

# Demoboard BTT3018EJ User Manual V1.0

## About this document

### Scope and purpose

This document describes how to use the Demoboard BTT3018EJ.

### Intended audience

Engineers, hobbyists and students who want to switch 24V loads in their Arduino/XMC1100 kit projects.

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# 1 Getting Started

## 1.1 BTT3018EJ Shield overview

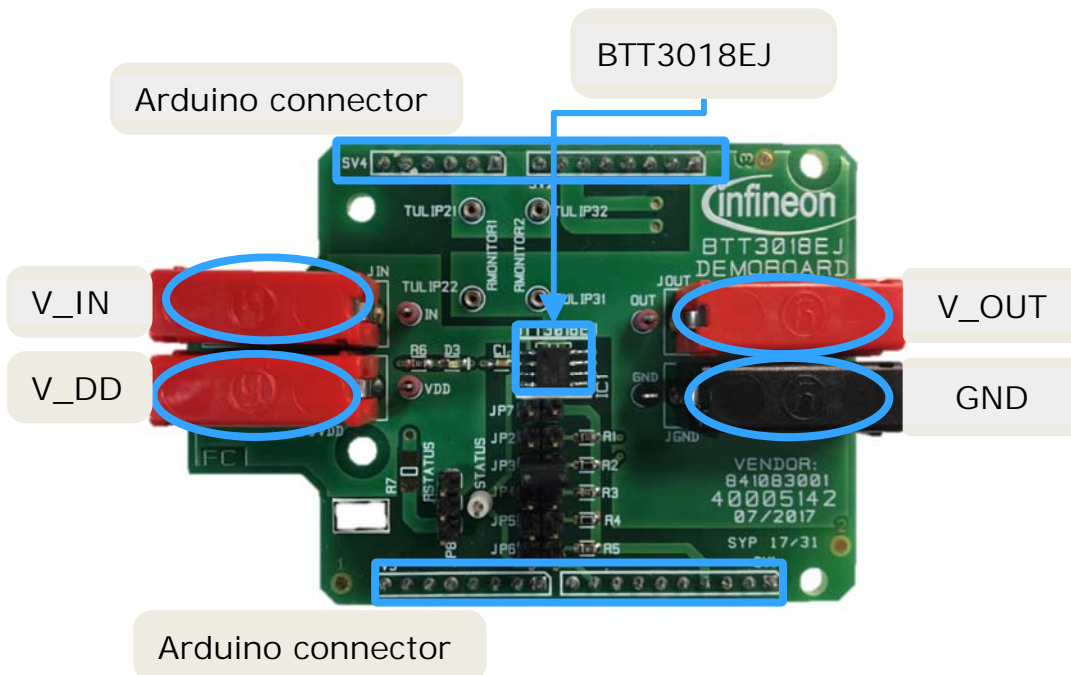
The 24V low-side switch demoboard with one BTT3018EJ from Infineon Technologies is a flexible evaluation board dedicated to drive all kinds of loads. This demoboard is compatible with Arduino UNO shield and Infineon XMC1100.

The demoboard can be controlled either with the general logic I/O-ports of a microcontroller or with a PWM. It includes typical schematic to control the BTT3018EJ. This shield offers a quick evaluation of the product, the “Status” latch functionality, the “SRP” functionality, and all protections, e.g. “Over temperature shut down”.

**WARNING:** Please refer to BTT3018EJ Datasheet for details on functionalities and parameters values. This user manual does not replace the datasheet and user must be aware of limitations before turning on any supply.

The demoboard can be easily connected to any Arduino UNO board or Infineon XMC1100 via headers. Code and graphic interface is available for Arduino UNO.

No code/interface is available for XMC1100, but XMC1100 can be easily programmed through Arduino IDE: please check the following link for details: <https://github.com/Infineon/XMC-for-Arduino>



## 1.2 Key features

- Demoboard is able to provide continuous current load (36V- 20A) between V\_OUT and GND.
- A green LED will turn ON when logic supply voltage is connected and ON.
- Output voltage, Input logic, Status and SRP can be measured externally with test points.
- Output voltage, Input logic, Status can be monitored with the Arduino Interface.

