PE25203

Document Category: Product Brief

Divide-by-2 and -3, 4A Charge Pump, Capacitor Divider

General Description

The PE25203 is an ultra-high efficiency charge pump that is configurable to divide down an input voltage by two or three and delivers up to 4A with peak efficiency up to 99%.

The PE25203 supports an input voltage range of 5.7V to 10V in divide-by-2 mode and 8.4V to 15V in divide-by-3 mode. The PE25203 is primarily used to convert a two- or three-cell battery input to a 1S output for the downstream regulator to improve overall system efficiency and extend the run time.

The PE25203 offers a unique auto-switch mode to change the divide-down ratio during operation to avoid a downstream under-voltage lockout (UVLO) event at heavy system loading during a low-battery condition.

The PE25203 comes in a 4.545 mm × 2.715 mm 47-pin WLCSP package. The pinout is designed to be fully compatible with Type III PCB design.

Features

- Proprietary architecture enables industry leading efficiency with an ultra-low 1-mm profile solution
- Wide input voltage range, from 5.7V to 15V, supports two- or three-cell mobile computers and 12V-bus point-of-load applications
- Peak efficiency of 99%
- Pin-selectable cycle skipping mode for improved light-load efficiency
- Dynamically configurable divide-by-2 or -3 modes under load
- Low EMI fixed-frequency operation under heavy load conditions
- Fully protected input under-voltage, output over-current and thermal shutdown

Applications

- Two-cell and three-cell lithium platforms
- Ultrabook and notebook computers
- Full-size tablet computers
- Ultra-thin form factor designs
- $12V_{IN}$ point-of-load designs in networking and telecommunications

Efficiency

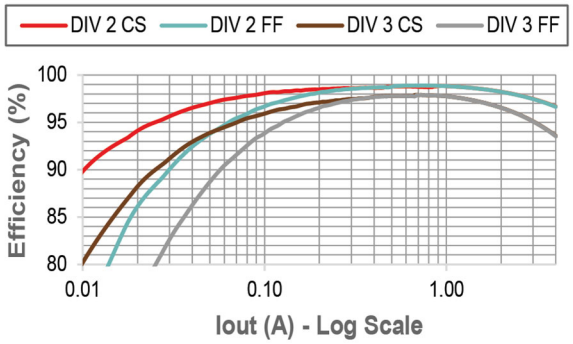


Figure 1. Typical efficiency with V_{IN}=7.7V in divide-by-2 and V_{IN}=11.55V in divide-by-3, fixed frequency (FF) and cycle skip (CS) modes

Application

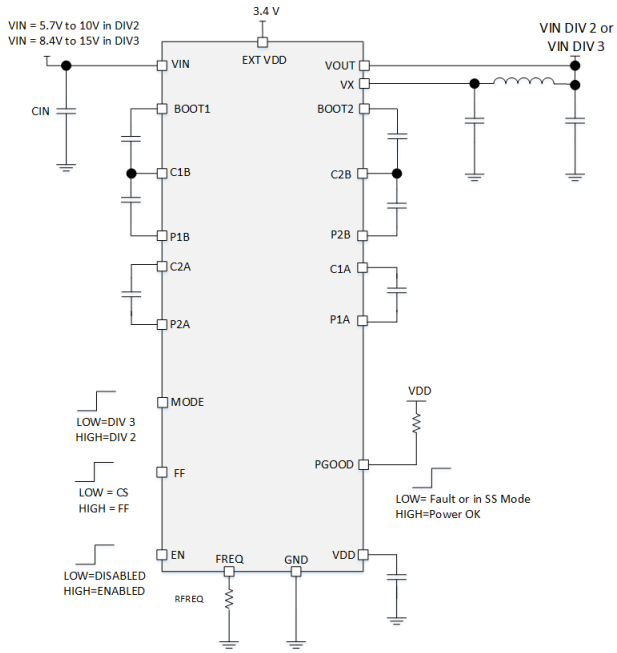


Figure 2. Application Schematic

Application Circuit

Figure 3 shows a typical application circuit configured to operate in divide-by-2 and divide-by-3 modes.

