

Certificate of Compliance

Certificate: 1213275 (LR 82858)

Master Contract: 179606

Project: 2203977

Date Issued: 2009/07/31

Issued to: Fairchild Semiconductor

3001 Orchard Pky
San Jose, CA 95134
USA

Attention: Mr. John Constantino

*The products listed below are eligible to bear
the CSA Mark shown with adjacent indicator*



T. Munteanu, P.Eng.

Issued by: T. Munteanu, P.Eng.

PRODUCTS

CLASS 3231 52 - SWITCHES - Component - Automatic - Industrial Control

Solid state photo-coupled relays, open type, fully encapsulated, for PCB mounting only, max. input voltage equal to max. output voltage.

Cat Number Input Current(Max) Load Voltage(Max) Output Current(Max)

HSR 312 80mA 250V 190mAac/320mAdc

HSR 312L 80mA 250V 170mAac/300mAdc

HSR 412 80mA 400V 140mAac/210mAdc

HSR 412L 80mA 400V 120mAac/200mAdc

FOD 1518A 80mA 250V 170mAac/300mAdc

FOD 1518AN 80mA 250V 190mAac/320mAdc

Conditions to be Accepted:

These photo-coupled isolators are intended to be used in the other CSA Certified equipment where the suitability of the combination will be determined by CSA International.



Supplement to Certificate of Compliance

Certificate: 1213275

Master Contract: 179606

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
2203977	2009/07/31	Covers change of leadframe supplier from QDI to QPL.
1431585	2003/09/26	Addition of models FOD 1518A and FOD 1518AN opto-coupled Solid State Relays

History

1352996 Aug. 22, 2002 Alternative manufacturer for identical LED chip and alternative outer molding compound manufacturer.

1213275 Feb. 20, 2002 Original Certification, Models HSR312, HSR312L, HSR412, HSR412L opto-coupled Solid State Relays



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APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 14 - Industrial Control Equipment

MASTER CONTRACT: 179606 (LR82858)

REPORT: 1213275

PROJECT: 2203977

Edition 1: February 20, 2002; Project 1213275 – Toronto
Issued by T. Munteanu, P. Eng.

Edition 2: August 22, 2002; Project 1352996 – Toronto
Issued by Babu Patel, P.Eng.

Report Pages Reissued.

Edition 3: September 26, 2003; Project 1431585 – Toronto
Issued by T. Munteanu, P. Eng.

Report Pages Reissued

Edition 4: July 31, 2009; Project 2203977 – Toronto
Issued by T. Munteanu, P. Eng.

Report Pages Reissued

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PRODUCTS

CLASS 3231 52 - SWITCHES - Component - Automatic - Industrial

Solid state photo-coupled relays, open type, fully encapsulated, for PCB mounting only, max. input voltage equal to max. output voltage.

Cat Number	Input Current (Max)	Load Voltage (Max)	Output Current (Max)
HSR 312	80mA	250V	190mAac/320mAdc
HSR 312L	80mA	250V	170mAac/300mAdc
HSR 412	80mA	400V	140mAac/210mAdc

The test report shall not be reproduced, except in full, without the approval of CSA International.

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HSR 412L	80mA	400V	120mAac/200mAdc
FOD 1518A	80mA	250V	170mAac/300mAdc
FOD 1518AN	80mA	250V	190mAac/320mAdc

Conditions to be Accepted:

These photo-coupled isolators are intended to be used in the other CSA Certified equipment where the suitability of the combination will be determined by CSA International.

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No.	0-M91 -	General Requirements - Canadian Electrical Code, Part II
CAN/CSA-C22.2 No.	14-05 -	Industrial Control Equipment

MARKINGS

(III. 1)

The model designation, complete manufacturer's name or trademark and date code appear on each device. The submitter's name or trademark, model designation, electrical rating, the CSA component acceptance mark are permanently marked on the smallest shipping box.

ALTERATIONS

The markings are as stated in "Markings" above.

FACTORY TESTS

The equipment at the conclusion of manufacture, before shipment, shall withstand for one min, without breakdown, the application of a dielectric voltage equal to 1000V plus twice the rated voltage between input and output. The factory test may be made at existing room temperature. As an alternative, a potential 20 percent higher may be applied for one sec.

