



File E90700

Vol 3

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Revised: 2009-06-26

FOLLOW-UP SERVICE PROCEDURE  
(TYPE R)

COMPONENT - OPTICAL ISOLATORS  
(FPQU2,FPQU8)

Manufacturer: SEE ADDENDUM FOR MANUFACTURING LOCATIONS

Applicant: FAIRCHILD SEMICONDUCTOR CORP  
(725625-001) 3001 ORCHARD PKY  
SAN JOSE CA 95134

Recognized Company: SAME AS APPLICANT  
(725625-001)

This Procedure authorizes the above manufacturer to use the marking specified by Underwriters Laboratories Inc.(UL), or any authorized licensee of UL, only on products covered by this Procedure, in accordance with the applicable UL Services Agreement.

The prescribed Mark or Marking shall be used only at the above manufacturing location on such products which comply with this Procedure and any other applicable requirements.

The Procedure contains information for the use of the above named Manufacturer and representatives of Underwriters Laboratories Inc. and is not to be used for any other purpose. It is lent to the Manufacturer with the understanding that it is not to be copied, either wholly or in part, and that it will be returned to Underwriters Laboratories Inc. (UL) or any authorized licensee of UL, upon request.

This PROCEDURE, and any subsequent revision, is the property of Underwriters Laboratories Inc.(UL) and the authorized licensee of UL and is not transferable.

Underwriters Laboratories Inc.

Stephen Hewson  
Senior Vice President  
Global Follow-Up Service Operations

William R. Carney  
Director  
North American Certification Program

File E90700

Vol 3

ADDENDUM TO PAGE 1  
AUTHORIZATION PAGE

ISSUED: 2005-08-09

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LOCATION

(153559-001) LITE-ON ELECTRONICS (THAILAND) CO LTD  
38/4 MOO 1 RANGSIT-ONGKARAK RD  
BUNGYEETOH  
TANYABURI  
PHATHUM THANI 12130 THAILAND

(248856-001) LITE-ON ELECTRONIC (TIANJIN) CO LTD  
11 FU-YUAN RD  
TIANJIN WUGING DEVELOPMENT AREA  
TIANJIN CHINA

Recognized Component Marking Data Page (RCMDP)

(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

RECOGNIZED COMPONENT MARKING

Products Recognized under UL's Component Recognition Service are identified by marking elements consisting of:

1. The Recognized Company's identification specified in this document.
2. A catalog, model or other applicable product designation specified in the descriptive sections of this document.
3. The UL Recognized Component Mark shown below is optional unless required elsewhere in the Procedure.

Only those components, which actually bear the Marking, should be considered as being covered under the Recognition Program. The UL Listing or Classification Mark is not authorized for use on or in connection with Recognized Components.

Recognized Component Mark



Minimum size of the Recognized Component Mark is not specified as long as it is legible. Minimum height of the registered symbol ® shall be 3/64 inch but may be omitted if it is out of proportion to the Recognized Component Mark or not legible to the naked eye.

The manufacturer may reproduce the Mark electronically. Any decision regarding the acceptability of the manufacturer's Mark reproduction will be made at the Reviewing Office.

Recognized Component Marking Data Page (RCMDP)

(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

RECOGNIZED COMPONENT MARKING

Products Recognized under UL's Component Recognition Service are identified by marking elements consisting of:

1. The Recognized Company's identification specified in this document.
2. A catalog, model or other applicable product designation specified in the descriptive sections of this document.
3. The UL Recognized Component Mark shown below:
  - (A) Recognized only to Canadian safety requirements, or;
  - (B) Recognized to both U.S. and Canadian safety requirements.

Only those components, which actually bear the Marking, should be considered as being covered under the Recognition Program. The UL Listing or Classification Mark is not authorized for use on or in connection with Recognized Components.

Recognized Component Mark

(A)



(B)



Minimum size of the Recognized Component Mark is not specified as long as it is legible. Minimum height of the registered symbol ® shall be 3/64 inch but may be omitted if it is out of proportion to the Recognized Component Mark or not legible to the naked eye.

