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Please find attached the related material

For your convenience, the below describes the related updates:

For revised/new documentation, please reference 2021-01-22 in the page headings.

E516634-20200930-Description
Figure-1-Total
Illustration-2-Total

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File E516634
Project 4789491519

September 30, 2020

REPORT

on

COMPONENT - Equipment and Systems for Use in Hazardous Locations – Component

(OERX2, OERX8)

* * * * * * * * * * * * * * * * * * * *

Complementary Product Category
COMPONENT - Intrinsically Safe Equipment and Systems for Use in Zone Classified Hazardous Locations - Component

(OEVX2, OEVX8)

Recognized Company:

ANALOG DEVICES INC
WILMINGTON, MA

DESCRIPTION

PRODUCT COVERED:

USR, CNR – Digital Isolator, Intrinsically Safe Component for use in Class I, Division 1, Groups A, B, C, and D

USR – Digital Isolator, Intrinsically Safe Component for use in Class I, Zone 0, AEx ia IIC, Hazardous Locations

CSR – Digital Isolator, Intrinsically Safe Component for use in Class I, Zone 0, Ex ia IIC, Hazardous Locations

Models: ADuM1440ARQZ
ADuM1441ARQZ
ADuM1442ARQZ
ADuM1445ARQZ
ADuM1446ARQZ
ADuM1447ARQZ
ADuM1440ARSZ
ADuM1441ARSZ
ADuM1442ARSZ
ADuM1445ARSZ
ADuM1446ARSZ
ADuM1447ARSZ
AD71217ARSZ

GENERAL:

These devices are non-optical isolators consisting of an encoder and decoder. The encoder and decoder are separated by a transformer. Internal “chips” are connected to lead frames that are molded into the enclosure.

These products shall comply with all elements of ordinary locations File E214100, issued date 2014-08-09, Non-optical Isolating Device, covering for this Applicant and with the following description. Should the above mentioned Procedure File be withdrawn, labeling under this Procedure must be discontinued until authorization to resume is received.

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

USR indicates investigation to United States Standards:

- UL 913 Standard For Intrinsically Safe Apparatus and Associated Apparatus For Use in Class I, II, III, Division 1, Hazardous (Classified) Locations- Edition 8 - Revision Date 2018/12/10

- UL60079-0, Explosive Atmospheres - Part 0: Equipment - General Requirements, Edition 7, Revision Date 04/15/2020

- UL 60079-11 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"- Edition 6 - Revision Date 2018/09/14

CNR indicates investigation to Canadian National Standards:

- CSA C22.2 No. 60079-0, Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements, Edition 4, Issue Date 02/2019

- CSA C22.2 NO. 60079-11:14 Explosive atmospheres — Part 11: Equipment protection by intrinsic safety "i"- Edition 2 - Issue Date 2014/02/01

The models ADuM144XARYZ are intended for use in an ambient temperature of -40°C to 85°C.

The model AD71217ARSZ is intended for use in an ambient temperature of -55°C to 85°C.

CONDITIONS OF ACCEPTABILITY -

1. The components being certified comply with UL 60079-11:2014. When one of these components will be used in an equipment, the component is to be fitted on a PCB inside a suitable enclosure and re-certified as equipment. The operating temperature range of these components is -55°C to 85 °C.

2. 2 This assembly is an isolating component between separate intrinsically safe circuits. The assembly should be connected to suitably certified intrinsically safe circuits considering following entity parameters:

Terminal Encoder

Parameter	Ui	Ii	Pi	Li	Ci
All Pins	42V	275mA	1.3W	0uH	4pF

Terminal Decoder

Parameter	Ui	Ii	Pi	Li	Ci
All Pins	42V	275mA	1.3W	0uH	4pF

3. The components (i.e. Digital Isolators) being certified will have the following safety ratings. The temperature class will be determined based on the following table:

Package Type	Temperature Coefficient	Maximum Permissible Temperature
QSOP-16	40.4°C/W	189.8°C
SSOP-20	51.2°C	218.0°C

*

* **4.** The capability of the device to control a load has not been investigated.

* **5.** These devices should be installed in a suitable end product enclosure.

* **6.** If the maximum operating (ambient) temperature exceeds the rating noted in the ratings table, additional means should be used to determine if the maximum junction temperature of the device is exceeded.

* **7.** 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.

CONSTRUCTION DRAWING:

* **The** construction drawing **is** shown in ILL. 1.

MARKING:

* **The** marking drawing **is** shown in ILL. 2.

MODEL NOMENCLATURE:

The Model number designates the following:

ADuM144XARYZ:

X - Number 0, 1, 2, 5, 6, 7 – Determines numbers of inputs on encoder or decoder side.
0- Encoder 4 inputs, Decoder 0 inputs
1- Encoder 3 inputs, Decoder 1 inputs
2- Encoder 2 inputs, Decoder 2 inputs
5- Encoder 4 inputs, Decoder 0 inputs
6- Encoder 3 inputs, Decoder 1 inputs
7- Encoder 2 inputs, Decoder 2 inputs

Y – Q or S – Determines package size.
Q- RQ-16, QSOP-16 package
S- RS-20, SSOP-20 package

AD71217ARSZ:
3 encoder inputs, 1 decoder input, RS-20, SSOP-20 package size, and a low ambient of -55°C.

