

## Product Brief

# 24V Protected Switch Shield

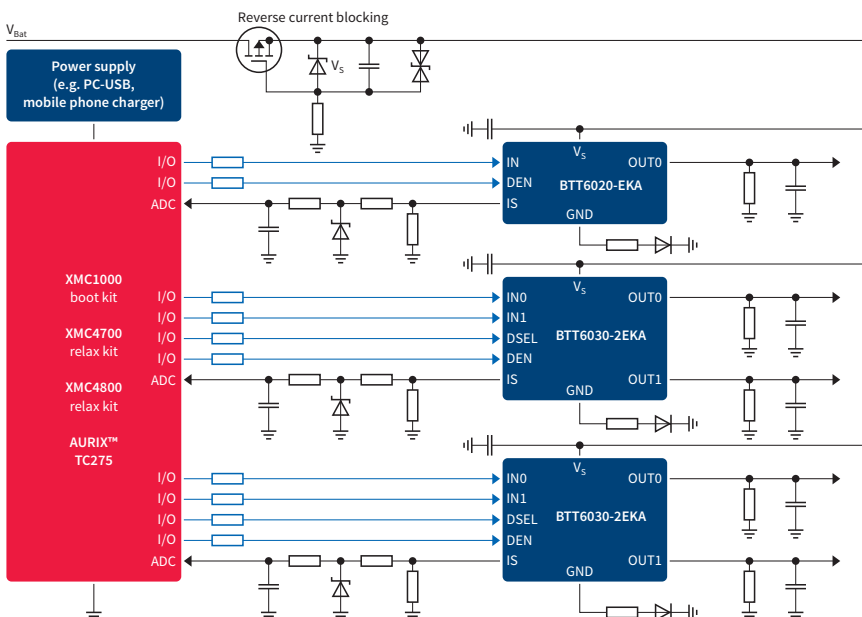
with BTT6030-2EKA and BTT6020-1EKA for Arduino

Infineon's **PROFET™+ 24V** family of protected high-side switches (BTT6xxx) drive resistive, capacitive as well as inductive loads (e.g. truck bulbs, car bulbs, valves, motors, relays, capacitors, LEDs). Using the 24V Protected Switch Shield for Arduino enables fast prototyping and in-expensive evaluation of the pin-to-pin compatible **PROFET™+ 24V** devices.

The shield is equipped with three **PRO**Tected high-side power MOSFETs out of the **PROFET™+ 24V** family (2x BTT6030-2EKA, 1x BTT6020-1EKA). It can be controlled either by an Arduino board (e.g. Arduino Uno, Arduino Due) or the ARM® powered Infineon XMC™ microcontroller kits using the Arduino form factor.

The power switches are controlled via the INx (input) pins. The **PROFET™+ 24V** devices also provide a sense current at the IS pin, which can be enabled via the **DEN** (Diagnosis **EN**able) pin. For the two channel devices the sensed channel is selected via the **DSEL** (Diagnosis **SEL**ect) pin. For each device the sense signal (IS) is connected to an own ADC channel of the microcontroller.

The 24V Protected Switch Shield provides a fast and easy access to drive up to five 24 V loads with a nominal current of 4 A to 5 A each.



### Key features

- > Compatible with Arduino microcontroller boards and Infineon's XMC™ microcontroller kits using the Arduino form factor
- > Capable of PWM up to 400 Hz
- > Driver circuit with logic level inputs
- > Diagnosis with current sense
- > Protection of load and driver circuit, e.g. against overtemperature, overcurrent, ESD

### Key benefits

- > Fast and inexpensive prototyping of 24 V load driving
- > Load diagnosis with current sense capability
- > Overtemperature shutdown with latch behavior

### Applications

- Drive resistive, capacitive and inductive loads with PWM or DC
- > 8 ~ 36 V nominal input voltage (max. 5 ~ 48 V)
  - > Nominal current up to 5 A per channel restricted due to PCB (BTT6020-1EKA nominal current: 7 A)
  - > E.g. truck bulbs, valves, motors, relays

# 24V Protected Switch Shield

## with BTT6030-2EKA and BTT6020-1EKA for Arduino

The BTT6030-2EKA and BTT6020-1EKA are integrated high-side power switches and part of the PROFET™+ 24V family. The power transistor is built by an N-channel vertical power MOSFET with charge pump in one package (DSO-14). To block reverse current on the board an IPD50P04P4L-11 is used.

