

PE25208

Document Category: Product Brief



48 V_{IN} Divide-by-2- and -3, 8A Charge Pump, Capacitor Divider

General Description

The PE25208 is an ultra-high efficiency charge pump IC that is configurable to divide down an input voltage by two or three and delivers up to 8A with peak efficiency up to 98.2%. The PE25208 can also be used in parallel to increase output power

The PE25208 supports an input voltage range of 18V to 45V in divide-by-2 mode and 18V to 60V in divide-by-3 mode. The PE25208 is primarily used as a front-end converter to convert the USB PD EPR input to a lower voltage for downstream charger circuit with improved overall system efficiency.

The PE25208 comes in an 8.095 mm × 4.095 mm 148-pin WLCSP package. The pinout is specially designed to be fully compatible with Type III PCB design.

Features

- Proprietary architecture enables industry-leading efficiency in an ultra-compact footprint and low-profile solution
- Parts can be operated in parallel for higher output power
- Input voltage range of 18V to 60V supports USB PD EPR input and custom AC–DC bricks
- Peak efficiency of 98.2%
- Selectable divide-by-3 or divide-by-2 mode
- Fully protected with input under-voltage, output short circuit detection and thermal shutdown fault detection
- Low EMI fixed-frequency operation under heavy load conditions

Applications

- Ultrabooks/notebook computers
- Portable workstations
- Gaming laptops

Efficiency

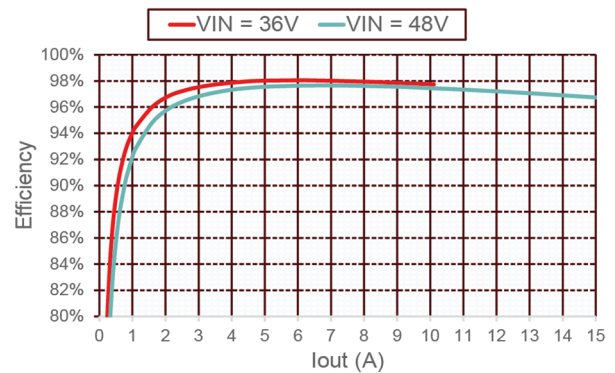


Figure 1. PE25208 typical efficiency vs. I_{OUT} at 48V divide-by-3 and 36V divide-by-2 parallel operations

Application

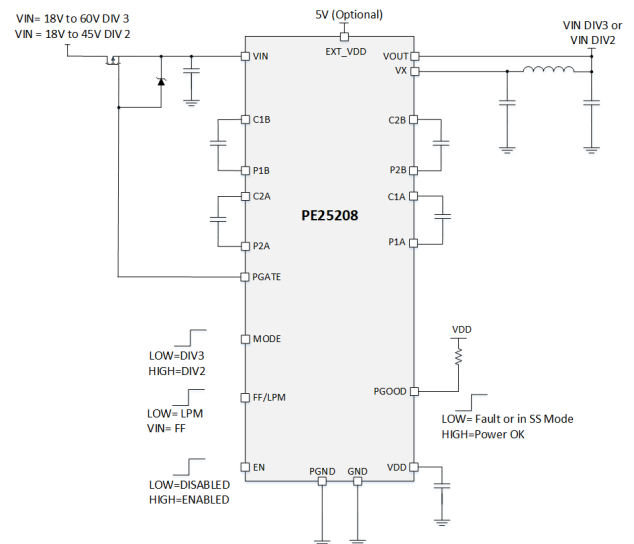


Figure 2. PE25208 Typical Application Circuit

Application Circuits

Figure 3 shows the application circuit for the PE25208 in single-IC operation.

