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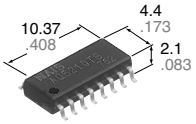
DISCONTINUED

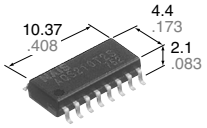
GU (General Use) Type SOP Series Multi-function (1a,2a MOSFET & optocoupler) 16 Pin Type

PhotoMOS RELAYS

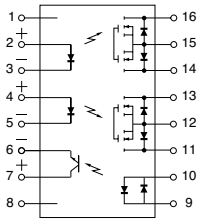
2 MOSFET Relay and
1 optocoupler type



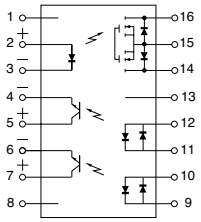
1 MOSFET Relay and
2 optocouplers type



mm inch



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		

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			Symbol	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 leakage current	Maximum	I_{Leak}	1μA		I_F=0 I_L=Max.
Transfer characteristics	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]

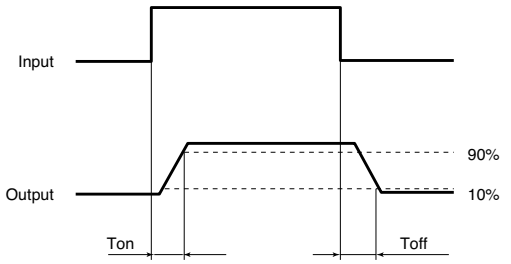
Item			Symbol	AQS210TS	AQS210T2S	Condition
Input	LED operate current	Typical	I_{Fon}	2mA		I_C=2mA V_{CE}=0.5V
		Maximum		6mA		
	LED turn off current	Minimum	I_{Foff}	5μA		I_C=1μA V_{CE}=5V
		Typical		35μA		
	LED dropout voltage	Typical	V_F	1.14 (1.25 V at I_F=50mA)		I_F=5mA
		Maximum		1.5V		
Output	Saturation voltage	Typical	V_{on}	0.08V		I_F=15mA I_C=2mA
		Maximum		0.5V		
	Off state leakage current	Typical	I_{CEO}	0.01nA		I_F=0 V_{CE}=5V
		Maximum		500nA		
	Current transfer ratio	Minimum	—	33%		I_F=5mA V_{CE}=0.5V
		Typical		100%		
Transfer characteristics	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			Symbol	AQS210TS	AQS210T2S	Condition
Transfer characteristics	I/O capacitance	Typical	C_{iso}	0.8pF		f =1 MHz V_B=0
		Maximum		1.5pF		
	Initial I/O isolation resistance	Minimum	R_{iso}	1,000MΩ		500V DC

*Turn on/Turn off time

For type of connection, see page 34.



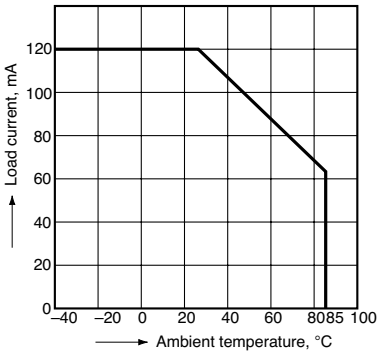
■ For Dimensions, see Page 28.
■ For Schematic and Wiring Diagrams, see Page 34.
■ For Cautions for Use, see Page 36.

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]

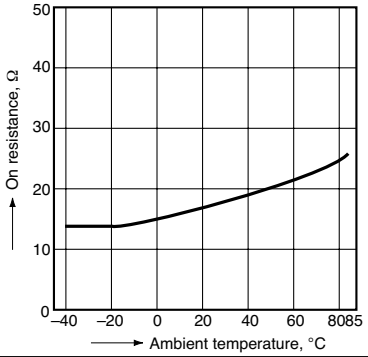
1. Load current vs. ambient temperature characteristics

