



Description

The AQV2xx is solid state relays containing an AlGaAs infrared LEDs on the light emitting side (input side) optically coupled to a high voltage output detector circuit. The detector consists of a photovoltaic diode array and MOSFETs on the output side. The single channel configuration is equivalent to 1 form A EMR. The devices in a 6-pin small outline DIP package and 6-pin SMD package.

Features

- Normally open signal pole signal throw relay
- Low operating current
- 60 to 600V output withstand voltage
- Wide operating temperature range of -40°C to 85°C
- High input-output isolation voltage($V_{iso} = 5,000\text{Vrms}$)
- RoHS

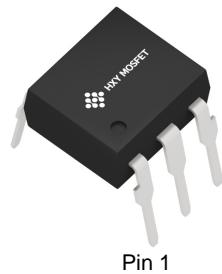
Applications

- Measurement equipment
- Exchange equipment
- FA/OA equipment
- Security
- Industrial controls

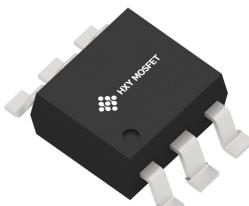
Package Marking and Ordering Information

Product ID	Pack	Qty(PCS)	Packaging
AQV2xx	DIP-6	65	Tube
AQV2xx	SMD-6	2000	Reel

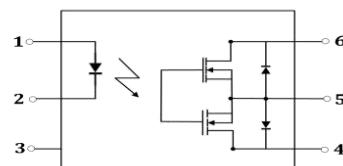
xx: From 12, 15, 14, 16



DIP-6



SMD-6



Pin Configuration

1. AN
2. CA
3. N/CO
4. D1
5. Source
6. D2



Maximum Ratings

Parameter		Symbol	Values		Unit	
Input	Forward Current	I_F	50		mA	
	Reverse Voltage	V_R	6		V	
	Power Dissipation	P	75		mW	
	Peak Forward Current (100 μ s pulse, 100Hz)	I_{FP}	1		A	
	Thermal Resistance Junction-Ambient	R_{thJ-A}	325		°C/W	
	Thermal Resistance Junction-Case	R_{thJ-C}	200		°C/W	
Output	Break Down Voltage	V_L	AQV212	60	V	
			AQV215	100		
			AQV214	400		
			AQV216	600		
	Continuous Load Current	I_L	AQV212	550	mA	
			AQV215	180		
			AQV214	120		
			AQV216	50		
	Pulse Load Current ⁽¹⁾	I_{LPeak}	AQV212	1.2	A	
			AQV215	0.5		
			AQV214	0.3		
			AQV216	0.15		
Power Dissipation		P_{out}	500		mW	
Operating temperature range		T_{op}	-40 ~ 85		°C	
Storage temperature range		T_{stg}	-40 ~ 125		°C	
Total Power consumption		$P(W)$	550		mW	
Isolation Voltage ⁽²⁾		V_{ISO}	5000		Vrms	
Soldering Temperature ⁽³⁾		T_{SOL}	260		°C	

Notes:

(1). A connection: 100ms (1 shot), V_L = DC

(2)AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 3 are shorted together, and pins 4, 6 are shorted together.

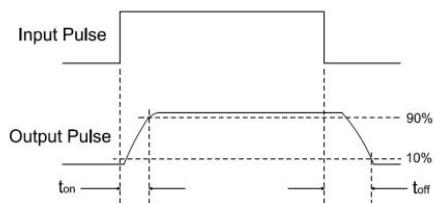
(3).For 10 seconds



Electronic Optical Characteristics (TA = 25°C)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Input	Forward Voltage	V _F	-	1.2	1.5	V	I _F =10mA
	Reverse Current	I _R	-	-	1	μA	V _R =5V
Output	Off State leakage Current	I _{leak}	-	-	1	μA	I _F =0mA, V _L =Max
	On Resistance	R _{d(ON)}	-	0.7	2.5	Ω	I _F =10mA, I _L = Max. t = 1s
			-	6.5	15		
			-	20	30		
			-	40	70		
	Output Capacitance	C _{out}	-	80	-	pF	V _L = 0V, f = 1MHz
			-	60	-		
			-	45	-		
			-	30	-		
	LED turn on Current	I _{F(on)}		2.5	5	mA	I _L = Max.
Transfer Characteristics	LED turn off current	I _{F(off)}	0.4	2.5	-	mA	I _L = Max.
	Turn On Time	T _{ON}	-	1.4	3	ms	I _F = 10 mA, I _L = Max. R _L = 200 Ω,
			-	1.2	3		
			-	0.4	3		
			-	1.4	3		
Turn Off Time	AQV212	T _{OFF}	-	0.05	0.5		
	AQV215		-	0.05	0.5		
	AQV214		-	0.05	0.5		
	AQV216		-	0.05	0.5		

