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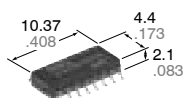
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NAIS

**GU (General Use) Type
SOP Series
Multi-function (1a1b MOSFET
& optocoupler) 16 Pin Type**

PhotoMOS RELAYS

1a1b MOSFET Relay and
1 optocoupler type



mm inch

FEATURES

1. SO package 16-Pin type in super miniature design

The device comes in a super-miniature SO package 16-Pin type measuring (W)4.4 x (L)10.37 x (H) 2.1mm (W).173 x (L).408 x (H).083inch

2. Ideal for PC card and Fax/Modem applications

The small size provides additional space for increased functionality. The new device has been specifically designed for the PCMCIA embedded and handheld device markets.

3. Tape and reel

The device comes standard in a tape and reel (1,000 pcs./reel) to facilitate automatic insertion machines.

TYPICAL APPLICATIONS

- PCMCIA Modem card (Data/fax modem)
- Laptop and notebook computers
- PDA's
- Mobile computing equipment
- Medical equipment
- Security systems
- Meters (Water, Gas, Vending machine)

TYPES

1 optocoupler type	Output rating*		Part No.		Packing quantity in tape and reel
	Load voltage	Load current	Picked from the 1/2/3/4/5/6/7/8-pin side	Picked from the 9/10/11/12/13/14/15/16-pin side	
AC/DC type	350 V	100 mA	AQS610TSX	AQS610TSZ	1,000 pcs.

* Indicate the peak AC and DC values.

Notes: (1) Tape package is the standard packing style. Also available in tube. (Part No. suffix "X" or "Z" is not needed when ordering; Tube: 50 pcs.; Case: 1,000 pcs.)

(2) For space reasons, the package type indicator "X" and "Z" are omitted from the seal.

RATING

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

1) Relay portion (2, 3, 14, 15, 16 and 4, 5, 11, 12, 13 pins)

Item		Symbol	AQS610TS	Remarks
Input	LED forward current	I _F	50 mA	
	LED reverse voltage	V _R	3 V	
	Peak forward current	I _{FP}	1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P _{in}	75 mW	
Output	Load voltage	V _L	350 V	
	Continuous load current	I _L	0.1 A (0.12 A)	() : in case of using only 1 channel
	Peak load current	I _{peak}	0.36 A	100 ms (1 shot), V _L = DC
	Power dissipation	P _{out}	600 mW	

2) Detector portion (6, 7, 9, 10 pins)

Item		Symbol	AQS610TS	Remarks
Input	LED forward current	I _F	50 mA	
	Peak forward current	I _{FP}	1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P _{in}	75 mW	
Output	Output voltage	BV _{CEC}	30 V	
	Power dissipation	P _{out}	150 mW	

3) Others

Item		Symbol	AQS610TS	Remarks
Total power dissipation		P _T	650 mW	
I/O isolation voltage		V _{iso}	1500 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	

AQS610TS

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

1) Relay portion (2, 3, 14, 15, 16 and 4, 5, 11, 12, 13 pins)

Item		Symbol	AQS610TS	Condition	
Input	LED operate current	Typical	0.9 mA	$I_L = \text{Max.}$	
		Maximum	3 mA		
	LED reverse current	Minimum	0.4 mA	$I_L = \text{Max.}$	
		Typical	0.8 mA		
LED dropout voltage	Typical	1.14 (1.25 V at $I_F = 50\text{mA}$)		$I_F = 5\text{mA}$	
	Maximum	1.5 V			
Output	On resistance	Typical	18Ω	$I_F = 5\text{ mA (N.O.)}, I_F = 0\text{ mA (N.C.)}$ $I_L = \text{Max.}$ Within 1 s on time	
		Maximum	25Ω		
	Off state leakage current	Maximum	1μA		$I_F = 0\text{ mA (N.O.)}, I_F = 5\text{ mA (N.C.)}$ $V_L = \text{Max.}$
Transfer characteristics	Operate time*	Typical	0.23 ms (N.O.), 0.52 ms (N.C.)		$I_F = 0\text{ mA} \pm 5\text{ mA}$ $I_L = \text{Max.}$
		Maximum	1.0 ms		
	Reverse time*	Typical	0.04 ms (N.O.), 0.23 ms (N.C.)		$I_F = 5\text{ mA} \pm 0\text{ mA}$ $I_L = \text{Max.}$
		Maximum	1.0 ms		