The manufacturer may reproduce the Mark electronically. Any decision regarding the acceptability of the manufacturer's Mark reproduction will be made at the Reviewing Office.

## INDEX

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Optical Isolators, Package Construction Code Y, Models FOD815, H11B815, and FOD816.	2	USR/CNR
Optical Isolators, Package Construction Code Y, Model FOD852.	3	USR/CNR
Double Protection Optical Isolator, Package Construction Code R, Models FODM and HMA, followed by 121, 124 or 2701, may be followed by any alphanumeric suffix. Models FODM, and HMAA, followed by 2705, may be followed by any alphanumeric suffix.	4	USR/CNR
Double Protection Optical Isolator, Package Construction Code D, Models FOD41XX, FOD42XX and FODCX, where X can be any number.	5	USR
Single Protection Optical Isolator, Models MCT6X and MCT9X, where X can be any letters or numbers.	6	USR
<b>Single Protection Optical Isolators, Package Construction Code R, four-pin devices, model FODM30XX, where X may be any number or letter.</b>	<b>7</b>	<b>USR</b>

G E N E R A L

PRODUCT COVERED:

Component - Optical Isolators.

\*

This page replaces page 2.


## FACTORY LOCATION AND IDENTIFICATION:

When more than one manufacturing location is indicated on the Authorization Page Addendum for the Procedure Volume, a factory identification code shall be assigned to identify each manufacturing facility. The absence of a factory identification code is an acceptable alternative for one of the manufacturers. The factory identification and associated manufacturing location are as follows:

Factory Location	Identification
(153559-001)	"2" or "Y"
(248856-001)	none

## MARKING:

USR - Recognized company name or trademark, and model designation provided on each unit.

CNR - Recognized company name or trademark, model designation, and the Recognized Component Mark for Canada , provided on each unit.

## RATINGS:

Specification Sheet - A specification sheet shall be provided with the product and contain the following information in tabular or graphic format:

1. Maximum continuous power, a current, and voltage rating for both the photo-emitter and the photo-sensor circuits.
2. A dielectric insulation-voltage rating between input and output terminals, specified in volts rms, or dc, as applicable.
3. The maximum operating temperature.
4. Derating specifications related to ambient temperatures.

## GENERAL CONSTRUCTION:

Corrosion Protection - All ferrous parts are of corrosion resistant material or are plated or painted as corrosion protection.

File E90700  
Project 05CA30325

August 1, 2005

REPORT

on

OPTICAL ISOLATORS - COMPONENT

FAIRCHILD SEMICONDUCTOR CORP

3001 ORCHARD PKY  
SAN JOSE 95134  
US

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DESCRIPTIONPRODUCT COVERED:

USR, CNR - Optical Isolator, Package Construction Code Y, Models FOD814, H11AA814 may be followed by A.

\*Models FOD817, FOD617, H11A817, H11A617, may be followed by A, B, **C**, D or **X**. These devices have been investigated for double protection.

RATINGS:

Model	Current (mA)		Power (mW)		Isoation Voltage	Max Operating Temp (°C)	Max Junction Temp (°C)
	Emitter	Sensor	Emitter	Sensor			
FOD814	50	50	70	150	5000	105	125
H11AA814	50	50	70	150	5000	105	125
FOD817	50	50	70	150	5000	110	125
H11A817	50	50	70	150	5000	110	125
FOD617	50	50	70	150	5000	110	125
H11A617	50	50	70	150	5000	110	125

\*

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

General - These devices are photocoupled isolators consisting of a photo-emitter, such as light emitting diode, optically coupled to a photo detector, such as a transistor. They are intended to be used in applications where the suitability of the combination has been determined by Underwriters Laboratories Inc. Only the insulating function for the rated dielectric insulation voltage between the input and output of the device has been investigated.

USR indicates investigation to the US Standard, Optical Isolators, UL 1577, 4<sup>th</sup> Edition.

