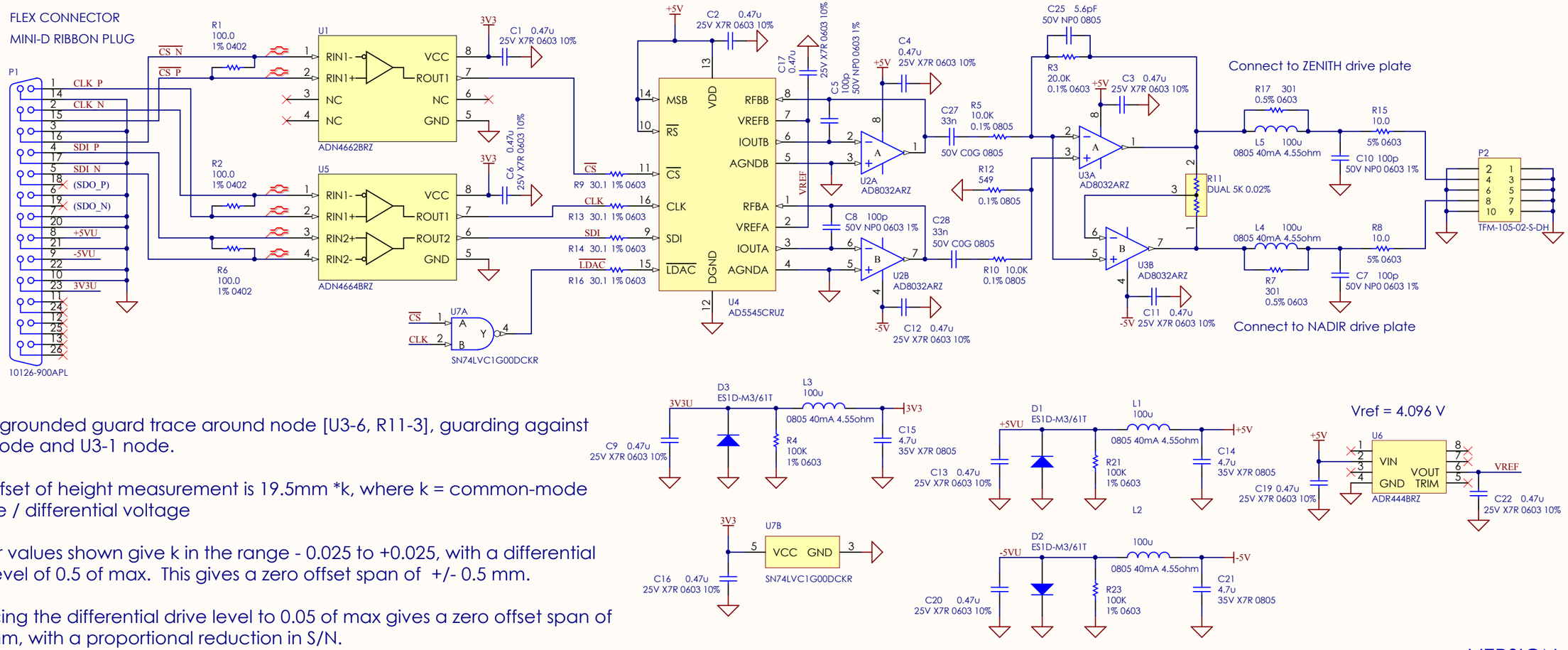
REVISION HISTORY

LTR	DESCRIPTION	CLASS	DWN	ENGR	
A	---------- INITIAL RELEASE ----------	E			SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES.
B	UPDATED VARIOUS PARTS. ADDED GUARD RING AND ROGERS 4350B.	E			



NOTES

1. Place grounded guard trace around node [U3-6, R11-3], guarding against U3-7 node and U3-1 node.
2. Zero offset of height measurement is 19.5mm *k, where k = common-mode voltage / differential voltage
3. Resistor values shown give k in the range - 0.025 to +0.025, with a differential drive level of 0.5 of max. This gives a zero offset span of +/- 0.5 mm.
4. Reducing the differential drive level to 0.05 of max gives a zero offset span of +/- 5mm, with a proportional reduction in S/N.

VERSION 4

10369689	
NEXT ASSEMBLY	USED ON
APPLICATION	

MATERIAL:

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

LINEAR TOLERANCES:

.XX ± .03
.XXX ± .010

ANGULAR TOLERANCE: ± 0.5°

SURFACE ROUGHNESS (MICROMETERS) ✓

DO NOT SCALE DRAWING
INTERPRET DIMENSIONING AND TOLERANCING PER ASME Y14.5-2009
INTERPRET DWG PER ASME Y14.100

CONTRACT NO _____

APPD_____DATE_____

DWN	C. SHELTON
ENGR	C. SHELTON

SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES.

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CA 91109

EDGE SENSOR DRIVE BOARD SCHEMATIC DIAGRAM

SIZE	CAGE CODE		REV
B	23835	10369688	B
SCALE: 1/1	UNCLASSIFIED	SHEET 1 OF 1	

REV 09/2016

ALTIUM GENERATED

JPL_B_SH1

REVISION HISTORY																
LTR	ZONE	DESCRIPTION	CLASS	DWN	CHK	STRUCT	MATL	THRM CONT			ENGR	DSGN SUPV	DATA MGT	RELEASE DATE
A		INITIAL RELEASE	E	SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES										
B	A8/B7	BOARD SIZE CHANGE. ADDED ROGERS 4350B MATERIAL. ADDED GUARD RING.	E											