CONSTRUCTION DETAILS:

General – The devices are constructed in accordance with the following figures, illustrations and descriptive pages. Dimensions are approximate unless specifically indicated otherwise.

[X] Spacings – Where affecting intrinsic safety, spacings have been evaluated and found to be in accordance with Table 5 of UL 60079-11, Sixth Edition and CSA C22.2 No. 60079-11:14.

DOCUMENTATION:

The devices are constructed in accordance with the following drawings:

FIG. No.	ILL. No.	Description	Drawing No.	Revision
1		ADuM144XARQZ		
	1	Construction Drawing	CF0002	0
	2	Marking Drawing	MF0002	0

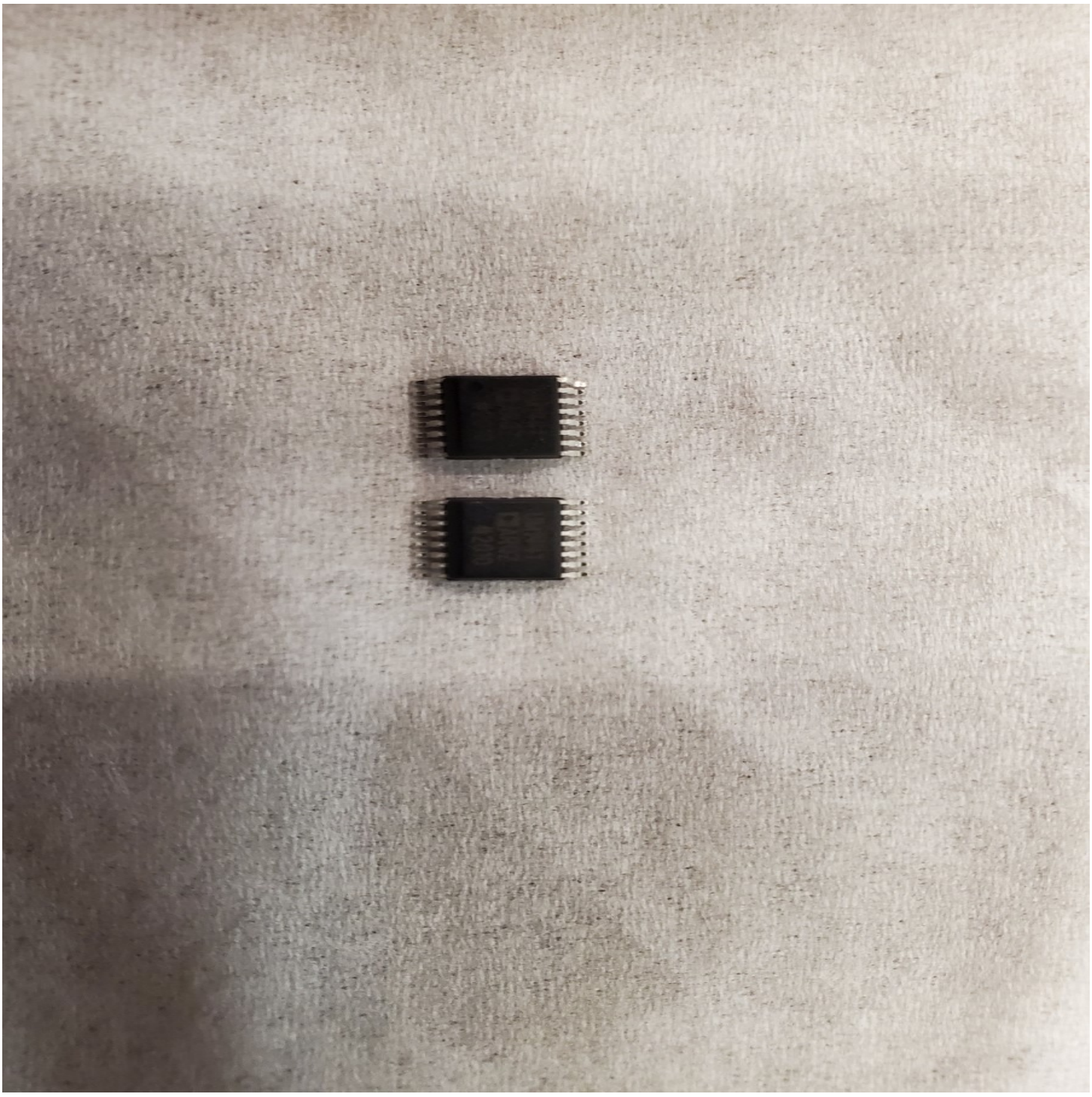
NOTE FOR FIELD REPRESENTATIVE – Confirm all drawing numbers and revision levels/dates.

