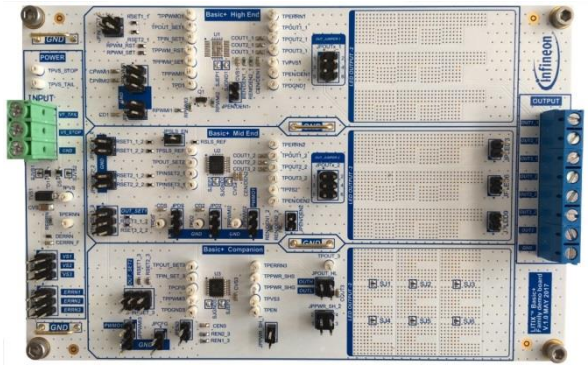
LITIX™ Basic+ Family Board V1.1

November 2018

Board description

- Equipped with one TLD2141-3EP (High End), one TLD2331-3EP (Mid End) and one TLD1114-1EP (Companion) LITIX™ Basic+ devices
- Compatible with all LITIX™ Basic+ High End and Mid End devices
- Typical supply voltage range: 8V – 16V (5.5V – 40V), with possibility to power-ON and test each device separately
- On-board LED load for each device, 3x3 LEDs per device
- Possibility to connect to external load
- 15cm x 10cm 2-layer PCB



Board connectors

- POWER: Supply connector, VS and GND
  - VS_STOP: Board power supply and activation of the internal PWM engine for Basic+ High End device
  - VS_TAIL: Board power supply without activation of the internal PWM engine
  - GND

- OUTPUT: External load
  - OUT1_1, OUT2_1, OUT3_1: For the Basic+ High End device (OUT1, OUT2, OUT3)
  - OUT1_2, OUT2_2, OUT3_1: For the Basic+ Mid End device (OUT1, OUT2, OUT3)
  - OUT3: For the Basic+ Companion
  - GND

Jumpers – Power Supply, Error Network

- JPVS: Select which devices will be supplied (all devices share the same reverse polarity protection circuit)
  - VS1: Close to supply the Basic+ High End
  - VS2: Close to supply the Basic+ Mid End
  - VS3: Close to supply the Basic+ Companion

- JPERRN: Select which devices will be connected to the error network (all devices share the same error network pull-up circuit)
  - ERRN1: Close to connect the Basic+ High End device to the error network
  - ERRN2: Close to connect the Basic+ Mid End device to the error network
  - ERRN3: Close to connect the Basic+ Companion device to the error network

Jumpers - Basic+ High End

- JPIN_SET_1: Sets the output current of OUT
  - RSET1_1 (37.4 kΩ): sets output current to 10 mA (30 mA for TLD2142-1EP)
  - RSET2_1 (6.19 kΩ): sets output current to 59 mA (177 mA for TLD2142-1EP)

- JPPWMI1: PWMI connection
  - CPWMI1 (120 nF): Set the PWM frequency to 220 Hz and duty cycle* 10%
  - CPWMI2 (68 nF): Set the PWM frequency to 400 Hz and duty cycle* 10%
  - GND: duty cycle is 100%

* Duty cycle set by the RPWM_SET and RPWM_RST resistors

Jumpers - Basic+ High End cont'd

- JPD1: Diagnosis management
  - CD1: When a fault is detected, or ERRN is pulled-down externally, all the channels driven by the device are switched off after a delay time $t_{D(set)}$. Delay time is set by CD1 capacitor
  - GND: Only the channel under fault condition will be deactivated

- JPEN/DEN1: Close to connect EN/DEN to resistor divider to activate device and diagnosis

Jumpers – Basic+ Mid End

- JPINSETx_2: Sets the output current of OUTx (1 or 2)
  - RSETx_1_2 (37.4 kΩ): sets output current to 10 mA (30 mA for TLD2132-1EP)
  - RSETx_2_2 (6.19 kΩ): sets output current to 59 mA (177 mA for TLD2132-1EP)

- JPINSET3_2: Sets the output current of OUT3
  - OUT_SET1: Output current is controlled by the OUT_SET of the Basic+ High End device
  - RSET3_1_2 (37.4 kΩ): sets output current to 10 mA (30 mA for TLD2132-1EP)
  - RSET3_2_2 (6.19 kΩ): sets output current to 59 mA (177 mA for TLD2132-1EP)

- JSLS_EN: When closed, the SLS diagnosis is deactivated. When open the voltage reference is set by the resistor RSLS_REF

Jumpers – Basic+ Mid End cont'd

- JPEN/DEN2: Close to connect EN/DEN to resistor divider to activate device and diagnosis

- JPD: Diagnosis management
  - GND: Only the channel under fault condition will be deactivated
  - CD2: When a fault is detected, or ERRN is pulled-down externally, all the channels driven by the device are switched off after a delay time $t_{D(set)}$. Delay time is set by CD2 capacitor
- JPDS: SLS diagnosis
  - GND: Latched SLS detection
  - CDS: Automatic retry after $t_{SL(wait)}$. $t_{SL(wait)}$ time defined by CDS capacitor