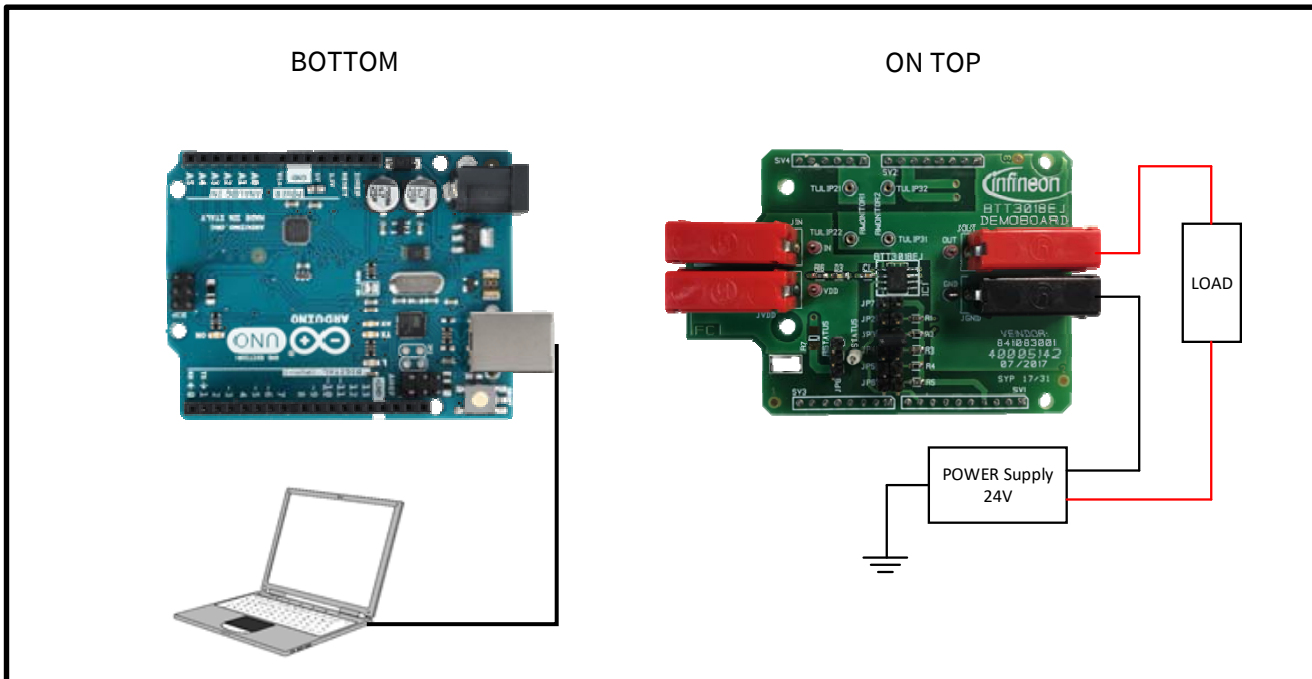
## 1.3 Demoboard package contents

In the zip package must be the following:

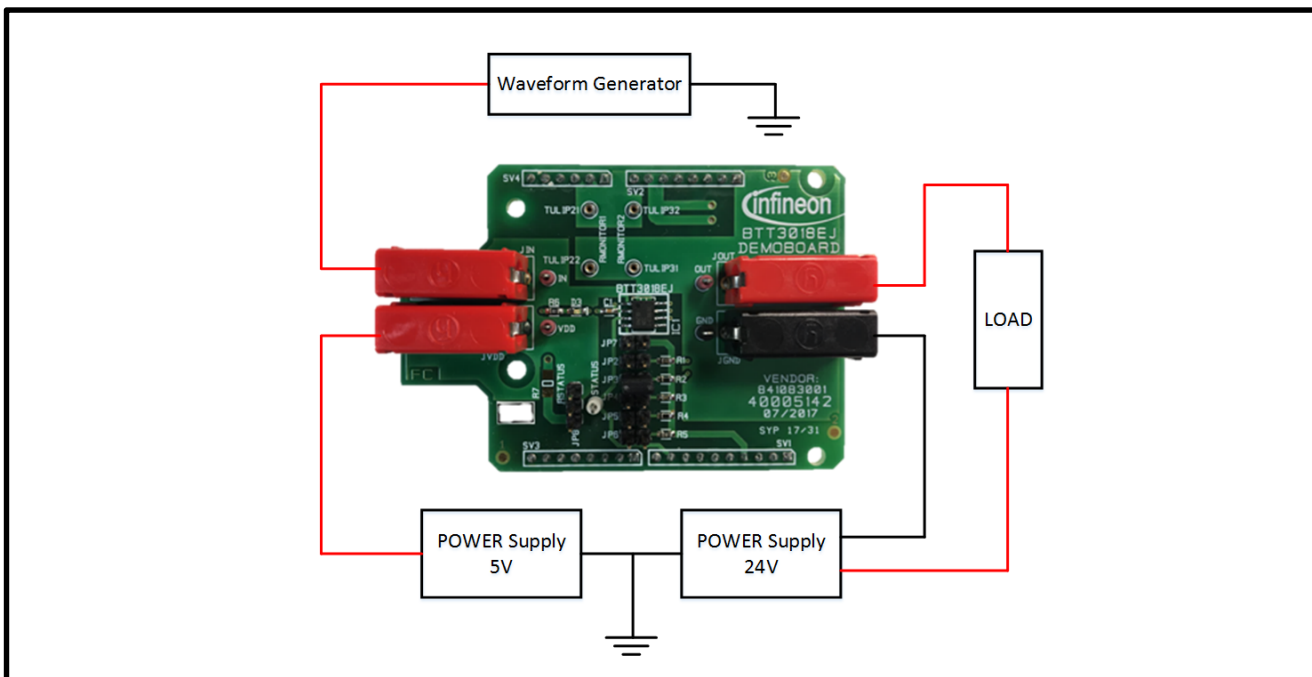
- Demoboard\_BTT3018EJ\_User\_Manual\_Vx.x
- Demoboard\_BTT3018EJ.exe
- Demoboard\_BTT3018EJ.ino

