

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

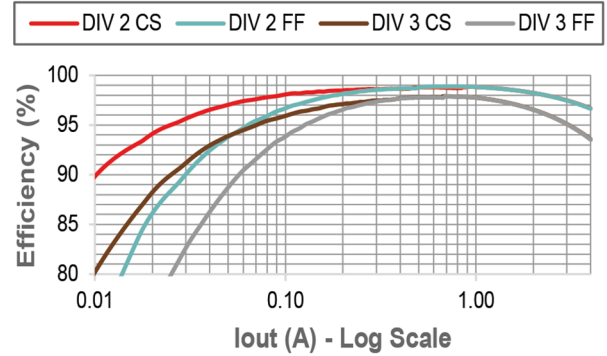


Figure 1. Typical Efficiency with $V_{IN} = 7.7V$ in Divide-by-2 and $V_{IN} = 11.55V$ in Divide-by-3, Fixed Frequency (FF) and Cycle Skip (CS) Modes.

Simplified Application

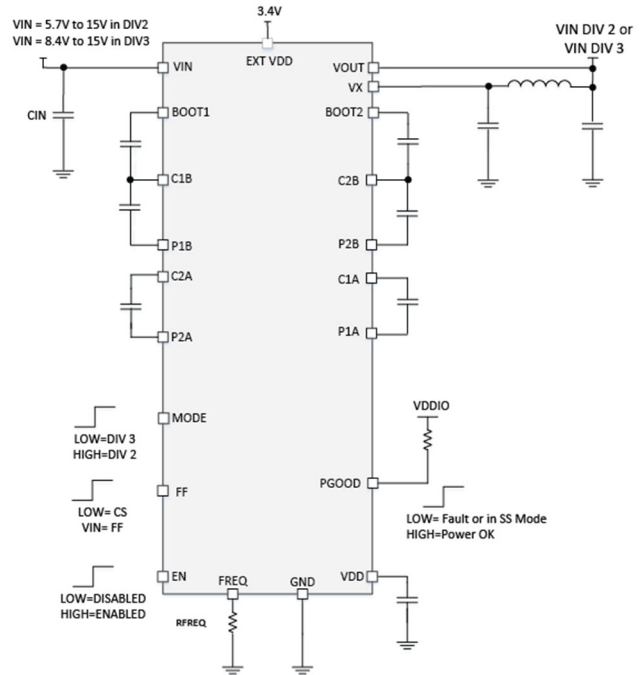


Figure 2. Application Schematic

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.

