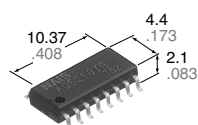


NAIS

**GU (General Use) Type
SOP Series
Multi-function (1a,2a MOSFET
& optocoupler) 16 Pin Type**

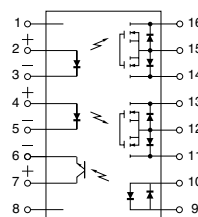
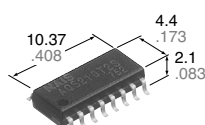
PhotoMOS RELAYS

2 MOSFET Relay and
1 optocoupler type

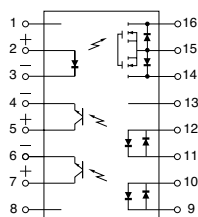


mm inch

1 MOSFET Relay and
2 optocouplers type



Relay portion
(2,3,14,15,16 pins)
(4,5,11,12,13 pins)
Detector portion
(6,7,9,10 pins)



Relay portion
(2,3,14,15,16 pins)
Detector portion
(4,5,11,12 pins)
(6,7,9,10 pins)

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	AQS210TSX	AQS210TSZ	1,000 pcs.

2 optocouplers 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	120 mA	AQS210T2SX	AQS210T2SZ	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) [AQS210TS], (2, 3, 14, 15, 16 pins) [AQS210T2S]

Item		Symbol	AQS210TS	AQS210T2S	Remarks
Input	LED forward current	I _F	50mA		
	LED reverse voltage	V _R	3V		
	Peak forward current	I _{FP}	1A		f=100 Hz, Duty factor=0.1%
	Power dissipation	P _{in}	75mW		
Output	Load voltage	V _L	350V		
	Continuous load current	I _L	0.1A (0.12 A)	0.12A	() : in case of using only 1 channel
	Peak load current	I _{peak}	0.36A		100 ms (1 shot), V _L = DC
	Power dissipation	P _{out}	600mW	400mW	

2) Detector portion (6, 7, 9, 10 pins) [AQS210TS], (4, 5, 11, 12 and 6, 7, 9, 10 pins) [AQS210T2S]

Item		Symbol	AQS210TS	AQS210T2S	Remarks
Input	LED forward current	I _F	50mA		
	Peak forward current	I _{FP}	1A		f = 100 Hz, Duty factor=0.1%
	Power dissipation	P _{in}	75mW		
Output	Output voltage	BV _{CEO}	30V		
	Power dissipation	P _{out}	150mW	100mW	

3) Others

Item		Symbol	AQS210TS	AQS210T2S	Remarks
Total power dissipation		P _T	650mW		
I/O isolation voltage		V _{iso}	1500V 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		

AQS210TS, 210T2S

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

1) Relay portion (2, 3, 14, 15, 16 and 4, 5, 11, 12, 13 pins) [AQS210TS] (2, 3, 14, 15, 16 pins) [AQS210T2S]

Item			Sym- bol	AQS210TS	AQS210T2S	Condition
Input	LED operate current	Typical	I _{Fon}	0.9mA		I _L =Max.
		Maximum		3mA		
	LED turn off current	Minimum	I _{Foff}	0.4mA		I _L =Max.
		Typical		0.8mA		
	LED dropout voltage	Typical	V _F	1.14 (1.25 V at I _F =50mA)		I _F =5mA
		Maximum		1.5V		
Output	On resistance	Typical	R _{on}	17Ω		I _F =5mA I _L =Max. Within 1 s on time
		Maximum		25Ω		
	Off state leak-age current	Maximum	I _{Leak}	1μA		I _F =0 I _L =Max.
Transfer char- acteristics	Turn on time*	Typical	T _{on}	0.23ms		I _F =5mA I _L =Max.
		Maximum		1.0 ms		
	Turn off time*	Typical	T _{off}	0.04ms		I _F =5mA I _L =Max.
		Maximum		1.0 ms		

2) Detector portion (6, 7, 9, 10 pins) [AQS210TS] (4, 5, 11, 12 and 6, 7, 9, 10 pins) [AQS210T2S]