Turn on/Turn off Time





Characteristics Curves

Fig.1 LED Dropout Voltage vs. Ambient Temperature

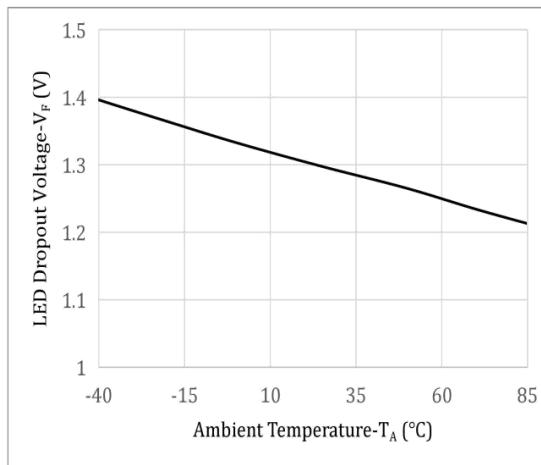


Fig.2 Output Current vs. Output Voltage

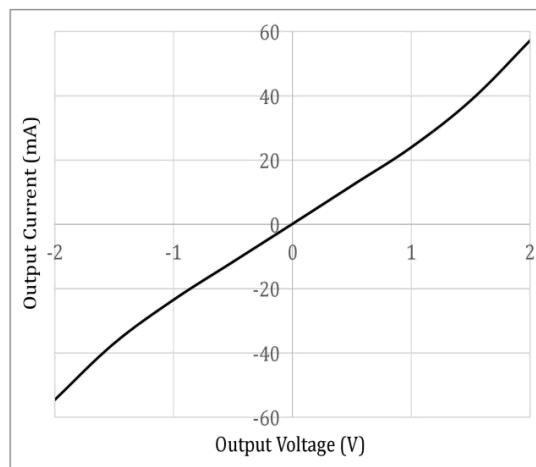


Fig.3 On Resistance vs. Ambient

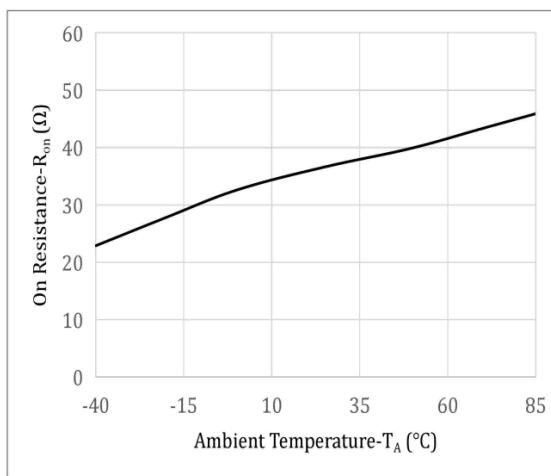


Fig.4 Load Current vs. Ambient Temperature

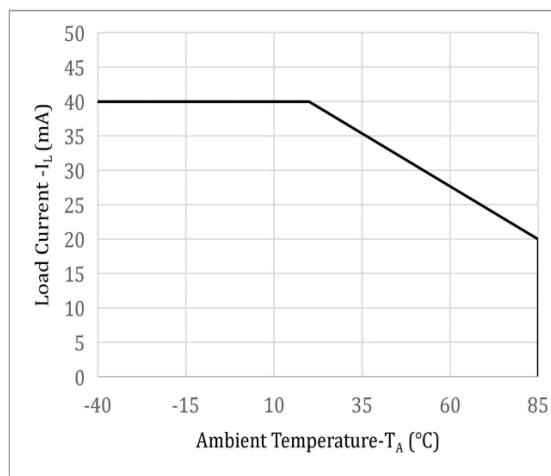


Fig.5 LED Operate Current vs. Ambient Temperature