Warning: The factory test(s) specified may present a hazard of injury to personnel and/or property and should only be performed by persons knowledgeable of such hazards and under conditions designed to minimize the possibility of injury.

DESCRIPTION

SPACINGS

Relays meet the requirements of CSA Std.C22.2 No 14-05, Table 6, Group B, for 301-600V.

For layout and dimensions see Ill. 2 and Fig. 1. Covers models HSR312, HSR312L, HSR412 and HSR 412L.

- a) Lead Wire: Material Drawing No. ESP-4070-0X supplied by QPL. The 'X' can be any number representing leadframe plating selection.
- b) Bonding Wire: 1.3 mils gold wire supplied by Heraeus.
- c) Outer Moulding Compound: E8436 FR-397 from Rogers Corp. Alternative material supplier is KE-96A from Toshiba or Kyocera.
- d) Inner Molding Compound: HIPEC Q3-6633 from Dow Corning.
- e) Leadframe: Same as Item a.
- f) LED Chip: PT 112 from Fairchild Semiconductor Optoelectronics Pte, Ltd. (formerly known as QT Singapore).

Alternative LED Chip: OPA8828 from Knowledge*on Inc.

- h) MOSFET Chip: HEXFET chip supplied by International Rectifier:

P/N : 94-2853 for HSR312 and HSR312L.

P/N : 94-2854 for HSR412 and HSR412L.

PVG chip supplied by International Rectifier:

P/N : 411679 for HSR312L

P/N : 409429 for HSR312, HSR412 and HSR412L.

Models FOD1518A and FOD1518AN:

The layout and dimensions of models FOD1518A and FOD1518AN are identical to respectively models HSR 312L and HSR 312 of Sec III 3.

Construction:

- a) Lead frame: Copper, copper plated copper, copper plated steel, Kovar, Alloy 42, tin plated on outside of the package (Alloy 194).

b) LED Chip: PT112 from Fairchild Semiconductor Optoelectronics Pte, Ltd. (formerly known as QT Singapore).

Alternative LED Chip: ED211R from Optotech, Taiwan.

c) Sensor Chip (PV6): PA 831 from MN1, Russia

d) Output Chip (MOSFET): TN5325NW-D539 from Supertext, USA

e) Wire: 1.3 mils gold wire supplied by Henaeus

f) Inner Molding Compound: Silicone, type HIPEC Q3-6633 by Dow Corning.

g) Outer Molding Compound: Epoxy, type E8436 FR-397 by Vyncolit Corp (formerly Rogers Corp) or alternate material Type KE96A by Koyocera Chemical (formerly Toshiba Chemical).

TEST REPORT

The Temperature, Overload, Endurance and Dielectric Strength tests were performed at CSA Laboratory in Toronto, according to Std. C22.2 No 14-95, on representative samples provided by the submittor.

The test results are as follows:

HSR312 rated:

Input: Max 80mA
Output: Bi-directional: max 190mA, 250V ac.
Unidirectional: max 320mA, 250V dc.

I. Temperature Test (CI 6.2):

Input: 80mA
Output: 320mA, 250V dc, wire size 24 AWG; enclosure 2 1/4 in by 2 in by 2 1/4 in

Thermocouple Location	Deg C
Ambient	23
Case (top)	41
Case (bottom)	43
Pin	42
Ambient inside box	26

Results: Acceptable

II. Overload Test (CI 6.5):

1. Input: 80mA
Output: 480mA, 250V dc, (for unidirectional relay)

50 operations

Results: Acceptable

2. Input: 80mA
Output: 285mA, 250V ac, (for bi-directional relay), power factor 70-80%

50 operations

Results: Acceptable

III. Endurance Test (CI 6.6):

1. Input: 80mA
Output: 320mA, 250V dc (for unidirectional relay)

6000 operations

Results: Acceptable

- 2. Input: 80mA
Output: 190 mA, 250Vac, power factor 70-80%
6000 operations
Results: Acceptable

IV. Dielectric Strength Test:

1500 Vac for 1 min between input and output and between live parts and case wrapped in foil.

Result: No dielectric breakdown

HSR 412 rated:

- Input: Max 80mA
- Output: Bi-directional: max 140mA, 400V ac.
Unidirectional: max 210mA, 400V dc.