## 1.4 Typical connection

### 1.4.1 With Arduino Shield



### 1.4.2 Without Arduino shield (For Oscilloscope monitoring)

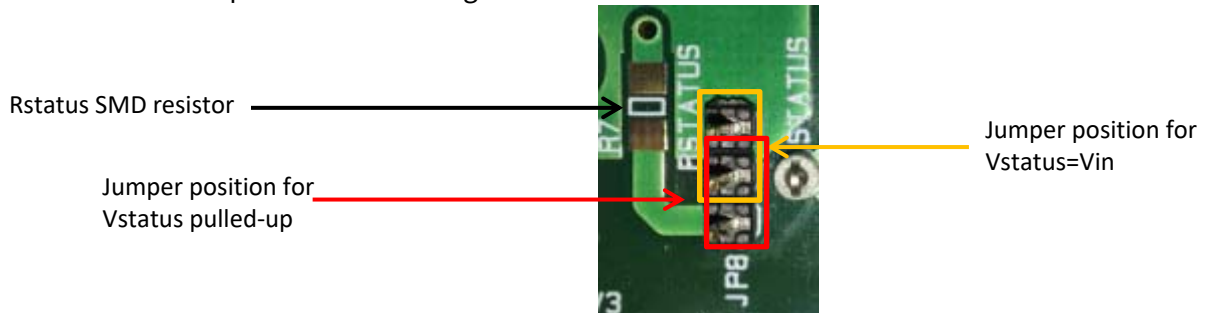


## 2 Demoboard configuration

- If an Arduino board is used, configuration needs to be set in the software. Please refer to 3.2.3 Demoboard configuration panel.

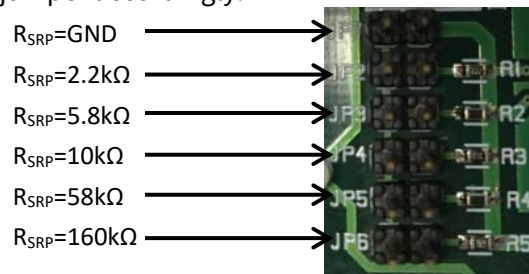
### 2.1 Status pin connection

- BTT3018EJ can be controlled with pin pulled-up to Vdd to allow fault monitoring.
- If no diagnosis is needed, the Status pin can be connected to the Input pin
- Use Jumper to choose configuration.



### 2.2 Slew Rate pin configuration

- Use jumper to choose SRP resistor value from GND to 160kΩ. Values of SMD resistors on the boards are the same that are characterized in the Datasheet (GND, 2.2kΩ, 5.8kΩ, 10kΩ, 58kΩ, 160kΩ). Use jumper accordingly.



## 3 Software utilisation

- Software “*Demoboard\_BTT3018EJ.exe*” is a GUI for Windows OS, used with the Arduino UNO board with the dedicated code “*Demoboard\_BTT3018EJ.ino*”.

