PE25213

Document Category: Product Brief

Divide-by-2 and -3, 10A Charge Pump, Capacitor Divider

General Description

The PE25213 is an ultra-high efficiency charge pump that is configurable to divide down an input voltage by two or three and delivers up to 10A with peak efficiency up to 99%.

The PE25213 supports an input voltage range of 5.7V to 15V in divide-by-2 mode and 8.4V to 15V in divide-by-3 mode. The PE25213 is primarily used as a front-end converter to convert a two- or three-cell battery input to a 1-1.5S output for downstream regulator to improve overall system efficiency and extend run time.

The PE25213 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 low battery condition.

The PE25213 comes in a 4.545 mm × 2.715 mm 47-pin WLCSP package. The pinout is specially designed to be fully compatible with Type III PCB design.

Features

- Proprietary architecture enables industry leading efficiency with an ultra-low 1mm 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.

Typical 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

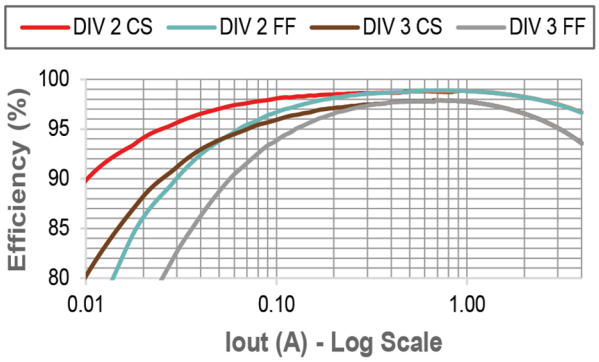


Figure 1. Typical Efficiency with V_{IN} = 7.7V in Divide-by-2 and V_{IN} = 11.55V in Divide-by-3, Fixed Frequency (FF) and Cycle Skip (CS) Modes.

Simplified Application

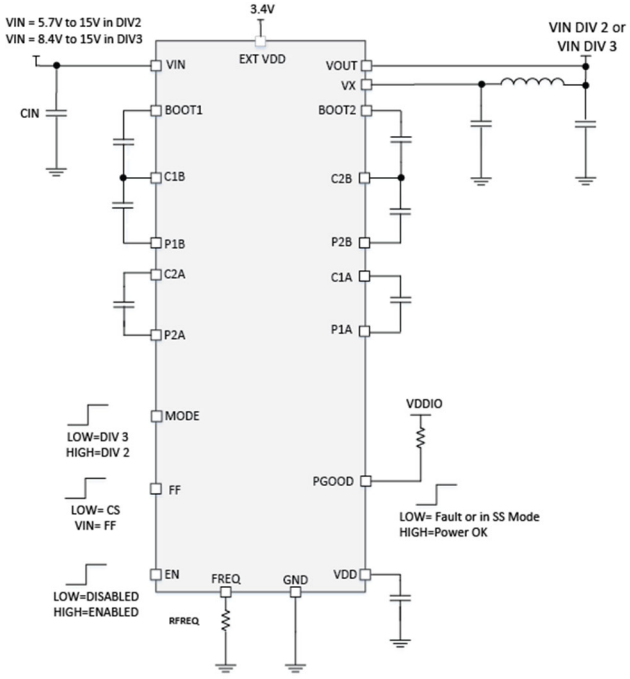


Figure 2. Application Schemati

Application Circuit

Figure 3 shows a typical application circuit configured to operate in divide-by-2 and divide-by-3 modes. For more details about component values, see the Application Information section on page 3.

