SD Card

P1 — SD Card

Q1 DMG2305UX
SDOFF
3.3v
C18 10uF 25v
C2 1uf

Pin	Signal		
1	CS/DAT3	Case	C1
2	CS	Case	C2
3	DI	Case	C3
4	VDD	Case	C4
5	CLK	CD1	CD1
6	VSS	CD2	CD2
7	DO		
8	DAT1		

CS, MOSI, SCK, MISO

MCU

3.3v
R1 47k
C3 1uf
C14 1uf
DTR
C24 .1uf

U2 ATMEGA1284P

R19 10k
R20 10k
PVCurrent
R14 47k
PVShort

PB4, PB3, PB2, PB1, PB0, Vcc, PA0, PA1, PA2, PA3
SS, CS, D2, SDOFF, Key, BattV, PSTAT, RTCInt

44 43 42 41 40 39 38 37 36 35 34

PB5 1, PB6 2, PB7 3, /RST 4, Vcc 5, Gnd 6, XTAL2 7, XTAL1 8, PD0 9, TX0 10, RX1 11, PD2

PA4 33, PA5 32, PA6 31, PA7 30, AREF 29, Gnd 28, AVcc 27, PC7 26, PC6 25, PC5 24, PC4 23

MOSI, MISO, SCK, SS, RST
3.3v
16 MHz Y1 Optimize
C9 18pf, C12 18pf
RX0, TX0, RX1

PD3, PD4, PD5, PD6, PD7, Vcc, Gnd, PC0, PC1, PC2, PC3
12 13 14 15 16 17 18 19 20 21 22

TX1, USBInt, Reset, Mbatt
R4 330
D1 LED
3.3v

D23, D22, D21
C6 .1uf
3.3v
C8 1uF
J4

VREF, JTDI, JTDO, JTMS, JTCK, RST
1 2 3 4 5 6 7 CON7

C13 1uf
R7 3.9k, R8 3.9k
3.3v
SCL, SDA

3G Cellular Radio

VBATT
C20 10uF 25v

RX1, TX1

U3 SIM5320A

Gnd 1, Gnd 2, Pwr_On 3, Reset 4, Gnd 5, SPI_CLK 6, SPI_MISO 7, SPI_MOSI 8, SPI_CS 9, Gnd 10, Reserved 16, Reserved 17, USIM_DATA 18, USIM_RESET 19, USIM_CLK 20, V_USIM

Key, Reset

Gnd 60, Gnd 59, Gnd 58, Gnd 57, Gnd 56, MAIN_ANT, Gnd, Gnd, I2C_SDA 55, I2C_SCL 54, GPIO6 53, GPIO42 52, GPIO41 51, GPIO1 50, GPIO43 49, GPIO40 48, GPIO44 47, ADC1 46, ADC2 45, CURRENT_SINK 44, VREG_AUX 43, VRTC 42, Gnd 41

J1 CON-SMA-EDGE-S

PSTAT

Cellular USB Port

P2 USB/MicroB
S1, VCC, D-, D+, ID, GND, S2
R11 27, R10 27
C10 10uF 25v

SIM Card

J3 MiniSIM
Vcc, RST, CLK, Gnd, Vpp, I/O

TVS1

RTC

3.3v 3.3v
R2 47k
U5 DS3231
C17 1uf

32kHz 1, Vcc 2, /Int 3, /Rst 4, NC 5, NC 6, NC 7, NC 8
SCL 16, SDA 15, VBat 14, GND 13, NC 12, NC 11, NC 10, NC 9

RTCInt, RST
SCL, SDA

RFM95W Lora Transciever

3.3v
C4 10uF 25v
C5 .01uf NP0
D22, D21
R3 10k

U1 RFM95W
GND 1, MISO 2, MOSI 3, SCK 4, NSS 5, RST 6, DIO5 7, GND 8
DIO2 16, DIO1 15, DIO0 14, Vcc 13, DIO4 12, DIO3 11, GND 10, ANT 9

MISO, MOSI, SCK, SS, RST

J2 CON-SMA-EDGE-S
C7 10uF 25v

MCU USB Port

C15 10uF 25v
C16 .01uf NP0
U4 FT231X

RX0, TX0

TXD 20, RXD 4, RTS# 2, CTS# 9, DTR# 1, DSR# 7, DCD# 8, RI#
VCC 15, VCCIO 3, 3V3OUT 13, USBDM 12, USBDP 11, RESET# 14
CBUS0 18, CBUS1 17, CBUS2 10, CBUS3 19, GND 16, GND 16

