

SPOC – BTS 5566GX SPOC – BTS 5576GX SPOC – BTS 5590GX

SPI Power Controller for Advanced Light Control



THE SPOC products are five channel high-side smart power switches in P-DSO-36-20 package providing embedded protective functions. They are especially designed to control standard exterior front and rear lighting in automotive applications.

IN ORDER to use the same hardware with bulbs and LEDs, the device can be configured to bulb or LED mode. As a result, both load types are handled optimally in switching and diagnosis accuracy. (not BTS 5566GX)

CONFIGURATION and diagnosis are done via SPI. Additionally, there is a current sense signal available for each channel that is routed via a multiplexer to one diagnosis pin. SPOC provide a secure limp home functionality via limp home input pin.

Parameter	Symbol	Value
Operating Voltage Power Switch	V_{bb}	4.5 ... 28 V
Logic Supply Voltage	V_{dd}	3.8 ... 5.5 V
Over Voltage Protection	$V_{bb(AZ, min)}$	41 V
Nominal Loads (bulbs) <ul style="list-style-type: none"> ■ Channel 0, 1 ■ Channel 2 ■ Channel 3, 4 		21 W (27 W) 21 W (27 W) flasher 5 W / 10 W
SPI Access Frequency	$f_{SCLK(max)}$	1 MHz (BTS 5590) 2 MHz (BTS 5576, BTS 5566)

Parameter	BTS 5590GX	BTS 5576GX	BTS 5566GX
Bulb Application	Yes	Yes	Yes
LED Application	Yes	Yes	No
Watchdog functionality	Yes	No	No
On-state Resistances $R_{DS(ON)}$ <ul style="list-style-type: none"> ■ Channel 0, 1 ■ Channel 2 ■ Channel 3, 4 	25 mΩ 40 mΩ 100 mΩ	25 mΩ 30 mΩ 90 mΩ	25 mΩ 30 mΩ 90 mΩ

Basic Features

- 8 bit serial peripheral interface (daisy chain capable SPI) for control and diagnosis
- CMOS compatible parallel input pins for each channel provide straightforward PWM operation
- Very low stand-by current
- Optimized electromagnetic compatibility (EMC) for bulbs as well as LEDs

Protective Functions

- Reverse battery protection with external components
- Short circuit and overload protection
- Multi step current limitation
- Thermal shutdown with latch
- Over voltage protection
- Loss of ground protection

Diagnosis Functions

- Multiplexed proportional load current sense signals
- High accuracy of current sense signal at wide load current range
- Current sense ratio (k_{ILIS}) configurable for LEDs or bulbs (not BTS 5566GX)
- Very fast diagnosis in LED mode (< 2% duty cycle at 100 Hz) (not BTS 5566GX)
- Latching feedback on over temperature and over load via SPI

Application Specific Functions

- Integration of adjustable watchdog timer with external capacitor (BTS 5590GX only)
- Sophisticated trigger state machine with two bit increment and lock, served via SPI
- Fail-safe activation via LHI pin and configuration via input pins
- Load type configuration between bulbs and LEDs (not BTS 5566GX)