Note: Recommendable LED forward current $I_F = 5\text{ mA}$

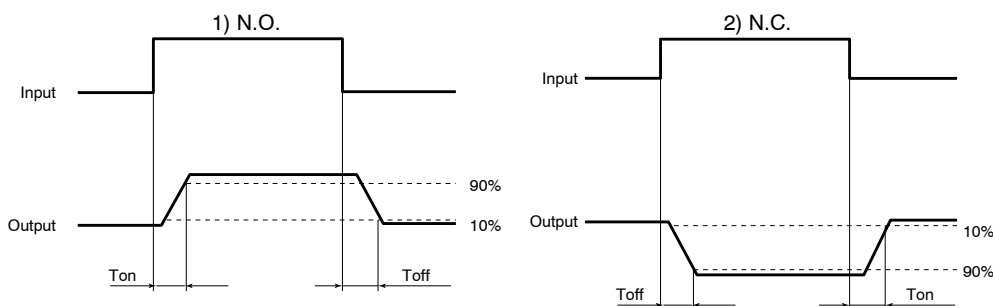
2) Detector portion (6, 7, 9, 10 pins)

Item		Symbol	AQS610TS	Condition
Input	LED operate current	Typical	2 mA	$I_C = 2\text{ mA}$ $V_{CE} = 0.5\text{ V}$
		Maximum	6 mA	
	LED turn off current	Minimum	5μA	$I_C = 1\text{ mA}$ $V_{CE} = 5\text{ V}$
		Typical	35μA	
LED dropout voltage	Typical	1.14 (1.25 V at $I_F = 50\text{ mA}$)		$I_F = 5\text{ mA}$
	Maximum	1.5 V		
Output	Saturation voltage	Typical	0.08 V	$I_F = 15\text{ mA}$ $I_C = 2\text{ mA}$
		Maximum	0.5 V	
	Off state leakage current	Typical	0.01 nA	$I_F = 0$ $V_{CE} = 5\text{ V}$
		Maximum	500 nA	
Current transfer ratio	Minimum	—	33%	$I_F = 5\text{ mA}$ $V_{CE} = 0.5\text{ V}$
	Typical	—	100%	
Transfer characteristics	Turn on time*	Typical	T_{on}	$I_F = 5\text{ mA}$ $V_{CE} = 5\text{ V}$ $I_C = 2\text{ mA}$
	Turn off time*	Typical	T_{off}	$I_F = 5\text{ mA}$ $V_{CE} = 5\text{ V}$ $I_C = 2\text{ mA}$

3) Others

Item		Symbol	AQS610TS	Condition
Transfer characteristics	I/O capacitance	Typical	0.8pF	$f = 1\text{ MHz}$ $V_B = 0$
		Maximum	1.5pF	
	Initial I/O isolation resistance	Minimum	R_{iso}	1,000MΩ

*Operate/Reverse time



■ For Dimensions, see Page 441.

■ For Schematic and Wiring Diagrams, see Page 447.

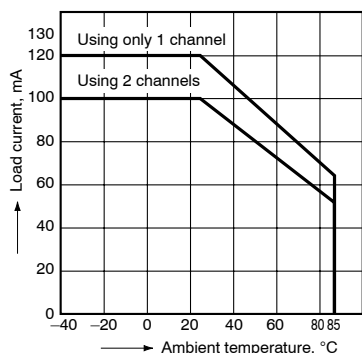
■ For Cautions for Use, see Page 449.

REFERENCE DATA

[1] Relay portion (2, 3, 14, 15, 16 and 4, 5, 11, 12, 13 pins)

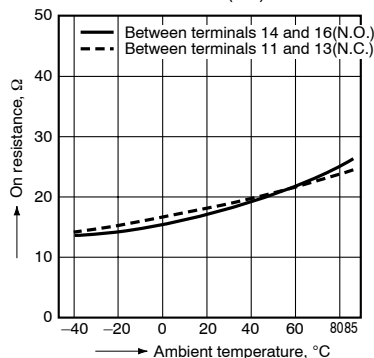
1. Load current vs. ambient temperature characteristics