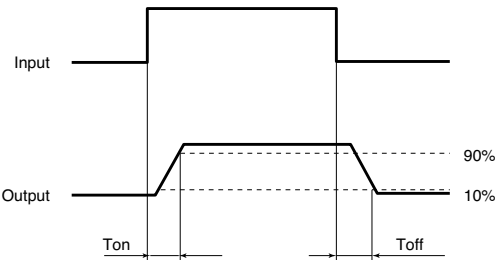
Item			Sym- bol	AQS210TS	AQS210T2S	Condition
Input	LED operate current	Typical	I _{Fon}	2mA		I _C =2mA V _{CE} =0.5V
		Maximum		6mA		
	LED turn off current	Minimum	I _{Foff}	5μA		I _C =1μA V _{CE} =5V
		Typical		35μA		
	LED dropout voltage	Typical	V _F	1.14 (1.25 V at I _F =50mA)		I _F =5mA
		Maximum		1.5V		
Output	Saturation volt- age	Typical	V _{on}	0.08V		I _F =15mA I _C =2mA
		Maximum		0.5V		
	Off state leak- age current	Typical	I _{CEO}	0.01nA		I _F =0 V _{CE} =5V
		Maximum		500nA		
	Current trans- fer ratio	Minimum	—	33%		I _F =5mA V _{CE} =0.5V
		Typical		100%		
Transfer char- acteristics	Turn on time*	Typical	T _{on}	0.01ms		I _F =5mA V _{CE} =5V I _C =2mA
	Turn off time*	Typical	T _{off}	0.03ms		I _F =5mA V _{CE} =5V I _C =2mA

3) Others

Item			Sym- bol	AQS210TS	AQS210T2S	Condition
Transfer char- acteristics	I/O capaci- tance	Typical	C _{iso}	0.8pF		f =1 MHz V _B =0
		Maximum		1.5pF		
	Initial I/O isola- tion resistance	Minimum	R _{iso}	1,000MΩ		500V DC

*Turn on/Turn off time

For type of connection, see page 34.



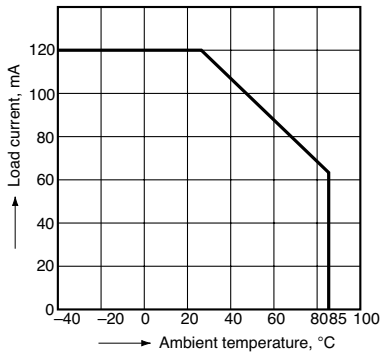
- For Dimensions, see Page 28.
- For Schematic and Wiring Diagrams, see Page 34.
- For Cautions for Use, see Page 36.

REFERENCE DATA

[1] Relay portion (2, 3, 14, 15, 16 and 4, 5, 11, 12, 13 pins) [AQS210TS] (2, 3, 14, 15, 16 pins) [AQS210T2S]

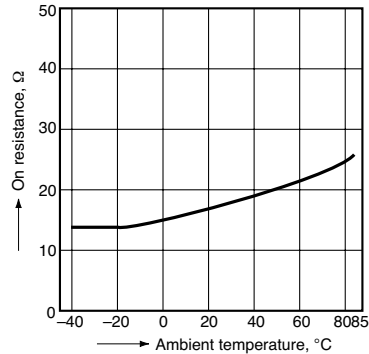
1. Load current vs. ambient temperature characteristics

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



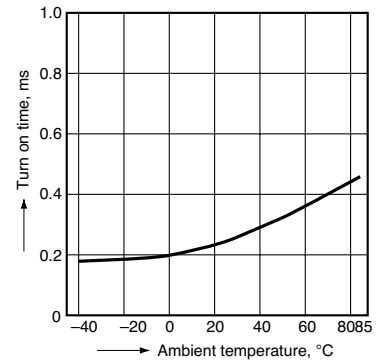
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 14 and 16 (AQS210TS), (AQS210T2S); LED current: 5 mA; Load voltage: Max. (DC); Continuous load current: Max. (DC)



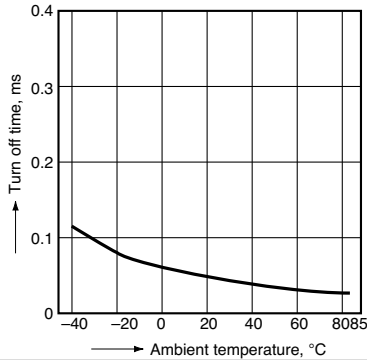
3. Turn on time vs. ambient temperature characteristics