22. MARK IN LOCATION SHOWN WITH 1.0 MINIMUM HIGH CHARACTERS THE DASH NUMBER and SERIAL NUMBER "NXXXXX" (WHERE N IS A VENDOR DESIGNATION LETTER ASSIGNED BY TMT AND XXXXX IS A UNIQUE 5 DIGIT SERIAL NUMBER FOR EACH PART. THE VENDOR DESIGNATION AND THE STARTING SERIAL NUMBER SHALL BE IN ACCORDANCE WITH THE VALUES PROVIDED IN THE PURCHASE ORDER)
21. BOW AND TWIST OF RIGID SECTIONS SHALL NOT EXCEED 0.75% WHEN MEASURED DIAGONALLY.
20. ALL UNDIMENSIONED HOLES SHALL BE LOCATED WITHIN 0.12 RADIUS OF THE POSITION INDICATED BY THE MASTER PATTERN ARTWORK.
19. ALL COPPER FEATURE SIZES OF THE FINISHED PRINTED WIRING FLEXPRINT SHALL BE WITHIN ± 10% OF THE SIZE INDICATED BY THE MASTER PATTERN ARTWORK.
18. REGISTRATION OF ALL PRINTED WIRING ELEMENTS AFTER LAMINATION SHALL BE WITHIN 0.076 mm OF THE TRUE POSITION.
17. PAIRED TRACES IN FLEX AREA ARE TO HAVE 100 OHMS ± 10% DIFFERENTIAL IMPEDANCE. TRACE WIDTH AND SPACE MAY BE ADJUSTED TO OBTAIN THIS.
16. ELECTRICAL TEST: CONTINUITY SHORT AND OPEN TESTING ON ALL AVAILABLE EXPOSED TERMINAL PADS USING IPC-D-356A NETLIST DATA. CONTINUITY TEST SHALL BE AT 5 OHMS MAX. SHORTS TESTING SHALL BE PERFORMED AT 200V. MINIMUM ISOLATION OF 100M OHMS.
15. LEGEND OVER SOLDER MASK ON BOTH SIDES OF PWB USING HYSOL M-SERIES/CATALYST 20/A WHITE EPOXY INK. LEGEND MARKING SHALL NOT BE NEARER THAN .005 INCH TO ANY PAD. CHARACTER HEIGHT SHALL BE .030 INCH MINIMUM.
14. AFTER APPLICATION OF SOLDER MASK, PLATE ALL EXPOSED COPPER WITH ENIG PER IPC-6013.
13. APPLY SOLDER MASK, ITEM 7, TO TOP AND BOTTOM OVER BARE COPPER, COMPONENT PADS TO BE FREE FROM BLEEDING OR MISREGISTRATION.
12. FABRICATE AND INSPECT PRINTED WIRING BOARD PER IPC-6013B, CLASS 2, TYPE 4.
11. FOIL LAMINATION MAY BE APPLIED AS AN ALTERNATE COSTRUCTION ON OUTER LAYERS.
10. MATERIAL: NON-SUPPORTED ADHESIVE FILM (THICKNESS AND QUANTITY AS REQUIRED) PER IPC-4203/18-0000MX
9. MATERIAL: NON-SUPPORTED POLYIMIDE FILM, ADHESIVE ONE SIDE PER IPC-4203/1-E1E1M1/0
8. MATERIAL: 1 OZ COPPER CLAD, SINGLE SIDED, .002 IN. THICK POLYIMIDE LAMINATE PER IPC-4204/11-E1E2Z CU-W7-HS/0
7. MATERIAL: 1 OZ COPPER CLAD, DOUBLE SIDED, .003 IN. THICK POLYIMIDE LAMINATE PER IPC-4204/11-E1E3Z CU-W7-HS/HS
6. MATERIAL: 0.135 mm THICK EPOXY/WOVEN GLASS PREPEG PER IPC-4101/P 26-E2116 TW RE VC
5. MATERIAL: 1 OZ COPPER CLAD, DOUBLE SIDED, 0.38 mm THICK EPOXY/WOVEN GLASS LAMINATE PER IPC-4101/L 26-0450-C1/C1
4. MATERIAL: 1 OZ COPPER CLAD, DOUBLE SIDED, 0.422 mm THICK HYDROCARBON/CERAMIC/WOVEN GLASS LAMINATE PER IPC-4103A/L11A3-0422-C1/C1
3. THIS IS A REDUCED DIMENSION DRAWING. ADDITIONAL DIMENSIONS NEEDED TO DEFINE THE TRUE PROFILES OF THIS PART SHALL BE OBTAINED FROM THE MASTER CAD MODEL DATABASE NAMED 10369692-A.ZIP. DIMENSIONS AND TOLERANCES SHALL BE INTERPRETED PER ASME Y14.5M.
2. THIS DOCUMENT AND RELATED ARTWORK ARE COMPUTER GENERATED. ALL MODIFICATIONS ARE TO BE PERFORMED TO THE ORIGINAL DATABASE ON FILE IN SECTION 383.
1. THE FINISHED PRINTED WIRING BOARD SHALL MEET THE REQUIREMENTS OF IPC-A-600-X (LATEST REVISION).

NOTES: UNLESS OTHERWISE SPECIFIED

QTY REQD	ITEM NO	REF DES	CAGE CODE	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	MATERIAL OR NOTE	ZONE
AR	9			SERIES M. CATALYST 20/A	INK, WHITE EPOXY		15	
AR	8			LPI, SM P41	SOLDERMASK, PROBIMER 52	IPC-SM-840 CL A	13	
AR	7				ACRYLIC ADHESIVE FILM NON-SUPPORTED		10	
AR	6				POLYIMIDE FILM ACRYLIC ADHESIVE ONE SIDE		9	
AR	5				POLYIMIDE FILM CU CLAD 1/2 OZ.		8	
AR	4				POLYIMIDE FILM CU CLAD 1/2 OZ. / 1/2 OZ.		7	
AR	3				GLASS BASE EPOXY RESIN PREPREG, B-STAGE		6	
AR	2				GLASS BASE EPOXY RESIN CU CLAD 1 OZ / 1 OZ		5	
AR	1				GLASS BASE HYDROCARBON RESIN (CERAMIC FILLER) CU CLAD 1 OZ / 1 OZ	ROGERS 4350B	4	

PARTS LIST

10369690	
NEXT ASSEMBLY	USED ON
APPLICATION	

MATERIAL: MATERIAL PER SPECIFICATION

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS

LINEAR TOLERANCES:

0 to 6	± 0.1
OVER 6 to 30	± 0.2
OVER 30 to 120	± 0.3
OVER 120 to 315	± 0.5
OVER 315 to 1000	± 0.8