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



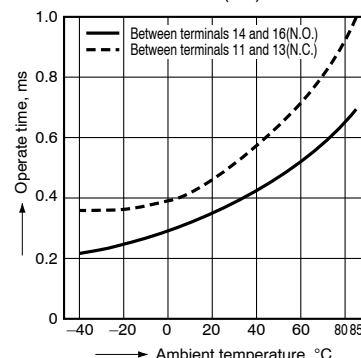
2. On resistance vs. ambient temperature characteristics

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



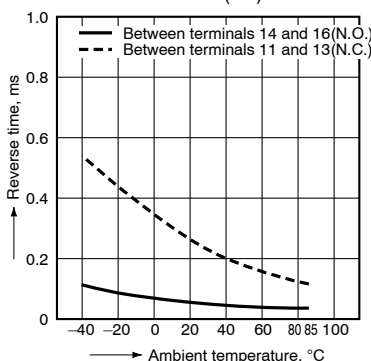
3. Operate time vs. ambient temperature characteristics

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



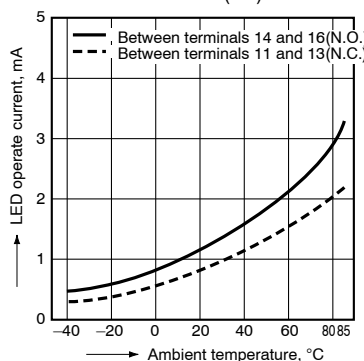
4. Reverse time vs. ambient temperature characteristics

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



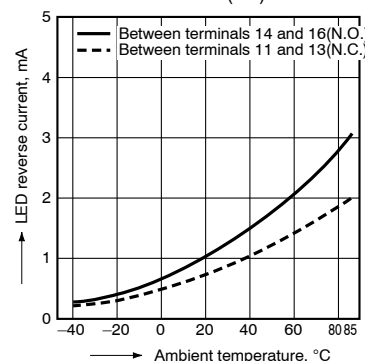
5. LED operate current vs. ambient temperature characteristics

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



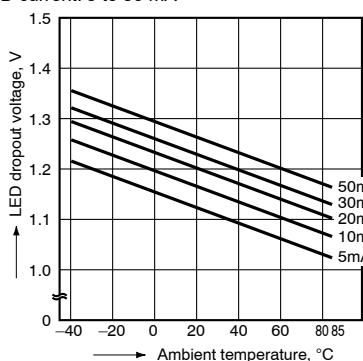
6. LED reverse current vs. ambient temperature characteristics

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



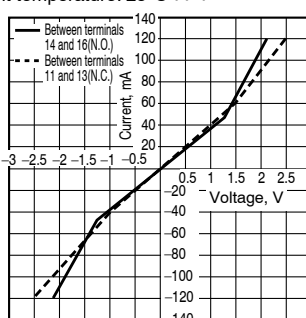
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



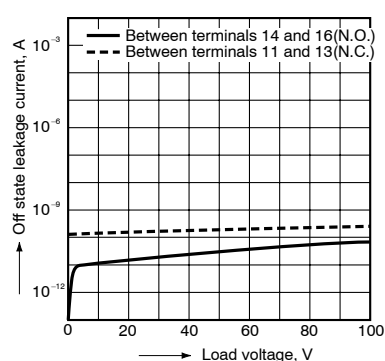
8. Voltage vs. current characteristics of output at MOS portion

Ambient temperature: 25°C 77°F



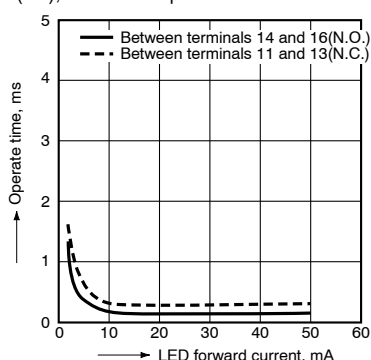
9. Off state leakage current

Ambient temperature: 25°C 77°F



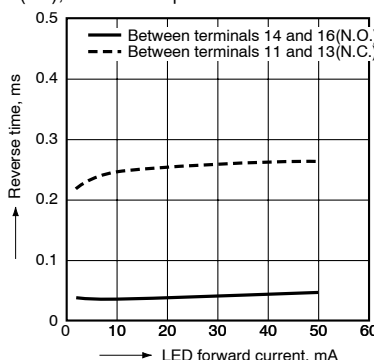
10. LED forward current vs. operate time characteristics