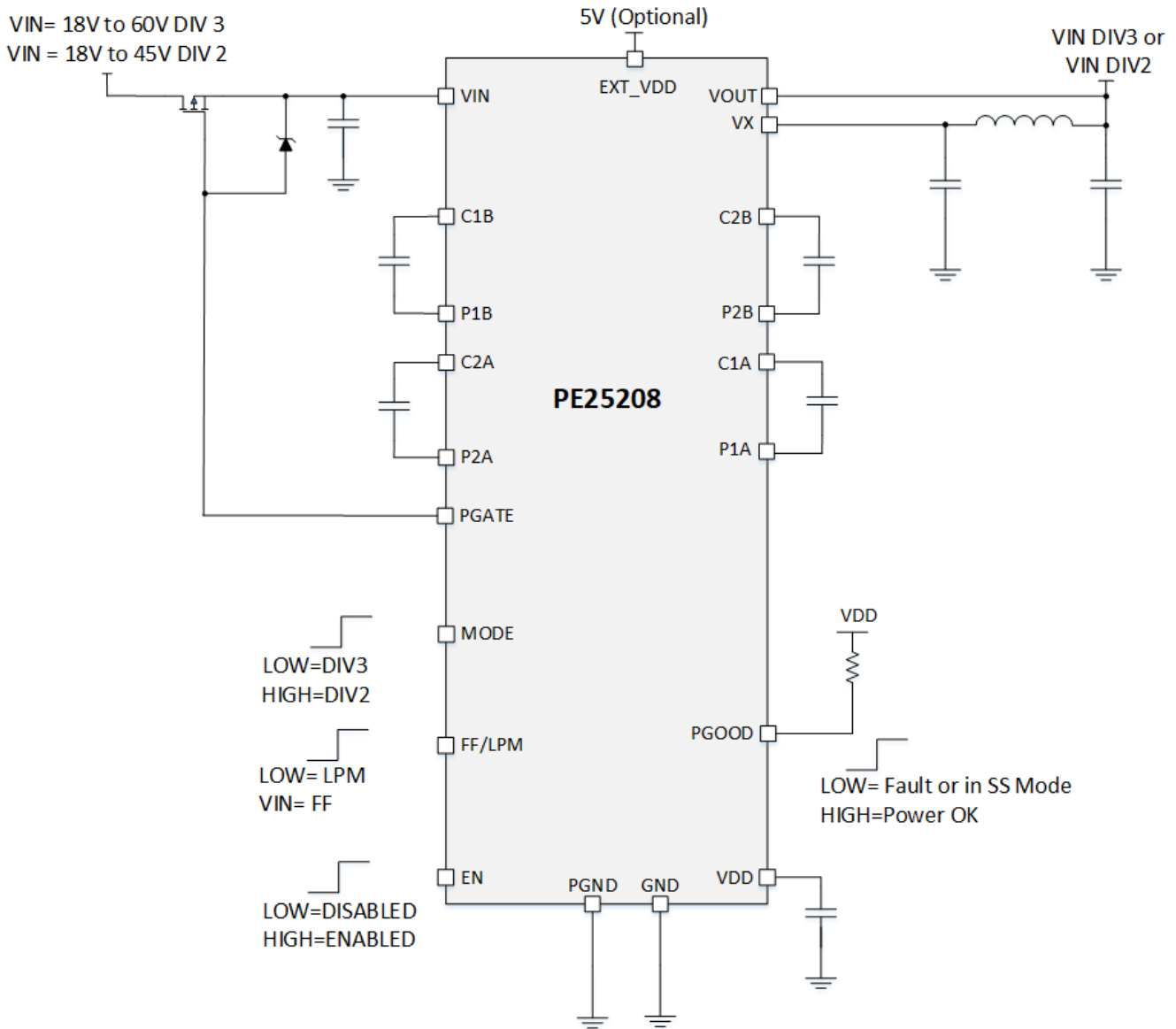


Figure 3. PE25208 Application Circuit in Single-IC Operation

Figure 4 shows the application circuit for the PE25208 in parallel-IC operation.