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



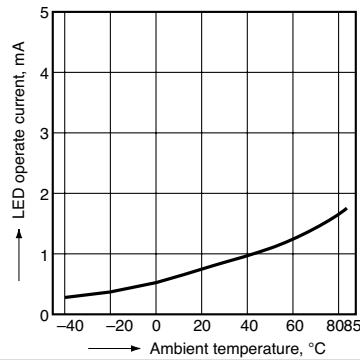
4. Turn off time vs. ambient temperature characteristics

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



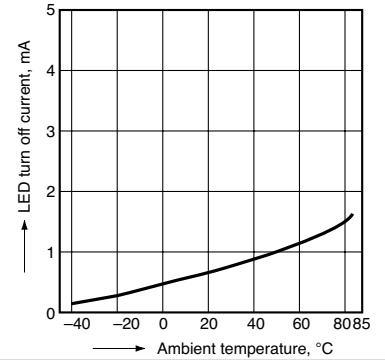
5. LED operate current vs. ambient temperature characteristics

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



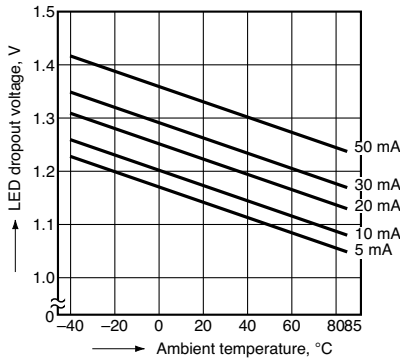
6. LED turn off current vs. ambient temperature characteristics

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



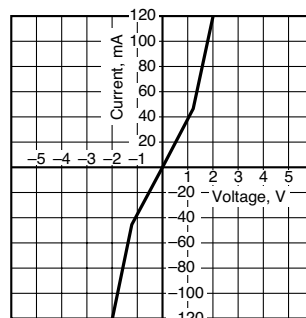
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



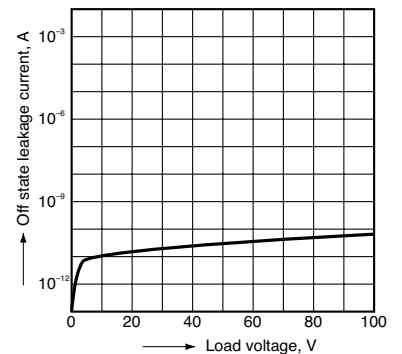
8. Voltage vs. current characteristics of output at MOS portion

Measured portion: between terminals 14 and 16 (AQS210TS), (AQS210T2S); Ambient temperature: 25°C 77°F



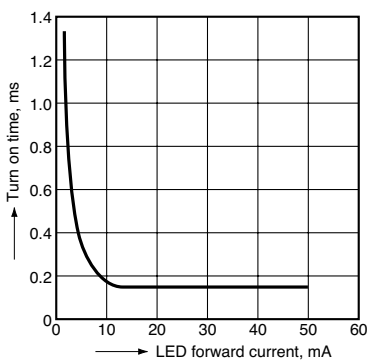
9. Off state leakage current

Measured portion: between terminals 14 and 16 (AQS210TS), (AQS210T2S); Ambient temperature: 25°C 77°F



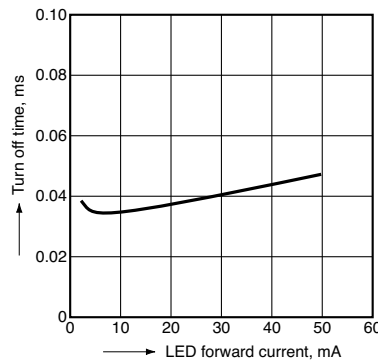
10. LED forward current vs. turn on time characteristics

Measured portion: between terminals 14 and 16 (AQS210TS), (AQS210T2S); Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