ANGULAR TOLERANCES: ± 0.5°

MACHINE FINISH

DO NOT SCALE DRAWING

INTERPRET DWG PER ASME Y14.100M

CONTRACT NO

APPD	DATE
DWN	D. PALMER
ENGR	C. SHELTON
STRUCT	
MATL	
THRM CONT	
CHK	
DSGN SUPV	

SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CA 91109

EDGE SENSOR – DRIVE BOARD RIGID-FLEX PWB FABRICATION

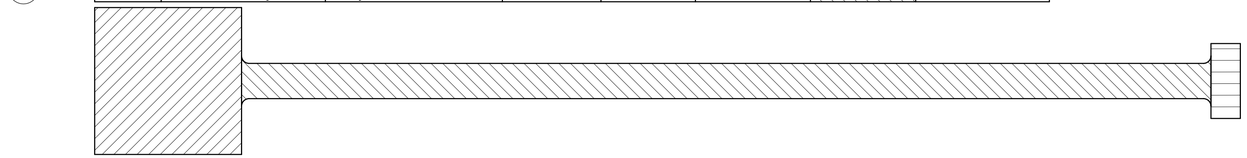
SIZE	CAGE CODE		REV
D	23835	10369689	B

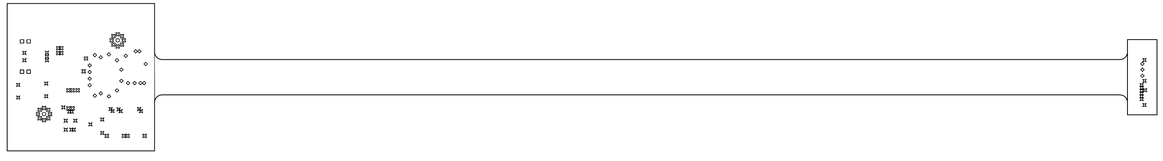
SCALE: 1/1	UNCLASSIFIED	SHEET 1 OF 2

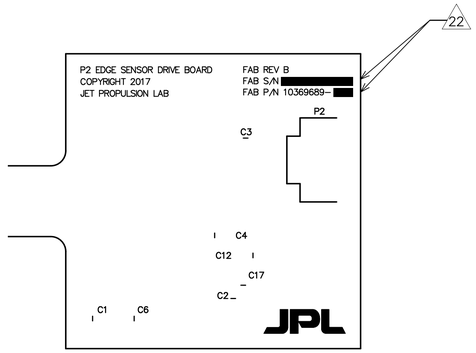
REV 01/2013

DBASE NAME: ANSI_D-SH1/A5

Layer	Name	Material	Thickness	Constant	Rigid Stack	Flex Stack	Rigid Stack 2
1	Flex Coverlay Top	Polyimide/Adhesive	0.051mm	3.5			
2	Top Overlay						
3	Top Solder	Solder Resist	0.010mm	3.5			
4	Component Side	Copper	0.036mm				
5	Dielectric 1	Rogers 4350B	0.381mm	4.8			
6	Ground Plane	Copper	0.036mm				
7	Dielectric 11	FR-4	0.226mm	4.2			
8	Flex Shield Top	Copper	0.018mm				
9	Dielectric 6	Polyimide	0.051mm	3.78			
10	Dielectric 10	Acrylic Adhesive	0.041mm	3.78			
11	Diff Pair	Copper	0.018mm				
12	Dielectric 9	Polyimide	0.076mm	3.5			
13	Flex Shield Bot	Copper	0.018mm				
14	Dielectric 12	FR-4	0.226mm	4.2			
15	Power Plane	Copper	0.036mm				
16	Dielectric 4	FR-4	0.381mm	4.2			
17	Solder Side	Copper	0.036mm				
18	Bottom Solder	Solder Resist	0.010mm	3.5			
19	Bottom Overlay						
20	Flex Coverlay Bot	Polyimide/Adhesive	0.051mm	3.5			







DASH AND SERIAL NUMBER DETAIL (2X)

Symbol	Count	Hole Size	Plated	Hole Type	Via/Pad
⌑	36	0.381mm (15.00mil)	PTH	Round	Via
⊠	31	0.508mm (20.00mil)	PTH	Round	Via
◇	25	0.711mm (28.00mil)	PTH	Round	Via
□	4	0.838mm (33.00mil)	PTH	Round	Pad
○	2	2.400mm (94.49mil)	NPTH	Round	Pad
	98 Total				

LAYER DRILL DRAWING (GD1)

P2 EDGE SENSOR – SENSE BOARD
10369692-116 REV B
JPL D.P. 11/01/2017

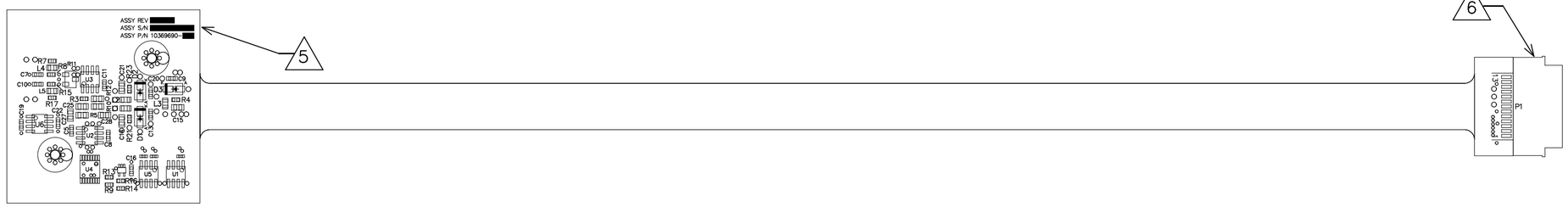
SIZE	CAGE CODE		REV
D	23835	10369689	B
SCALE: 1/1	UNCLASSIFIED	SHEET 2 OF 2	

REV 02/2013
DBASE NAME: ANSI_D-SH2/A5

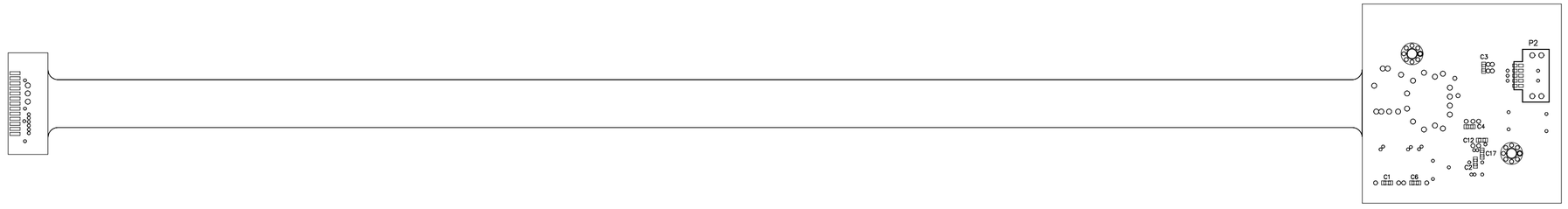
REVISION HISTORY													
LTR	DESCRIPTION	CLASS	DWN	CHK	STRUCT	MATL	THRM CONT			ENGR	DSGN SUPV	DATA MGT	RELEASE DATE
A	INITIAL RELEASE	E	SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES										
B	PWB SIZE AND SHAPE CHANGED. PARTS UPDATED.	E											

NOTES: UNLESS OTHERWISE SPECIFIED

1. WORKMANSHIP STANDARDS AND ACCEPTABILITY REQUIREMENTS SHALL MEET IPC-A-610 (LATEST VERSION).
2. THIS DOCUMENT AND RELATED ARTWORK ARE COMPUTER GENERATED. CHANGES ARE TO BE PERFORMED ON THE ORIGINAL DATABASE IN SECTION 383.
3. SOLDER COMPONENTS USING LEAD FREE SOLDER, ITEM 3.
4. CLEAN SOLDER FLUX FROM BOARD SO THERE IS NO DISCERNABLE RESIDUE.
5. MARK OR INK STAMP DASH NUMBER, REVISION LETTER AND SERIAL NUMBER USING INK, ITEM 2. CHARACTERS TO BE 1mm HIGH MINIMUM.
6. P1 IS A STRADDLE MOUNT CONNECTOR WITH PINS ON TOP AND BOTTOM LAYERS.
7. FOR ELECTRONIC PARTS LIST SEE PL10369690_B.
8. FOR SCHEMATIC DIAGRAM SEE JPL DRAWING 10369688_B.
9. THIS PRINTED WIRING BOARD ASSEMBLY CONSISTS OF ONLY SMT TECHNOLOGY.