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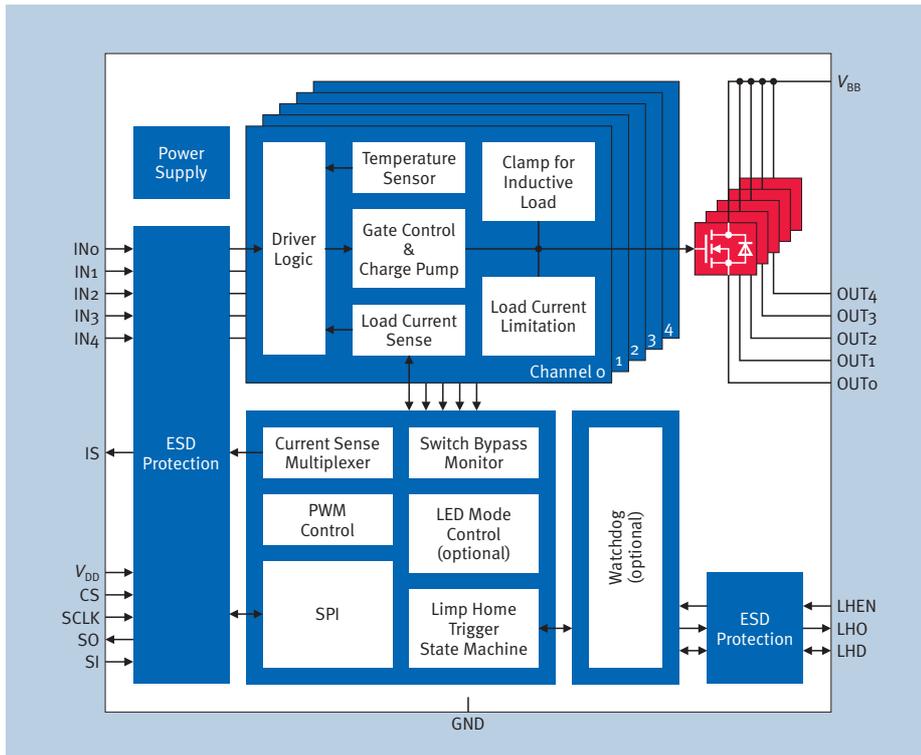
Automotive Power



Never stop thinking

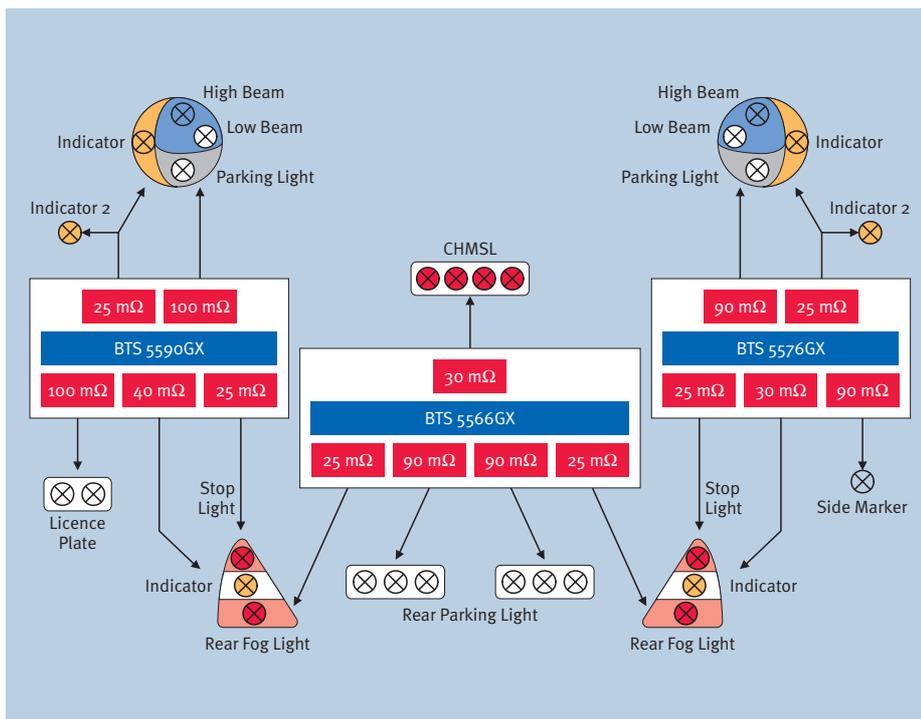
Block Diagram

- SPOC are five channel high-side power switches designed with load current sense and limitation, clamping for inductive loads, temperature sensor protection
- There is a multiplexed current sense signal available. The current sense ratio of each channel is designed for the nominal load current
- An 8 bit SPI interface is used for control and diagnosis, and provides daisy chain capability. A modulo 8 counter is integrated to ensure correct data transmission
- Inputs/outputs are ESD protected



Application Example

- High-side power switch for 12 V grounded loads in automotive application
- Especially designed for standard exterior lighting: tail light, stop light, parking light, license plate, rear fog light, indicators and equivalent LEDs



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