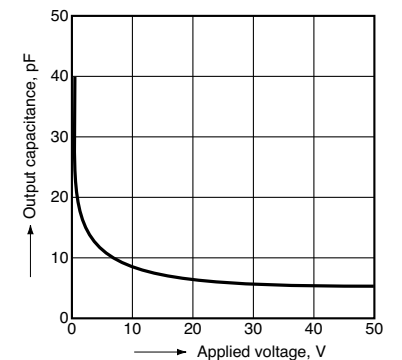
11. LED forward current vs. turn off time characteristics

Measured portion: between terminals 14 and 16 (AQS210TS), (AQS210T2S); Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



12. Applied voltage vs. output capacitance characteristics

Measured portion: between terminals 14 and 16 (AQS210TS), (AQS210T2S); Frequency: 1 MHz; Ambient temperature: 25°C 77°F

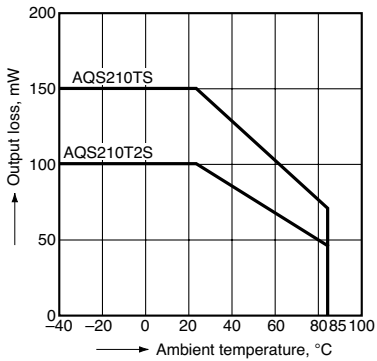


AQS210TS, 210T2S

[2] Detector portion (6, 7, 9, 10 pins) [AQS210TS] (4, 5, 11, 12 pins and 6, 7, 9, 10 pins) [AQS210T2S]

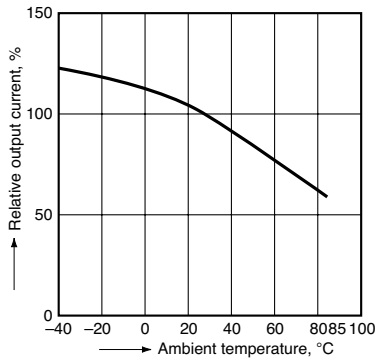
1. Output loss vs. ambient temperature characteristics

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



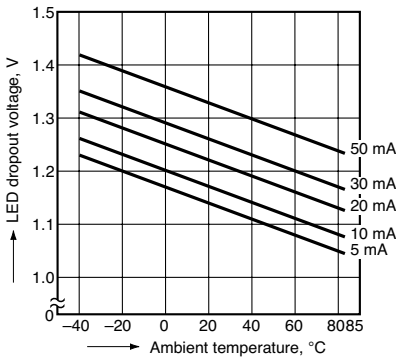
2. Relative output current vs. ambient temperature characteristics

Measured portion: between terminals 6 and 7
(AQS210TS), (AQS210T2S)
 $I_F = 5\text{ mA}$, $V_{CE} = 0.5\text{ V DC}$



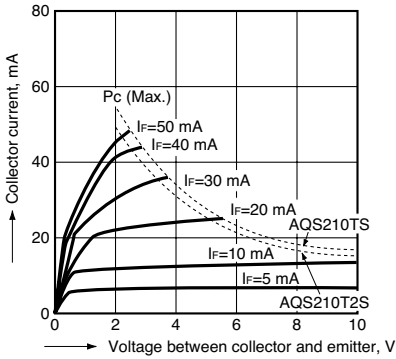
3. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



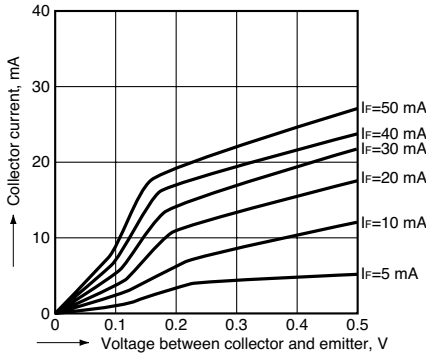
4-1. Collector current vs. voltage between collector and emitter characteristics (I_C - V_{CE})

Measured portion: between terminals 6 and 7
(AQS210TS), (AQS210T2S)
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
(AQS210TS), (AQS210T2S)
Ambient temperature: 25°C 77°F



5. Off state leakage current

Measured portion: between terminals 6 and 7
(AQS210TS), (AQS210T2S)
 $I_F = 0\text{ mA}$
 $T_a = 25^{\circ}\text{C}$ 77°F