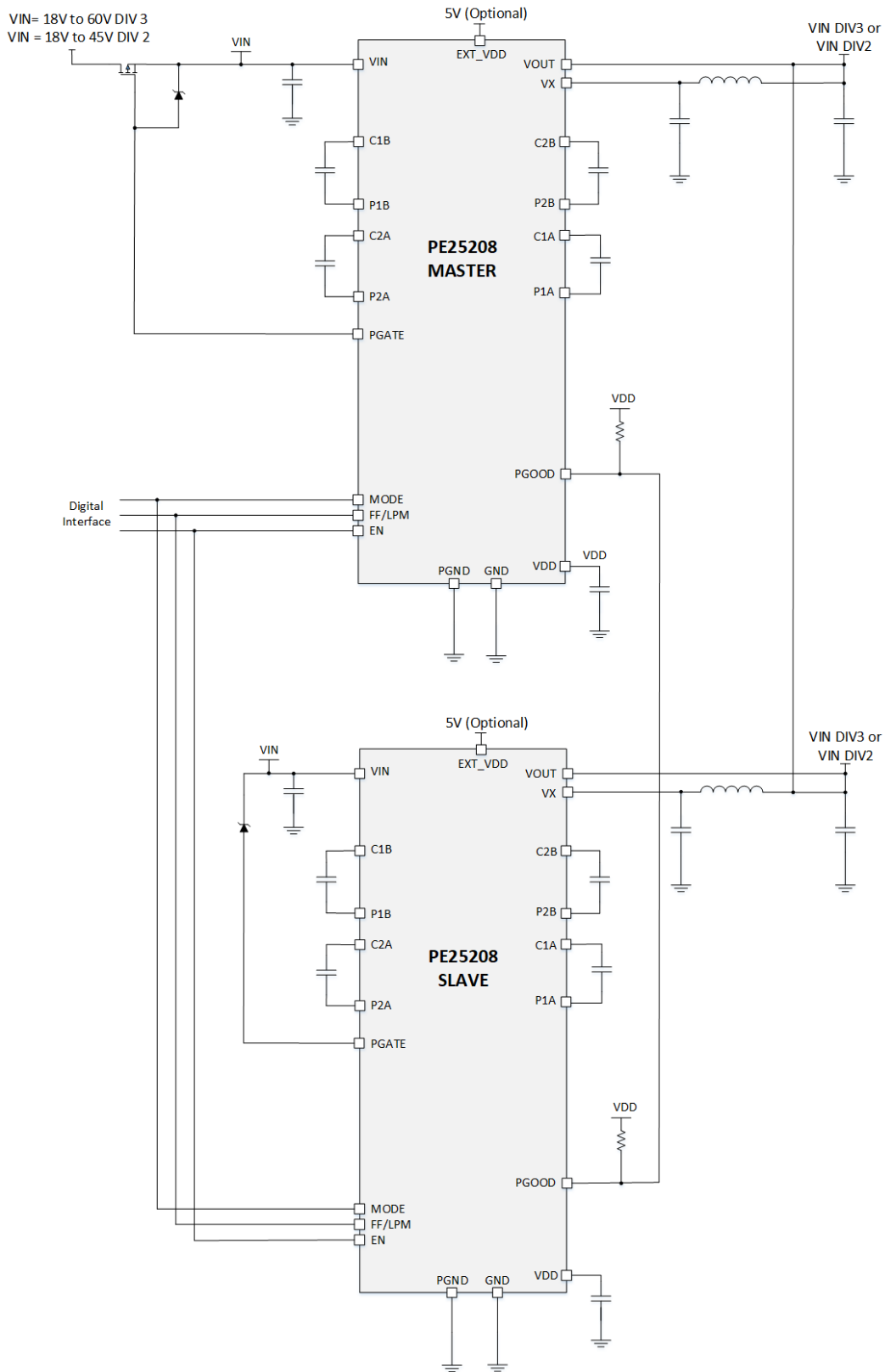


Figure 4. PE25208 Application Circuit in Parallel-IC Operation

Applications Information

The PE25208 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 Schematics

Figure 5 and Figure 6 show the PE25208 application schematic examples. For the recommended components, see Table 1 and Table 2.

