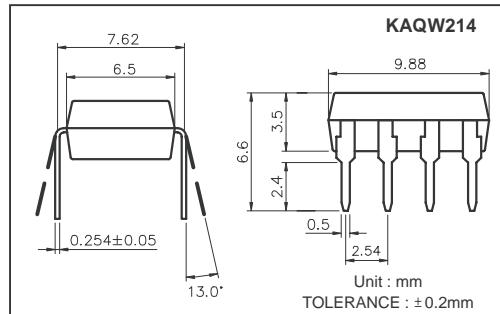


COSMO High Voltage, Solid State Relay-MOSFET Output KAQW214/214A

UL 1577/ UL 508 (File No.E108430), FI EN60950 (File No.FI13698)

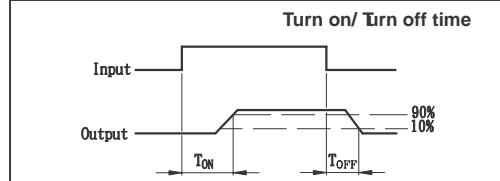
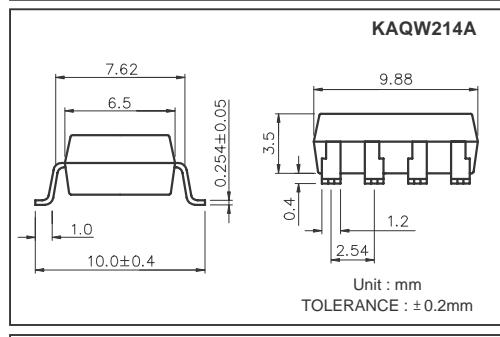
Features

1. Normally Open, Single Pole Single Throw
2. Control 400VAC or DC Voltage
3. Switch 130mA Loads
4. LED control Current, 5mA
5. Low ON-Resistance
6. dv/dt, >500V/ms
7. Isolation Test Voltage, 3750VACrms



Absolute Maximum Ratings (Ta=25°C)

Emitter (Input)	Detector (Output)
Reverse Voltage.....5.0V	Output Breakdown Voltage±400V
Continuous Forward Current50mA	Continuous Load Current±130mA
Peak Forward Current1A	Power Dissipation500mW
Power Dissipation100mW	
Derate Linearly from 25°C1.3mW/°C	
General Characteristics	
Isolation Test Voltage3750VACrms	Storage Temperature Range ...-40°C to +125°C
Isolation Resistance	Operating Temperature Range...-30°C to +85°C
Vio=500V, Ta=25°C≥10 ¹⁰ Ω	Junction Temperature.....100°C
Total Power Dissipation550mW	Soldering Temperature,
Derate Linearly from 25°C2.5mW/°C	2mm from case, 10 sec260°C



Electro-optical Characteristics (Ta=25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Emitter (Input)						
Forward Voltage	VF	IF =10mA		1.2	1.5	V
Operation Input Current	IFON	VL =±20V, IL =100mA, t =10ms			5	mA
Recovery Input Current	IFOFF	VL =±20V, IL ≤5μA	0.2			mA
Detector (Output)						
Output Breakdown Voltage	VB	IB=50μA	400			V
Output Off-State Leakage	ITOFF	VT =100V, IF =0mA	0.2	1		μA
I/O Capacitance	CISO	IF =0, f =1MHz	6			p F
ON Resistance	RON	IL =100mA, IF =10mA	20	30		Ω
Turn-On Time	TON	IF =10mA, VL =±20V	0.3	1.0		ms
Turn-Off Time	TOFF	t =10ms, IL =±100mA	0.7	1.5		ms

Schematic and Wiring Diagrams

Type	Schematic	Output configuration	Load	Connection	Wiring Diagrams
KAQW214 & KAQW214A		2a	AC/DC	-	<p>(1) Two independent 1 Form A use</p> <p>(2) 2 Form A use</p>