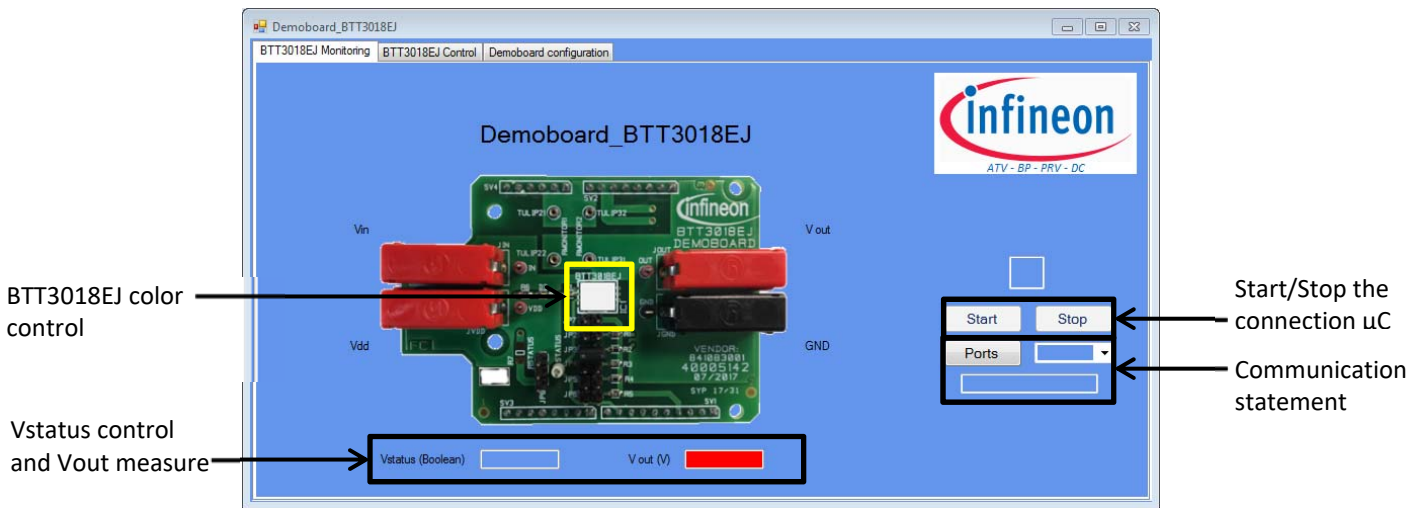
### 3.1 Installation

- User has to install the Arduino IDE software to allow communication between computer and Arduino board.
- Once the program is installed, connect the Arduino shield. Double-click the “*Demoboard\_BTT3018EJ.ino*” Arduino code and upload it.
- When the code is correctly uploaded/ installed, the user can plug the demoboard on the Arduino shield. The green LED must turn on, meaning that BTT3018EJ logic is supplied.
- Then, launch “*Demoboard\_BTT3018EJ.exe*”.
  - Click on “Ports” to select the right communication port on your Arduino board.
  - Click on “Start” to start the system.
    - If it’s not working, check your port name.

- Port name is usually called “COM X”, where “X” is a number.
  - If installation is done and operational, user can see text transmitted by the Arduino board below the port selector.
- When user wants to turn OFF the application, user has to click on “Stop” before closing the windows (none application can be shut down before closing the communication with the Arduino board).
  - **WARNING:** when application is stopped, it has to be shut down then restarted again.