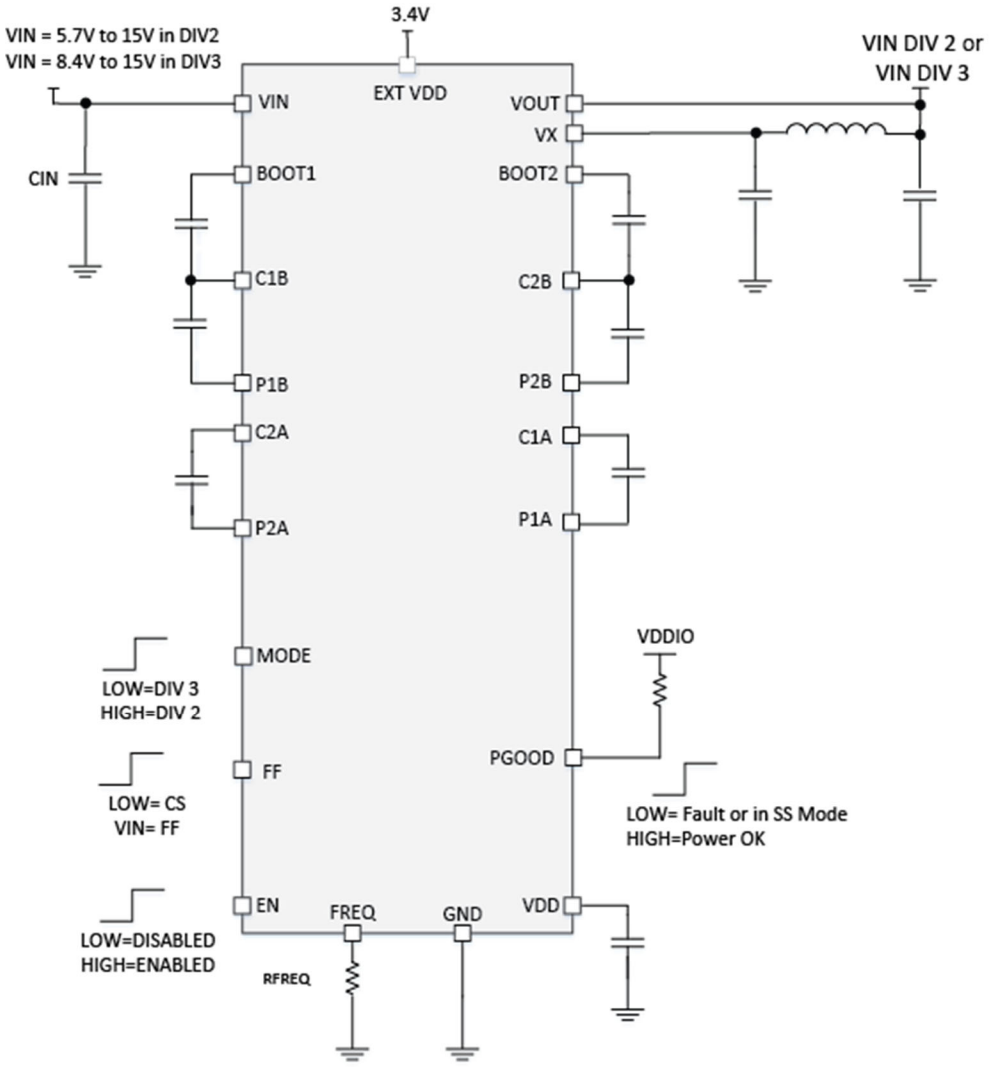


Figure 3. Simplified Application Circuit

Application Information

The PE25213 is a charge pump-based DC-DC ratiometric converter. It is a high-efficiency bus converter in which the output follows the input by a fixed ratio of divide-by-2 or divide-by-3. Because of its architecture, there are differences from conventional inductive buck converters.