- JPWMI2: PWMI connection
  - PWMO1: Use of PWMO signal of Basic+ High End
  - GND: Outputs activated

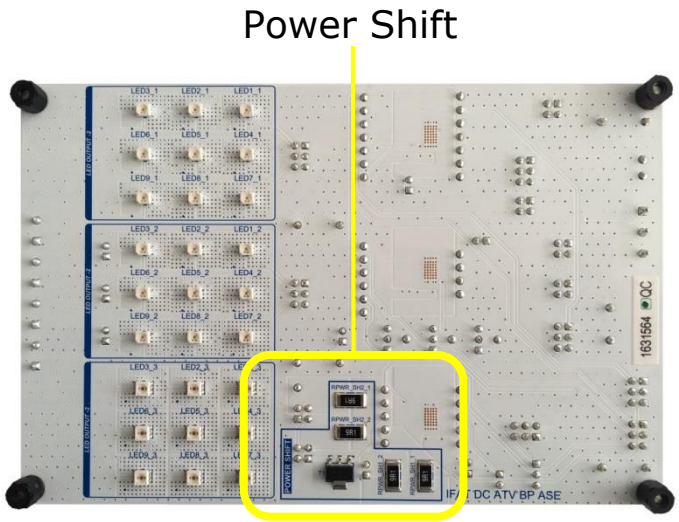
Jumpers - Companion

- JPIN_SET3: Sets the output current
  - OUT_SET2: Output current is driven by the OUT_SET
  - RSET1_3 (13.7 kΩ): Sets the output current to 80 mA
  - RSET2_3 (2.94 kΩ): Sets the output current to 373 mA
- JPPWMI3: PWM connection
  - PWMO1: Use of PWMO signal of Basic+ High End
  - GND: Output activated
- JPCFG: Close if higher current accuracy is needed to drive the target load (closed when OUTH is connected to the load)
- JPEN3: Close to connect EN/DEN to resistor divider to activate device and diagnosis

Jumpers – Companion cont'd

- JPPWR_SH_1: Close to allow Power Shift control

- JPPWR_SH_2: Change of R2
  - 1 – 2 or 3 – 4 closed: R2 = 9.1 Ω, $IPSH_{max}$ = 350 mA
  - 1 - 2 and 3 - 4 closed: R2 = 4.55 Ω, $IPSH_{max}$ = 700 mA



Jumpers – Load selection

- OUT_JUMPER-1, 2: Bypass to connect the on-board load, LED OUTPUT–1, 2 to the outputs of Basic+ High End, Basic+ Mid End. Leave open to connect external load
  - 1-2 closed: Connect OUT1 of Basic+ High End, Basic+ Mid End
  - 3-4 closed: Connect OUT2 of Basic+ High End, Basic+ Mid End
  - 5-6 closed: Connect OUT3 of Basic+ High End, Basic+ Mid End

- JPOUT_HL: Bypass to connect the on-board load, LED OUTPUT-3 to the output of Basic+ Companion. Leave open to connect to external load
  - OUTH: Connect OUTH of Basic+ Companion (JPCFG must be closed)
  - OUTL: Connect OUTL of Basic+ Companion (JPCFG must be open)

On-board Load

- LED OUTPUT–1: 1 rows of 3 red LEDs (LS E6SF) for each channel (3x3) of Basic+ High End

- LED OUTPUT–2: 1 rows of 3 red LEDs (LS E6SF) for each channel (3x3) of Basic+ Mid End
  - JPLED3, JPLED6, JPLED9: Bypass to simulate a SLS fault on the LED3, LED6 and LED9 respectively

- LED OUTPUT–3: 3 rows of 3 LEDs (LR G6SP) for the output of Basic+ Companion. The middle row is currently in use
  - SJ1 – SJ6: Close to create an LED matrix for high current applications

1 Board description

2 Quick start

3 Schematic and layout

Quick Start

- Connect battery to VS_TAIL or VS_STOP and GND (e.g. 8V – 16V)
- Supply the device(s) under test (JPVS)
- Connect the device(s) to the Error network (JPERRN)
- Select the output current (JPINSET_x)
- Enable the device(s) and diagnosis (JPEN/DENx)
- Select the desired fault management (JPDx, JPDS)
- Select load, close OUT_JUMPER-x jumpers to use the on-board LEDs or leave open and connect external load to the connector OUTPUT
- Activate outputs using PWM input (JPPWMIx)

