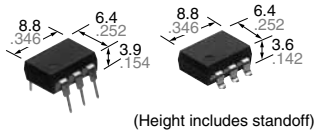
Standard type: cULus / Reinforced type: cULus BSI

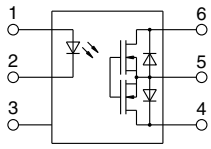
Normally closed DIP6-pin type Low on-resistance with 250V/400V load voltage

PhotoMOS® HE 1 Form B (AQV45○, AQV454H)



(Height includes standoff)

mm inch

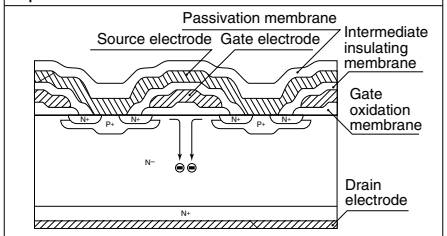


RoHS compliant

FEATURES

1. 1 Form B (Normally-closed) type with low on-resistance
This has been achieved thanks to the built-in MOSFET processed by our proprietary method, DSD (Double-diffused and Selective Doping) method.

Cross section of the normally-closed type of power MOS



2. Controls low-level analog signals
PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

3. High sensitivity and low on-resistance
Can control max. 0.2 A load current with 5 mA input current. Low on-resistance of Typ. 5.5 Ω (AQV453).

4. Reinforced insulation 5,000 Vrms type also available.
More than 0.4 mm .016 inch internal insulation distance between inputs and outputs. Conforms to IEC950 (reinforced insulation).

TYPICAL APPLICATIONS

- Security equipment
- High-speed inspection machines
- Measuring instruments
- Telephone equipment
- Sensing equipment

TYPES

	I/O isolation	Output rating*		Package	Part No.				Packing quantity	
		Load voltage	Load current		Through hole terminal	Surface-mount terminal				
					Tube packing style		Tape and reel packing style		Tube	Tape and reel
							Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side		
AC/DC dual use	1,500 Vrms	250 V	200 mA	DIP6-pin	AQV453	AQV453A	AQV453AX	AQV453AZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.
		400 V	150 mA		AQV454	AQV454A	AQV454AX	AQV454AZ		
	Reinforced 5,000 Vrms				AQV454H	AQV454HA	AQV454HAX	AQV454HAZ		

* 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.

RATING

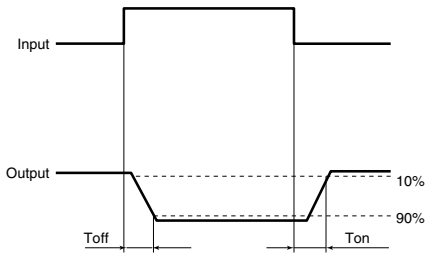
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item		Symbol	Type of connection	AQV453(A)	AQV454(A)	AQV454H(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		250 V	400 V		
	Continuous load current	I_L	A	0.2 A	0.15 A		A connection: Peak AC, DC B, C connection: DC
			B	0.3 A	0.18 A		
			C	0.4 A	0.25 A		
	Peak load current	I_{PEAK}		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 Vrms		5,000 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			

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

Item			Symbol	Type of connection	AQV453(A)	AQV454(A)	AQV454H(A)	Condition
Input	LED operate (OFF) current	Typical	I_{Foff}	—	1 mA	0.9 mA	1.4 mA	I_L = Max.
		Maximum			3 mA			
	LED reverse (ON) current	Minimum	I_{Fon}	—	0.4 mA			I_L = Max.
		Typical			0.9 mA	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	5.5 Ω	11 Ω		I_F = 0 mA I_L= Max. Within 1 s
		Maximum			8 Ω	16 Ω		
		Typical	R_{on}	B	2.7 Ω	6.3 Ω		I_F = 0 mA I_L= Max. Within 1 s
		Maximum			4 Ω	8 Ω		
		Typical	R_{on}	C	1.4 Ω	3.1 Ω		I_F = 0 mA I_L = Max. Within 1 s
		Maximum			2 Ω	4 Ω		
	Off state leakage current	Maximum	I_{Leak}	—	1 μA	1 μA	10 μA	I_F= 5 mA V_L= Max.
Transfer characteristics	Operate (OFF) time*	Typical	T_{off}	—	1.52 ms	1.2 ms	1.8 ms	I_F = 0 mA → 5 mA I_L = Max.
		Maximum			3 ms	2.0 ms	3.0 ms	
	Reverse (ON) time*	Typical	T_{on}	—	0.4 ms	0.36 ms	0.4 ms	I_F = 5 mA → 0 mA I_L = Max.
		Maximum			1 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

*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
AQV453(A)	Load voltage (Peak AC)	V_L	—	200	V
	Continuous load current (A connection)	I_L	—	0.2	A
AQV454(A)	Load voltage (Peak AC)	V_L	—	320	V
	Continuous load current (A connection)	I_L	—	0.15	A
AQV454H(A)	Load voltage (Peak AC)	V_L	—	320	V
	Continuous load current (A connection)	I_L	—	0.15	A

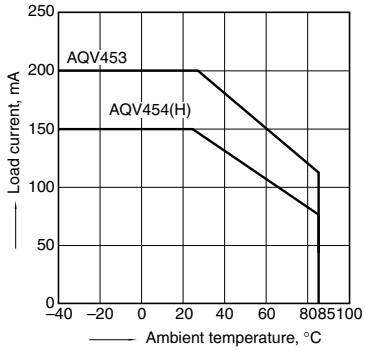
■ **These products are not designed for automotive use.**
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