### 3.2 Features

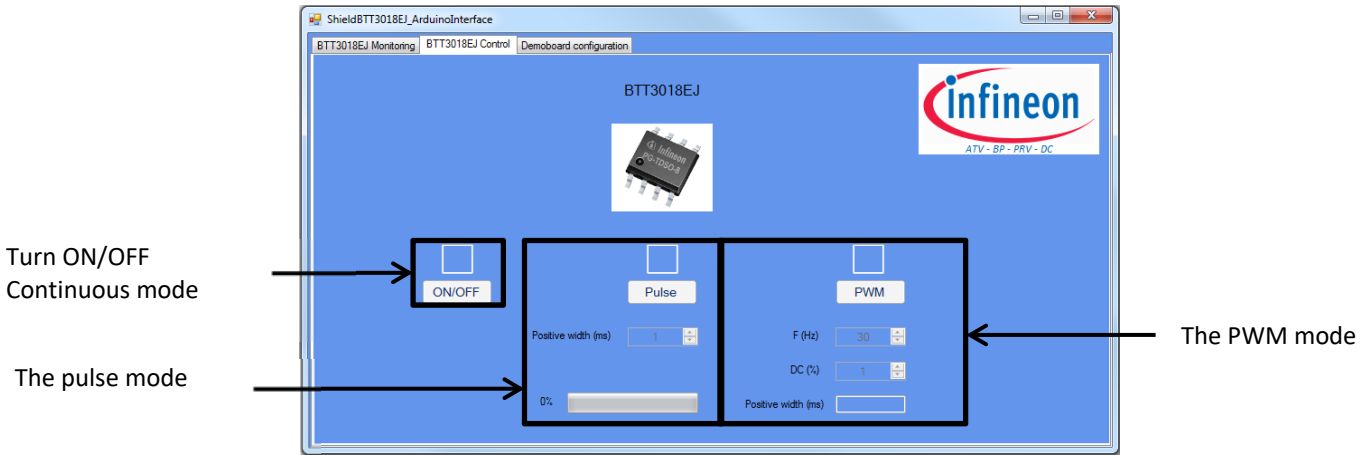
#### 3.2.1 Monitoring Panel



- BTT3018EJ color control has three possible states: ON OFF FA. If FA, please stop and close the program, then restart it again.
- If BTT3018EJ operates normally, Vstatus should appear in green.
- If BTT3018EJ is latched, status appears in red. Status needs to be reset by 5V pull-up if not connected to Input.

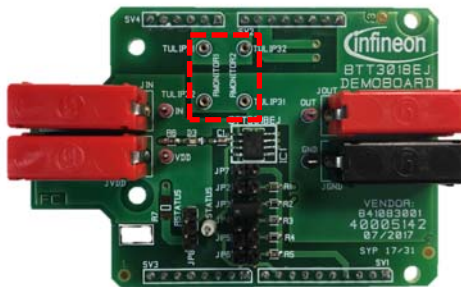
#### 3.2.2 Control Panel

- Button ON and OFF allow user to switch ON and OFF BTT3018EJ in continuous mode.
- Button “Pulse” creates a manageable pulse on each BTT3018EJ.
  - User can create a pulse with period control
  - The timing can be from 1ms to 1000s in logarithmic mode.
- Button PWM allows user to manage duty cycle and frequency.

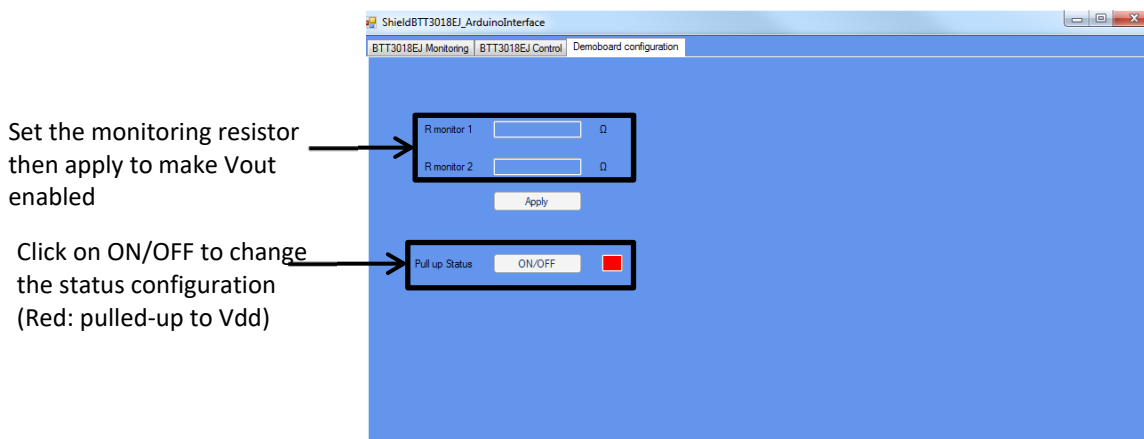


### 3.2.3 Demoboard configuration panel

- To use the Vout measure, user needs to go to “demoboard configuration panel” to set the monitoring resistors. It is a simple voltage divider that should be designed to protect the Arduino microprocessor in current and voltage. Resistors can be connected in the “Tulip” connectors without soldering. Examples of values:
  - Rmonitor1 = 10kΩ
  - Rmonitor2 = 1kΩ



- Vstatus can be in the pull up mode or can be connected to Vin, user needs to go to “demoboard configuration panel” to set the right statement.



## 4 Board connectors description

### 4.1 Power connectors

Name	Connector	Type	Description
JOUT	P1	Power supply	OUT
JGND	P2	Ground power	Ground
JVIN	P3	Power input	BTT3018EJ INPUT pin control to turn ON/OFF
JVDD	P4	Power input	5V to provide logic supply Vdd pin (Do not use if shield is connected to the Arduino board)

### 4.2 ARDUINO/XMC1100 connectors

#### 4.2.1 Connector SV1

Name	Pin	Type	Description
	1	No connected	
	2	No connected	
	3	No connected	
Gnd	4	Digital Ground	Ground
	5	No connected	
	6	Digital Input	
IN	7	Digital Input	To turn the device ON/OFF
	8	Digital Input	
STATUS	9	Digital Input	To monitor the part status
	10	Not connected	

