CSA.SchDoc

CHARGE SENSITIVE AMPLIFIER

CSA_OUT
VINJ
INJ

SHA.SchDoc

SHAPER

SHA_IN
HPF_OUT
SHA_OUT
RSEL[2..0]

HPF
SHA
RSEL[2..0]

COMP IN

COMP.SchDoc

COMPARATOR

COMP_IN
COMP_OUT
VTHR

IO.SchDoc

INTERFACE

HIT
RSEL[2..0]
VTHR
VINJ
INJ

FID FID FID

R4 100M
R5 1M
FB1 2 1
C4 50V 10n
L1
D1 1N4148W-7-F
BIAS
C5 50V 100n
C6 50V 100n
C8 50V 10n
C7 50V 10n
VREF
DLW5BTM142SQ2L

RF 1G
CF 1p
U1 LTC6268-10
VCC1
SENSOR
SENSOR
VREF
CC 1u
CSA_IN
CSA_OUT
CSA_OUT
R6 100R
CSA

CINJ 1p
C1 5p
C2 10p
C3 20p
R1 10M
R2 10M
R3 10M
VREF

R7 1k
VINJ
VINJ
C9 1n
VREF

CSA LOAD
12 10 8 6 4 2
11 9 7 5 3 1

INJ
INJ
INJ
Q1 FDN337N
R9 10k
VREF

VCC1
R8 4k02
VREF
5V **FB2** 1 2 **VCC1**
C11 100n
R10 1k
C10 100n

Title:	Charge Sensitive Amplifier	
Project: AFE	Drawn by:HK	
	Revision:1.0	
Date: 25/03/2022 Time: 12:06:14	Sheet 2 of 5	
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SI LAB Silizium Labor Bonn

Physikalisches Institut
Universität Bonn
Nußallee 12
53115 Bonn

SHA_IN

CHP
1n

C12
4p7

R12
10k

VCC2

5
4
3
U4
OPA357AIDBVT
6
1
2

R14
1k

C14
10u

HPF_OUT

R11
100R

HPF

VCC2 U2
13 VDD

RLP1 100R 4 S1
RLP2 200R 5 S2
RLP3 499R 6 S3
RLP4 1k 7 S4
RLP5 2k 12 S5
RLP6 4k99 11 S6
RLP7 10k 10 S7
RLP8 20k 9 S8

D 8

RSEL0 1 A0
RSEL1 16 A1
RSEL2 15 A2
VCC2 2 EN

GND 14
VSS 3

TMUX1108PWR

LPF

CLP
1n

R16
1k

C15
10u

C13
4p7

R13
10k

VCC2 U3
OPA357AIDBVT

5
4
3
6
1
2

SHA_OUT

SHA_OUT

R15
100R

SHA

VCC2 U5
13 VDD

RHP1 100R 4 S1
RHP2 200R 5 S2
RHP3 499R 6 S3
RHP4 1k 7 S4
RHP5 2k 12 S5
RHP6 4k99 11 S6
RHP7 10k 10 S7
RHP8 20k 9 S8

D 8

VCC2

R17
10k

C16
10u

R18
200R

RSEL[2..0]

RSEL0 1 A0
RSEL1 16 A1
RSEL2 15 A2
VCC2 2 EN

GND 14
VSS 3

TMUX1108PWR

5V FB3 VCC2
1 2

C17 C18 C19 C20
100n 100n 100n 100n

COMP_IN

VCC2

COMP_IN

VTHR

VTHR

R20
1k

C21
100n

3
+

5

4
−

2

1

U6
TLV7011DBVR

red
COMP1

R22
1k

R19
100R

COMP_OUT

COMP

R21
220R

COMP_OUT

U7 — SN74AVC4T245DR

3.3V	1	VCCA	VCCB	16	VCC_IO
	15	1OE			
	14	2OE			
	2	1DIR			
	3	2DIR			
MOSI	4	1A1	1B1	13	MOSI_LS
SCK	5	1A2	1B2	12	SCK_LS
CS0_B	6	2A1	2B1	11	CS0_B_LS
GPIO4/INJ	7	2A2	2B2	10	INJ_LS
	8	GND			
	9	GND			GND

U8 — SN74HCS594QPWRQ1

VCC_IO	16	VCC	QA	15	RSEL0
			QB	1	RSEL1
			QC	2	RSEL2
	10	SRCLR	QD	3	
	13	RCLR	QE	4	
			QF	5	
MOSI_LS	14	SER	QG	6	
SCK_LS	11	SRCLK	QH	7	
CS0_B_LS	12	RCLK	QH'	9	SDIO
			GND	8	GND

RSEL[2..0]

SPI — Molex 44620-0002

8	SCK
7	MOSI
6	5V_IN
5	MISO
4	CS0_B
3	GND_IN
2	GPIO5/HIT
1	GPIO4/INJ

GND_IN

5V — R26 1k — ON green — GND

Ct1 X7R 10n / Rt1 100R
Ct2 X7R 10n / Rt2 100R
Ct3 X7R 10n / Rt3 100R
Ct4 X7R 10n / Rt4 100R

GND1 GND

5V — FB6 1 2 VCC_COMP — C32 100n

5V_IN / U11 — TPS73033DBVR

5V	FB4	1	2			
C24 10u		L2		C25 100n	C26 100n	
GND_IN		DLW5BTM142SQ2L				

U11	IN	OUT	5	3.3V
	NR	4
	EN	GND	2

C27 10u | C28 100n

5V — FB5 1 2 VCC_IO
C29 100n | C30 100n | C31 100n

GPIO5/HIT — HIT

U9 — TLV7011DBVR

Delay: ~0.7 RC = 70us

INJ_LS — R24 1k — R23 100k / VCC_COMP
C22 100n | C23 100n | R25 100k
INJ

VTHR VINJ
R27 100R | R28 100R

U10 — MCP4822-E/SN

SDIO	4	SDI	VOUTA	8	VTHR
CS0_B_LS	2	CS	VOUTB	6	VINJ
SCK_LS	3	SCK			
VCC_IO	5	LDAC			
	1	VDD	VSS	7	

VREF = 4.096V

VTHR
VINJ