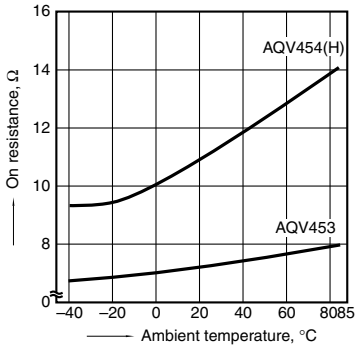
Allowable ambient temperature: –40 to +85°C
–40 to +185°F

Type of connection: A



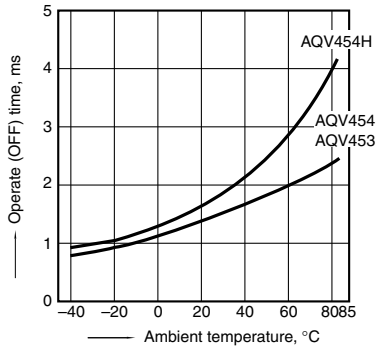
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;
LED current: 0 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



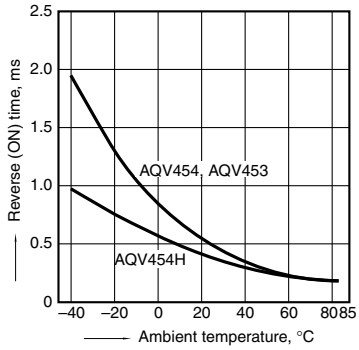
3. Operate (OFF) time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



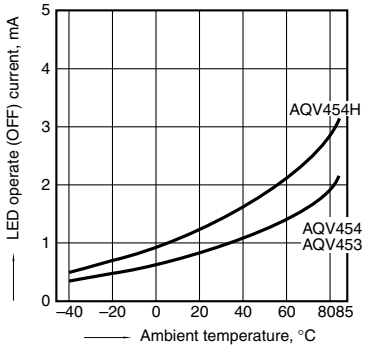
4. Reverse (ON) time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



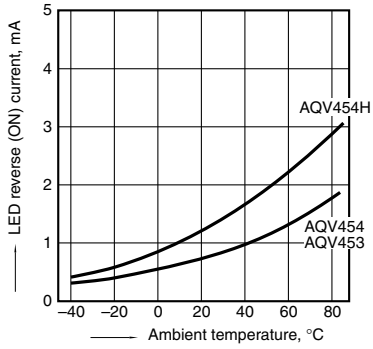
5. LED operate (OFF) current vs. ambient temperature characteristics

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



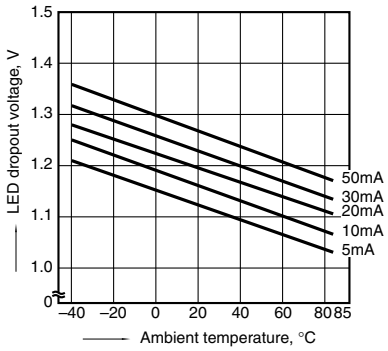
6. LED reverse (ON) current vs. ambient temperature characteristics

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



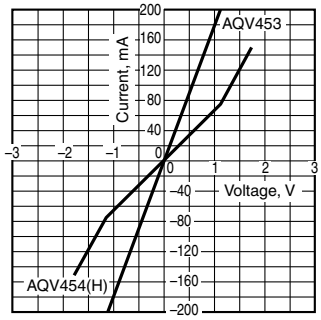
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



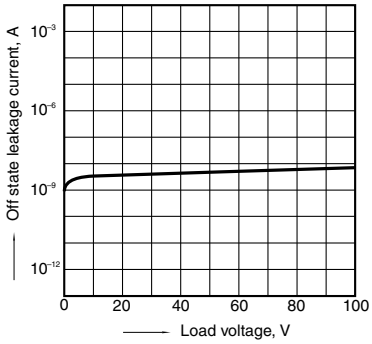
8. Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



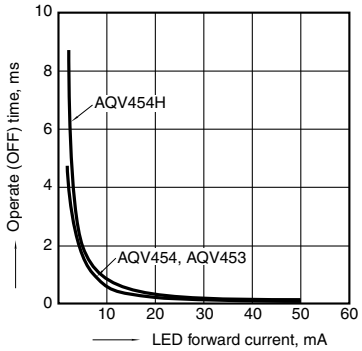
9. Off state leakage current vs. load voltage characteristics

Sample: AQV454;
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



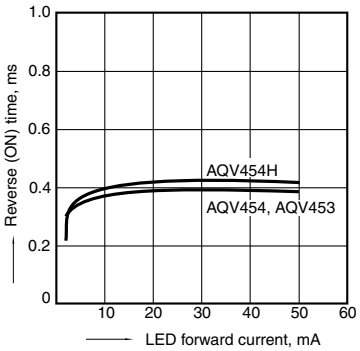
10. Operate (OFF) time vs. LED forward current characteristics

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



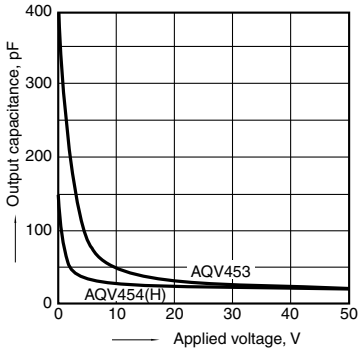
11. Reverse (ON) time vs. LED forward current characteristics

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



12. Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 4 and 6;
Frequency: 1 MHz; Ambient temperature: 25°C 77°F



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