#### 4.2.2 Connector SV2

Name	Pin	Type	Description
-	1	No connected	
-	2	No connected	
-	3	No connected	
-	4	No connected	
-	5	No connected	
-	6	No connected	
-	7	No connected	
-	8	No connected	

### 4.2.3 Connector SV3

Name	Pin	Type	Description
-	1	No connected	-
-	2	No connected	-
-	3	No connected	-
-	4	No connected	-
-	5	No connected	-
Gnd	6	Digital Ground	Ground
Gnd	7	Digital Ground	Ground
-	8	No connected	-

### 4.2.4 Connector SV4

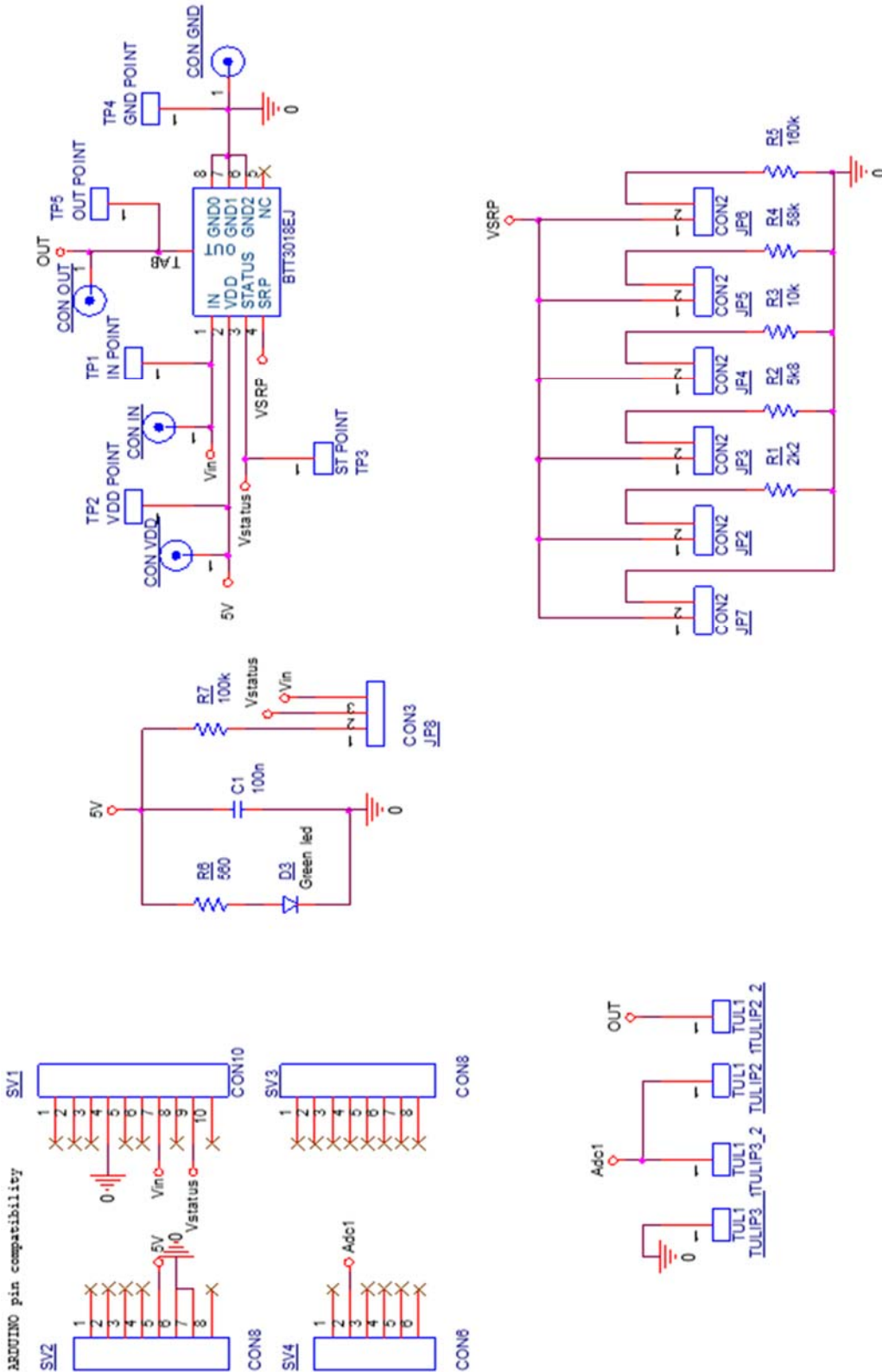
Name	Pin	Type	Description
	1	Analog input	
Adc	2	Analog input	Analog measurement for V_ds
	3	Analog input	
	4	Analog input	
	5	No connected	
	6	No connected	

