BT29 Spotlight – 0.5A Switching-Free DC Boost Regulator

1. Features

Metric	Performance
V_{ON}	3.1V @ I_{LOAD}=0.1A
I_{IN}	0.24A @ I_{LOAD}=0.1A
I_{OUT} max.	0.5A
V_{OUT} Range	V_{ON} to 5V
Temperature range	-40°C to 125°C
PSRR	60dB @ 120Hz
RMS Noise	320 µV (10Hz-100kHz)
Package	6x6x0.8 mm^3 QFN-28

Additional features:

- Inductor-less and switching-free DC boost conversion

2. Applications

- Low noise, post-battery boost regulator
- Radiation tolerant DC power mgmt:
  - TID 200 krad(Si)

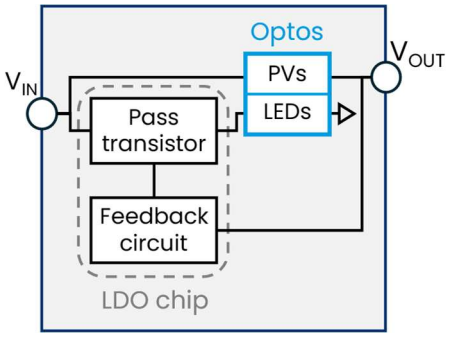

Figure 1. Schematic of an optocoupler enhanced linear boost regulator in a QFN package.

3. Description

The BT29 series consists of efficient, compact and low-noise DC boost voltage regulators that operate without using switching. The chip provides good ripple rejection performance, low ground current, enable/disable functionality, over-temperature and over-current protection. BT291D50H provides an adjustable voltage output of up to V_{OUT} = 5V, set by two feedback resistors. The minimum input voltage for a regulated output is V_{IN} = 3.1V at 0.1A load current. The input voltage can exceed the output voltage by up to +7V, therefore allowing buck/boost operation.

Polaris Semiconductor's voltage regulator technology enables switching-free boost conversion with high efficiency. This inductor-less, linear regulator technology offers superior electromagnetic interference behavior and lower BOM than switching-based solutions. The devices employ our patented hybrid optoelectronic circuit topology, including high-efficiency, GaAs-based optocouplers co-packaged with a low-dropout (LDO) linear voltage regulator. High efficiency DC boost conversion is available due to the efficient photovoltaic-output optocoupler devices integrated within the package.

Please get in touch to learn more or tell us how our switching-free boost technology can best meet your needs.

4. Selected Characteristics & Typical Applications

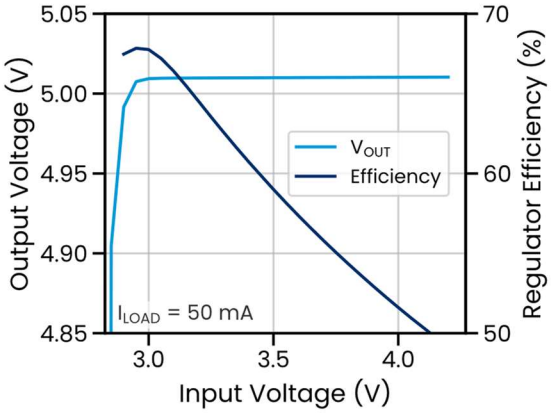

Figure 1. BT291D50H output voltage and efficiency versus input voltage with 50mA load current.

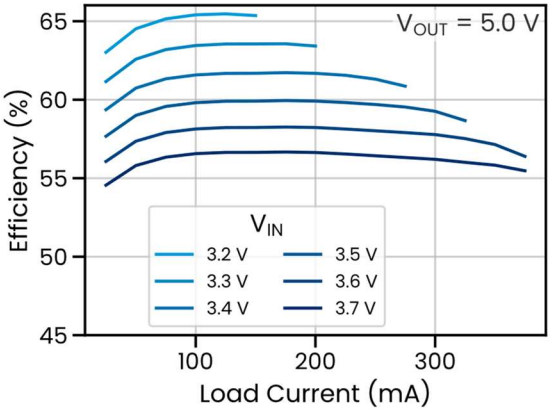

Figure 2. BT291D50H efficiency versus load current for various input voltages.

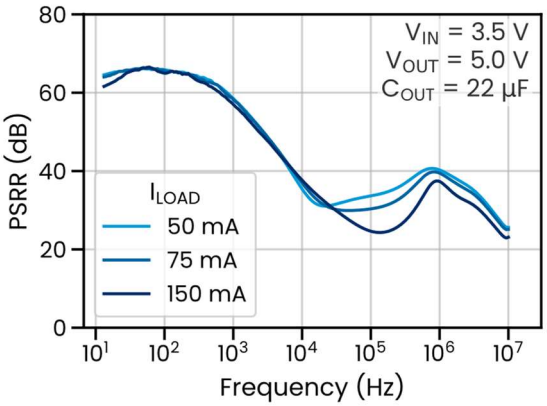

Figure 3. BT291D50H PSRR with different load currents. C_{OUT} is a X7R MLCC with 0.47Ω series resistor.

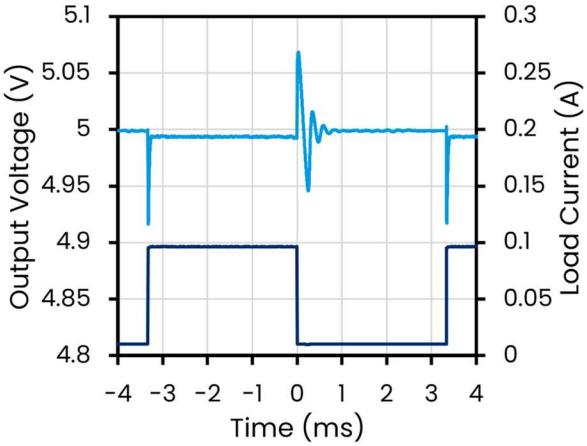

Figure 4. BT291D50H load switching transient with C_{OUT}=22µF X7R MLCC with 0.47Ω series resistor and V_{IN}=3.5V.

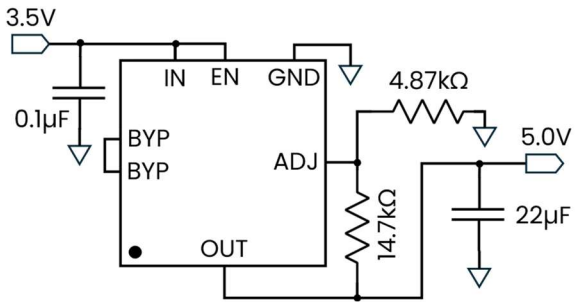

Figure 5. A 3.5V to 5V boost configuration in a 6mm QFN28 package. Enable and bypass functionality are not used in this example.

5. BT29 Series Product Line Specifications

Max V_{IN}	12V
Max V_{OUT}	5V
Min V_{IN}	3.1V @ I_{LOAD}=0.1A
Max I_{OUT}	500 mA
TID	200 krad(Si)

Device	**Max V_{OUT} (V)**	**Min V_{IN} @ I_{OUT}=0.1A (V)**	**Peak Efficiency @ I_{OUT} = 0.1A (%)**	**PSRR @ 1kHz (dB)**	**V_{RMS} noise, 10-100kHz (µV)**	**Package**	**QFN Dimensions**
BT291D50H	5	3.1	68%	60	~320	QFN 28	6x6x0.8 mm^3

All the parts listed here are under development and device specifications provided here are subject to change.

Contact us at info@polarissemiconductor.com for datasheets and additional information.