Application Schematic

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

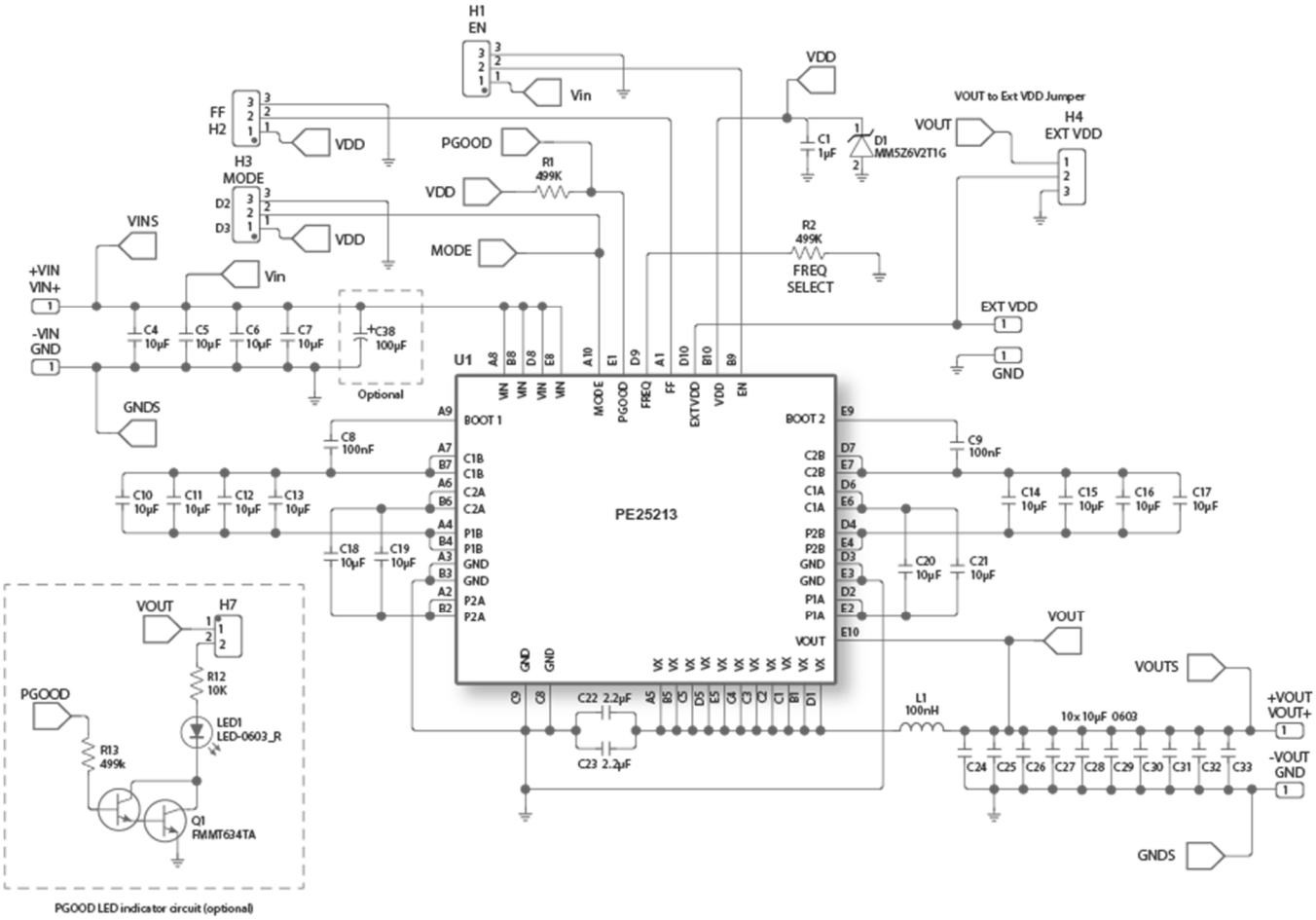


Figure 4. Detailed Application Schematic Circuit

Application Circuit Part List

Table 1 lists Murata recommended parts.