CNR indicates investigation to the Canadian Standard, CSA Component Acceptance Service No. 5A.

Conditions of Acceptability - When installed in the final use equipment, the following are among the considerations to be made.

1. These devices are intended for factory installation in compliance with the enclosure, spacing, and segregation requirements of the ultimate application.
2. The device shall be used within the ratings specified in this report.
3. The short circuit interrupting capacity or behavior under short circuit conditions has not been evaluated for these devices. Accordingly, the end use circuit should contain suitable impedance to eliminate the need for such testing or appropriate tests should be conducted.
4. The electrical and temperature ratings recorded above shall be acceptable in the ultimate application.
5. The suitability of use when exposed to oil, chemicals and the like has not been determined by this investigation.
6. If a particular end use application requires evaluation of "as received" case material, properties not contemplated under the scope of this investigation, such properties will have to be separately investigated.
7. The suitability of the connections shall be determined in the end use application.
8. The capability of the device to control a load has not been investigated.
9. The suitability of the device to be mounted over dead metal of opposite polarity has not been investigated.

10. For Double Protected Models Only - The optical isolator enclosure is considered acceptable for only one level of protection. The double protection requirements for the end-use product are to be given further consideration with regards to the optical isolator enclosure.

CONSTRUCTION DETAILS:

For Engineering Use Only - See ILL. 1 for functional block diagram.

File E90700  
Project 05CA30325

August 2, 2005

REPORT

on

OPTICAL ISOLATORS - COMPONENT

FAIRCHILD SEMICONDUCTOR CORP

3001 ORCHARD PKY  
SAN JOSE 95134  
US

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DESCRIPTIONPRODUCT COVERED:

**USR, CNR Component - Optical Isolators, Package Construction Code Y, Models FOD815, H11B815, FOD816.**

\*

RATINGS:

Model	Current (mA)		Power (mW)		Isoation Voltage	Max Operating Temp (°C)	Max Junction Temp (°C)
	Emitter	Sensor	Emitter	Sensor			
FOD815	50	80	70	150	5000	105	125
H11B815	50	80	70	150	5000	105	125
FOD816	50	80	70	150	5000	110	125

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

These devices are optically coupled isolating switches with gallium arsenide light emitting diodes optically coupled to photo detectors. The solid-state portion of these devices is encapsulated in a silicon or epoxy compound. The light emitting diode and detector are separated by an insulating window. Internal "chips" are provided with terminals molded into the enclosure.

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

USR indicates investigation to the US Standard, Optical Isolators, UL 1577, 4<sup>th</sup> Edition.

CNR indicates investigation to the Canadian Standard, CSA Component Acceptance Service No. 5A.

Conditions of Acceptability - Each device shall be reviewed with respect to the following conditions of acceptability:

- 1. The capability of the device to control a load has not been investigated.**
- 2. These devices should be installed in a suitable end product enclosure.**

3. The maximum temperature on the case should not exceed the maximum operating temperature rating specified in the ratings table.
  4. For single protection devices, the insulation to the case has not been evaluated. For double protection devices, the insulation to the case has been evaluated to the isolation voltage specified in the ratings table.
  5. In addition to meeting single protection requirements, double protection optical isolators have also been investigated for use in up to 250 V, 50/60 Hz circuits in audio, video, and similar equipment in applications in which breakdown of the optical isolator may result in a risk of fire, electrical shock, or injury to persons.
- \*

CONSTRUCTION DETAILS:

General - The general design, shape and arrangement shall be as illustrated in the following descriptive pages. All dimensions are approximate.

Specification Sheet - Specification sheet is provided and contains the following information:

1. Maximum continuous power, a current and a voltage rating for both the photo-emitter and the photo-sensor.
2. A dielectric insulation-voltage rating between input and output terminals. This should be the same as the isolation VAC in ratings above.
3. The maximum operating temperature as specified in above ratings.
4. Derating specification related to ambient temperatures.

For Engineering Use Only - See ILL. 1 for functional block diagram.