1 Board description

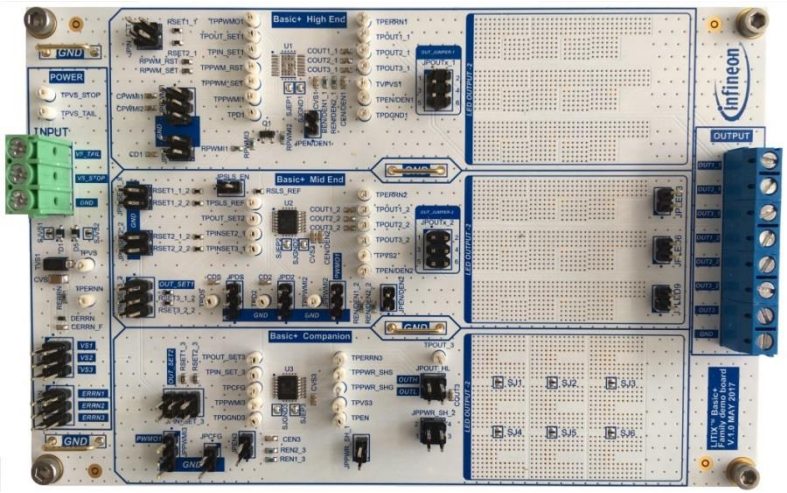
2 Quick start

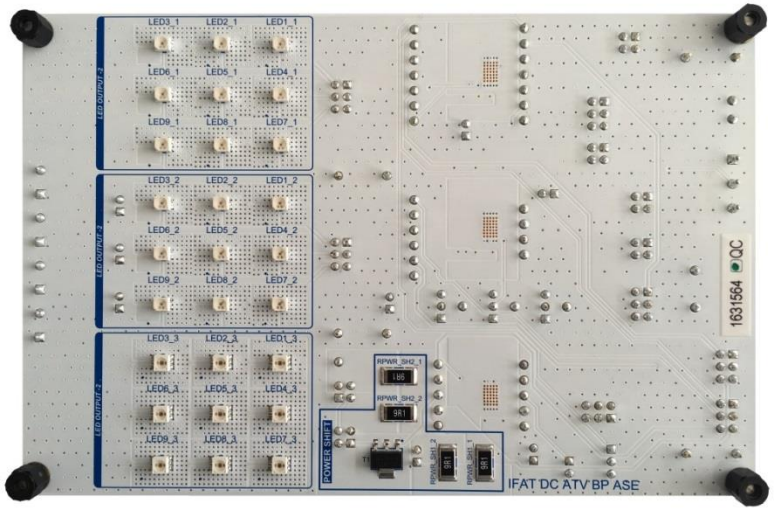
3 Schematic and layout

Schematic and board layout

- The schematic and layout designs are shown on the following pages.

- The visible content (names,…) can be activated or deactivated using the PDF reader layer settings.





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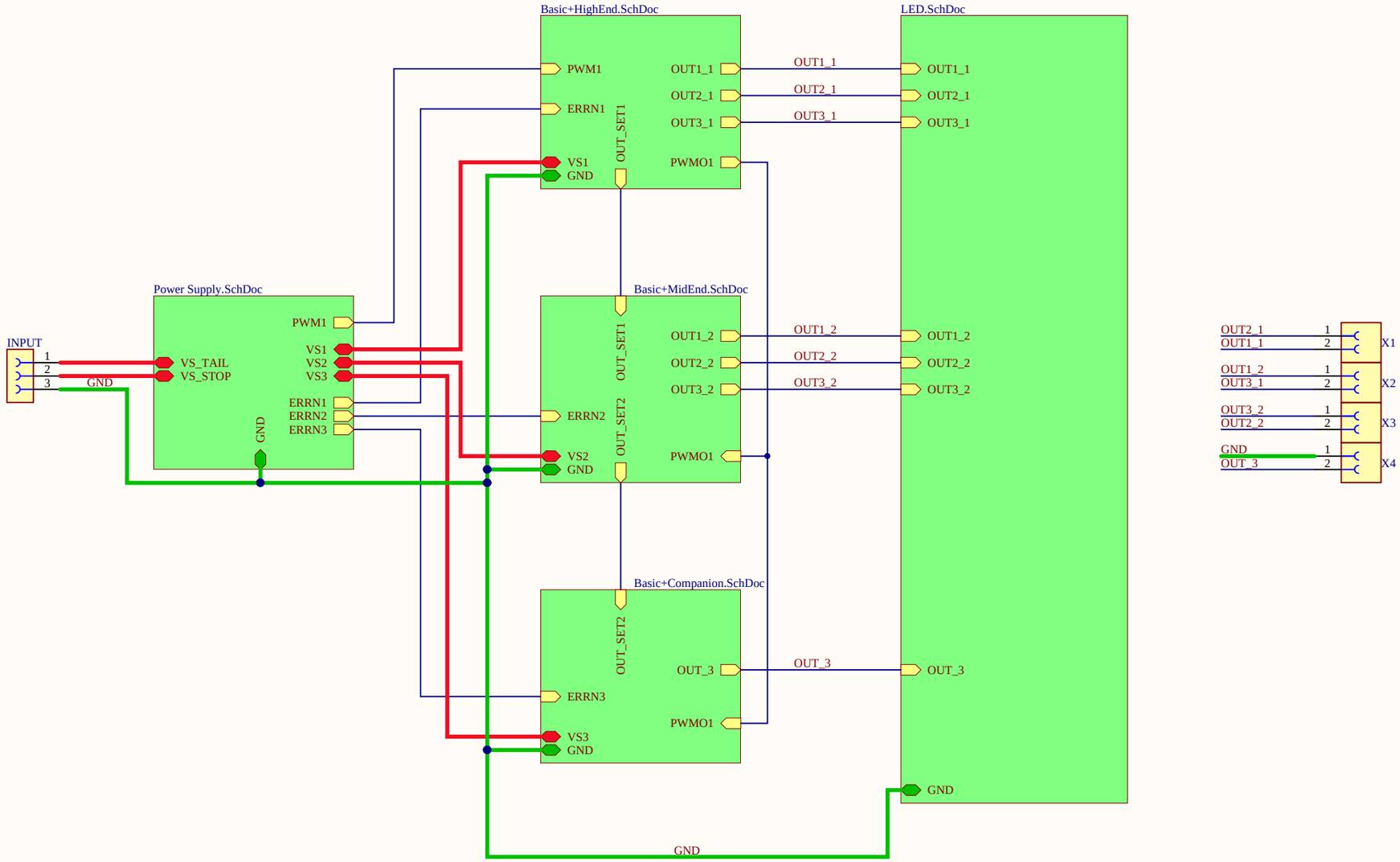