TOP ASSEMBLY



BOTTOM ASSEMBLY

SEE SEPARATE PARTS LIST

QTY REQD	ITEM NO	REF DES	CAGE CODE	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	MATERIAL OR NOTE
AR	3			Sn96.5/Ag3.0/ Cu0.5	SOLDER	J-STD-005A	3
AR	2			SERIES M CATALYST 20A	INK, WHITE EPOXY		4
1	1			10369689	PRINTED WIRING BOARD		REV A
-1							

PARTS LIST

NEXT ASSEMBLY	USED ON
APPLICATION	

MATERIAL: MATERIAL PER SPECIFICATION

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
LINEAR TOLERANCES:
.XX .03
.XXX .010
ANGULAR TOLERANCES: 0.5
MACHINE FINISH
DO NOT SCALE DRAWING
INTERPRET DWG PER ASME Y14.100

CONTRACT NO

		DATE
APPD		
DWN	D. PALMER	
CHK	C. SHELTON	
STRUCT		
MATL		
THRM CONT		
ENGR		
DSGN SUPV		

SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES.

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CA 91109

EDGE SENSOR DRIVE BOARD PWA ASSEMBLY

SIZE	CAGE CODE		REV
C	23835	10369690	B

SCALE: 1/1 | UNCLASSIFIED | SHEET 1 OF 1

REV 01/2013

DBASE NAME: ANSI_C-SH1/A5

PL10369690 B Edge Sensor - Drive Board Parts List

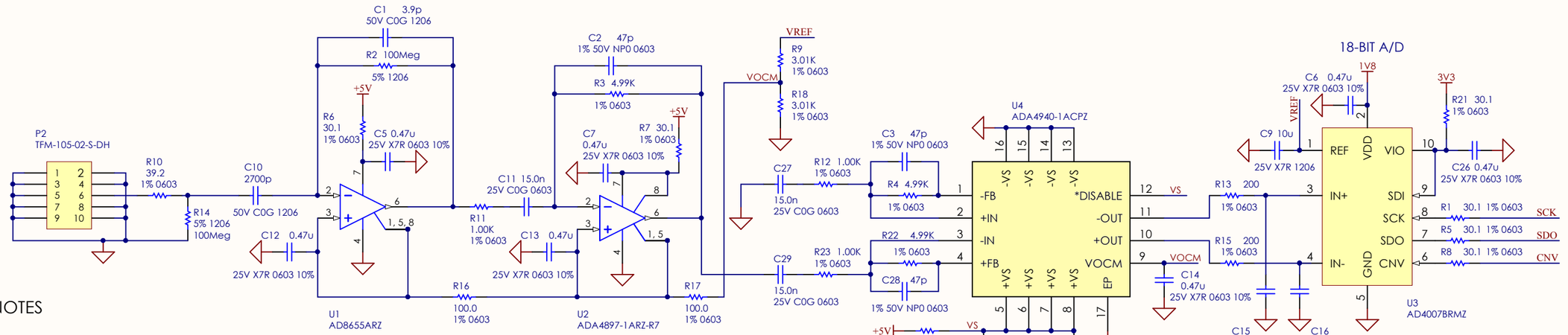
Source Data From: sensor_drive_v4.PrjPCB
Project: sensor_drive_v4.PrjPCB
Report Date: 11/1/2017 11:15:03 PM
Print Date: 11/7/2017 12:37:14 AM

Item	Quantity	Designator	Description	Footprint	Manufacturer	ManufacturerPN	Supplier	SupplierPN
1.	2	C27, C28	CAP CER 0.033UF 50V C0G 0805	CAPCP1608X09N	TDK	CGA4J2C0G1H333J125AA	Digi-Key	445-6950-1-ND
2.	14	C1, C2, C3, C4, C6, C9, C11, C12, C13, C16, C17, C19, C20, C22	CAP CER 0.47UF 25V X7R 0603 10%	CAPCP1608X09N	TDK	CGA3E3X7R1E474K080AE	Digikey	445-173660-1-ND
3.	3	C14, C15, C21	CAP CER 4.7UF 35V 20% X7R 0805	CAPCP2012X14N	TDK	CGA4J1X7R1V475M125AE	Digikey	445-172480-1-ND
4.	1	C25	CAP CER 5.6PF 50V NP0 0805	CAPCP2012X09N	AVX	08055A5R6CAT2A	Digikey	478-1301-1-ND
5.	4	C5, C7, C8, C10	CAP CER 100PF 50V C0G/NP0 0603 1%	CAPCP1608X09N	Kemet	C0603C101F5GACTU	Digi-Key	399-7819-1-ND
6.	1	P2	CONN HEADER 10POS 0.05IN	TFM-105-02-S-DH	Samtec	TFM-105-02-S-DH	Digikey	SAM12052-ND
7.	1	P1	CONN MINI-D RIBBON PLUG 26POS STRADDLE MOUNT	10126-900AP	3M	10126-900APL	Digikey	3M15560-ND
8.	3	D1, D2, D3	DIODE GEN PURP 200V 1A DO214AC	DO-214AC	Vishay	ES1D-M3/61T	Digikey	ES1D-M3/61TGICT-ND
9.	1	U4	IC DAC 16BIT SER DUAL 16TSSOP	RU-16_N	Analog Devices	AD5545CRUZ	Digikey	AD5545CRUZ-ND
10.	1	U7	IC GATE NAND 1CH 2-INP SC-70-5	SC-70	Texas Instruments	SN74LVC1G00DCKR	Digikey	296-9846-1-ND
11.	2	U2, U3	IC OPAMP 16V R-R OUT 8SOIC	R-8_N	Analog Devices	AD8032ARZ	Digikey	AD8032ARZ-ND
12.	1	U1	IC RCVR DIFF LVDS 1CH 8SOIC	R-8_N	Analog Devices	ADN4662BRZ	Digikey	ADN4662BRZ-ND
13.	1	U5	IC RCVR DIFF LVDS 2CH 8SOIC	R-8_N	Analog Devices	ADN4664BRZ	Digikey	ADN4664BRZ-ND
14.	1	U6	IC VREF 4.096V 8-SOIC	R-8_N	Analog Devices	ADR444BRZ	Digikey	ADR444BRZ-ND
15.	5	L1, L2, L3, L4, L5	IND 100UH 140MA 4.55 OHM 0805	INDC2012X14N	TDK	KLZ2012NHR101LTD25	Digikey	445-174997-1-ND
16.	1	R11	RES NET 5K OHM 2 RES 1610	DSMZ	Vishay	Y4485V0002QT9R	Digikey	Y4485-5K/5KBCT-ND
17.	2	R5, R10	RES SMD 10K OHM 0.1% 1/4W 0805	RESC2012N	Panasonic	ERJ-PB6B1002V	Digikey	P20708CT-ND
18.	2	R8, R15	RES SMD 10 OHM 5% 1/10W 0603	RESC1608X06N	Panasonic	ERJ-3GEYJ100V	Digikey	P10GCT-ND
19.	1	R3	RES SMD 20K OHM 0.1% 1/10W 0603	RESC1608X06N	Panasonic	ERA-3AEB203V	Digikey	P20KDBCT-ND
20.	4	R9, R13, R14, R16	RES SMD 30.1 OHM 1% 1/10W 0603	RESC1608X06N	Panasonic	ERJ-3EKF30R1V	Digikey	P30.1HCT-ND
21.	3	R4, R21, R23	RES SMD 100K OHM 0.1% 1/5W 0603	RESC1608X06N	Panasonic	ERJ-PB3B1003V	Digikey	P20200CT-ND
22.	3	R1, R2, R6	RES SMD 100 OHM 1% 1/16W 0402	RESC1005N	Yageo	RC0402FR-07100RL	Digikey	311-100LRCT-ND
23.	2	R7, R17	RES SMD 301 OHM 0.5% 1/5W 0603	RESC1608X06N	Panasonic	ERJ-PB3D3010V	Digikey	P20222CT-ND
24.	1	R12	RES SMD 549 OHM 0.1% 1/8W 0805	RESC2012N	Panasonic	ERA-6AEB5490V	Digikey	P549DACT-ND