## 4.3 Test points

Name	Pin	Type	Description
IN	1	Digital Input	Pin activation for BTT3018EJ
VDD	2	Logic SUPPLY	Pin to provide supply to BTT3018EJ Logic
STATUS	3	Digital Input	Pin to monitor the part status
OUT	4	Analog Input	Pin to monitor Vout
GND	5	Analog input	Pin to monitor GND



## 5 Schematic



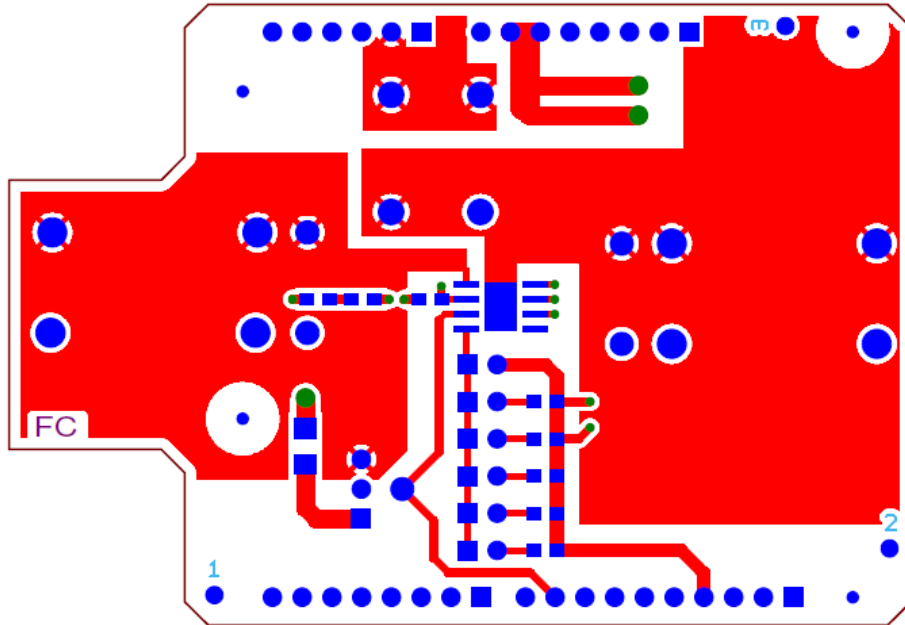
Title	Demoboard Arduino BTT3018EJ		
Size	Document Number	Rev	<RevCode>
A	Geoffrey Bernard		
Date:	Wednesday, December 18, 2019	Sheet	1 of 1