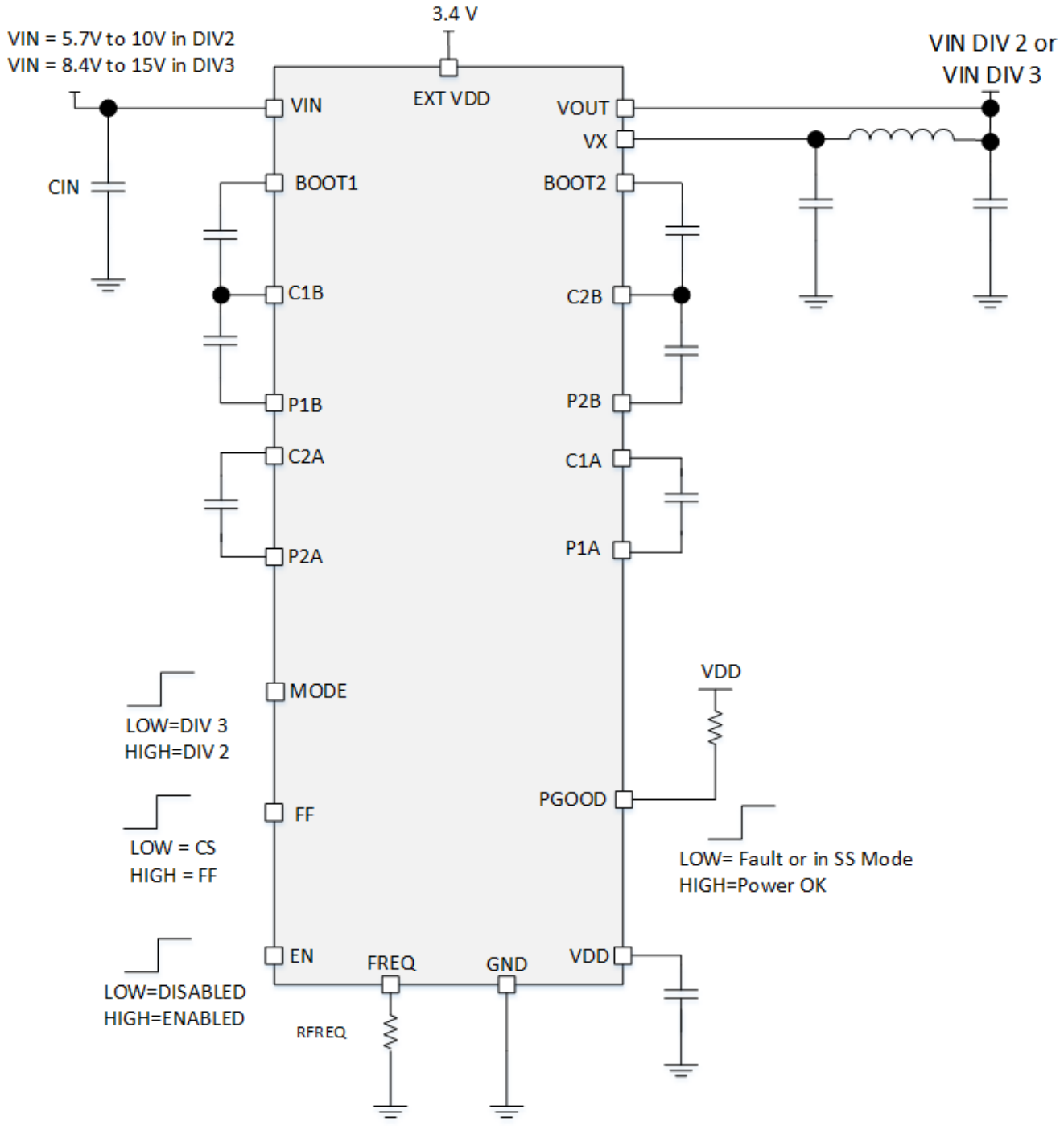


Figure 3. PE25203 Typical Application Circuit

Application Schematic

Figure 4 shows a typical application circuit with details of links, corresponding modes of operation, and suggested component values.