File E90700  
Project 05CA30325

August 3, 2005

REPORT

on

OPTICAL ISOLATORS - COMPONENT

FAIRCHILD SEMICONDUCTOR CORP

3001 ORCHARD PKY  
SAN JOSE 95134  
US

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## DESCRIPTION

## PRODUCT COVERED:

**USR, CNR - Optical Isolator, Package Construction Code Y, Model FOD852. This model has been investigated for double protection.**

## RATINGS:

Model	Current (mA)		Power (mW)		Isoation Voltage	Max Operating Temp (°C)	Max Junction Temp (°C)
	Emitter	Sensor	Emitter	Sensor			
FOD852	60	50	100	150	5000	100	100

## ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

These devices are optically coupled isolating switches with gallium arsenide light emitting diodes optically coupled to photo detectors. The solid state portion of these devices is encapsulated in a silicon or epoxy compound. The light emitting diode and detector are separated by an insulating window. Internal "chips" are provided with terminals molded into the enclosure.

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

**USR indicates investigation to UL 1577, the Standard for Optical Isolators, 4<sup>th</sup> Edition.**

**CNR indicates investigation to the Canadian Standard, CSA Component Acceptance Service No. 5A.**

Conditions of Acceptability - Each device shall be reviewed with respect to the following conditions of acceptability:

1. The capability of the device to control a load has not been investigated.
2. These devices should be installed in a suitable end product enclosure.
3. The maximum temperature on the case should not exceed the maximum operating temperature rating specified in the Ratings table.
4. For single protection devices, the insulation to the case has not been evaluated. For double protection devices, the insulation to the case has been evaluated to the isolation voltage specified in the ratings table.
5. In addition to meeting single protection requirements, double protection optical isolators have also been investigated for use in up to 250 V, 50/60 Hz circuits in audio, video, and similar equipment in applications in which breakdown of the optical isolator may result in a risk of fire, electrical shock, or injury to persons.
6. For Double Protected Models Only - The optical isolator enclosure is considered acceptable for only one level of protection. The double protection requirements for the end-use product are to be given further consideration with regards to the optical isolator enclosure.

\*

## CONSTRUCTION DETAILS:

General - The general design, shape, and arrangement shall be as illustrated in the following descriptive pages and illustrations. All dimensions are approximate.

Marking - Recognized company name or trademark, and type designation provided on each unit.

Specification Sheet - specification sheet is provided and contains the following information in tabular or graphic format.

1. Maximum continuous power, a current and a voltage rating for both the photo-emitter and the photo-sensor.
2. A dielectric insulation-voltage rating between input and output terminals. This should be the same as the isolation VAC.
3. The maximum operating temperature.
4. Derating specification related to ambient temperatures.

Abbreviation - R/C - Recognized Component.

For Engineering Use Only - See ILL. 1 for functional block diagram.

File E90700  
Project 06CA12346

March 15, 2006

REPORT

on

COMPONENT - Optical Isolators, Optical Isolators Certified for Canada

FAIRCHILD SEMICONDUCTOR CORP  
San Jose, CA., USA

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## DESCRIPTION

## PRODUCT COVERED:

USR, CNR Component - Double Protection Optical Isolator, Package Construction Code R, Models FODM, and HMA, followed by 121, 124 or 2701, may be followed by any alphanumeric suffix. Models FODM, and HMAA, followed by 2705, may be followed by any alphanumeric suffix.

## MAXIMUM RATINGS (at nominal operating temperature):

Model	Current (mA)		Power (mW)		Isolation Voltage (AC)	Max Operating Temp (°C)	Max Junction Temp(°C)	Max Storage Temp(°C)
	Emitter	Sensor	Emitter	Sensor				
<b>FODM/HMA121, -124, -2701</b>	<b>50</b>	<b>80</b>	<b>70</b>	<b>150</b>	<b>3750</b>	<b>110</b>	<b>125</b>	<b>125</b>
<b>FODM/HMAA2705</b>	<b>50</b>	<b>80</b>	<b>70</b>	<b>150</b>	<b>3750</b>	<b>110</b>	<b>125</b>	<b>125</b>

## GENERAL:

These devices are photocoupled isolators consisting of a photo-emitter such as a light emitting diode, optically coupled to a photo detector, such as a transistor. The light emitting diode and sensor are separated by an insulating window. Internal "chips" are provided with terminals molded into the enclosure.

## ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

USR indicates this product was investigated under the UL Standard for Safety for Optical Isolators, UL 1577, Fourth Edition.

CNR indicates this product was investigated under the Canadian Certification Notice, CSA Component Acceptance Service No. 5A.

Conditions of Acceptability - Each device shall be reviewed with respect to the following conditions of acceptability:

1. The capability of the device to control a load has not been investigated.
2. These devices should be installed in a suitable end product enclosure.
3. The maximum temperature on the case should not exceed the maximum operating temperature rating specified in the ratings table.
4. For single protection devices, the insulation to the case has not been evaluated. For double protection devices, the insulation to the case has been evaluated to an isolation voltage of 1000 V.
5. In addition to meeting single protection requirements, double protection optical isolators have also been investigated for use in up to 250 V, 50/60 Hz circuits in audio, video, and similar equipment in applications in which breakdown of the optical isolator may result in a risk of fire, electrical shock, or injury to persons.
6. For Double Protected Models Only - The optical isolator enclosure is considered acceptable for only one level of protection. The double protection requirements for the end-use product are to be given further consideration with regards to the optical isolator enclosure. A 1000 V Dielectric Voltage Withstand Test was performed between the terminals and the case.

#### CONSTRUCTION DETAILS:

General - The product shall be constructed in accordance with the following description. All dimensions are approximate, unless specified as "max" or "min".

## DESCRIPTION

## PRODUCT COVERED:

USR Component - Double Protection Optical Isolator, Package Construction Code D, Models FOD41XX, FOD42XX and FODCX, where X can be any number.

## MAXIMUM RATINGS (at nominal operating temperature):

Model	Current (mA)		Power (mW)		Isolation Voltage (AC)	Max Operating Temp (°C)	Max Junction Temp(°C)	Max Storage Temp(°C)
	Emitter	Sensor	Emitter	Sensor				
FOD41XX	60	300	100	600	5000	110	125	150
FOD42XX	60	300	100	600	5000	110	125	150
FODCX	60	300	100	400	5000	110	125	150

## GENERAL:

These devices are photocoupled isolators consisting of a photo-emitter such as a light emitting diode, optically coupled to a photo detector, such as a transistor. The light emitting diode and sensor are separated by an insulating window. Internal "chips" are connected to lead frames that are molded into the enclosure.

## ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

USR indicates this product was investigated under the UL Standard for Safety for Optical Isolators, UL 1577, Fourth Edition.

Conditions of Acceptability - Each device shall be reviewed with respect to the following conditions of acceptability:

1. The capability of the device to control a load has not been investigated.
2. These devices should be installed in a suitable end product enclosure.
3. The maximum temperature on the case should not exceed the maximum operating temperature rating specified in the ratings table.
4. For single protection devices, the insulation to the case has not been evaluated. For double protection devices, the insulation to the case has been evaluated to the isolation voltage specified in the ratings table.
5. In addition to meeting single protection requirements, double protection optical isolators have also been investigated for use in up to 250 V, 50/60 Hz circuits in audio, video, and similar equipment in applications in which breakdown of the optical isolator may result in a risk of fire, electrical shock, or injury to persons.

CONSTRUCTION DETAILS:

General - The product shall be constructed in accordance with the following description. All dimensions are approximate, unless specified as "max" or "min".

File E90700  
Project 07CA23784

May 22, 2007

REPORT

on

COMPONENT - OPTICAL ISOLATORS

FAIRCHILD SEMICONDUCTOR CORP  
SAN JOSE, CA

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## DESCRIPTION

## PRODUCT COVERED:

USR Component - Single Protection Optical Isolator, Models MCT6X and MCT9X, where X can be any letters or numbers.