Link to Miscellaneous Document

Miscellaneous
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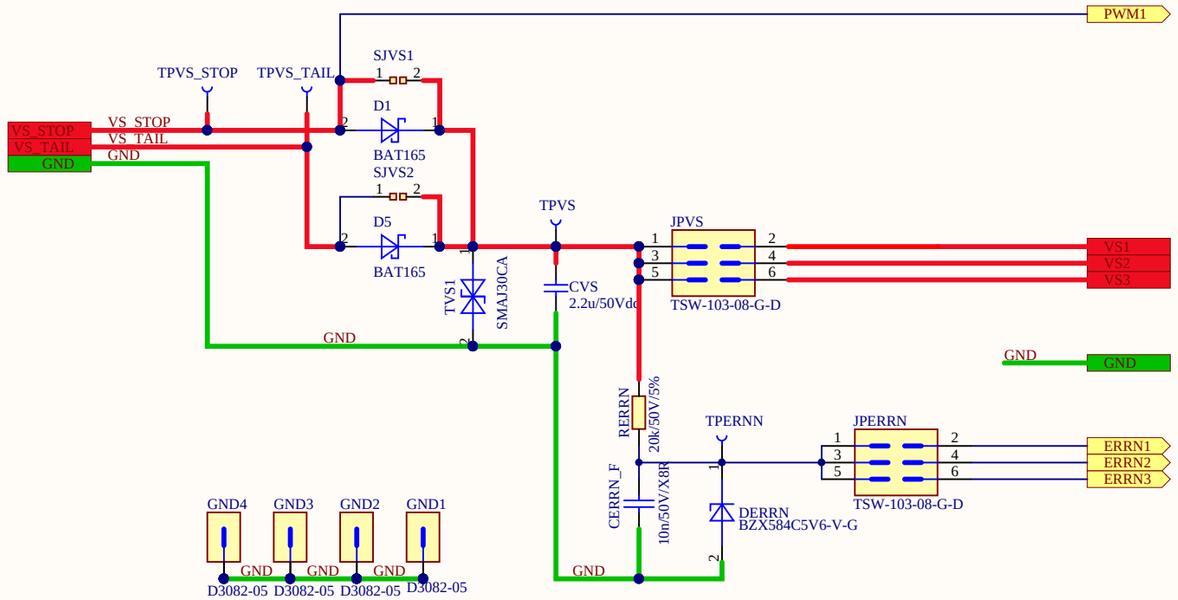
		Sheet 2	of 8

