An example of a circuit that might undergo MOS-FET deterioration due to voltage is given below.

REFERENCE DATA

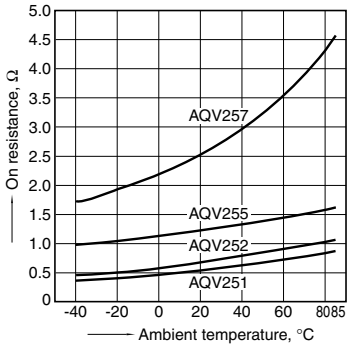
1.-(1) Load current vs. ambient temperature characteristics
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F ;
Type of connection: A



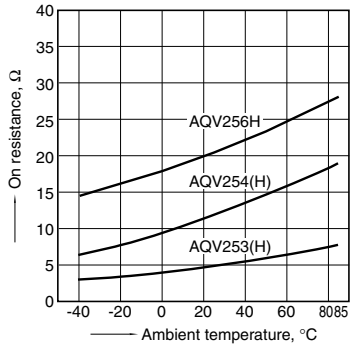
1.-(2) Load current vs. ambient temperature characteristics
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F ;
Type of connection: A



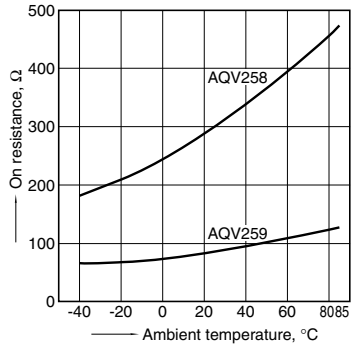
2.-(1) On resistance vs. ambient temperature characteristics
Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: Max. (DC)



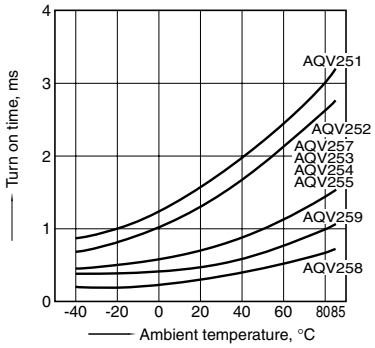
2.-(2) On resistance vs. ambient temperature characteristics
Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: Max. (DC)



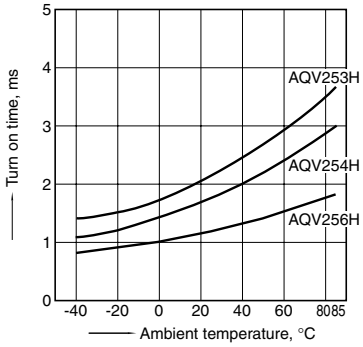
2.-(3) On resistance vs. ambient temperature characteristics
Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: 30 mA (DC)



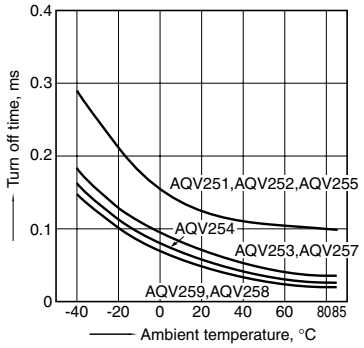
3.-(1) Turn on time vs. ambient temperature characteristics
LED current: 5 mA;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



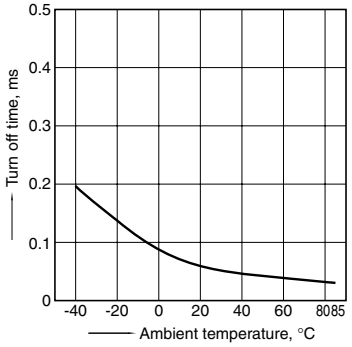
3.-(2) Turn on time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