Total

REVISION HISTORY

LTR	DESCRIPTION	CLASS	DWN	ENGR	
A	---------- INITIAL RELEASE ----------	E			SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES.
B	UPDATED VARIOUS PARTS. ADDED GUARD RING AND ROGERS 4350B.	E			



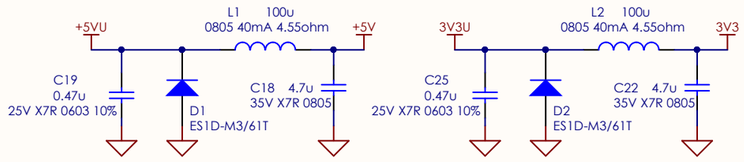
NOTES

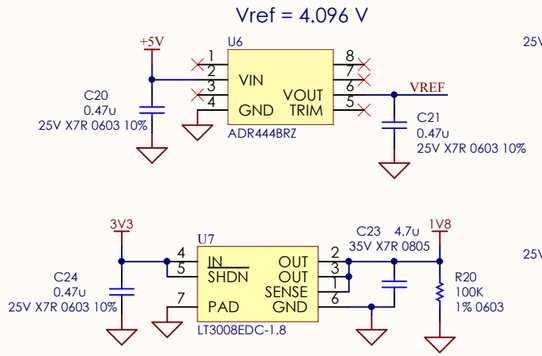
1. Place guard ring around U1-2 node, Thread guard ring under C1, R2, C10, and connect it to U1-1,3,5,8.

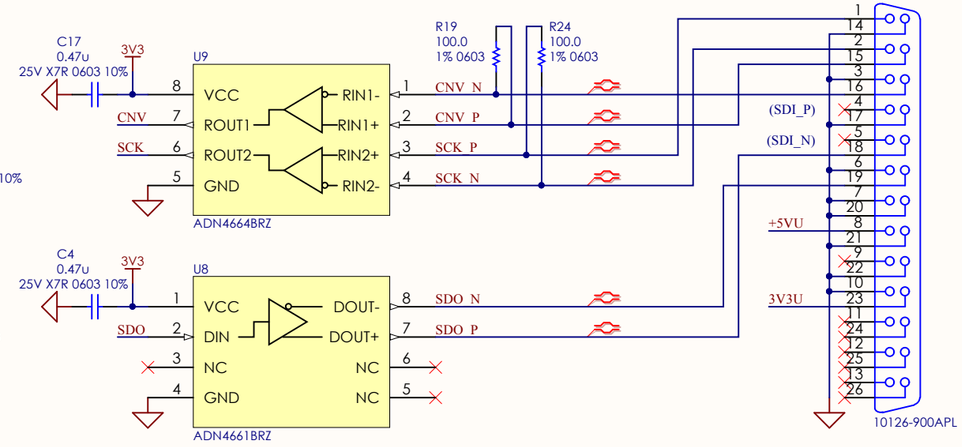
2. Place guard ring around U2-2 node, Thread guard ring under C2, R3, C11, and connect it to U2-1,3,5.

3. In the ground plane under U1, create an isolated filled shape matching the U1 guard trace oval and connect it to the U2 guard trace

4. In the ground plane under U2, create an isolated filled shape matching the U2 guard trace oval and connect it to the U2 guard trace.







VERSION 4

10369692	
NEXT ASSEMBLY	USED ON
APPLICATION	

MATERIAL:

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

LINEAR TOLERANCES:

.XX ± .03
.XXX ± .010

ANGULAR TOLERANCE: ± 0.5°

SURFACE ROUGHNESS (MICROMETERS) √

DO NOT SCALE DRAWING
INTERPRET DIMENSIONING AND TOLERANCING PER ASME Y14.5-2009
INTERPRET DWG PER ASME Y14.100

CONTRACT NO _____

APPD _____ DATE _____

DWN	C. SHELTON
ENGR	C. SHELTON

SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES.