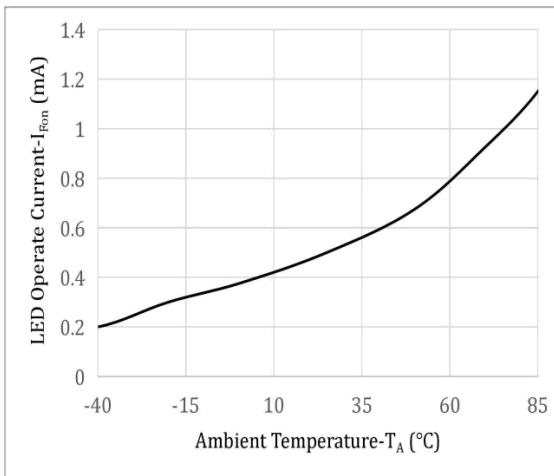


Fig.6 LED Turn Off Current vs. Ambient

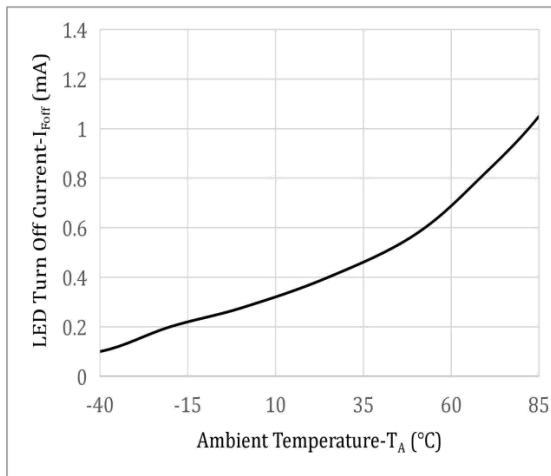




Fig.7 Turn On Time vs. Ambient Temperature

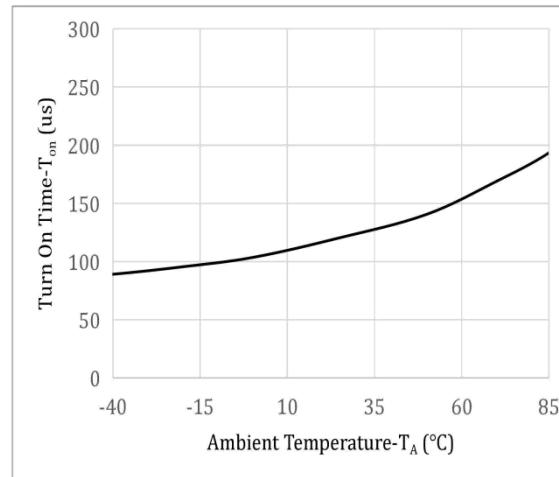


Fig.8 Turn Off Time vs. Ambient Temperature

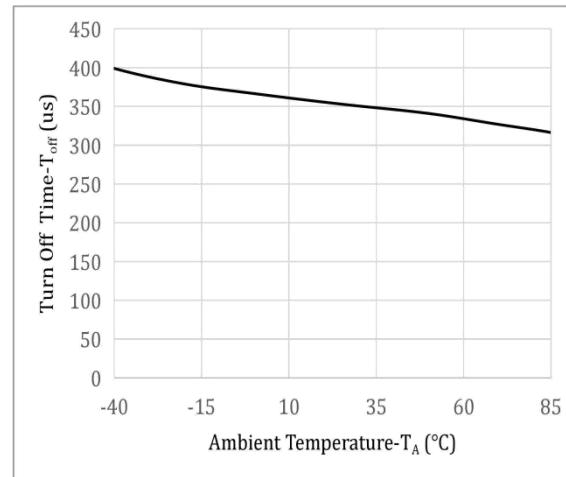


Fig.9 Turn On Time vs. LED Forward Current

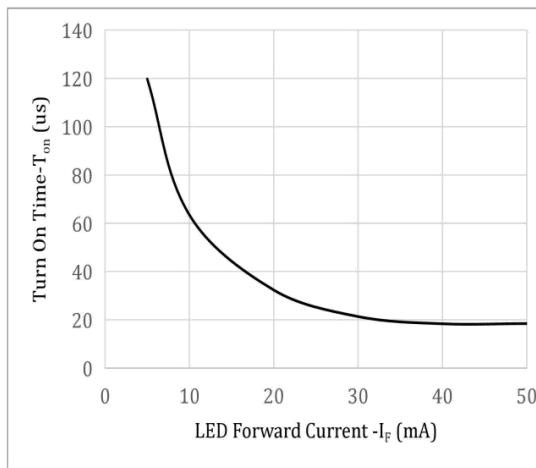


Fig.10 Turn Off Time vs. LED Forward