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



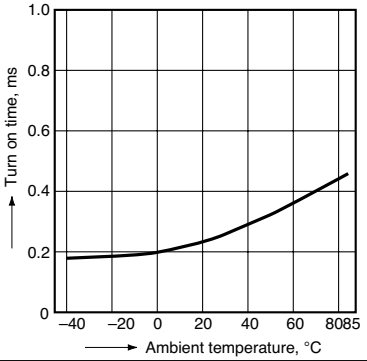
2. On resistance vs. ambient temperature characteristics

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



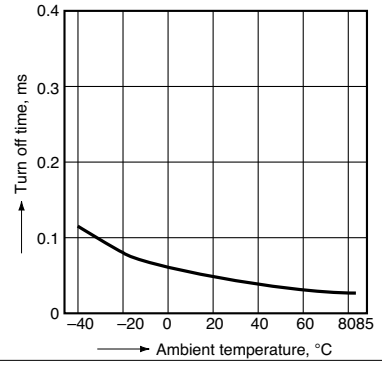
3. Turn on time vs. ambient temperature characteristics

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



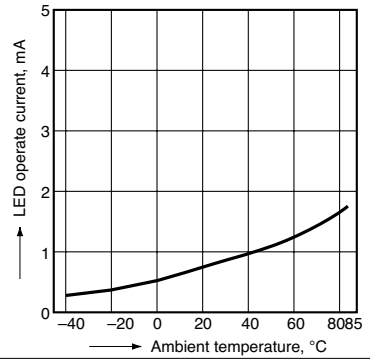
4. Turn off time vs. ambient temperature characteristics

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



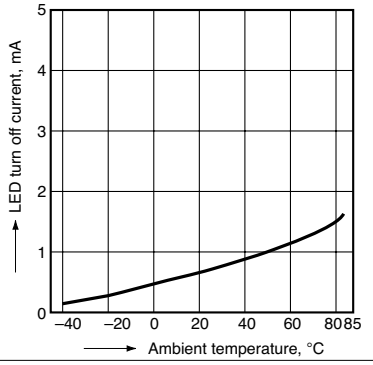
5. LED operate current vs. ambient temperature characteristics

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



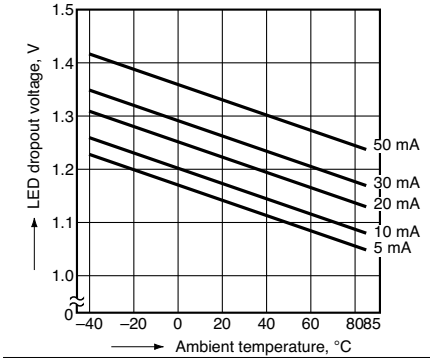
6. LED turn off current vs. ambient temperature characteristics

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



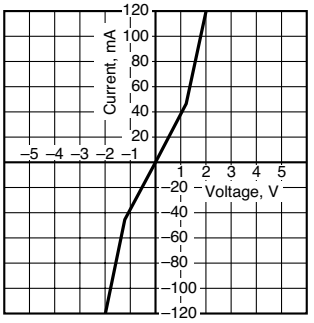
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



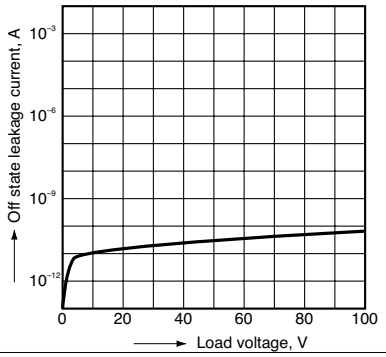
8. Voltage vs. current characteristics of output at MOS portion