Data Curve

<p>Fig.1 Load current vs. ambient temperature Allowable ambient temperature: -40°C to +85°C</p> <table border="1"> <thead> <tr> <th>Ambient Temperature Ta (°C)</th> <th>Load Current (mA)</th> </tr> </thead> <tbody> <tr><td>-40</td><td>130</td></tr> <tr><td>0</td><td>120</td></tr> <tr><td>20</td><td>100</td></tr> <tr><td>40</td><td>80</td></tr> <tr><td>60</td><td>60</td></tr> <tr><td>80</td><td>40</td></tr> <tr><td>85</td><td>35</td></tr> </tbody> </table>	Ambient Temperature Ta (°C)	Load Current (mA)	-40	130	0	120	20	100	40	80	60	60	80	40	85	35	<p>Fig.2 On resistance vs. ambient temperature Across terminals 5,7 and 6,8 pin LED current: 5mA Continuous load current: 130mA(DC)</p> <table border="1"> <thead> <tr> <th>Ambient Temperature Ta (°C)</th> <th>On Resistance (Ω)</th> </tr> </thead> <tbody> <tr><td>-40</td><td>18</td></tr> <tr><td>0</td><td>20</td></tr> <tr><td>20</td><td>22</td></tr> <tr><td>40</td><td>25</td></tr> <tr><td>60</td><td>28</td></tr> <tr><td>80</td><td>30</td></tr> </tbody> </table>	Ambient Temperature Ta (°C)	On Resistance (Ω)	-40	18	0	20	20	22	40	25	60	28	80	30	<p>Fig.3 Turn on time vs. ambient temperature Load voltage: 400V(DC) LED current: 5mA Continuous load current: 130mA(DC)</p> <table border="1"> <thead> <tr> <th>Ambient Temperature Ta (°C)</th> <th>Turn on Time Msec</th> </tr> </thead> <tbody> <tr><td>-40</td><td>0.1</td></tr> <tr><td>0</td><td>0.2</td></tr> <tr><td>20</td><td>0.4</td></tr> <tr><td>40</td><td>0.8</td></tr> <tr><td>60</td><td>1.5</td></tr> <tr><td>80</td><td>2.2</td></tr> </tbody> </table>	Ambient Temperature Ta (°C)	Turn on Time Msec	-40	0.1	0	0.2	20	0.4	40	0.8	60	1.5	80	2.2																																										
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<p>Fig.4 Turn off time vs. ambient temperature LED current: 5mA; Load voltage: 400V(DC) Continuous load current: 130mA(DC)</p> <table border="1"> <thead> <tr> <th>Ambient Temperature Ta (°C)</th> <th>Turn off Time Msec</th> </tr> </thead> <tbody> <tr><td>-40</td><td>1.0</td></tr> <tr><td>0</td><td>0.8</td></tr> <tr><td>20</td><td>0.6</td></tr> <tr><td>40</td><td>0.5</td></tr> <tr><td>60</td><td>0.4</td></tr> <tr><td>80</td><td>0.4</td></tr> </tbody> </table>	Ambient Temperature Ta (°C)	Turn off Time Msec	-40	1.0	0	0.8	20	0.6	40	0.5	60	0.4	80	0.4	<p>Fig.5 LED operate vs. ambient temperature Load voltage: 400V(DC) Continuous load current: 130mA(DC)</p> <table border="1"> <thead> <tr> <th>Ambient Temperature Ta (°C)</th> <th>LED Operate Current (mA)</th> </tr> </thead> <tbody> <tr><td>-40</td><td>1.5</td></tr> <tr><td>0</td><td>2.0</td></tr> <tr><td>20</td><td>2.5</td></tr> <tr><td>40</td><td>3.0</td></tr> <tr><td>60</td><td>3.5</td></tr> <tr><td>80</td><td>4.0</td></tr> </tbody> </table>	Ambient Temperature Ta (°C)	LED Operate Current (mA)	-40	1.5	0	2.0	20	2.5	40	3.0	60	3.5	80	4.0	<p>Fig.6 LED turn off current vs. ambient temperature Load voltage: 400V(DC) Continuous