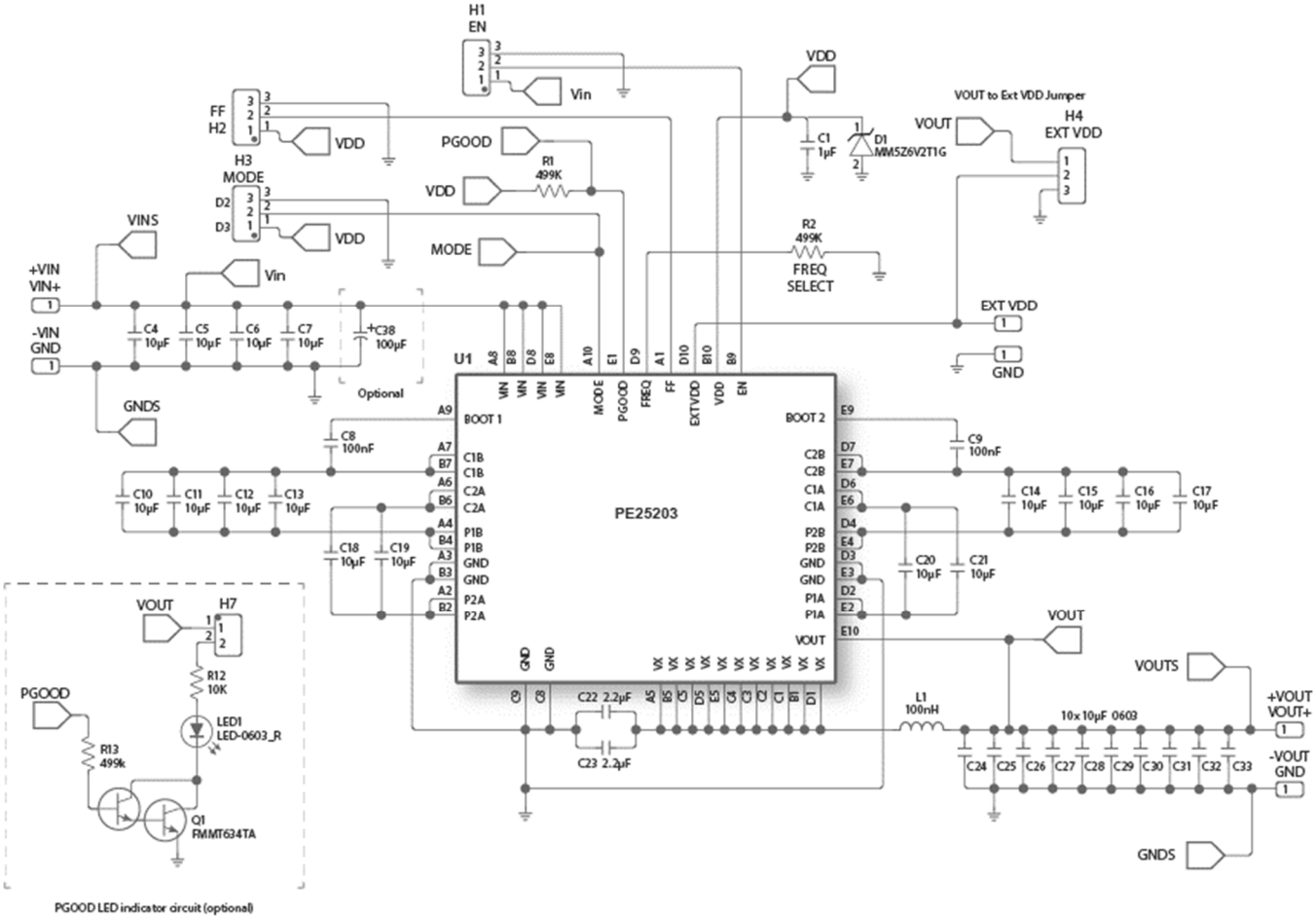


Figure 4. Detailed Application Schematic Circuit

Application Circuit Part List

Table 1 lists the pSemi recommended parts.