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CA 91109

EDGE SENSOR SENSE BOARD SCHEMATIC DIAGRAM

SIZE	CAGE CODE		REV
B	23835	10369691	B
SCALE: 1/1	UNCLASSIFIED	SHEET 1 OF 1	

ALTIUM GENERATED

REV 09/2016

JPL_B_SH1

REVISION HISTORY

LTR	ZONE	DESCRIPTION	CLASS	DWN	CHK	STRUCT	MATL	THRM CONT			ENGR	DSGN SUPV	DATA MGT	RELEASE DATE
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19. ALL COPPER FEATURE SIZES OF THE FINISHED PRINTED WIRING FLEXPRINT SHALL BE WITHIN± 10% OF THE SIZE INDICATED BY THE MASTER PATTERN ARTWORK.
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17. PAIRED TRACES IN FLEX AREA ARE TO HAVE 100 OHMS± 10% DIFFERENTIAL IMPEDANCE. TRACE WIDTH AND SPACE MAY BE ADJUSTED TO OBTAIN THIS.
16. ELECTRICAL TEST: CONTINUITY SHORT AND OPEN TESTING ON ALL AVAILABLE EXPOSED TERMINAL PADS USING IPC-D-356A NETLIST DATA. CONTINUITY TEST SHALL BE AT 5 OHMS MAX. SHORTS TESTING SHALL BE PERFORMED AT 200V. MINIMUM ISOLATION OF 100M OHMS.
15. LEGEND OVER SOLDER MASK ON BOTH SIDES OF PWB USING HYSOL M-SERIES/CATALYST 20/A WHITE EPOXY INK. LEGEND MARKING SHALL NOT BE NEARER THAN .005 INCH TO ANY PAD. CHARACTER HEIGHT SHALL BE .030 INCH MINIMUM.
14. AFTER APPLICATION OF SOLDER MASK, PLATE ALL EXPOSED COPPER WITH ENIG PER IPC-6013.
13. APPLY SOLDER MASK, ITEM 7, TO TOP AND BOTTOM OVER BARE COPPER, COMPONENT PADS TO BE FREE FROM BLEEDING OR MISREGISTRATION.
12. FABRICATE AND INSPECT PRINTED WIRING BOARD PER IPC-6013B, CLASS 2, TYPE 4.
11. FOIL LAMINATION MAY BE APPLIED AS AN ALTERNATE COSTRUCTION ON OUTER LAYERS.
10. MATERIAL: NON-SUPPORTED ADHESIVE FILM (THICKNESS AND QUANTITY AS REQUIRED) PER IPC-4203/18-0000MX
9. MATERIAL: NON-SUPPORTED POLYIMIDE FILM, ADHESIVE ONE SIDE PER IPC-4203/1-E1E1M1/0
8. MATERIAL: 1 OZ COPPER CLAD, SINGLE SIDED, .002 IN. THICK POLYIMIDE LAMINATE PER IPC-4204/11-E1E2Z CU-W7-HS/0
7. MATERIAL: 1 OZ COPPER CLAD, DOUBLE SIDED, .003 IN. THICK POLYIMIDE LAMINATE PER IPC-4204/11-E1E3Z CU-W7-HS/HS
6. MATERIAL: 0.135 mm THICK EPOXY/WOVEN GLASS PREPEG PER IPC-4101/P 26-E2116 TW RE VC
5. MATERIAL: 1 OZ COPPER CLAD, DOUBLE SIDED, 0.45 mm THICK EPOXY/WOVEN GLASS LAMINATE PER IPC-4101/L 26-0450-C1/C1
4. MATERIAL: 1 OZ COPPER CLAD, DOUBLE SIDED, 0.422 mm THICK HYDROCARBON/CERAMIC/WOVEN GLASS LAMINATE PER IPC-4103A/L11A3-0422-C1/C1
3. THIS IS A REDUCED DIMENSION DRAWING. ADDITIONAL DIMENSIONS NEEDED TO DEFINE THE TRUE PROFILES OF THIS PART SHALL BE OBTAINED FROM THE MASTER CAD MODEL DATABASE NAMED 10369692-A.ZIP. DIMENSIONS AND TOLERANCES SHALL BE INTERPRETED PER ASME Y14.5M.
2. THIS DOCUMENT AND RELATED ARTWORK ARE COMPUTER GENERATED. ALL MODIFICATIONS ARE TO BE PERFORMED TO THE ORIGINAL DATABASE ON FILE IN SECTION 383.
1. THE FINISHED PRINTED WIRING BOARD SHALL MEET THE REQUIREMENTS OF IPC-A-600-X (LATEST REVISION).

NOTES: UNLESS OTHERWISE SPECIFIED

QTY REQD	ITEM NO	REF DES	CAGE CODE	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	MATERIAL OR NOTE	ZONE
	-1							
AR	9			SERIES M. CATALYST 20/A	INK, WHITE EPOXY		15	
AR	8			LPI, SM P41	SOLDERMASK, PROBIMER 52	IPC-SM-840 CL A	13	
AR	7				ACRYLIC ADHESIVE FILM NON-SUPPORTED		10	
AR	6				POLYIMIDE FILM ACRYLIC ADHESIVE ONE SIDE		9	
AR	5				POLYIMIDE FILM CU CLAD 1/2 OZ.		8	
AR	4				POLYIMIDE FILM CU CLAD 1/2 OZ. / 1/2 OZ.		7	
AR	3				GLASS BASE EPOXY RESIN PREPREG, B-STAGE		6	
AR	2				GLASS BASE EPOXY RESIN CU CLAD 1 OZ / 1 OZ		5	
AR	1				GLASS BASE HYDROCARBON RESIN (CERAMIC FILLER) CU CLAD 1 OZ / 1 OZ	ROGERS 4350B	4	

PARTS LIST

10369693	
NEXT ASSEMBLY	USED ON
APPLICATION	

MATERIAL: MATERIAL PER SPECIFICATION

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS

LINEAR TOLERANCES:

0 to 6	± 0.1
OVER 6 to 30	± 0.2
OVER 30 to 120	± 0.3
OVER 120 to 315	± 0.5
OVER 315 to 1000	± 0.8

ANGULAR TOLERANCES: ± 0.5°

MACHINE FINISH √

DO NOT SCALE DRAWING

INTERPRET DWG PER ASME Y14.100M

CONTRACT NO

APPD	DATE
DWN	D. PALMER
ENGR	C. SHELTON
STRUCT	
MATL	
THRM CONT	
CHK	
DSGN SUPV	

SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CA 91109

EDGE SENSOR – SENSE BOARD RIGID-FLEX PWB FABRICATION

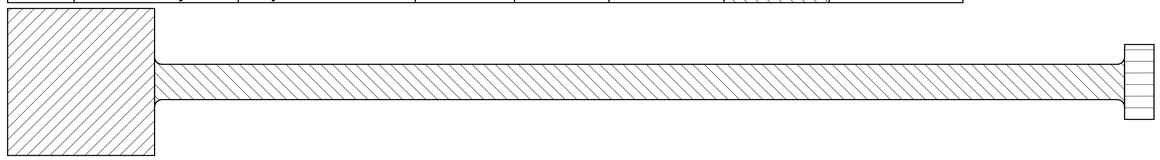
SIZE	CAGE CODE		REV
D	23835	10369692	B

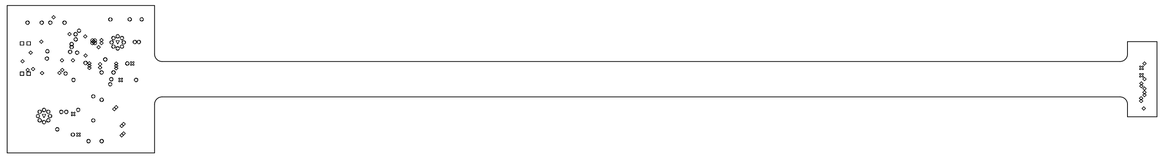
SCALE: 1/1 | UNCLASSIFIED | SHEET 1 OF 2