load current: 130mA(DC)</p> <table border="1"> <thead> <tr> <th>Ambient Temperature Ta (°C)</th> <th>LED Turn off Current (mA)</th> </tr> </thead> <tbody> <tr><td>-40</td><td>0.5</td></tr> <tr><td>0</td><td>0.7</td></tr> <tr><td>20</td><td>1.0</td></tr> <tr><td>40</td><td>1.5</td></tr> <tr><td>60</td><td>2.0</td></tr> <tr><td>80</td><td>2.5</td></tr> </tbody> </table>	Ambient Temperature Ta (°C)	LED Turn off Current (mA)	-40	0.5	0	0.7	20	1.0	40	1.5	60	2.0	80	2.5																																												
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<p>Fig.7 LED dropout voltage vs. ambient temperature LED current: 5 to 50mA</p> <table border="1"> <thead> <tr> <th>Ambient Temperature Ta (°C)</th> <th>5mA</th> <th>10mA</th> <th>20mA</th> <th>30mA</th> <th>50mA</th> </tr> </thead> <tbody> <tr><td>-40</td><td>1.5</td><td>1.4</td><td>1.3</td><td>1.2</td><td>1.1</td></tr> <tr><td>0</td><td>1.4</td><td>1.3</td><td>1.2</td><td>1.1</td><td>1.0</td></tr> <tr><td>20</td><td>1.3</td><td>1.2</td><td>1.1</td><td>1.0</td><td>0.9</td></tr> <tr><td>40</td><td>1.2</td><td>1.1</td><td>1.0</td><td>0.9</td><td>0.8</td></tr> <tr><td>60</td><td>1.1</td><td>1.0</td><td>0.9</td><td>0.8</td><td>0.7</td></tr> <tr><td>80</td><td>1.0</td><td>0.9</td><td>0.8</td><td>0.7</td><td>0.6</td></tr> <tr><td>100</td><td>0.9</td><td>0.8</td><td>0.7</td><td>0.6</td><td>0.5</td></tr> </tbody> </table>	Ambient Temperature Ta (°C)	5mA	10mA	20mA	30mA	50mA	-40	1.5	1.4	1.3	1.2	1.1	0	1.4	1.3	1.2	1.1	1.0	20	1.3	1.2	1.1	1.0	0.9	40	1.2	1.1	1.0	0.9	0.8	60	1.1	1.0	0.9	0.8	0.7	80	1.0	0.9	0.8	0.7	0.6	100	0.9	0.8	0.7	0.6	0.5	<p>Fig.8 Voltage vs. current characteristics of output at MOS FET portion Measured portion: across terminals 5,7 and 6,8 pin Ambient temperature: 25°C</p> <table border="1"> <thead> <tr> <th>Voltage (V)</th> <th>Current (mA)</th> </tr> </thead> <tbody> <tr><td>-10</td><td>-10</td></tr> <tr><td>-5</td><td>-5</td></tr> <tr><td>-3</td><td>-3</td></tr> <tr><td>-2</td><td>-2</td></tr> <tr><td>-1</td><td>-1</td></tr> <tr><td>0</td><td>0</td></tr> <tr><td>1</td><td>10</td></tr> <tr><td>2</td><td>40</td></tr> <tr><td>3</td><td>100</td></tr> <tr><td>4</td><td>200</td></tr> <tr><td>5</td><td>130</td></tr> </tbody> </table>	Voltage (V)	Current (mA)	-10	-10	-5	-5	-3	-3	-2	-2	-1	-1	0	0	1	10	2	40	3	100	4	200	5	130	<p>Fig.9 Off state leakage current Across terminals 5,7 and 6,8 pin Ambient temperature: 25°C</p> <table border="1"> <thead> <tr> <th>Load Voltage (V)</th> <th>Off State Leakage Current (mA)</th> </tr> </thead> <tbody> <tr><td>0</td><td>1.2e-12</td></tr> <tr><td>20</td><td>1.5e-11</td></tr> <tr><td>40</td><td>1.8e-11</td></tr> <tr><td>60</td><td>2.0e-11</td></tr> <tr><td>80</td><td>2.2e-11</td></tr> <tr><td>100</td><td>2.5e-11</td></tr> </tbody> </table>	Load Voltage (V)	Off State Leakage Current (mA)	0	1.2e-12	20	1.5e-11	40	1.8e-11	60	2.0e-11	80	2.2e-11	100	2.5e-11
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