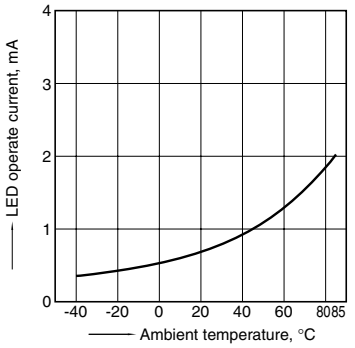
4.-(1) Turn off time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



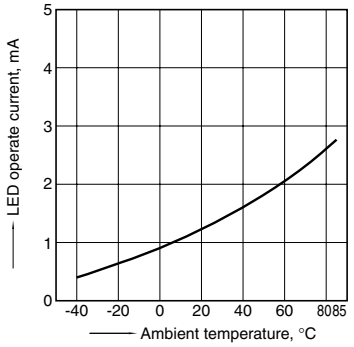
4.-(2) Turn off time vs. ambient temperature characteristics
Sample: AQV253H, AQV254H, AQV256H
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



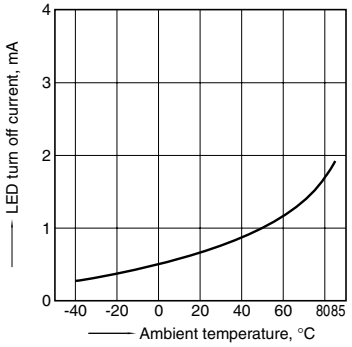
5.-(1) LED operate current vs. ambient temperature characteristics
Sample: AQV251, AQV252, AQV253, AQV254, AQV255, AQV258, AQV259; Load voltage: Max. (DC); Continuous load current: Max. (DC)



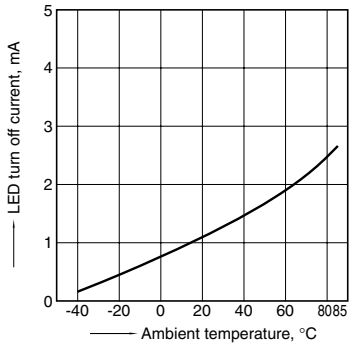
5.-(2) LED operate current vs. ambient temperature characteristics
Sample: AQV253H, AQV254H, AQV256H;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



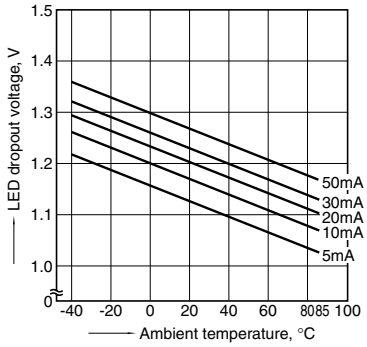
6.-(1) LED turn off current vs. ambient temperature characteristics
Sample: AQV251, AQV252, AQV253, AQV254, AQV255, AQV258, AQV259; Load voltage: Max. (DC); Continuous load current: Max. (DC)



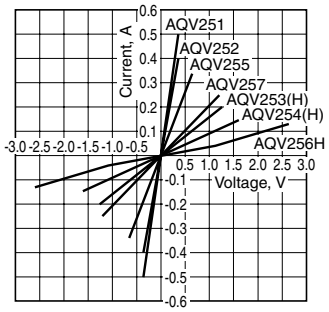
6.-(2) LED turn off current vs. ambient temperature characteristics
Sample: AQV253H, AQV254H, AQV256H;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



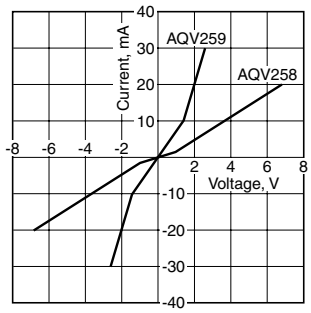
7. LED dropout voltage vs. ambient temperature characteristics
LED current: 5 to 50 mA