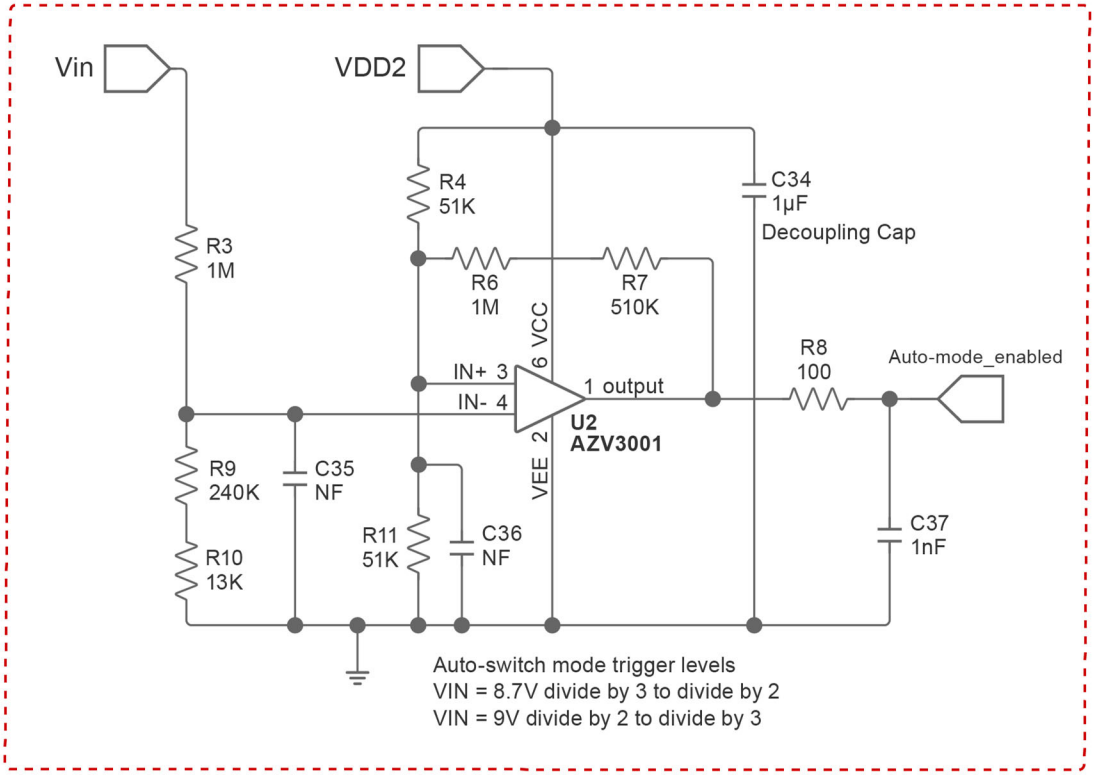
Table 1. pSemi Recommended Parts

Ref. No.	Value	Part Size	Part Number
C1	1 µF 6.3V X7R or better	0402	GRM155R70J105KA12D
C4,C5,C6,C7,C10,C11,C12, C13,C14,C15,C16,C17,C18, C19,C20,C21	10 µF 25V X5R or better	0603	GRM188R61E106KA73D
C8,C9	100 nF 100V X5R or better	0402	GRM155R62A104KE14D
C22, C23	2.2 µF 25V X5R or better*	0402	GRM155C81C225ME15D (X6S) GRM155R61E225KE11D (X5R)
C24,C25,C26,C27,C28,C29, C30,C31,C32,C33	10 µF 6.3V X5R	0603	GRM188R60J106ME47D
D1	Diode Zener 6.2V 500 MW	SOD523	MM5Z6V2T1G
L1	100 nH	2.5 mm x 2 mm x 1.2 mm	TFM252012ALMAR10MTAA
R1,R2	499 kΩ	0603	RC0603FR-07499KL
U1	Divide-by-2 and -3, 4A charge pump, capacitor divider	4.545 mm × 2.715 mm x 0.576 mm	PE25203

Note: * X5R for applications with maximum $T_A \leq 85$ °C, and X6S for applications with maximum $T_A > 85$ °C but ≤ 105 °C.

Auto-switch Mode Circuit

Figure 5 shows the circuit implemented to achieve the auto-switch mode ratio of the PE25203 evaluation kit (EVK).



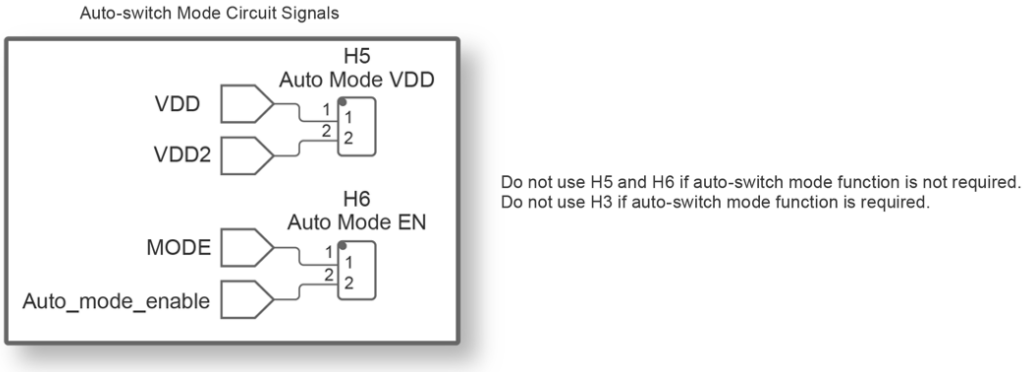


Figure 5. Optional Auto-switch Mode Circuit

Ordering Information

Table 2 lists the PE25203 order codes and shipping methods.

Table 2. Order Codes and Shipping Methods

Order Code	Description	Packaging	Shipping Method
PE25203A-V	4A Charge Pump Divide by 2 or 3	WLCSP on Tape and Reel	250 Units/T&R
PE25203A-R	4A Charge Pump Divide by 2 or 3	WLCSP on Tape and Reel	5000 Units/T&R
EK25203-01	PE25203 DC-DC Converter Evaluation Board	Populated PCB	1 Unit

Document Categories

Advance Information

The product is in a formative or design stage. The datasheet contains design target specifications for product development. Specifications and features may change in any manner without notice.

Preliminary Specification

The datasheet contains preliminary data. Additional data may be added at a later date. pSemi reserves the right to change specifications at any time without notice to supply the best possible product.

Product Specification

The datasheet contains final data. In the event pSemi decides to change the specifications, pSemi will notify customers of the intended changes by issuing a Customer Notification Form (CNF).

Product Brief

This document contains a shortened version of the datasheet. For the full datasheet, contact sales@psemi.com.

Sales Contact

For additional information, contact Sales at sales@psemi.com.

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