Fig.1 is a representative sample picture, ADuM144XARQZ models have 16 pins and ADuM144XARSZ and AD71217ARSZ models have 20 pins.

Enclosure – ADuM144XARQZ, where X can be any of these numbers 0, 1, 2, 5, 6, 7 , RQ-16 package with overall dimensions of 0.193 in. by 0.154 in. by 0.057 in. Molded from G600C epoxy manufactured by Suitomo. Minimum separation distance from encoder to decoder pins of 3.1mm.

Enclosure – AD71217ARSZ and ADuM144XARSZ, where X can be any of these numbers 0, 1, 2, 5, 6, 7, RS-20 package with overall dimensions of 7.20 in. by 5.30 in. by 1.75 in. Molded from G600C epoxy manufactured by Suitomo. Minimum separation distance from encoder to decoder pins of 4.6mm.

Figure-1 Page-1



The following Page(s) are related to Illustration-1. The next supplement, if applicable, will be identified with a new Supplement Page Heading.

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	INITIAL RELAESE	9-18-20	

Certificate component number: E516634

The components being certified comply with IEC 60079-11:2011. When one of these components will be used in an equipment, the component is to be fitted on a PCB inside an enclosure and re-certified as equipment. The creepage and clearance distances across the isolating component have been evaluated but the distances to other circuitry remain the responsibility of the user of the certified equipment

When the component will be fitted in an Intrinsically Safe equipment, 500V Routine Dielectric strength test must be carried out in accordance with 6.3.13 of IEC 60079-11:2011.

UNLESS OTHERWISE SPECIFIED DIMENSIONSARE IN INCHES TOLERANCES DECIMALS .XX +- .010 .XXX +- .005 FRACTIONS +- 1/32 ANGLES +-2	ASSEMBLY		ANALOG DEVICES 804 WOBURN STREET WILMINGTON, MA 01887			
	APPROVAL	DATE	TITLE			
Material	DRAWN BY M S CANTRELL	7-25-2019	ADuM144X INTRINSIC SAFETY CONSTRUCTION DRAWING			
	DESIGNED M S CANTRELL	7-25-2019				
	CHECKED K MCLAUGHLIN	7-25-2019				
Finish			SIZE B	FSCM NO	DRAWING NUMBER CF0002	REV 0
DO NOT SCALE DWG			SCALE N/A		SHEET 1	OF 5

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
0	INITIAL RELAESE		

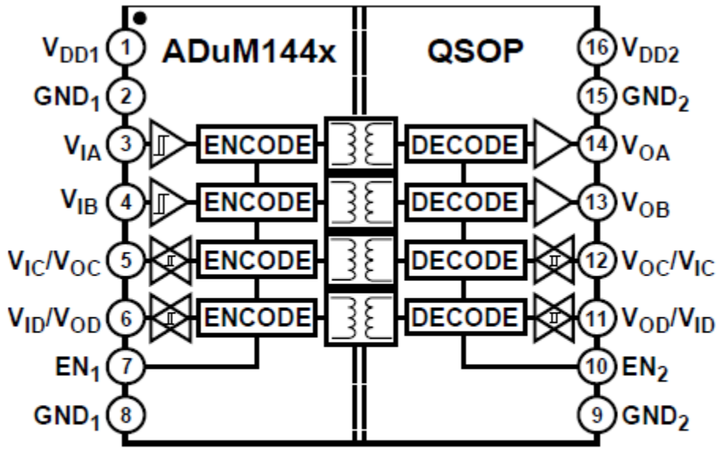


Figure 1.

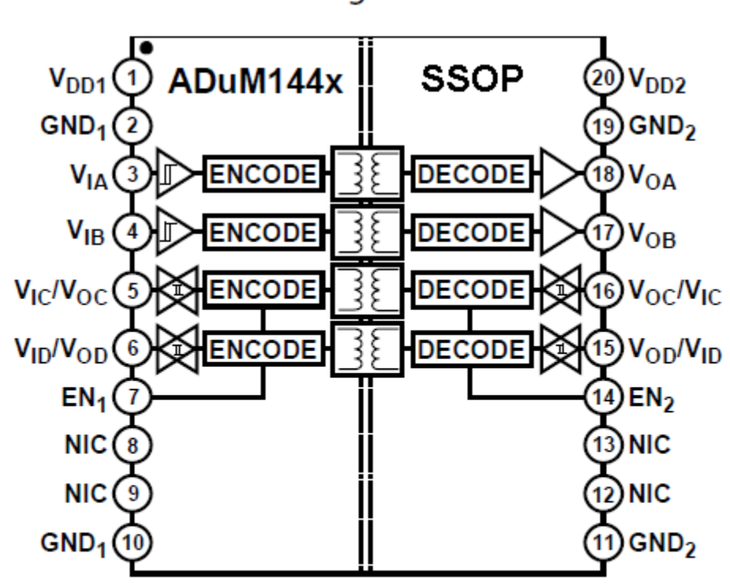


Figure 2

This assembly is an isolating component between separate intrinsically safe circuits. The assembly should be connected to suitably certified intrinsically safe circuits considering below entity parameters:

