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ams AG

The technical content of this austriamicrosystems application note is still valid.

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AS3492

Highly Efficient 2-10 LEDs Backlight Driver with 2 PWM Inputs

1 General Description

The AS3492 is an inductive highly efficient DCDC boost converter. The DCDC converter operates at a fixed frequency of 2MHz and includes soft startup to allow easy integration into noise sensitive RF systems. A predictable startup is guaranteed even with very low duty cycle PWM input signals. The voltage on the output capacitor is controlled to minimize ripple and to avoid any acoustic effects for low frequency PWM input signals.

The output of the DCDC converter is used for five current sources connected to up to 10 LEDs. If a current source is not required, it shall be connected to VOUT or GND - the AS3492 detects this condition and disables this current source automatically; this keeps the efficiency of the system constantly high.

The AS3492 is controlled by two enable inputs, ON13 and ON45. These inputs can also be used to connect a PWM input (like DLS or DBC).

The AS3492 includes several protection functions like undervoltage lockout, overcurrent and overtemperature. No microvias are required to assemble the AS3492 if only four channels are used and ON13=ON45.

The AS3492 is available in a space-saving WL-CSP package measuring only 1.7x1.4x0.5mm and operates over the -30°C to +85°C temperature range.

2 Key Features

- 2 MHz DCDC Boost converter
 - Small 4.7µH external coil
 - Very high application efficiency of up to 90%
 - Very low voltage changes on output to avoid acoustic noise on output capacitor even with PWM
 - Smooth startup even under low duty cycle PWM conditions
- Five Current sources up to 25mA
 - Low voltage compliance (150mV)
 - High side current source to simplify layout and thermal management of the LEDs
 - Automatically detect and disable failing or not used LEDs to keep efficiency high
 - Current matching <4%
 - Current accuracy <7.5%
- Excellent LED current output ripple <500µA
- Support DLS (Dynamic Luminance Scaling or DBC)
- Undervoltage lockout and overcurrent protection
- Overtemperature protection
- Available in a tiny WL-CSP package
 - 3x4 balls, 0.4mm pitch, 1.7x1.4x0.5mm

3 Application

Display backlight driver for mobile phones, digital cameras, PND and PMPs.