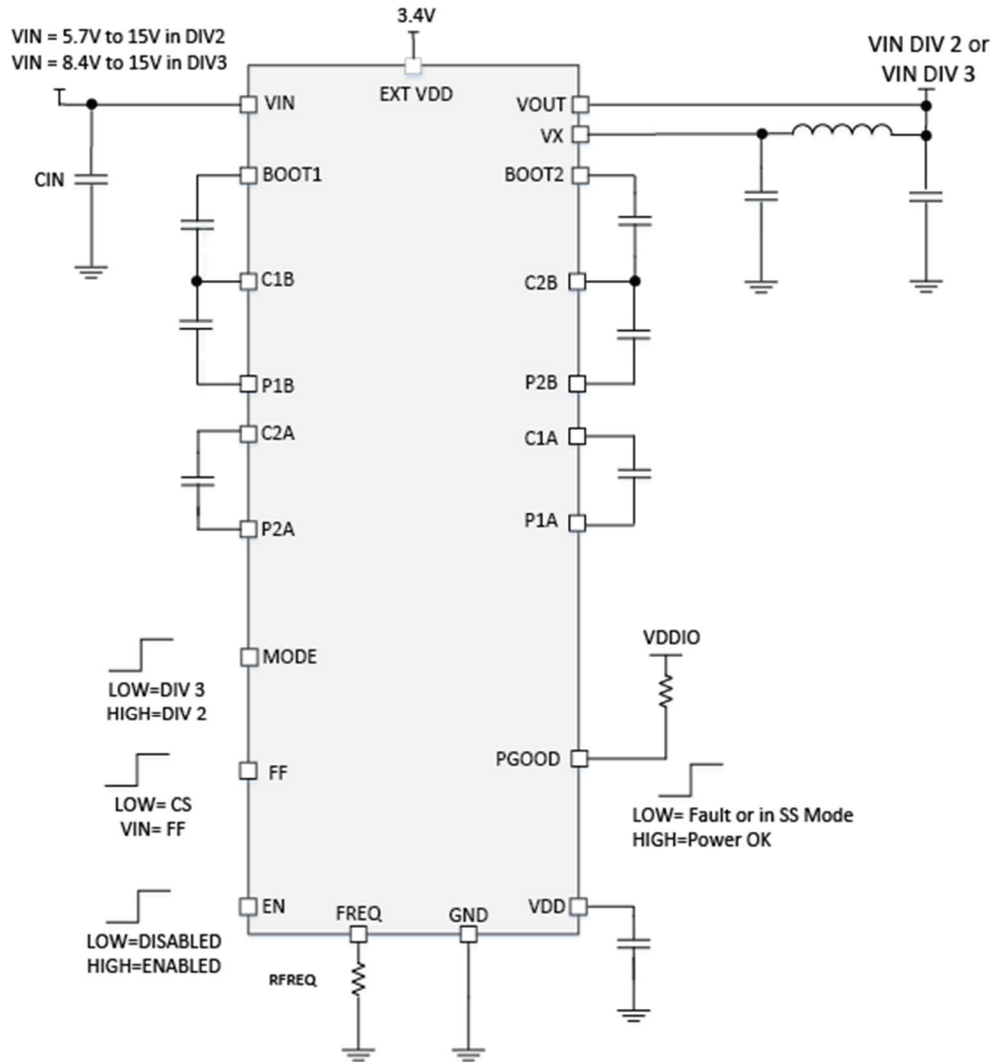


Figure 3. Simplified Application Circuit

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.