COMPONENT ENTITY PARAMETERS

Package type	Entity parameters Side 1	Entity parameters Side 2
QSOP-16	Ui=42V Ii=275mA Pi=1.3W Li=0 Ci=4pF	Ui=42V Ii=275mA Pi=1.3W Li=0 Ci=4pF
SSOP-20	Ui=42V Ii=275mA Pi=1.3W Li=0 Ci=4pF	Ui=42V Ii=275mA Pi=1.3W Li=0 Ci=4pF

UNLESS OTHERWISE SPECIFIED DIMENSIONSARE IN INCHES
TOLERANCES
DECIMALS .XX +- .010 .XXX +- .005
FRACTIONS +- 1/32
ANGLES +-2

ASSEMBLY

ANALOG DEVICES
804 WOBURN STREET
WILMINGTON, MA 01887

	APPROVAL	DATE
Material	DRAWN BY M S CANTRELL	7-25-2019
	DESIGNED M S CANTRELL	7-25-2019
	CHECKED K MCLAUGHLIN	7-25-2019
Finish		
DO NOT SCALE DWG		

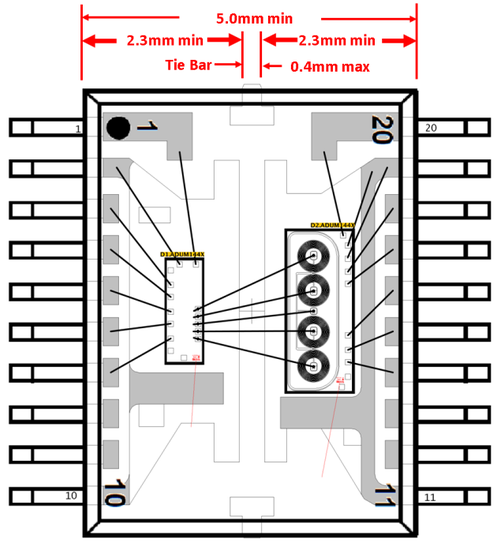
TITLE

ADuM144X INTRINSIC SAFETY CONSTRUCTION DRAWING

SIZE	FSCM NO	DRAWING NUMBER	REV
B		CF0002	0

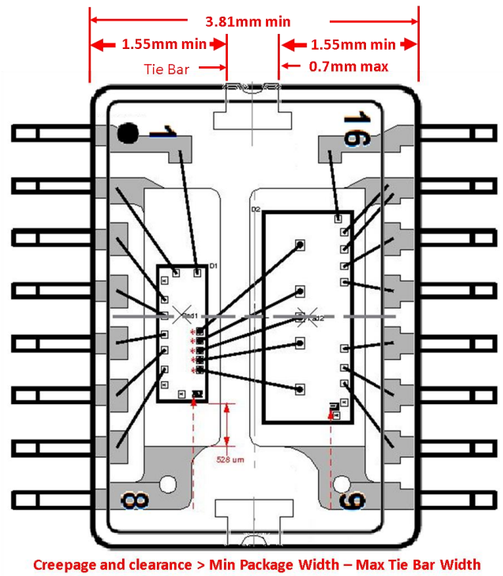
SCALE N/A SHEET 1 OF 5

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
0	INITIAL RELAESE		



Creepage and clearance > Min Package Width – Max Tie Bar Width
Package is SSOP-20

The minimum specified creepage and clearance distance across the SSOP-20 device is 4.6mm (i.e 2.3mm +2.3mm). The CTI is specified to be at least 100V



Creepage and clearance > Min Package Width – Max Tie Bar Width
Package is QSOP-16

The minimum specified creepage and clearance distance across the QSOP-16 device is 3.1mm (i.e 1.55mm +1.55mm). The CTI is specified to be at least 100V

BILL OF MATERIALS

Die 1	ADuM144XIC_A
Die 2	ADuM144xTC_A
Mold Compound	Sumitomo G600C
Coil Insulation Material	Asahi I-8124
Wire Type	M3 4N Gold
Wire Diameter	1 mil
Adhesive	Ablestik 84-1 LMISR4 Conductive
Leadframe	See *SSOP Package* or *QSOP Package* sections