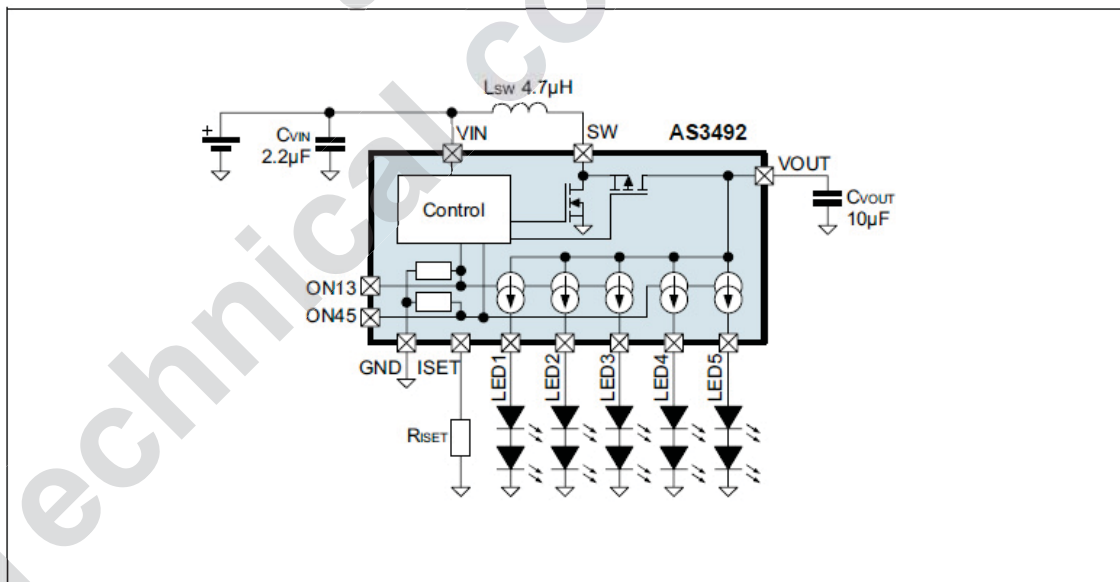


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4 Further Applications

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5 Revision status

AS3492 - AN02 - Demoboard

Rev.: 1V0

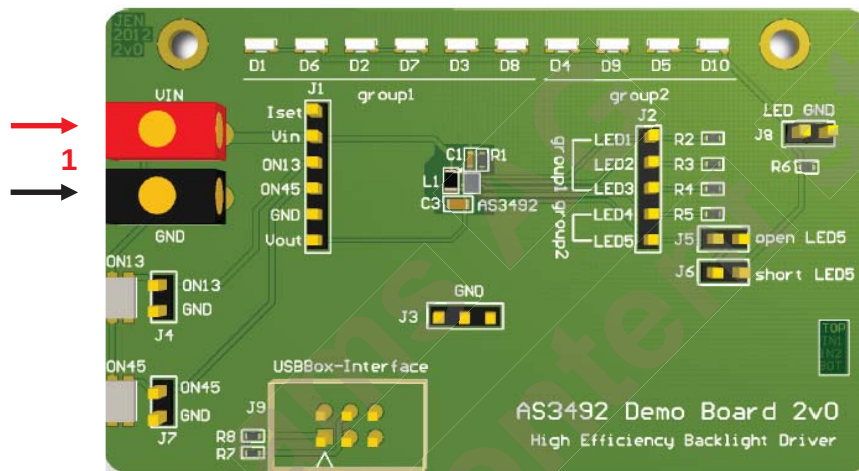
6 General description

Remark: all subsequent component numbering refers to the application schematics, shown in par"Application Schematic".

7 Getting Started

For this Application no Software is required

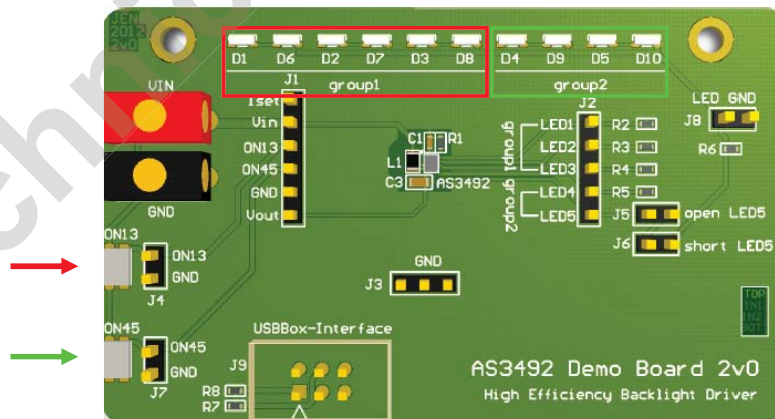
Connect the battery to VBAT and GND @ Point 1.



8 PCB: Get the board functional

Push the switch SW1 and all LEDs of "group1" should be turned on.