### Applications

- › 24 V grounded high-side loads
- › Suitable for automotive and industrial applications
- › All types of resistive, inductive and capacitive loads
- › Suitable for high and low current loads such as bulbs, valves, relays and LEDs
- › Replaces electromechanical relays, fuses and discrete circuits

### Diagnostic functions

- › Proportional load current sense
- › Open load detection in ON and OFF
- › Overtemperature sense
- › Stable diagnostic signal during short circuit
- › Enhanced  $k_{ILIS}$  accuracy with calibration

### Basic functions

- › RoHS compliant & AEC qualified
- › Op. voltage range (5 ... 48 V)
- › Low stand-by current (< 0.5  $\mu$ A)
- › ESD protection, optimized EMC
- › 3.3 V and 5 V – compatible logic inputs
- › Improved heat dissipation of DSO package

### Protection functions

- › Load dump: 65 V
- › Current limitation
- › Thermal shutdown: latch
- › Enhanced short circuit operation
- › Loss of ground/battery protection
- › Stable behavior at under voltage
- › Overvoltage protection

Product type	$R_{DS(on)}$ (typ) [m $\Omega$ ]	$R_{DS(on)}$ (max) @ $T_j = 150$ °C [m $\Omega$ ]	Nominal load current [A]	$I_{L(SC)}$ (typ) [A]	Number of channels	Package
<b>Automotive grade</b>						
BTT6010-1EKA	10	22	9	115	1	DSO-14
BTT6020-1EKA	20	42	7	74	1	DSO-14
BTT6030-1EKA	30	64	6	70	1	DSO-14
BTT6030-2EKA	30	64	2 x 4	70	2	DSO-14
BTT6050-1EKA	50	100	4.5	47	1	DSO-14
BTT6050-2EKA	50	100	2 x 3	47	2	DSO-14
BTT6100-2EKA	100	200	2 x 2.2	25	2	DSO-14
BTT6200-1EJA	200	400	1.5	11	1	DSO-8
BTT6200-4EMA	200	400	4 x 1	11	4	SSOP-24
<b>Special PROFET™+ 24V components with reduced current limitation (focus application: switching cables &gt; 20 m cable length)</b>						
BTT6010-1EKB	10	22	10	86	1	DSO-14
BTT6030-2EKB	30	64	2 x 4	60	2	DSO-14
BTF6070-2EKV	70	120	2 x 2.3	11	2	DSO-14

Published by  
Infineon Technologies AG  
85579 Neuburg, Germany

© 2016 Infineon Technologies AG.  
All Rights Reserved.

### Please note!

THIS DOCUMENT IS FOR INFORMATION PURPOSES ONLY AND ANY INFORMATION GIVEN HEREIN SHALL IN NO EVENT BE REGARDED AS A WARRANTY, GUARANTEE OR DESCRIPTION OF ANY FUNCTIONALITY, CONDITIONS AND/OR QUALITY OF OUR PRODUCTS OR ANY SUITABILITY FOR A PARTICULAR PURPOSE. WITH REGARD TO THE TECHNICAL SPECIFICATIONS OF OUR PRODUCTS, WE KINDLY ASK YOU TO REFER TO THE RELEVANT PRODUCT DATA SHEETS PROVIDED BY US. OUR CUSTOMERS AND THEIR TECHNICAL DEPARTMENTS ARE REQUIRED TO EVALUATE THE SUITABILITY OF OUR PRODUCTS FOR THE INTENDED APPLICATION.

WE RESERVE THE RIGHT TO CHANGE THIS DOCUMENT AND/OR THE INFORMATION GIVEN HEREIN AT ANY TIME.

### Additional information

For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices, please contact your nearest Infineon Technologies office ([www.infineon.com](http://www.infineon.com)).

### Warnings

Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life-endangering applications, including but not limited to medical, nuclear, military, life-critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.