## 6 B.O.M.

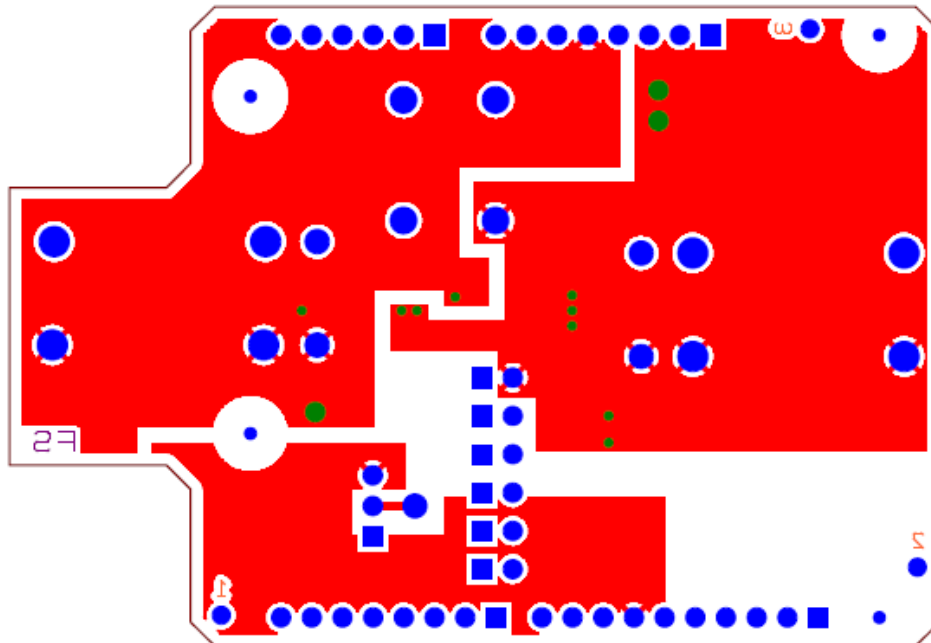
Item	Qty	Ref	Value	Package	Ordering code
1	1	C1	100nF	CMS0603	
2	1	D3	Green led	UTSS	RS: 125-4513
3	5	GND POINT	Test Point		RS:262-2179
4		OUT POINT	Test Point		RS:262-2185
5		IN POINT	Test Point		RS:262-2185
6		ST POINT	Test Point		RS:262-2040
7		VDD POINT	Test Point		RS:262-2185
8	6	JP2	Pin header 2pins		RS:251-8086
9		JP3	Pin header 2pins		RS:251-8086
10		JP4	Pin header 2pins		RS:251-8086
11		JP5	Pin header 2pins		RS:251-8086
12		JP6	Pin header 2pins		RS:251-8086
13		JP7	Pin header 2pins		RS:251-8086
14	1	JP8	Pin header 3pins		RS:251-8092
15	2	*	Jumpers 2pins for pin headers		RS:251-8503
16	4	CON OUT	Red Borne Hirschmann 60V		RS:738-547
17		CON GND	Black Borne Hirschmann 60V		RS:738-531
18		CON IN	Red Borne Hirschmann 60V		RS:738-547
19		CON VDD	Red Borne Hirschmann 60V		RS:738-547
20	1	R1	2k2	CMS0603	
21	1	R2	5k8	CMS0603	
22	1	R3	10k	CMS0603	
23	1	R4	58k	CMS0603	
24	1	R5	160k	CMS0603	
25	1	R6	560Ω	CMS0603	
26	1	R7	100kΩ	CMS0603	
27	2	TULIP2	2 x contacts à souder		RS: 615-4850
28		TULIP3	2 x contacts à souder		RS: 615-4850
29	1	SV1	CON10		RS: 547-3166
30	1	SV2	CON8		RS: 547-3166
31	1	SV3	CON8		RS: 547-3166
32	1	SV4	CON6		RS: 547-3166
33	1	IC1	BTT3018EJ	TDS08	Provided by Infineon

## 7 Board Layout

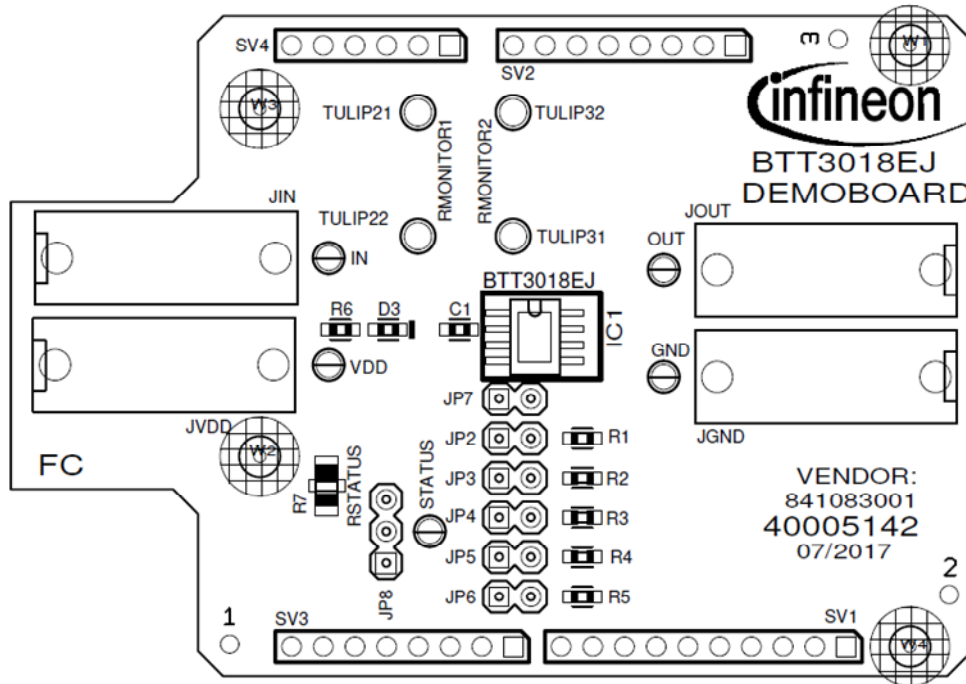
### 7.1 TOP



### 7.2 BOTTOM



### 7.3 MECHANICAL VIEW



**Revision History: V1.0**

<b>Previous Version: none</b>		
<b>Revision</b>	<b>Date</b>	<b>Changes</b>
1.0	November 22 <sup>nd</sup> 2017	First release

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