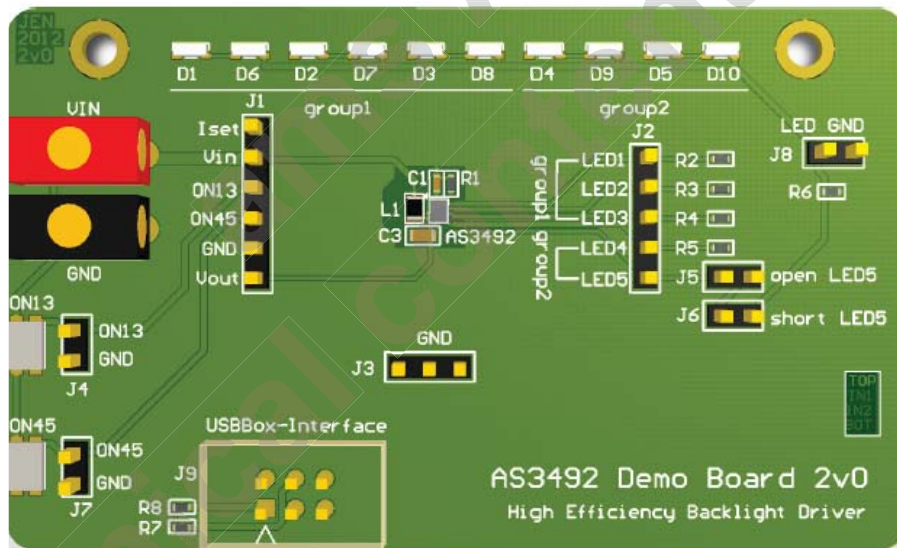
Push the switch SW2 and all LEDs of "group2" should be turned on



9 AS3492 Demoboard 2v0 jumper and device locations

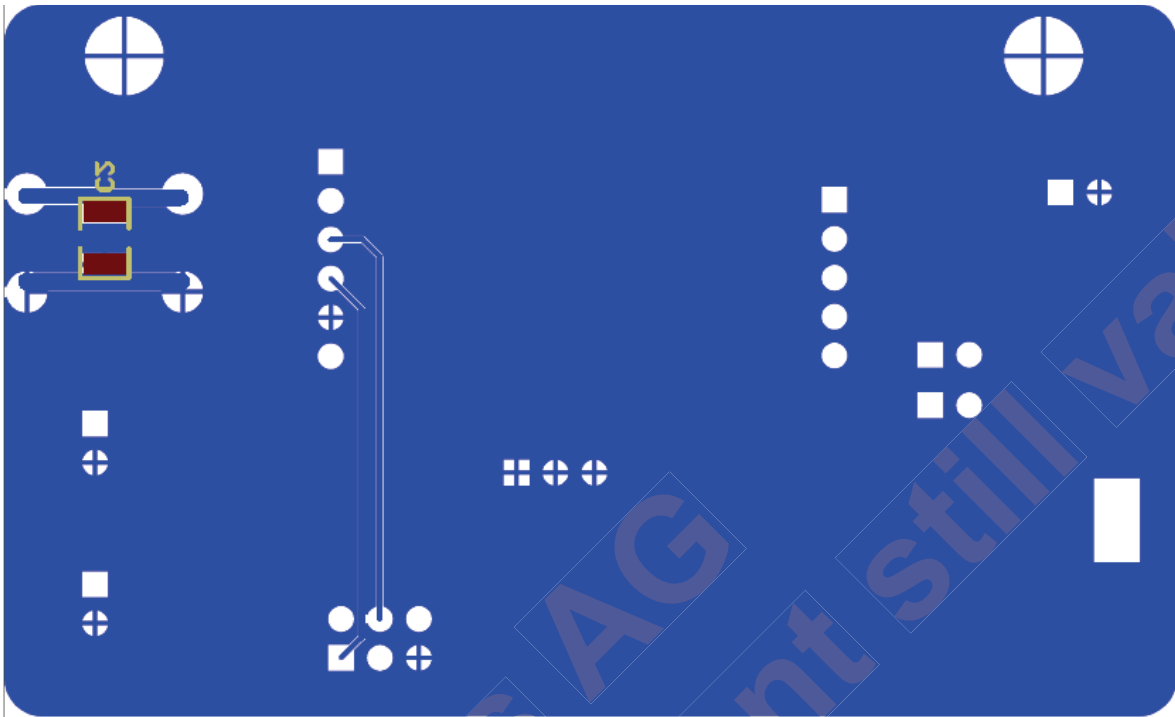
Listed below are the various connectors and jumpers.