Power Supply.SchDoc



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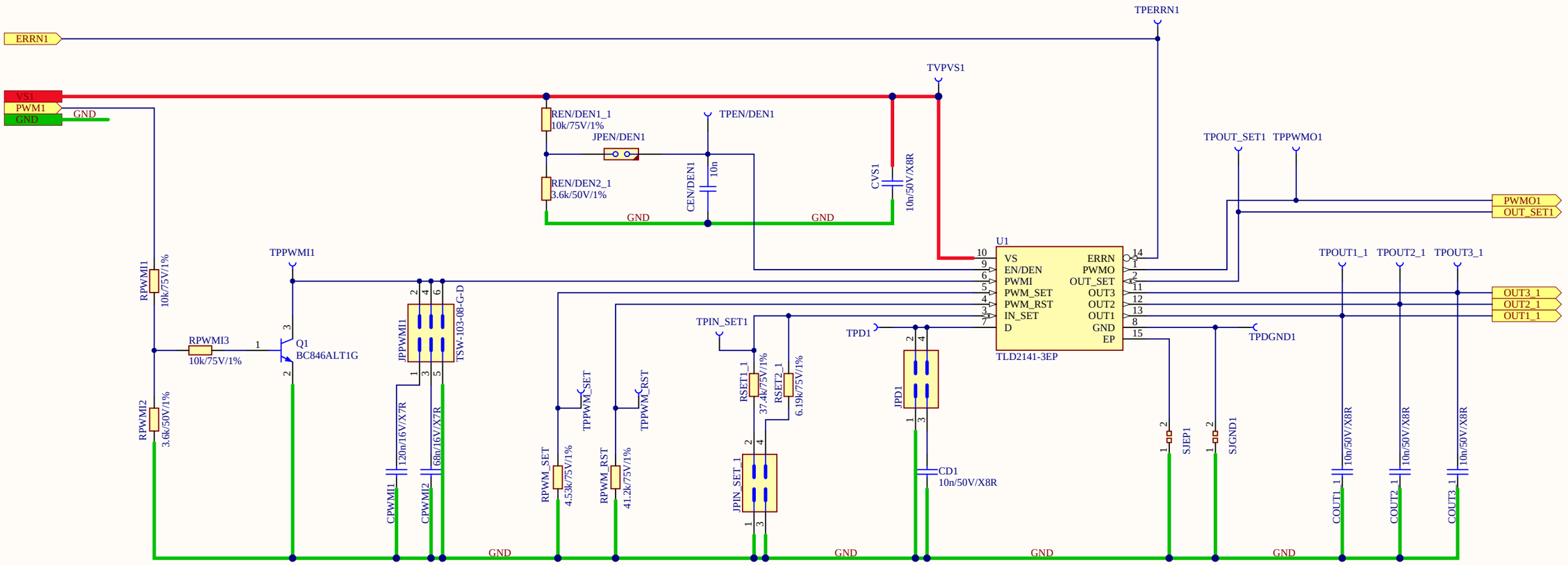
Sheet 3 of 8

Basic+HighEnd.SchDoc



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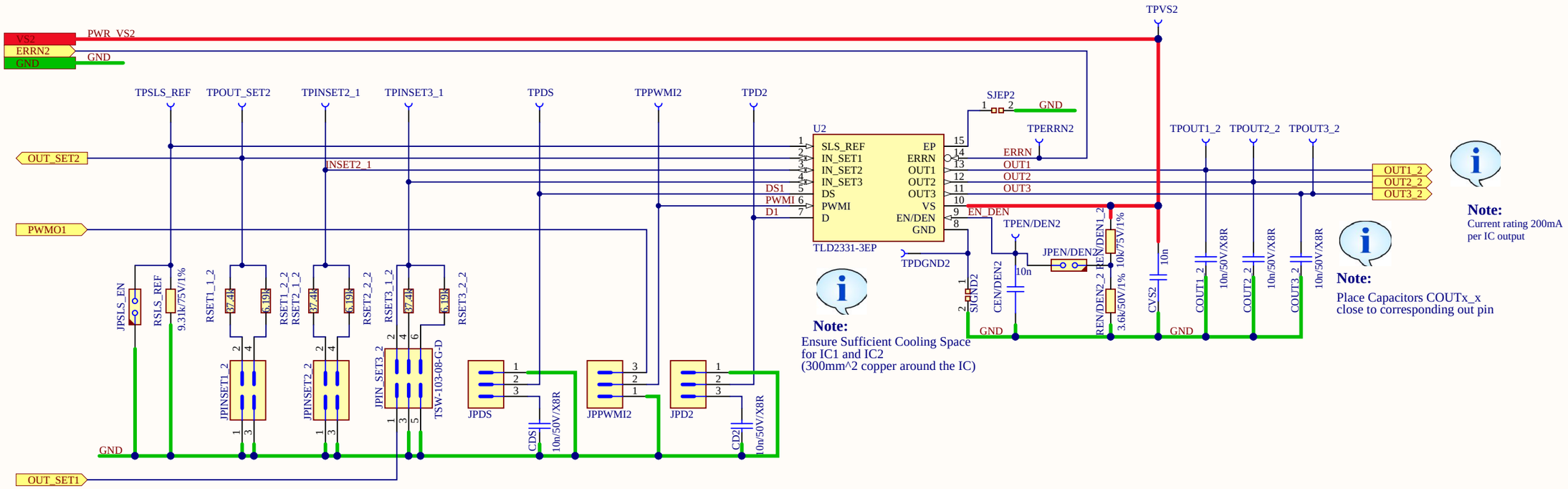
Basic+MidEnd.SchDoc