ASSEMBLY

Die 1 is adhered to the pin 1 side of the lead frame using Adhesive

Die 2 is adhered to the Pin 16 side of the lead frame using Adhesive

Bond wires are applied depending on the channel configuration

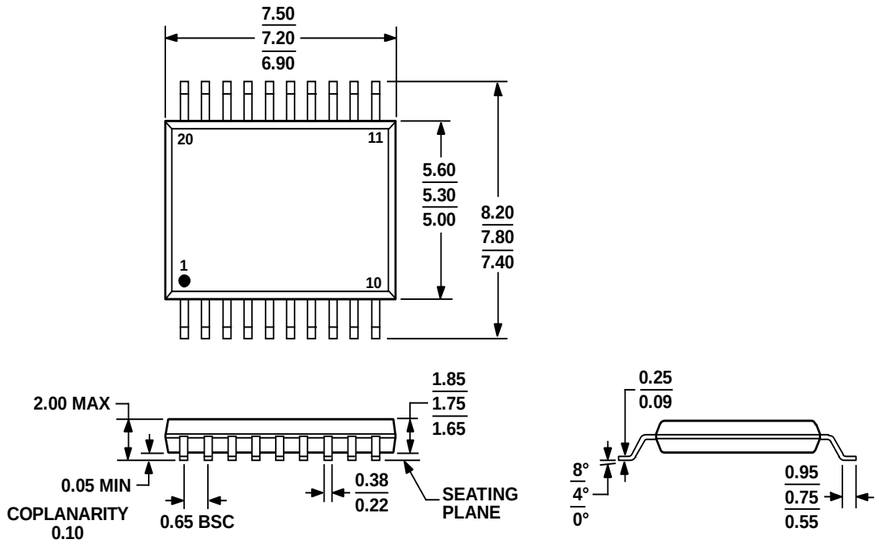
The assembly is placed in a mold and transfer molded to final dimensions.

Components are singulated and lead formed to final specifications appropriate to the package.

UNLESS OTHERWISE SPECIFIED DIMENSIONSARE IN INCHES TOLERANCES DECIMALS .XX +- .010 .XXX +- .005 FRACTIONS +- 1/32 ANGLES +-2	ASSEMBLY		ANALOG DEVICES 804 WOBURN STREET WILMINGTON, MA 01887	
	APPROVAL	DATE	TITLE	
Material	DRAWN BY M S CANTRELL	7-25-2019	ADuM144X INTRINSIC SAFETY CONSTRUCTION DRAWING	
	DESIGNED M S CANTRELL	7-25-2019		
	CHECKED K MCLAUGHLIN	7-25-2019		
Finish			SIZE B	FSCM NO
DO NOT SCALE DWG			SCALE N/A	SHEET 1 OF 5

DRAWING NUMBER	REV
CF0002	0

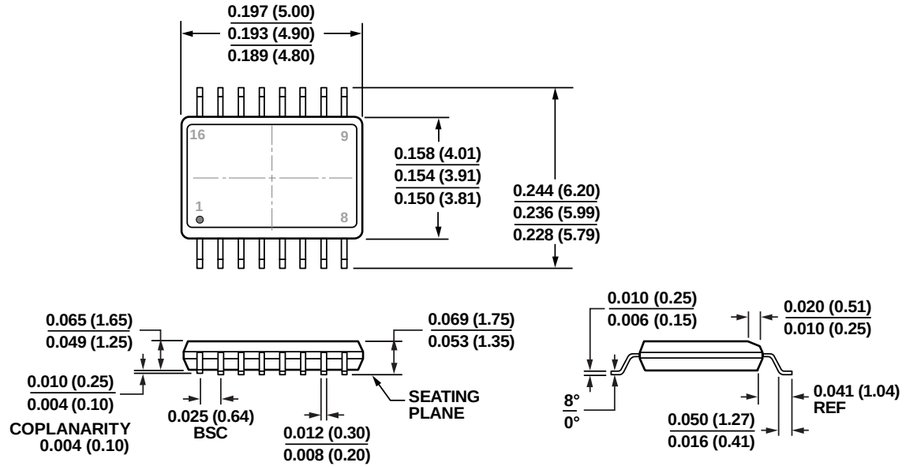
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
0	INITIAL RELAESE		



COMPLIANT TO JEDEC STANDARDS MO-150-AE

060106-A

Package	Leadframe Number
RS20	442436



COMPLIANT TO JEDEC STANDARDS MO-137-AB

CONTROLLING DIMENSIONS ARE IN INCHES; MILLIMETER DIMENSIONS (IN PARENTHESES) ARE ROUNDED-OFF INCH EQUIVALENTS FOR REFERENCE ONLY AND ARE NOT APPROPRIATE FOR USE IN DESIGN.