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



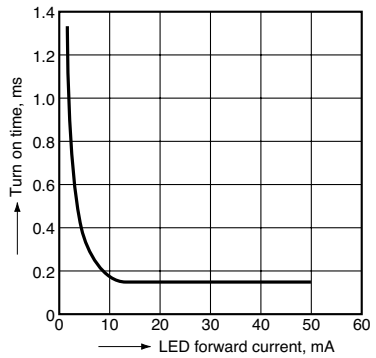
9. Off state leakage current

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



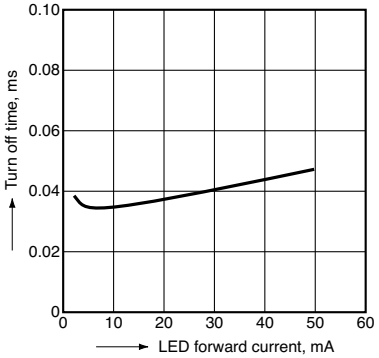
10. LED forward current vs. turn on time characteristics

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



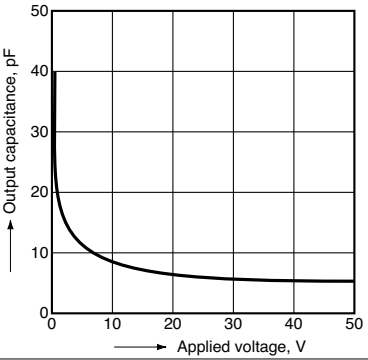
11. LED forward current vs. turn off time characteristics

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

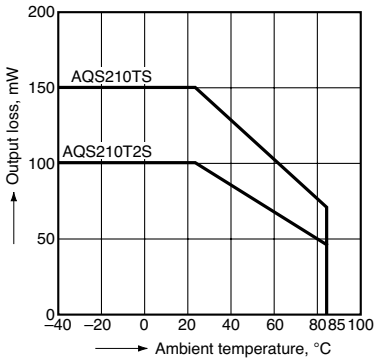
Measured portion: between terminals 14 and 16 (AQS210TS), (AQS210T2S); Frequency: 1 MHz; Ambient temperature: 25°C 77°F



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

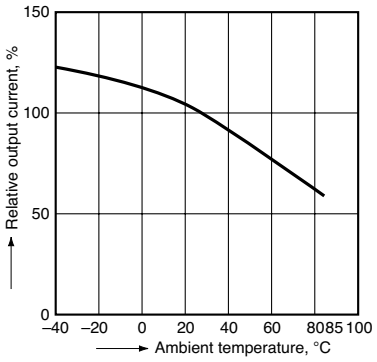
1. Output loss vs. ambient temperature characteristics

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



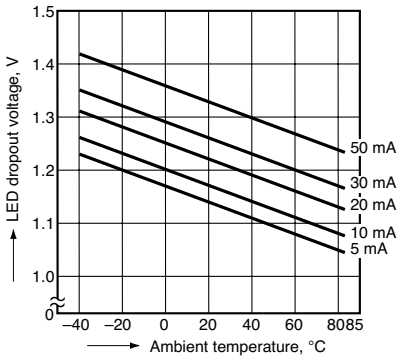
2. Relative output current vs. ambient temperature characteristics

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



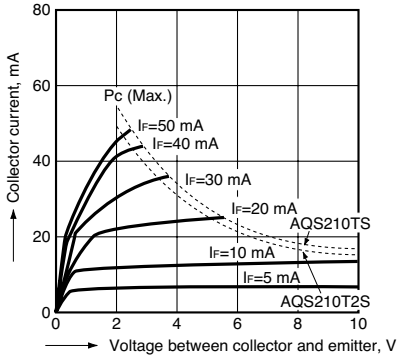
3. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



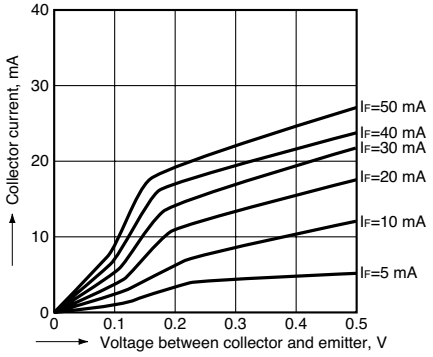
4-1. Collector current vs. voltage between collector and emitter characteristics (I_C-V_{CE})

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 mA
T_a= 25°C 77°F