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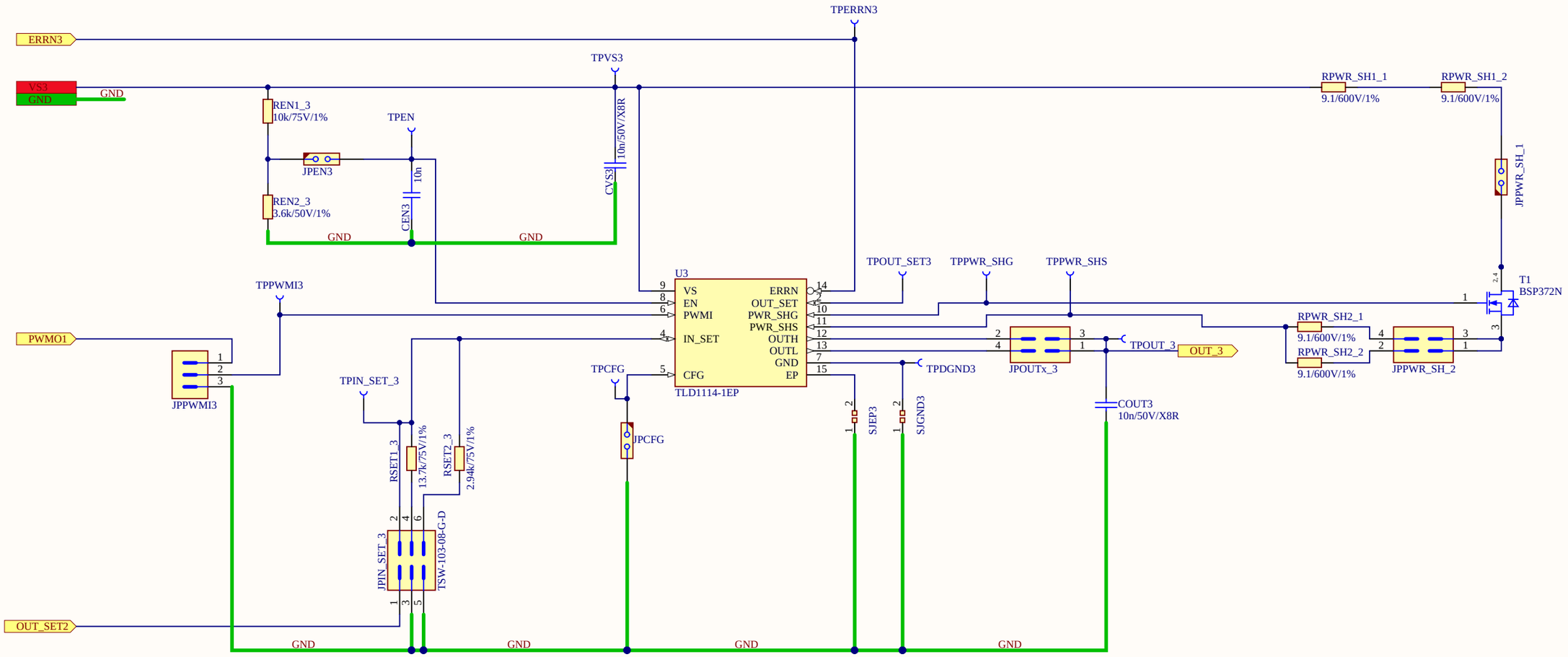
Basic+Companion.SchDoc



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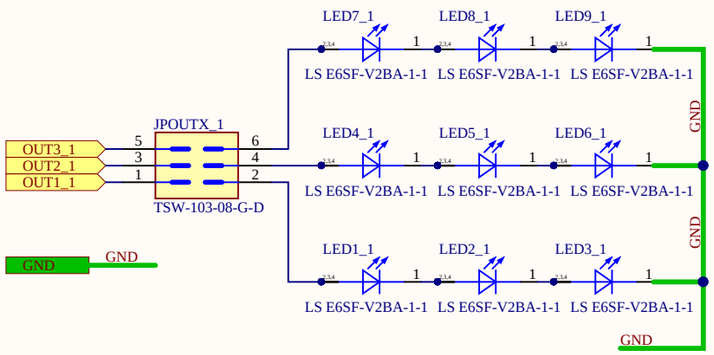
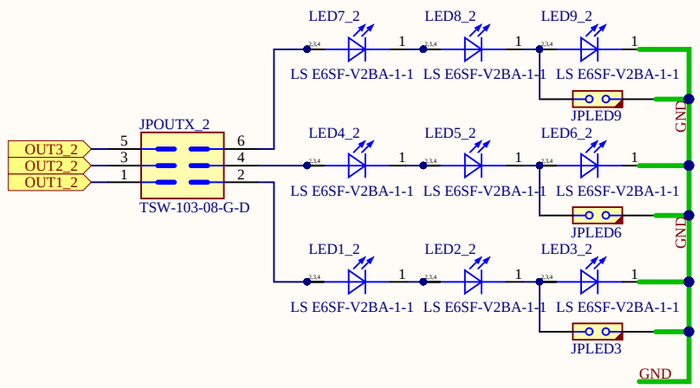
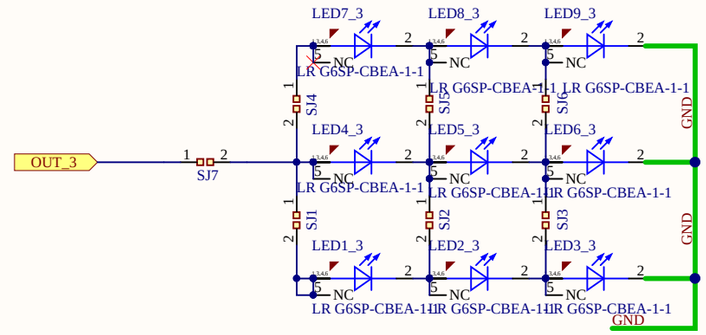
LED.SchDoc