09-12-2014-A

Package	Leadframe Number
RQ16	442102

UNLESS OTHERWISE SPECIFIED DIMENSIONSARE IN INCHES TOLERANCES DECIMALS .XX +- .010 .XXX +- .005 FRACTIONS +- 1/32 ANGLES +-2	ASSEMBLY		ANALOG DEVICES 804 WOBURN STREET WILMINGTON, MA 01887	
	APPROVAL	DATE	TITLE	
Material	DRAWN BY M S CANTRELL	7-25-2019	ADuM144X INTRINSIC SAFETY CONSTRUCTION DRAWING	
	DESIGNED M S CANTRELL	7-25-2019		
	CHECKED K MCLAUGHLIN	7-25-2019		
Finish			SIZE B	FSCM NO
DO NOT SCALE DWG			SCALE N/A	SHEET 1 OF 5

DRAWING NUMBER	REV
CF0002	0

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
0	INITIAL RELAESE		

Model	Number of Inputs, V_{DD1} Side	Number of Inputs, V_{DD2} Side	Default Output State	Package Description	Package Option
ADuM1440ARQZ	4	0	High	16-Lead QSOP	RQ-16
ADuM1441ARQZ	3	1	High	16-Lead QSOP	RQ-16
ADuM1442ARQZ	2	2	High	16-Lead QSOP	RQ-16
ADuM1445ARQZ	4	0	Low	16-Lead QSOP	RQ-16
ADuM1446ARQZ	3	1	Low	16-Lead QSOP	RQ-16
ADuM1447ARQZ	2	2	Low	16-Lead QSOP	RQ-16
ADuM1440ARSZ	4	0	High	20-Lead SSOP	RS-20
ADuM1441ARSZ	3	1	High	20-Lead SSOP	RS-20
ADuM1442ARSZ	2	2	High	20-Lead SSOP	RS-20
ADuM1445ARSZ	4	0	Low	20-Lead SSOP	RS-20
ADuM1446ARSZ	3	1	Low	20-Lead SSOP	RS-20
ADuM1447ARSZ	2	2	Low	20-Lead SSOP	RS-20
AD71217ARSZ	3	1	High	20-Lead SSOP	RS-20

UNLESS OTHERWISE SPECIFIED DIMENSIONSARE IN INCHES TOLERANCES DECIMALS .XX +- .010 .XXX +- .005 FRACTIONS +- 1/32 ANGLES +-2	ASSEMBLY		ANALOG DEVICES 804 WOBURN STREET WILMINGTON, MA 01887			
	APPROVAL	DATE	TITLE			
Material	DRAWN BY M S CANTRELL	7-25-2019	ADuM144X INTRINSIC SAFETY CONSTRUCTION DRAWING			
	DESIGNED M S CANTRELL	7-25-2019				
	CHECKED K MCLAUGHLIN	7-25-2019				
Finish			SIZE B	FSCM NO	DRAWING NUMBER CF0002	REV 0
DO NOT SCALE DWG			SCALE N/A		SHEET 1	OF 5

The following Page(s) are related to Illustration-2. The next supplement, if applicable, will be identified with a new Supplement Page Heading.

ANALOG DEVICES

MF0002

Marking File

ADuM1440/ADuM1441/ADuM1442/ADuM1445/ ADuM1446/ADuM1447/AD71217

GENERAL DESCRIPTION

This document contains the marking summary of ADuM1440/ADuM1441/ADuM1442/ADuM1445/ADuM1446/ADuM1447 micro-power digital isolators in QSOP and SSOP package sizes.

Manufacturer's name:	Analog Devices Inc
Manufacturer's address:	804 Woburn St, WILMINGTON MA, 01887 USA
Manufacturing Location:	Gateway Business Park Javalera Gen. Trias Cavite Philippines 4107

Certificate number:	E516634
Certification code:	c US US: Class I Zone 0 AEx ia IIC Ga CA: Ex ia IIC Ga US/CA: Class I, Div 1 Groups A, B, C, and D
Ambient range:	-40°C to +85°C
Extended ambient range for AD71217	-55°C to +85°C

Package type	Entity parameters Side 1	Entity parameters Side 2
QSOP-16	Ui=42V Ii=275mA Pi=1.3W Li=0 Ci=4pF	Ui=42V Ii=275mA Pi=1.3W Li=0 Ci=4pF
SSOP-20	Ui=42V Ii=275mA Pi=1.3W Li=0 Ci=4pF	Ui=42V Ii=275mA Pi=1.3W Li=0 Ci=4pF