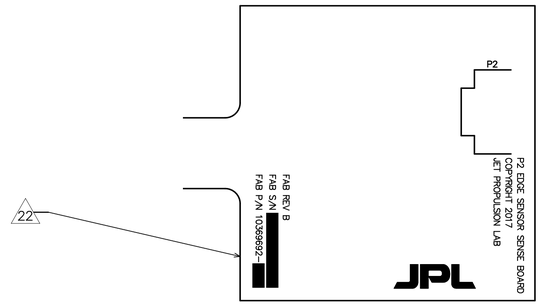
REV 01/2013

DBASE NAME: ANSI_D-SH1/A5

Layer	Name	Material	Thickness	Constant	Rigid Stack	Flex Stack	Rigid Stack 2
1	Flex Coverlay Top	Polyimide/Adhesive	0.051mm	3.5			
2	Top Overlay						
3	Top Solder	Solder Resist	0.010mm	3.5			
4	Component Side	Copper	0.036mm				
5	Dielectric 1	Rogers 4350B	0.381mm	3.48			
6	Ground Plane	Copper	0.036mm				
7	Dielectric 11	FR-4	0.226mm	4.2			
8	Flex Shield Top	Copper	0.018mm				
9	Dielectric 6	Polyimide	0.254mm	3.5			
10	Dielectric 10	Acrylic Adhesive	0.254mm	3.5			
11	Diff Pair	Copper	0.018mm				
12	Dielectric 9	Polyimide	0.076mm	3.5			
13	Flex Shield Bot	Copper	0.018mm				
14	Dielectric 12	FR-4	0.226mm	4.2			
15	Power Plane	Copper	0.036mm				
16	Dielectric 4	FR-4	0.381mm	4.2			
17	Solder Side	Copper	0.036mm				
18	Bottom Solder	Solder Resist	0.010mm	3.5			
19	Bottom Overlay						
20	Flex Coverlay Bot	Polyimide/Adhesive	0.051mm	3.5			







DASH AND SERIAL NUMBER DETAIL (2X)

Symbol	Count	Finished Hole Size	Plated	Hole Type	Via/Pad
▽	2	2.400mm (94.49mil)	NPTH	Round	Pad
□	4	0.838mm (33.00mil)	PTH	Round	Pad
○	5	0.254mm (10.00mil)	PTH	Round	Via
⊠	6	0.711mm (28.00mil)	PTH	Round	Via
◇	41	0.381mm (15.00mil)	PTH	Round	Via
⌖	54	0.508mm (20.00mil)	PTH	Round	Via
	112 Total				

LAYER DRILL DRAWING (GD1)

P2 EDGE SENSOR – SENSE BOARD
10369692-116 REV A
JPL D.P. 11/01/2017

SIZE	CAGE CODE		REV
D	23835	10369692	B
SCALE: 1/1	UNCLASSIFIED	SHEET 2 OF 2	

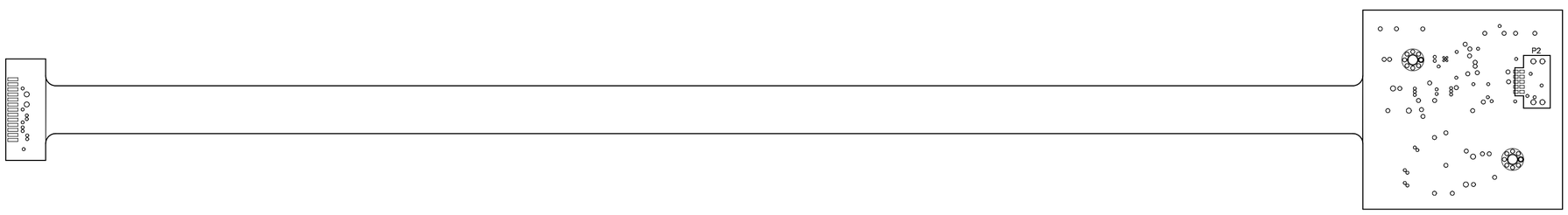
REV 02/2013
DBASE NAME: ANSI_D-SH2/A5

REVISION HISTORY													
LTR	DESCRIPTION	CLASS	DWN	CHK	STRUCT	MATL	THRM CONT			ENGR	DSGN SUPV	DATA MGT	RELEASE DATE
A	INITIAL RELEASE	E	SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES										
B	PWB SIZE AND SHAPE CHANGED. PARTS UPDATED.	E											

NOTES: UNLESS OTHERWISE SPECIFIED

1. WORKMANSHIP STANDARDS AND ACCEPTABILITY REQUIREMENTS SHALL MEET IPC-A-610 (LATEST VERSION).
2. THIS DOCUMENT AND RELATED ARTWORK ARE COMPUTER GENERATED. CHANGES ARE TO BE PERFORMED ON THE ORIGINAL DATABASE IN SECTION 383.
3. SOLDER COMPONENTS USING LEAD FREE SOLDER, ITEM 3.
4. CLEAN SOLDER FLUX FROM BOARD SO THERE IS NO DISCERNABLE RESIDUE.
5. MARK OR INK STAMP DASH NUMBER, REVISION LETTER AND SERIAL NUMBER USING INK, ITEM 2. CHARACTERS TO BE 1mm HIGH MINIMUM.
6. P1 IS A STRADDLE MOUNT CONNECTOR WITH PINS ON TOP AND BOTTOM LAYERS.
7. FOR ELECTRONIC PARTS LIST SEE PL10369693_B.
8. FOR SCHEMATIC DIAGRAM SEE JPL DRAWING 10369691_B.
9. THIS PRINTED WIRING BOARD ASSEMBLY CONSISTS OF ONLY SMT TECHNOLOGY.

TOP ASSEMBLY



BOTTOM ASSEMBLY

SEE SEPARATE PARTS LIST

QTY REQD	ITEM NO	REF DES	CAGE CODE	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	MATERIAL OR NOTE
AR	3				LEAD–FREE SOLDER Sn96.5/Ag3.0/Cu0.5	J–STD–005A	3
AR	2			SERIES M CATALYST 20A	INK, WHITE EPOXY		4
1	1			10369692	PRINTED WIRING BOARD		REV B

PARTS LIST

NEXT ASSEMBLY	USED ON
APPLICATION	

MATERIAL: MATERIAL PER SPECIFICATION

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
LINEAR TOLERANCES:
.XX .03
.XXX .010
ANGULAR TOLERANCES: 0.5
MACHINE FINISH
DO NOT SCALE DRAWING
INTERPRET DWG PER ASME Y14.100

CONTRACT NO

APPD	DATE
DWN	D. PALMER
ENGR	C. SHELTON
STRUCT	
MATL	
THRM CONT	
CHK	
DSGN SUPV	

SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES.