Load voltage: Max. (DC); Continuous load current:
Max. (DC); Ambient temperature: 25°C 77°F



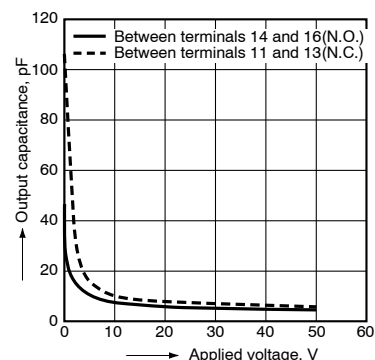
11. LED forward current vs. reverse time characteristics

Load voltage: Max. (DC); Continuous load current:
Max. (DC); Ambient temperature: 25°C 77°F



12. Applied voltage vs. output capacitance characteristics

Frequency: 1 MHz; Ambient temperature: 25°C 77°F

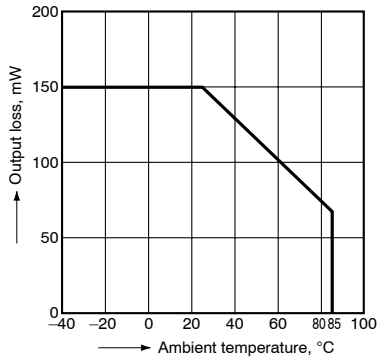


AQS610TS

[2] Detector portion (6, 7, 9, 10 pins)

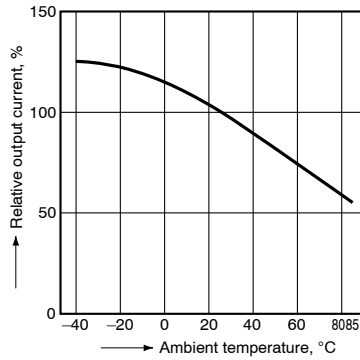
1. Output loss vs. ambient temperature characteristics

Allowable ambient temperature: -40°C to $+85^{\circ}\text{C}$
 -40°F to $+185^{\circ}\text{F}$



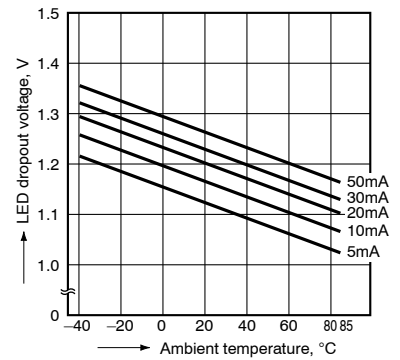
2. Relative output current vs. ambient temperature characteristics

Measured portion: between terminals 6 and 7
 $I_F = 5 \text{ mA}$, $V_{CE} = 0.5 \text{ V DC}$



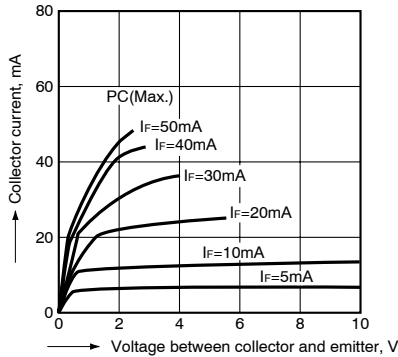
3. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



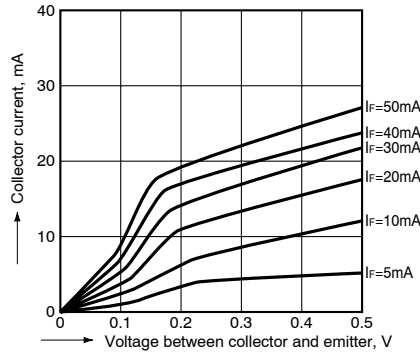
4-1. Collector current vs. voltage between collector and emitter characteristics (I_C - V_{CE})

Measured portion: between terminals 6 and 7
 Ambient temperature: 25°C 77°F



4-2. Collector current vs. voltage between collector and emitter characteristics (I_C - V_{CE})

Measured portion: between terminals 6 and 7
 Ambient temperature: 25°C 77°F



5. Off state leakage current

Measured portion: between terminals 6 and 7
 $I_F = 0 \text{ mA}$
 $T_a = 25^{\circ}\text{C}$ 77°F