Table 1COMPONENT ENTITY PARAMETERS

TABLE OF CONTENTS

REVISION HISTORY

9/20—Revision A: Initial Version

PACKAGE MARKING

QSOP PACKAGE MARKING

Marking Diagram

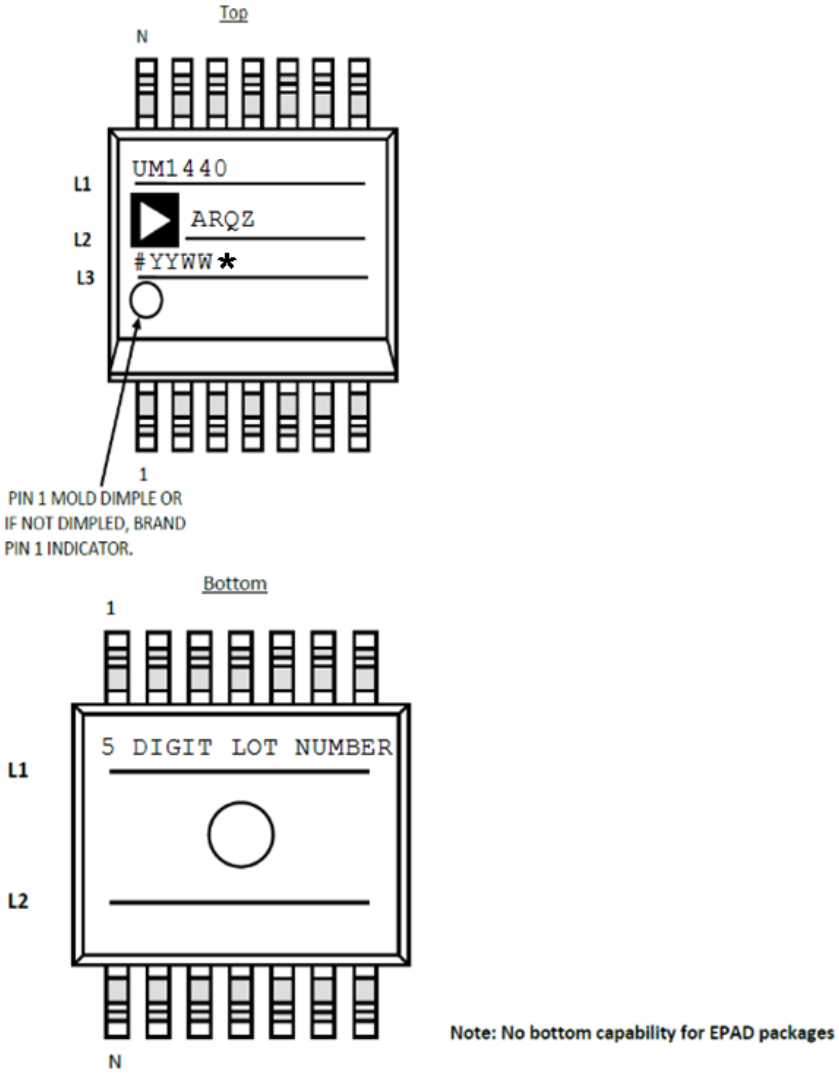


Figure 1 QSOP Package Marking Locations[1]

Marking Key

yy	last two digits of year of manufacture
ww	week of manufacture 1-52
ddddd	5 digit ADI lot code
#	indicates lead free product
*	indicates VDE certification when present

ADuM1440ARQZ

Top	Content	Characters Used	Characters Available
Line 1	UM1440	6	6
Line 2	ARQZ	4	5
Line 3	#yyww*	6	6
Bottom	Content	Characters Used	Characters Available
Line 1	ddddd	5	5
Line 2		0	5

Table 2 Marking Values for ADuM1440ARQZ in QSOP package

ADuM1441ARQZ

Top	Content	Characters Used	Characters Available
Line 1	UM1441	6	6
Line 2	ARQZ	4	5
Line 3	#yyww*	6	6
Bottom	Content	Characters Used	Characters Available
Line 1	ddddd	5	5
Line 2		0	5

Table 3 Marking Values for ADuM1441ARQZ in QSOP package

ADuM1442ARQZ

Top	Content	Characters Used	Characters Available
Line 1	UM1442	6	6
Line 2	ARQZ	4	5
Line 3	#yyww*	6	6
Bottom	Content	Characters Used	Characters Available
Line 1	ddddd	5	5
Line 2		0	5

Table 4 Marking Values for ADuM1442ARQZ in QSOP package

ADuM1445ARQZ

Top	Content	Characters Used	Characters Available
Line 1	UM1445	6	6
Line 2	ARQZ	4	5
Line 3	#yyww*	6	6
Bottom	Content	Characters Used	Characters Available
Line 1	ddddd	5	5
Line 2		0	5

Table 5 Marking Values for ADuM1445ARQZ in QSOP package

ADuM1446ARQZ

Top	Content	Characters Used	Characters Available
Line 1	UM1446	6	6
Line 2	ARQZ	4	5
Line 3	#yyww*	6	6
Bottom	Content	Characters Used	Characters Available
Line 1	ddddd	5	5
Line 2		0	5

Table 6 Marking Values for ADuM1446ARQZ in QSOP package

ADuM1447ARQZ

Top	Content	Characters Used	Characters Available
Line 1	UM1447	6	6
Line 2	ARQZ	4	5
Line 3	#yyww*	6	6
Bottom	Content	Characters Used	Characters Available
Line 1	ddddd	5	5
Line 2		0	5