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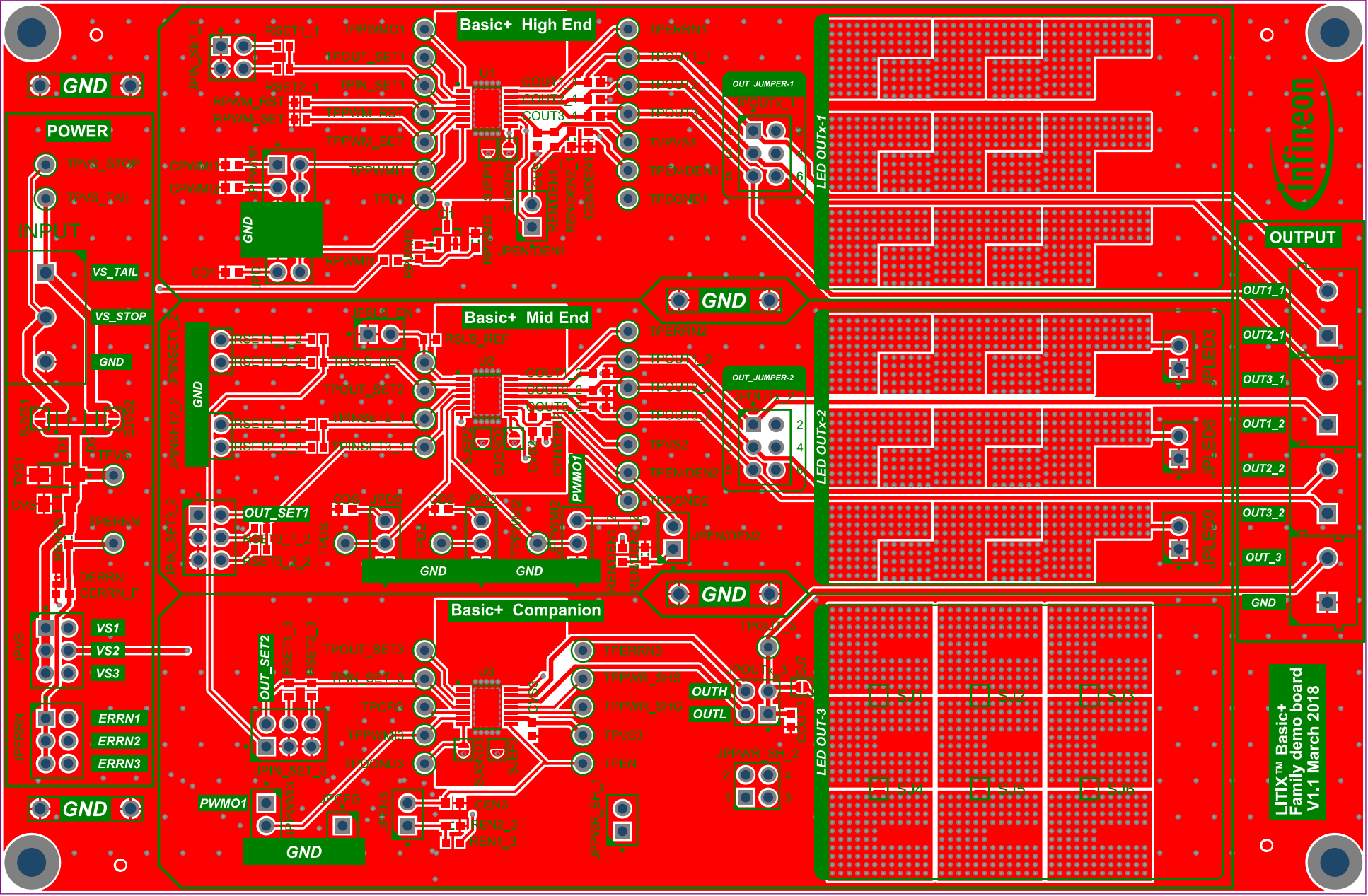
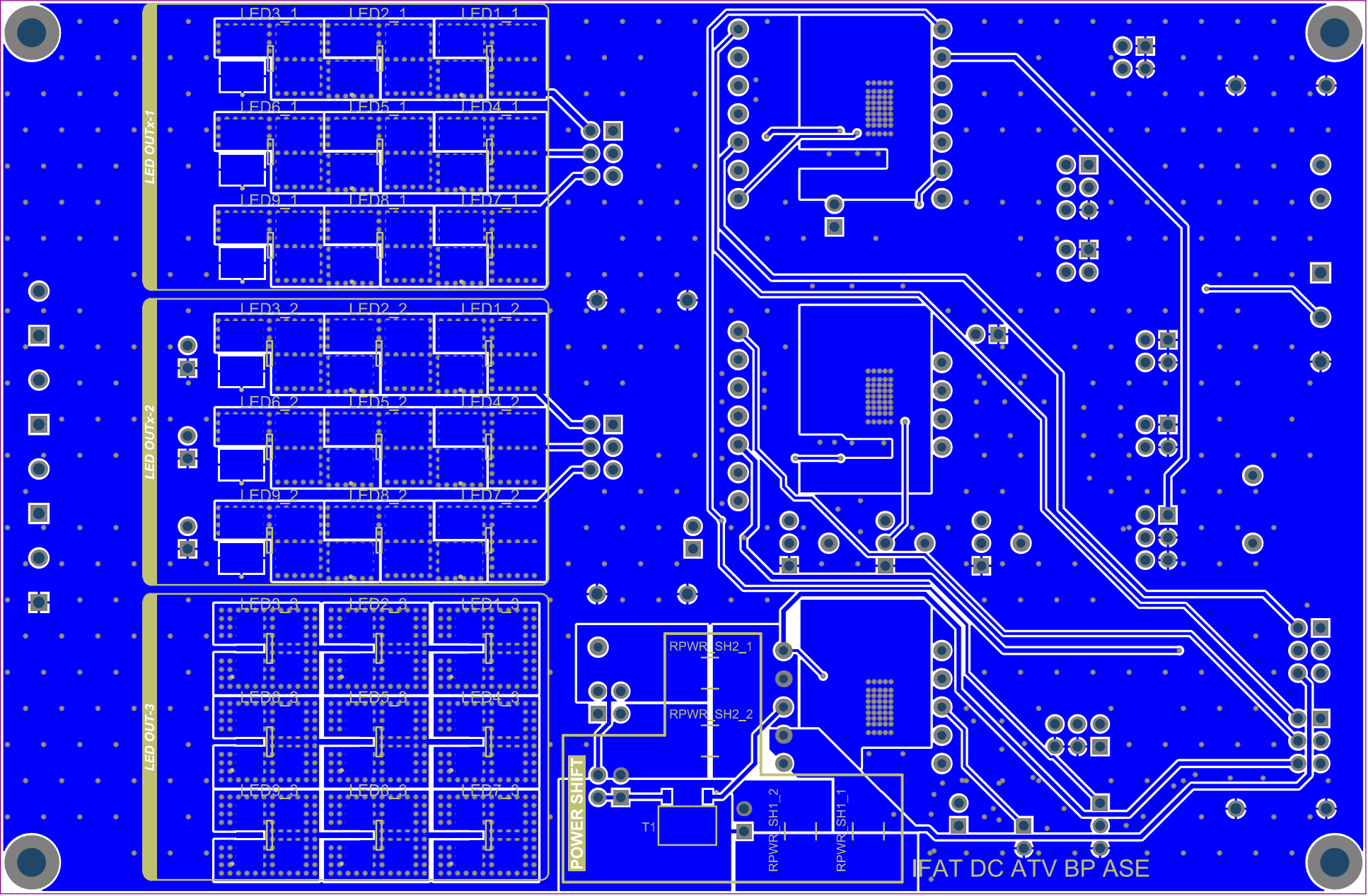

Basic+ High End
Basic+ Mid End
Basic+ Companion
POWER
INPUT
OUTPUT
GND
VS_TAIL
VS_STOP
TPVS_STOP
TPVS_TAIL
VS1
VS2
VS3
ERRN1
ERRN2
ERRN3
LED OUTx-1
LED OUTx-2
LED OUT-3
OUT_JUMPER-1
OUT_JUMPER-2
OUT_SET1
OUT_SET2
PWMO1
OUTH
OUTL
LITIX™ Basic+
Family demo board
V1.1 March 2018


LED OUTx-1
LED3_1
LED2_1
LED1_1
LED6_1
LED5_1
LED4_1
LED9_1
LED8_1
LED7_1
LED OUTx-2
LED3_2
LED2_2
LED1_2
LED6_2
LED5_2
LED4_2
LED9_2
LED8_2
LED7_2
LED OUT-3
LED3_3
LED2_3
LED1_3
LED6_3
LED5_3
LED4_3
LED9_3
LED8_3
LED7_3
RPWR_SH2_1
RPWR_SH2_2
POWER SHIFT
T1
RPWR_SH1_2
RPWR_SH1_1
IFAT DC ATV BP ASE

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