I. Temperature Test (CI 6.2):

- Input: 80mA
- Output: 320mA, 350V dc, wire size 24 AWG, enclosure 2 1/4 in by 2 in by 2 1/4 in.

Thermocouple Location	Deg C
Ambient	23
Case top	41
Case bottom	43
Pin	42
Ambient inside case	26

Results: Acceptable

II. Overload Test (CI 6.5)

- 1. Input: 80mA
Output: 315mA, 400V dc, (for unidirectional relay)
50 operations
Results: Acceptable
- 2. Input: 80mA
Output: 210mA, 400V ac, (for bi-directional relay), power factor 70-80%
50 operations
Results: Acceptable

III. Endurance Test (Cl 6.6)

1. Input: 80 mA
Output: 210mA, 400V dc (for unidirectional relay)
6000 operations
Results: Acceptable
2. Input: 80mA
Output: 140mA, 400V ac (for bi-directional relay), power factor 70-80%
6000 operations
Results: Acceptable

IV. Dielectric Strength Test:

1800V ac for 1 min between input and output and between live parts and case wrapped in foil.

Result: No dielectric breakdown.

Project 1213275: Alternative LED chip and alternative outer molding compound.

No further testing was required because the alternatives were identical to the previous chip and compound used.

Project 1431585: Covers the addition of new models FOD1518A and FOD1518AN opto-coupled solid state relays.

The Temperature, Overload, Endurance and Dielectric Strength tests were performed at CSA Laboratory in Toronto, according to Std. C22.2 No 14-95, on representative samples provided by the submittor.

The test results are as follows:

Cat No.: FOD1518AN
Rating: Input – 80mA
Output - Bi-directional – 190mA, 250V ac
- Uni-directional – 320mA, 250V dc

TEMPERATURE TEST (U. 6.2)

Connection: Uni-directional
Rating: 320mA, 250V dc
Input: 80mA
Test enclosure: 1 by 1 by ¾ inches

Thermocouple Location	Max. Temperature, °C
Enclosure top	37
Enclosure base	38.1
Terminal #5	39.6
Terminal #6	42.2
Room ambient	22.9

DIELECTRIC STRENGTH TEST (U. 6.8)

Immediately after the temperature test, an AC potential of 1500V ac was applied for one minute in each test

- a. Between live parts and metal mounting plate
- b. Between input and output circuits

Results: No dielectric breakdown.

OVERLOAD AND ENDURANCE TESTS (U.6.5, 6.6 & 6.8)

Test	Overload	Endurance	Overload	Endurance
Cat No	FOD1518AN			
Connection	Bi-directional		Uni-directional	
Wire size, AWG	20	20	20	20
Input	80mA		80mA	
Test based on rating of -				
Phase	1	1	DC	DC
Pole tested	1	1	1	1
Voltage	250V ac	250V ac	250V ac	250V ac
Frequency, Hz	60	60	DC	DC
Amperes	285mA	191mA	481mA	321mA
Test circuit parameters -				
Phase	1	1	DC	DC
Pole tested	1	1	1	1
Voltage	250V ac	250V ac	250V ac	250V ac
Frequency, Hz	60	60	DC	DC
Amperes	285mA	191mA	481mA	321mA
Power factor, range	70/80	70/80	Resistive	resistive
No. of operations	50	6,000	50	6,000
On time, second	1	1	1	1
Off time, second	9	9	9	9

The above overload and endurance tests were considered acceptable, since there was no indication of any electrical failure.

DIELECTRIC STRENGTH TEST

Immediately after the endurance test, an AC potential of 1500V ac was applied for one minute in each test

- a. Between live parts and metal mounting plate
- b. Between input and output circuits

Results: No dielectric breakdown.

NOTE: Samples are too small to wrap in foil, so test samples was mounted on a 4 by 4 by 1/8 inches metal plate during all above tests.

Project 2203977: Covers change of leadframe supplier from QDI to QPL. The initial submittal was in error and the correct supplier is QPL. No tests were considered necessary.