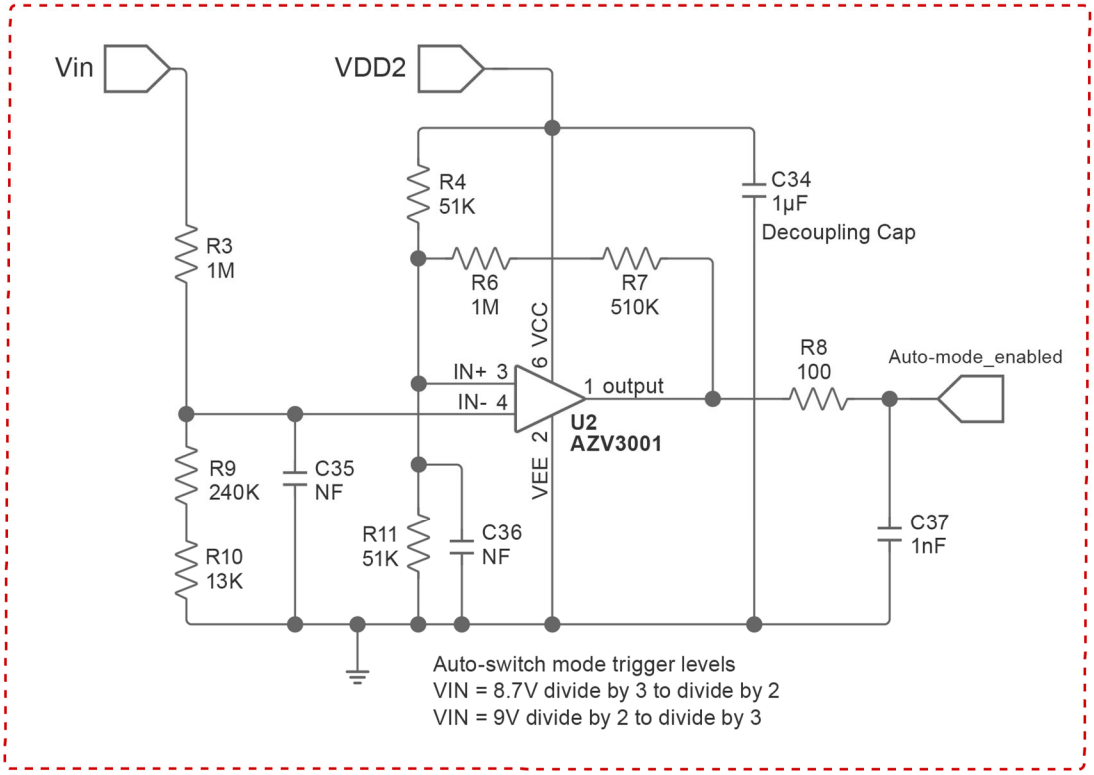
Table 1. Murata Recommended Parts

Ref. Number	Value	Part Size	Part Number
C1	1µF 6.3V X7R or better	0402	GRM155R70J105KA12D
C4, C5, C6, C7, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21	10µF 25V X5R or better	0603	GRM188R61E106KA73D
C8, C9	100 nF 100V X5R or better	0402	GRM155R62A104KE14D
C22, C23 (*)	2.2µF 25V X5R or better	0402	GRM155C81C225ME15D (X6S) GRM155R61E225KE11D (X5R)
C24, C25, C26, C27, C28, C29, C30, C31, C32, C33	10µF 25V X5R	0603	GRM188R61E106KA73D
D1	DIODE ZENER 6.2V 500MW	SOD523	MM5Z6V2T1G
L1	100 nH	2.5 mm x 2 mm x 1.2 mm	TFM252012ALMAR10MTAA
R1, R2	499k	0603	RC0603FR-07499KL
U1	Divide-by-2 and -3, 10A Charge Pump, Capacitor Divider		PE25213

Note *: X5R for applications with maximum TA<=85°C and X6S for applications with maximum TA>85°C but <=105°C.

Auto-switch Mode Circuit

The circuit shown in Figure 5 is implemented to achieve the auto-switch mode ratio of the PE25213 EVK.



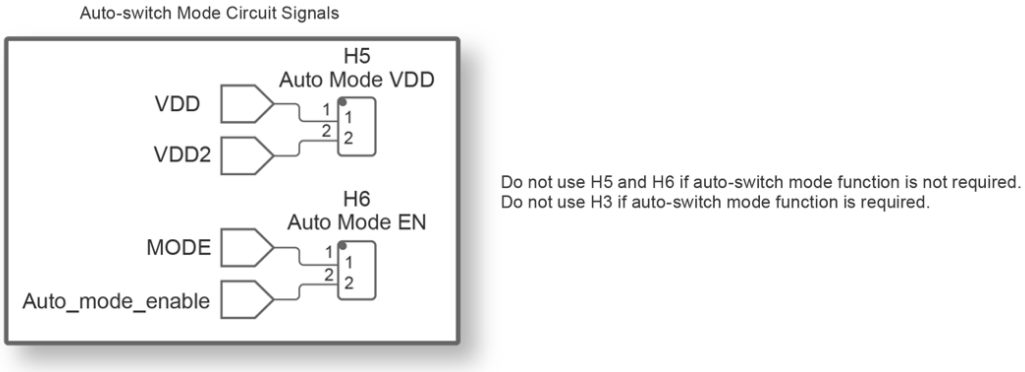


Figure 5. Optional Auto-switch Mode Circuit

Order Codes

Table 2 lists the available ordering codes for the PE25213 as well as available shipping methods.

Table 2. Order Codes

Order Codes	Description	Packaging	Shipping Method
PE25213A-V	10A Charge Pump Divide 2/3	WLCSP on Tape and Reel	250 Units / T&R
PE25213A-R	10A Charge Pump Divide 2/3	WLCSP on Tape and Reel	5000 Units / T&R
EK25213-01	PE25213 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 in order 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.