R6 3.9k, R5 3.9k
DTR
USBInt
C22 .1uf
R12 27, R15 27
C21 47pf, C23 47pf

P3 USB/MicroB
S1, VCC, D-, D+, ID, GND, S2

R16 510, R17 510
D3 LED, D2 LED
R9 3.9k

FID4 FID3 FID1 FID2
H1 H2 H3 H4

3.3v Regulator

VBATT
3.3v
U6 MCP1700-3102E/TT
IN, OUT, GND
C19 10uF 25v
C11 10uF 25v

PV Panel, Charger and Li-Ion Battery

Consumes 1uA max when not charging

L1 10uH 3A
D6 PMEG4005EG
D7 MBR0580S
D5 MBR0580S

TP2 PVCurrent
6v PV Panel (+)

TP1
6v PV Panel (-)

R27 3.6k
C31 1uf
C30 .01uf NP0
U8 BD9G101G
LX, VCC, EN, BST, GND, FB

TB1 Ext Pwr
D8 MBR0580S
R28 510
C33 1uf 35v
C32
C30

R18 1 ohm
R21 2.2k
C25 1uF
Q2 SSM3K376R
PVShort

Iset resistor set for 250mA charge

6v maximum
U7 BQ24092 - Li Charger
IN 1, ISET 2, Vss 3, TERM 4, nPG 5, Vss_pad
OUT 10, TS 9, nCHG, ISET2, Vss_pad

3.8v
VBATT
R24 10k
R26 10k
Mbatt
Q6 BC817
Q5 DMG2305UX

NTC1 10k NTC
D4 LED

C29 10uF 25v, C28 10uF 25v, C26 10uF 25v, C27 10uF 25v

Q3 RQ5E035ATTCL

SW1 ON/OFF
Use keystone #54
R23 10k

R25 330
Q4 SSM3K376R
VBATT

B1 Battery-18650_1043P
BattV
R22 30k

Item	Qty	Part	Value	Reference
1	1	1043	Battery-18650_1043P	B1
2	14	C0805X5R106V25	10uF 25v	C1,C4,C7,C10,C11,C15,C18, C19,C20,C26,C27,C28,C29, C32
3	8	C0603X5R105V16	1uf	C2,C3,C8,C13,C14,C17,C25, C31
4	3	C0603NP0103V50	.01uf NP0	C5,C16,C30
5	3	C0603X7R104V50	.1uf	C6,C22,C24
6	2	C0603NPO180V50	18pf	C9,C12
7	2	C0603NPO470V50	47pf	C21,C23
8	1	C0805X5R105V35	1uf 35v	C33
9	4	LTST-C171GKT	LED	D1,D2,D3,D4
10	3	MBR0580S1-7	MBR0580S	D5,D7,D8
11	1	PMEG4005EG	PMEG4005EG	D6
12	4		FIDUCIAL/Round	FID1,FID2,FID3,FID4
13	4	9911-062	spacer	H1,H2,H3,H4
14	2	CON-SMA-EDGE-S	CON-SMA-EDGE-S	J2,J1
15	1	009162006216715	MiniSIM	J3
16	1	DNL	CON7	J4
17	1	NR6045T100M	10uH 3A	L1
18	1	NCP18XH103D03RB	10k NTC	NTC1
19	1	503398-1892	SD Card	P1
20	2	105133-001	USB/MicroB	P2,P3
21	2	DMG2305UX	DMG2305UX	Q1,Q5
22	2	SSM3K376RLF	SSM3K376R	Q2,Q4
23	1	RQ5E035ATTCL	RQ5E035ATTCL	Q3
24	1	BC817-40W	BC817	Q6
25	4	R0603-4702	47k	R1,R2,R13,R14
26	6	R0603-1002	10k	R3,R19,R20,R23,R24,R26
27	2	R0603-3300	330	R25,R4
28	5	R0603-3901	3.9k	R5,R6,R7,R8,R9
29	4	R0603-27R0	27	R10,R11,R12,R15
30	3	R0603-5100	510	R16,R17,R28
31	1	R0805-1R00	1 ohm	R18
32	1	R0603-2201	2.2k	R21
33	1	R0603-3002	30k	R22
34	1	R0603-3601	3.6k	R27
35	1	SS12F56V4	ON/OFF	SW1
36	1	OSTOQ025450	Ext Pwr	TB1
37	1		6v PV Panel (-)	TP1
38	1		6v PV Panel (+)	TP2
39	1	SMF05CT1GOS	SMF05C	TVS1
40	1	RFM95W	RFM95W	U1
41	1	ATMEGA1284P-AU	ATMEGA1284P	U2
42	1	SIM5320A	SIM5320A	U3
43	1	FT231XS-R	FT231X	U4
44	1	DS3231SN	DS3231	U5
45	1	MCP1700T3302ETT	MCP1700-3102E/TT	U6
46	1	BQ24092DGQ	BQ24092 - Li Charger	U7
47	1	BD9G101G	BD9G101G	U8
48	1	ABM3-16.000MHZ-B2-T	16 MHz	Y1