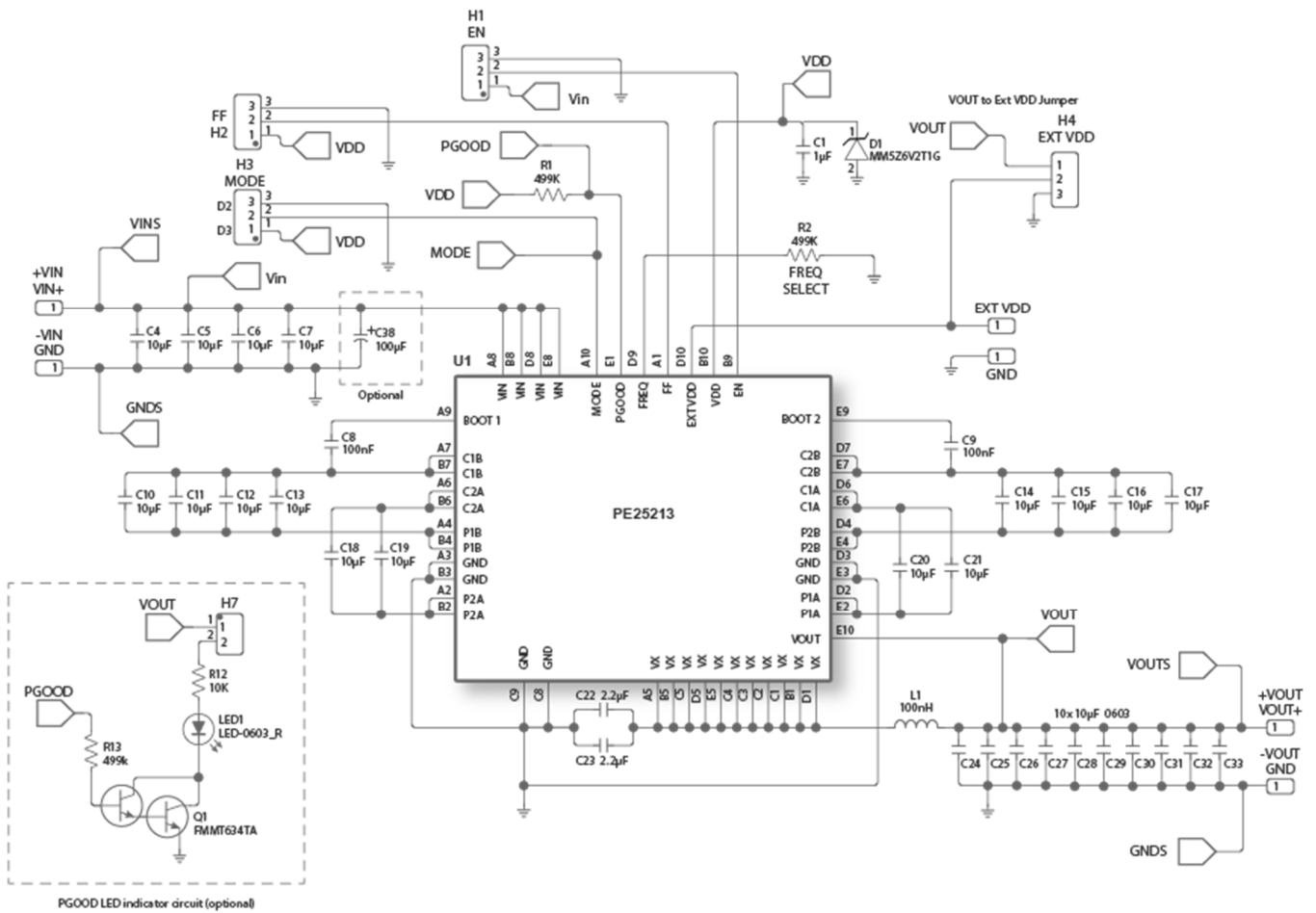


Figure 4. Detailed Application Schematic Circuit

Application Circuit Part List

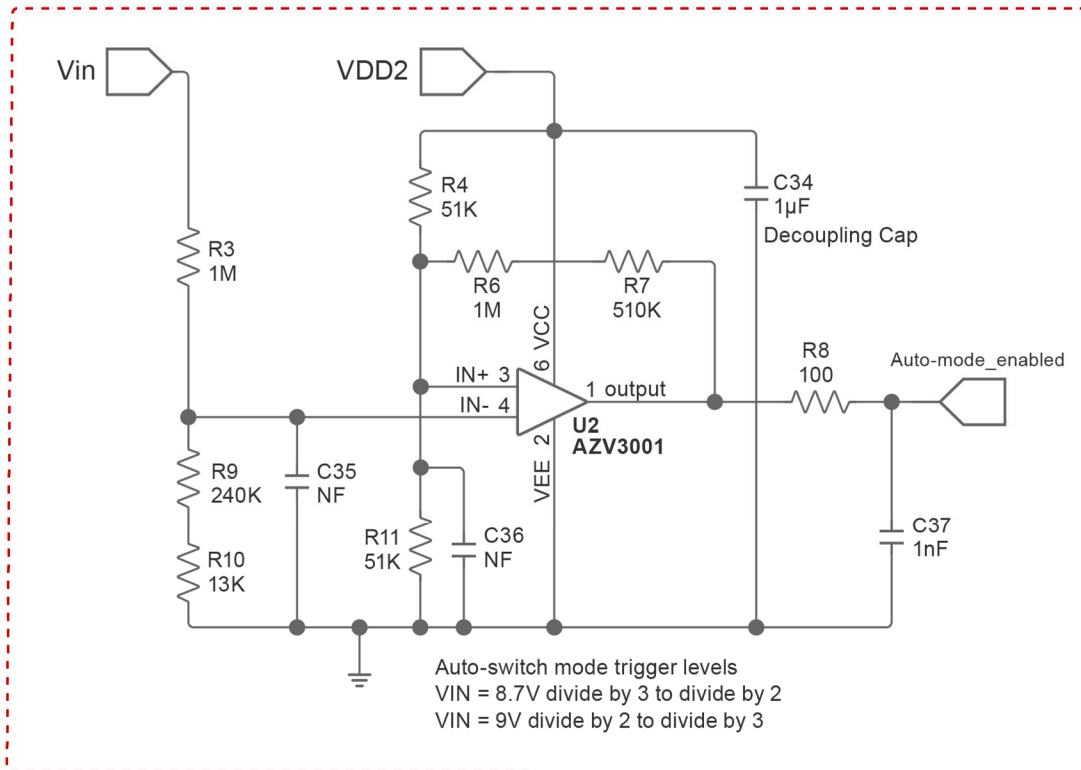
Table 1 lists Murata recommended parts.

Table 1. Murata Recommended Parts

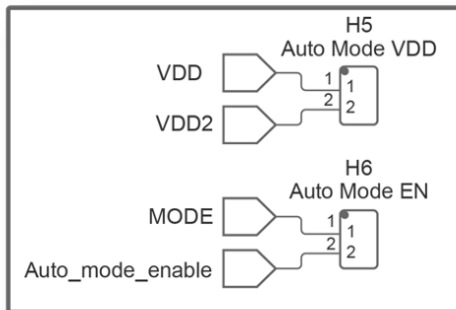
Ref. Number	Value	Part Size	Part Number
C1	1 μ F 6.3V X7R or better	0402	GRM155R70J105KA12D
C4, C5, C6, C7, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21	10 μ F 25V X5R or better	0603	GRM188R61E106KA73D
C8, C9	100 nF 100V X5R or better	0402	GRM155R62A104KE14D
C22, C23 (*)	2.2 μ F 25V X5R or better	0402	GRM155C81C225ME15D (X6S) GRM155R61E225KE11D (X5R)
C24, C25, C26, C27, C28, C29, C30, C31, C32, C33	10 μ F 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 \leq 85°C and X6S for applications with maximum TA $>$ 85°C but \leq 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.



Auto-switch Mode Circuit Signals



Do not use H5 and H6 if auto-switch mode function is not required.
 Do not use H3 if auto-switch mode function is required.

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

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Product Specification

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Product Brief

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

Sales Contact

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