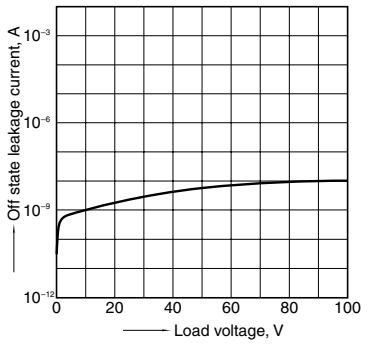
8.-(1) Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



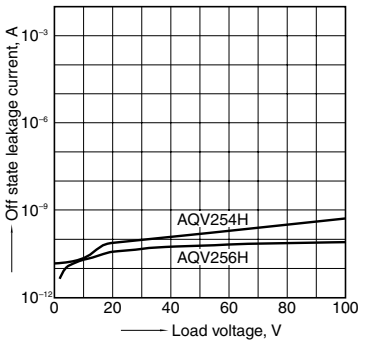
8.-(2) Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



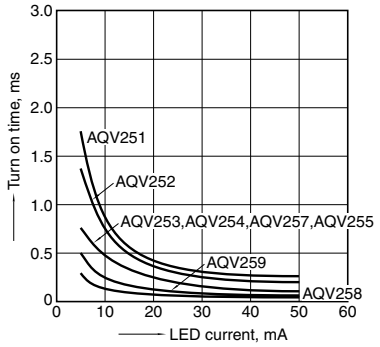
9-(1). Off state leakage current vs. load voltage characteristics
Sample: AQV259;
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



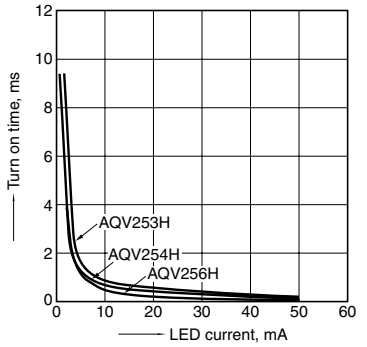
9-(2). Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



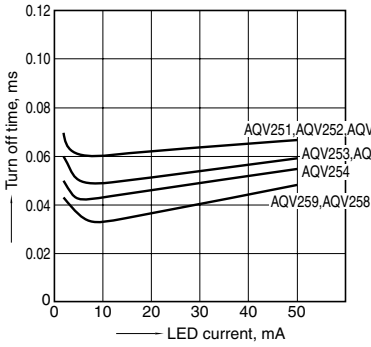
10-(1). Turn on time vs. LED forward current characteristics
Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



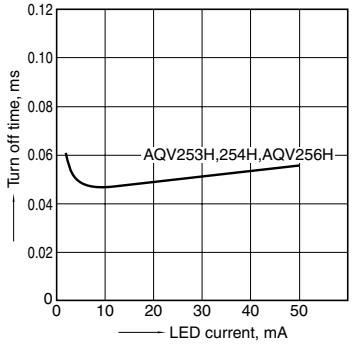
10-(2). Turn on time vs. LED forward current characteristics
Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



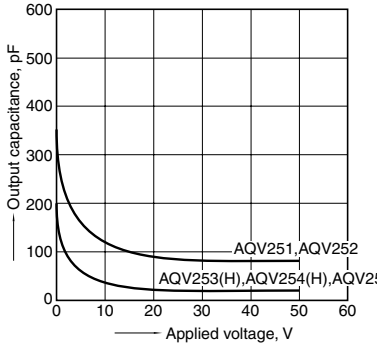
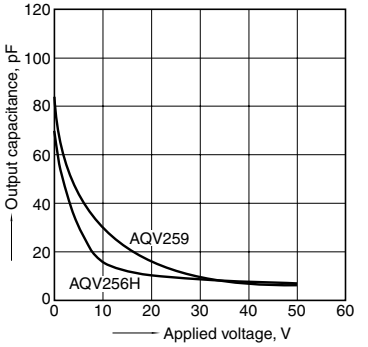
11-(1). Turn off time vs. LED forward current characteristics
Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



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