TO12-034 Rev 5
LoRa/Cellular Gateway
Assembly Drawing – TOP

J1

J2

H1

H2

J3

1

J4

7

P1

TP1

D1

P2

P3

D2

D3

TP2

+ B1 −

H3

D4

SW1

H4

TB1
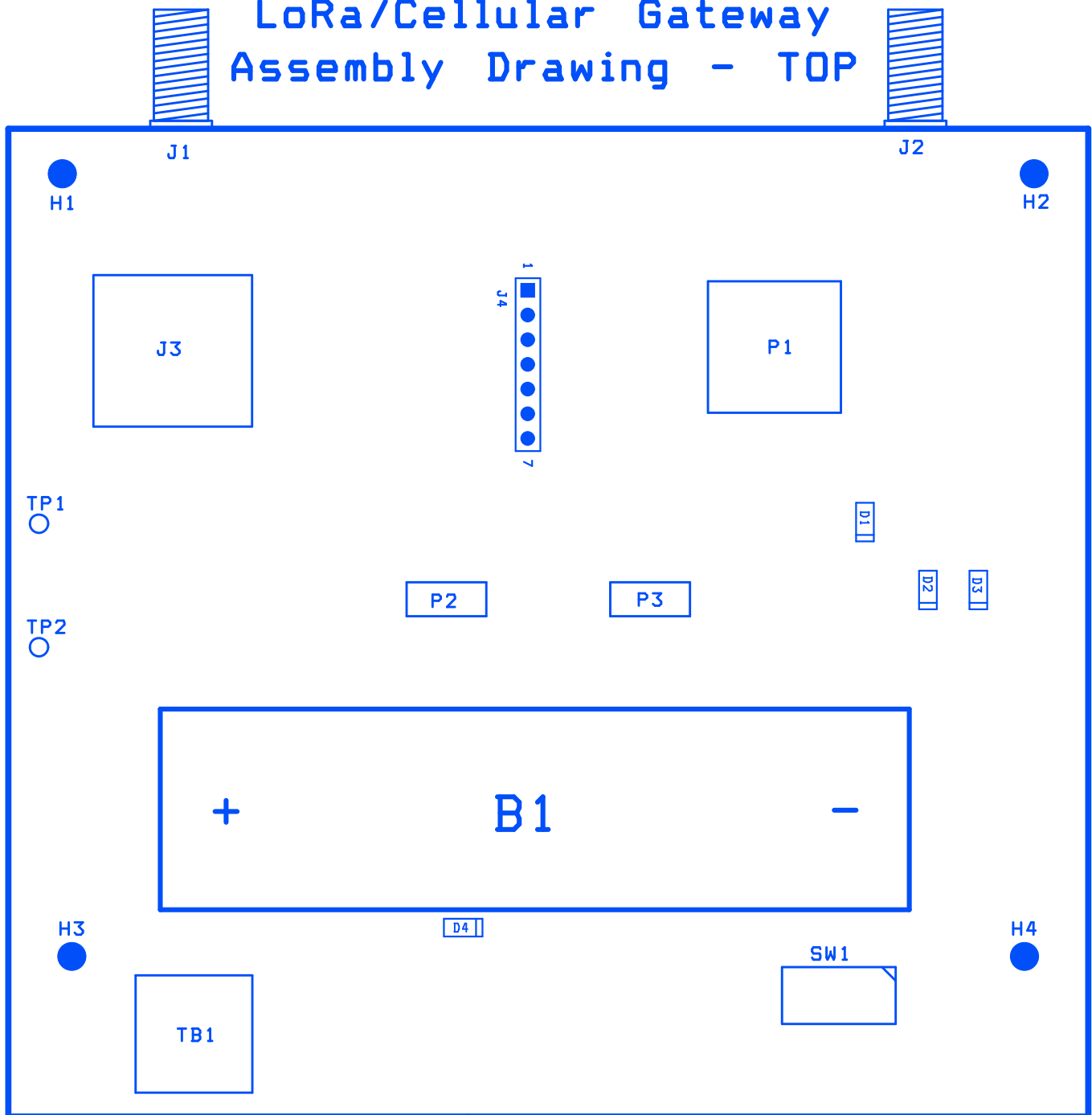
TO12-034 Rev 5
LoRa/Cellular Gateway
Assembly Drawing - BOTTOM

FID1

FID2

C1

C2 Q1 R1

C4
C5
C7

U1

R2

C6

C3

U3

R3

C8

U2

TVS1 C10

C9

Y1

C12

24

23

1

2

C11

C13

R4

C14

R5

R6

C18

C19 C20

R9

C15

C16

U4

R7 R8

R10 R11

R14

C17

Q2

R12 C21 C23

R13

C24

R18

R15

R19 R20 D5

R16 R17 C22

Q3

U6

NTC1

U7

R21
C25

Q4

R22 R23

Q5

R24

C26 C27 C28 C29

R25

R26

Q6

D6

D7

C30

L1

C32

U8

C31

R27

R28

C33

D8

FID3

FID4