## MAXIMUM RATINGS (at nominal operating temperature):

Model	Current (mA)		Power (mW)		Isolation Voltage (AC)	Max Operating Temp (°C)	Max Junction Temp (°C)	Max Storage Temp (°C)
	Emitter	Sensor	Emitter	Sensor				
MCT6, MCT9	60	30	100	150	5000	100	125	125

## GENERAL:

These devices are photocoupled isolators consisting of a photo-emitter such as a light emitting diode, optically coupled to a photo detector, such as a transistor. The light emitting diode and sensor are separated by an insulating window. Internal "chips" are connected to lead frames that are molded into the enclosure.

## ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

USR indicates this product was investigated under the UL Standard for Safety for Optical Isolators, UL 1577, Fourth Edition.

Conditions of Acceptability - Each device shall be reviewed with respect to the following conditions of acceptability:

1. The capability of the device to control a load has not been investigated.
2. These devices should be installed in a suitable end product enclosure.
3. The maximum temperature on the case should not exceed the maximum operating temperature rating specified in the ratings table.
4. For single protection devices, the insulation to the case has not been evaluated. For double protection devices, the insulation to the case has been evaluated to the isolation voltage specified in the ratings table.
5. In addition to meeting single protection requirements, double protection optical isolators have also been investigated for use in up to 250 V, 50/60 Hz circuits in audio, video, and similar equipment in applications in which breakdown of the optical isolator may result in a risk of fire, electrical shock, or injury to persons.

#### CONSTRUCTION DETAILS:

General - The product shall be constructed in accordance with the following description. All dimensions are approximate, unless specified as "max" or "min".

File E90700  
Project 06CA38737

January 05, 2007

REPORT

ON

COMPONENT - OPTICAL ISOLATORS

Fairchild Semiconductor Corp.  
San Jose, California

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## DESCRIPTION

## PRODUCT COVERED:

USR, CNR - Single Protection Optical Isolators, Package Construction Code R, four-pin devices, model FODM30XX, where X may be any number or letter.

## GENERAL:

This device is a photocoupled isolator consisting of a photo-emitter such as a light emitting diode, optically coupled to a photo detector such as a transistor. They are intended to be used in applications where the suitability of the combination has been determined by Underwriters Laboratories Inc. Only the insulation function for the rated dielectric insulation voltage between the input and output of the device has been investigated.

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

## Maximum Electrical Ratings:

Model	Current (mA)		Power (mW)		Isolation Voltage (AC)	Max Operating Temp (°C)	Max Junction Temp (°C)	Max Storage Temp (°C)
	Emitter	Sensor	Emitter	Sensor				
Package Code R, Model FODM30XX	60	70	100	300	3750	100	125	150

## ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

These devices are optically coupled isolating switches with light emitting diodes optically coupled to photo detectors. The solid state portion of these devices is encapsulated in a silicon or epoxy compound. The light emitting diode and detector are separated by an insulating window. Internal "chips" are provided with terminals molded into the enclosure.

Conditions of Acceptability - Each device shall be reviewed with respect to the following conditions of acceptability:

1. The capability of the device to control a load has not been investigated.
2. These devices should be installed in a suitable end product enclosure.
3. The maximum temperature on the case should not exceed the maximum operating temperature rating specified in the ratings table.
4. The insulation to the case has not been evaluated.

## CONSTRUCTION DETAILS:

General - The product shall be constructed in accordance with the following description. All dimensions are approximate unless specified as "max" or "min".

The general design, shape and arrangement shall be as illustrated, except where variations are specifically described.

Corrosion Protection - All ferrous parts are of corrosion resistant material or are plated or painted as corrosion protection.

Markings - See Section General for Markings.

Model Differences - All models have identical insulation systems. The only difference is the leadframe design or the size of the IC devices.

Abbreviation - R/C - Recognized Component