Table 7 Marking Values for ADuM1447ARQZ in QSOP package

SSOP PACKAGE MARKING

Marking Diagram

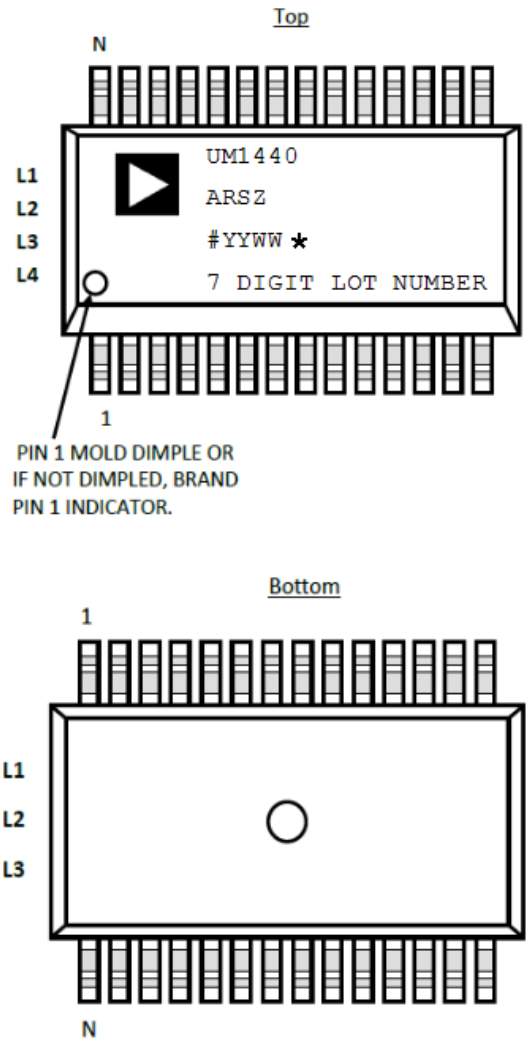


Figure 2 Marking locations for the SSOP package[1]

Marking Key

yy	last two digits of year of manufacture
ww	week of manufacture 1-52
ddddd	7 digit ADI lot code
#	indicates lead free product
*	indicates VDE certification when present

ADuM1440ARSZ

Top	Content	Characters Used	Characters Available
Line 1	UM1440	6	6
Line 2	ARSZ	4	6
Line 3	#yyww*	6	6
Line 4	ddddddd	7	7
Bottom	Content	Characters Used	Characters Available
Line 1		0	6
Line 2		0	3
Line 3		0	3

Table 8 Marking Values for ADuM1440ARSZ in SSOP package

ADuM1441ARSZ

Top	Content	Characters Used	Characters Available
Line 1	UM1441	6	6
Line 2	ARSZ	4	6
Line 3	#yyww*	6	6
Line 4	ddddddd	7	7
Bottom	Content	Characters Used	Characters Available
Line 1		0	6
Line 2		0	3
Line 3		0	3

Table 9 Marking Values for ADuM1441ARSZ in SSOP package

ADuM1442ARSZ

Top	Content	Characters Used	Characters Available
Line 1	UM1442	6	6
Line 2	ARSZ	4	6
Line 3	#yyww*	6	6
Line 4	ddddddd	7	7
Bottom	Content	Characters Used	Characters Available
Line 1		0	6
Line 2		0	3
Line 3		0	3

Table 10 Marking Values for ADuM1442ARSZ in SSOP package

ADuM1445ARSZ

Top	Content	Characters Used	Characters Available
Line 1	UM1445	6	6
Line 2	ARSZ	4	6
Line 3	#yyww*	6	6
Line 4	ddddddd	7	7
Bottom	Content	Characters Used	Characters Available
Line 1		0	6
Line 2		0	3
Line 3		0	3

Table 11 Marking Values for ADuM1445ARSZ in SSOP package

ADuM1446ARSZ

Top	Content	Characters Used	Characters Available
Line 1	UM1446	6	6
Line 2	ARSZ	4	6
Line 3	#yyww*	6	6
Line 4	ddddddd	7	7
Bottom	Content	Characters Used	Characters Available
Line 1		0	6
Line 2		0	3
Line 3		0	3

Table 12 Marking Values for ADuM1446ARSZ in SSOP package

ADuM1447ARSZ

Top	Content	Characters Used	Characters Available
Line 1	UM1447	6	6
Line 2	ARSZ	4	6
Line 3	#yyww*	6	6
Line 4	ddddddd	7	7
Bottom	Content	Characters Used	Characters Available
Line 1		0	6
Line 2		0	3
Line 3		0	3

Table 13 Marking Values for ADuM1447ARSZ in SSOP package

AD71217ARSZ

Top	Content	Characters Used	Characters Available
Line 1	71217	6	6
Line 2	ARSZ	4	6
Line 3	#yyww*	6	6
Line 4	ddddddd	7	7
Bottom	Content	Characters Used	Characters Available
Line 1		0	6
Line 2		0	3
Line 3		0	3

Table 14 Marking Values for ADuM1441ARSZ in SSOP package

[1] Pins are shown for illustration purposes only and pin count may differ from the illustration