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CA 91109

EDGE SENSOR SENSE BOARD PWA ASSEMBLY

SIZE	CAGE CODE		REV
C	23835	10369693	B
SCALE: 1/1	UNCLASSIFIED	SHEET 1 OF 1	

REV 01/2013

DBASE NAME: ANSI_C–SH1/A5

PL10369693 B Edge Sensor - Sense Board Parts List

Source Data From: sensor_sense_v4.PrjPCB
Project: sensor_sense_v4.PrjPCB
Report Date: 11/1/2017 11:22:12 PM
Print Date: 11/7/2017 12:35:08 AM

Item	Quantity	Designator	Description	Footprint	Manufacturer	ManufacturerPN	Supplier	SupplierPN
1.	3	C11, C27, C29	CAP CER 0.015UF 25V C0G/NP0 0603	CAPCP1608X09N	Kemet	C0603X153J3GACTU	Digi-Key	399-7389-1-ND
2.	15	C4, C5, C6, C7, C8, C12, C13, C14, C17, C19, C20, C21, C24, C25, C26	CAP CER 0.47UF 25V X7R 0603 10%	CAPCP1608X09N	TDK	CGA3E3X7R1E474K080AE	Digikey	445-173660-1-ND
3.	1	C1	CAP CER 3.9PF 50V C0G/NP0 1206	CAPCP3316X09N	Samsung	CL31C3R9BBCNNNC	Digikey	1276-1159-1-ND
4.	3	C18, C22, C23	CAP CER 4.7UF 35V 20% X7R 0805	CAPCP2012X14N	TDK	CGA4J1X7R1V475M125AE	Digikey	445-172480-1-ND
5.	2	C9, C30	CAP CER 10UF 25V 10% X7R 1206	CAPCP3316X19N	TDK	CGA5L1X7R1E106K160AE	Digikey	445-8806-1-ND
6.	3	C2, C3, C28	CAP CER 47PF 50V C0G/NP0 0603 1%	CAPCP1608X09N	Murata	GRM1885C1H470FA01J	Digikey	490-9687-1-ND
7.	2	C15, C16	CAP CER 1000PF 100V 5% NP0 0603	CAPCP1608X09N	Murata	GRM1885C2A102JA01D	Digikey	490-3281-1-ND
8.	1	C10	CAP CER 2700PF 50V C0G/NP0 1206	CAPCP3316X09N	Samsung	CL31C272JBFNNNE	Digikey	1276-3245-1-ND
9.	1	P2	CONN HEADER 10POS 0.05IN	TFM-105-02-S-DH	Samtec	TFM-105-02-S-DH	Digikey	SAM12052-ND
10.	1	P1	CONN MINI-D RIBBON PLUG 26POS STRADDLE MOUNT	10126-900AP	3M	10126-900APL	Digikey	3M15560-ND
11.	2	D1, D2	DIODE GEN PURP 200V 1A DO214AC	DO-214AC	Vishay	ES1D-M3/61T	Digikey	ES1D-M3/61TGICT-ND
12.	1	U3	IC ADC 18BIT 1MSPS DIFF PULSAR	RM-10_N	Analog Devices	AD4007BRMZ	Digikey	AD4007BRMZ-ND
13.	1	U4	IC AMP DIFF ADC DVR 18BIT	CP_16_2	Analog Devices	ADA4940-1ACPZ-R7	Digikey	ADA4940-1ACPZ-R7CT-ND
14.	1	U8	IC DRIVER DIFF LVDS 1CH 8SOIC	R-8_N	Analog Devices	ADN4661BRZ	Digikey	ADN4661BRZ-ND
15.	1	U1	IC OPAMP GP 28MHZ RRO 8SOIC	R-8_N	Analog Devices	AD8655ARZ	Digikey	AD8655ARZ-ND
16.	1	U2	IC OPAMP VFB 230MHZ RRO 8SOIC	R-8_N	Analog Devices	ADA4897-1ARZ-R7	Digikey	ADA4897-1ARZ-R7CT-ND
17.	1	U9	IC RCVR DIFF LVDS 2CH 8SOIC	R-8_N	Analog Devices	ADN4664BRZ	Digikey	ADN4664BRZ-ND
18.	1	U7	IC REG LINEAR 1.8V 20MA 6DFN	LT-DC6-6_V	Linear Technology	LT3008IDC-1.8#TRMPBF	Digikey	LT3008IDC-1.8#TRMPBFCT-ND
19.	1	U6	IC VREF 4.096V 8-SOIC	R-8_N	Analog Devices	ADR444BRZ	Digikey	ADR444BRZ-ND
20.	2	L1, L2	IND 100UH 140MA 4.55 OHM 0805	INDC2012X14N	TDK	KLZ2012NHR101LTD25	Digikey	445-174997-1-ND
21.	3	R11, R12, R23	RES SMD 1.00K OHM 1% 1/10W 0603	RESC1608X06N	Panasonic	ERJ-3EKF1001V	Digikey	P1.00KHCT-ND
22.	2	R9, R18	RES SMD 3.01K OHM 1% 1/10W 0603	RESC1608X06N	Panasonic	ERJ-3EKF3011V	Digikey	P3.01KHCT-ND
23.	3	R3, R4, R22	RES SMD 4.99K OHM 1% 1/10W 0603	RESC1608X06N	Panasonic	ERJ-3EKF4991V	Digikey	P4.99KHCT-ND
24.	1	R25	RES SMD 10 OHM 5% 1/10W 0603	RESC1608X06N	Panasonic	ERJ-3GEYJ100V	Digikey	P10GCT-ND
25.	6	R1, R5, R6, R7, R8, R21	RES SMD 30.1 OHM 1% 1/10W 0603	RESC1608X06N	Panasonic	ERJ-3EKF30R1V	Digikey	P30.1HCT-ND
26.	1	R10	RES SMD 39.2 OHM 1% 1/10W 0603	RESC1608X06N	Panasonic	ERJ-3EKF39R2V	Digikey	P39.2HCT-ND
27.	1	R20	RES SMD 100K OHM 1% 1/10W 0603	RESC1608X06N	Panasonic	ERJ-3EKF1003V	Digikey	P100KHCT-ND
28.	2	R2, R14	RES SMD 100M OHM 5% 1/4W 1206	RESC3216N	Stackpole	HMC1206JT100M	Digikey	HMC1206JT100MCT-ND
29.	4	R16, R17, R19, R24	RES SMD 100 OHM 1% 1/10W 0603	RESC1608N	Yageo	RC0603FR-07100L	Digikey	311-100HRCT-ND
30.	2	R13, R15	RES SMD 200 OHM 1% 1/4W 0603	RESC1608X06N	Panasonic	ERJ-PA3F2000V	Digikey	P200BYCT-ND

Total