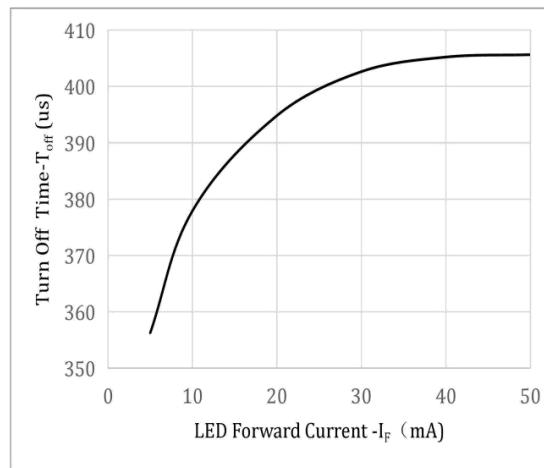
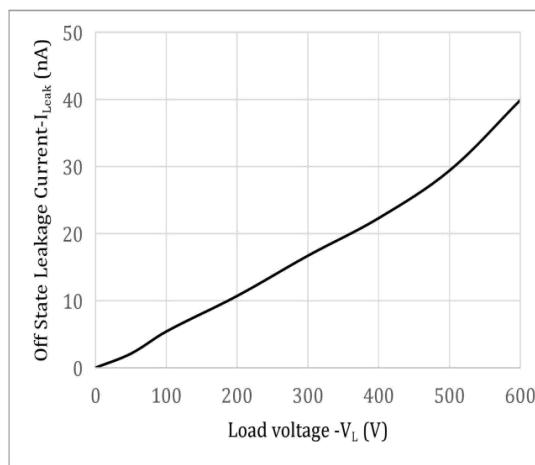


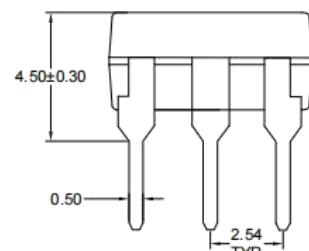
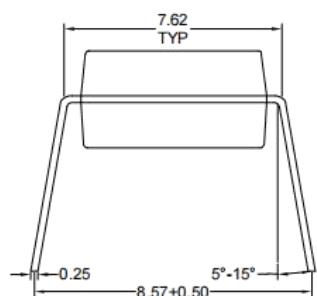
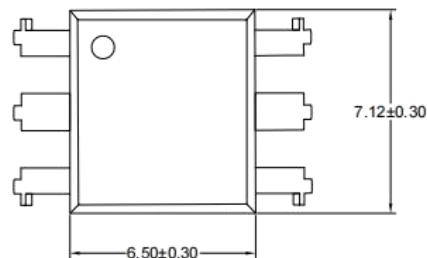
Fig.11 Off State Leakage Current vs Load Voltage





Outline Dimension

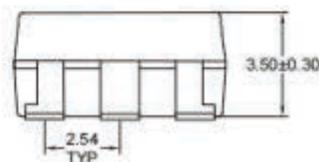
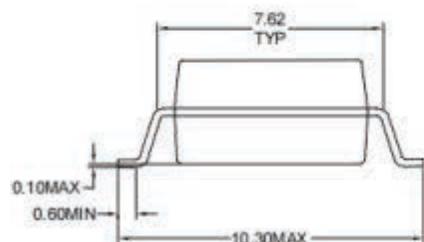
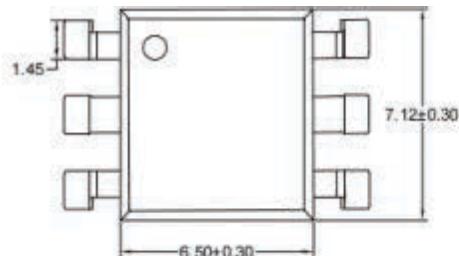
DIP-6 Type:





Outline Dimension

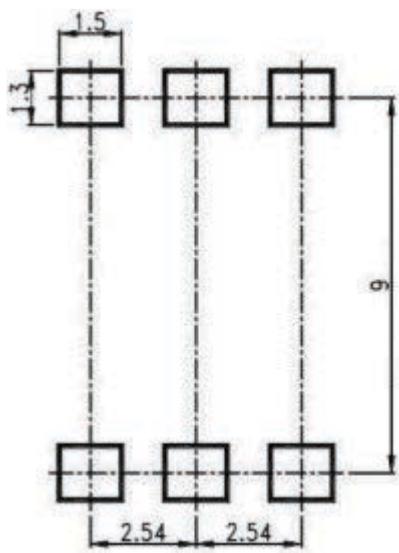
SMD-6 Type:



Unit: mm

Tolerance: ±0.1mm

Recommended solder pad Design



Unit: mm

Tolerance: ±0.1mm

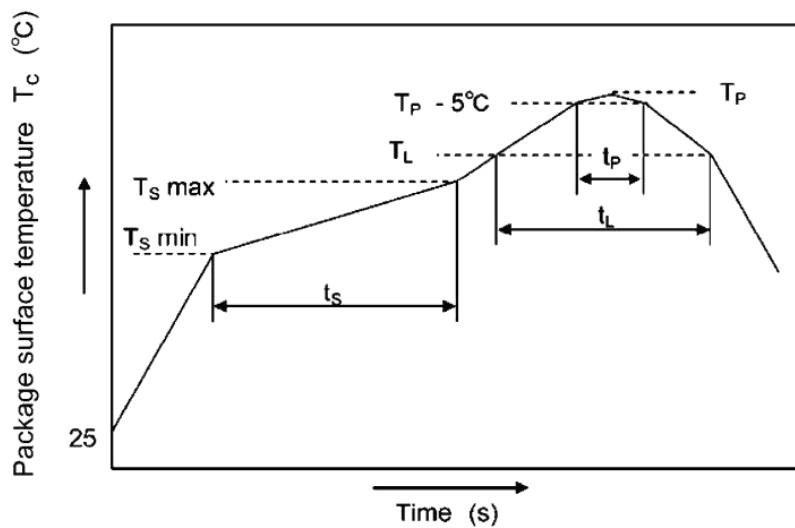


Temperature Profile Of Soldering

1. IR Reflow soldering

(JEDEC-STD-020D compliant)

Profile item	Conditon
Preheat	
-Temperature Min (TSmin)	150°C
-Temperature Max (TSmax)	200°C
-Time (min to max) (ts)	90±30 sec
Soldering zone	
-Temperature (TL)	217°C
-Time (t _L)	60-150 sec
Peak Temperature (TP)	260°C
-Time (TP-5°C to TP) (ts)	30 sec
Ramp-up rate	3°C / sec max
Ramp-down rate	3~6°C/ sec



Notes:

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.



2. Wave soldering (JEDEC22A111 compliant)

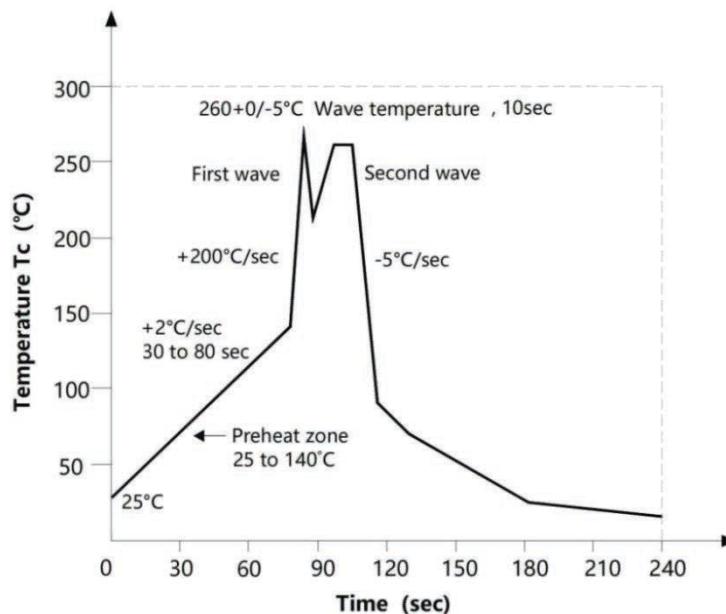
One time soldering is recommended within the condition.

Temperature: 260+0/-5°C.

Time: 10 sec.

Preheat temperature: 25 to 140°C.

Preheat time: 30 to 80 sec.



3. Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5°C

Time: 3 sec max.



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