Jumper	Function	Jumper setting	comment
J8	Connection of all LEDs to GND	Closed	Useful for all LED current measurements, remove therefore R6
J5	Open LED5 string	Closed	Open open LED detection
J6	Short LED5 string	open	Connect Jumper to short led detection
J3	GND		For GND connection of measurement probes
GND	Ground Connection		PWM input for current source LED4 and LED5
VIN	Vbat Connection		Supply voltage input: apply 2.5V – 5.5V
SW1	ON13		if pressed, ON13 is pulled to Vbat
SW2	ON45		if pressed, ON45 is pulled to Vbat
J9	USB-BOX Interface		austriamicrosystems USB-BOX IF – not assembled
Device	Value		comment
U1	AS3492		High Efficient 2-10 LEDs Backlight Driver IC
D1~D10	CL120		Citizen CL-120 LED SideLED
C1	2.2μF +/- 20% - X5R – 6V3		Semco CL05A225MQ5NNN
C3	10μF – X5R – 25V		Semco CL10A106MA8NRNC
L1	4.7μH - 2x1,2x1mm		Semco CIG21E4R7MNE
Device	Value		comment



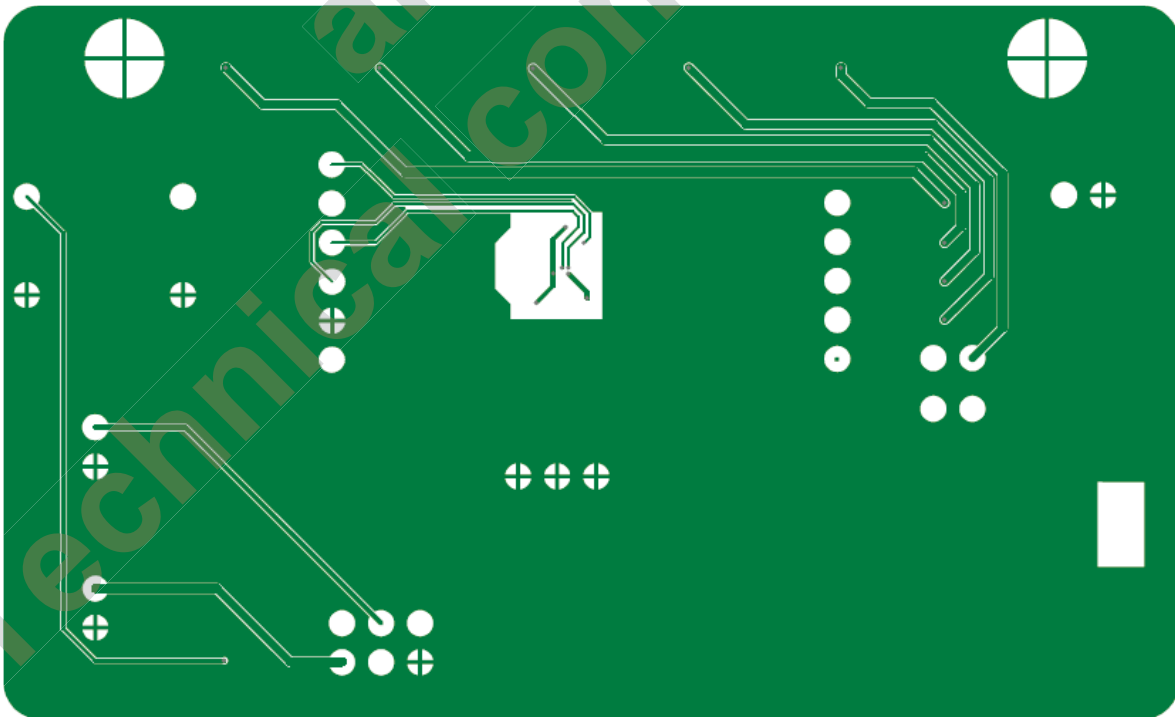
Connector and Jumper locations of AS3492 Demo Board 2V0

12 AS3492 Demoboard 2V0: Layout (bottom view)



Layout (bottom view)

13 AS3492 Demoboard 2V0: Layout (Multilayer 1)



Layout (Multilayer 1)



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