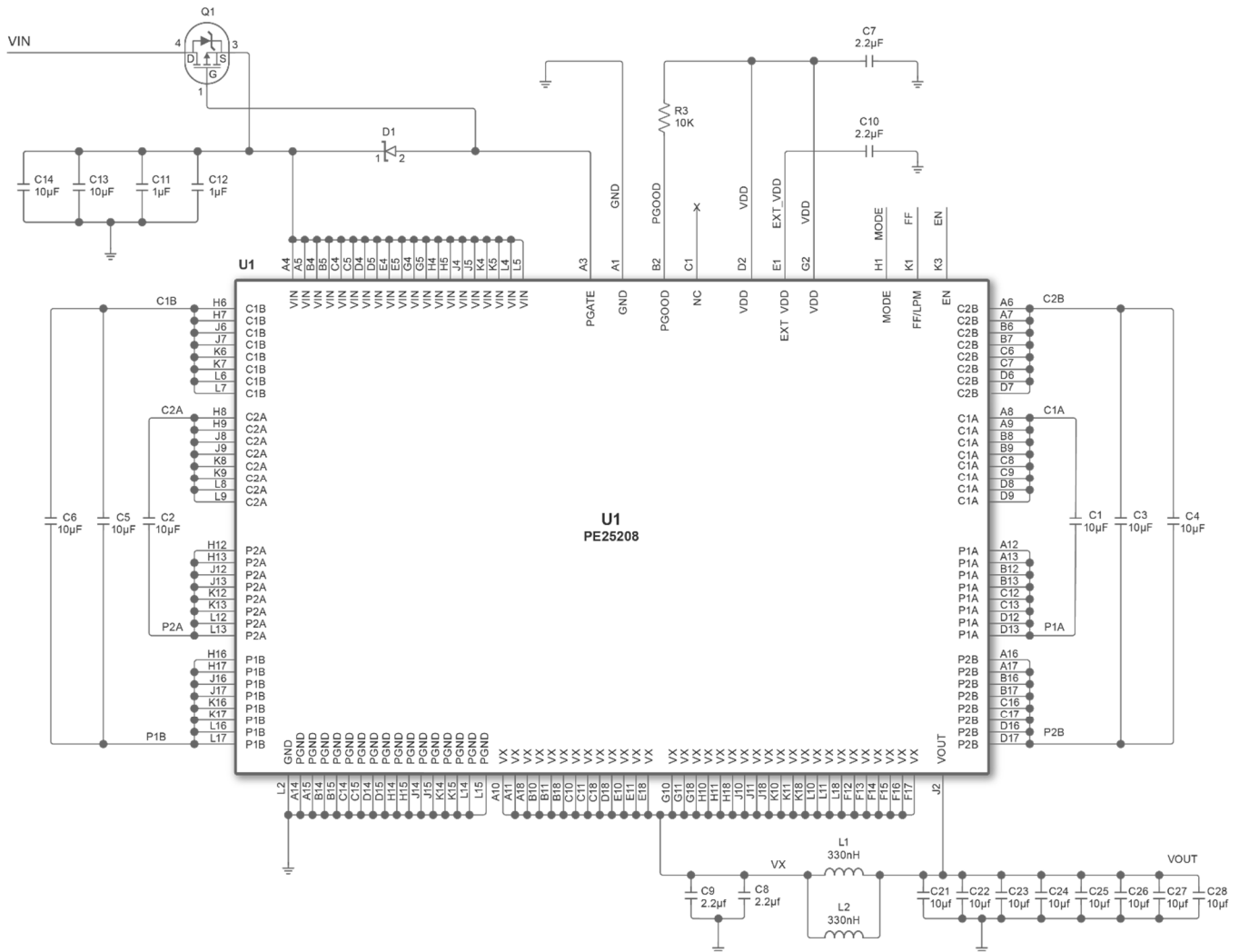


Figure 5. PE25208 Single Application Schematic

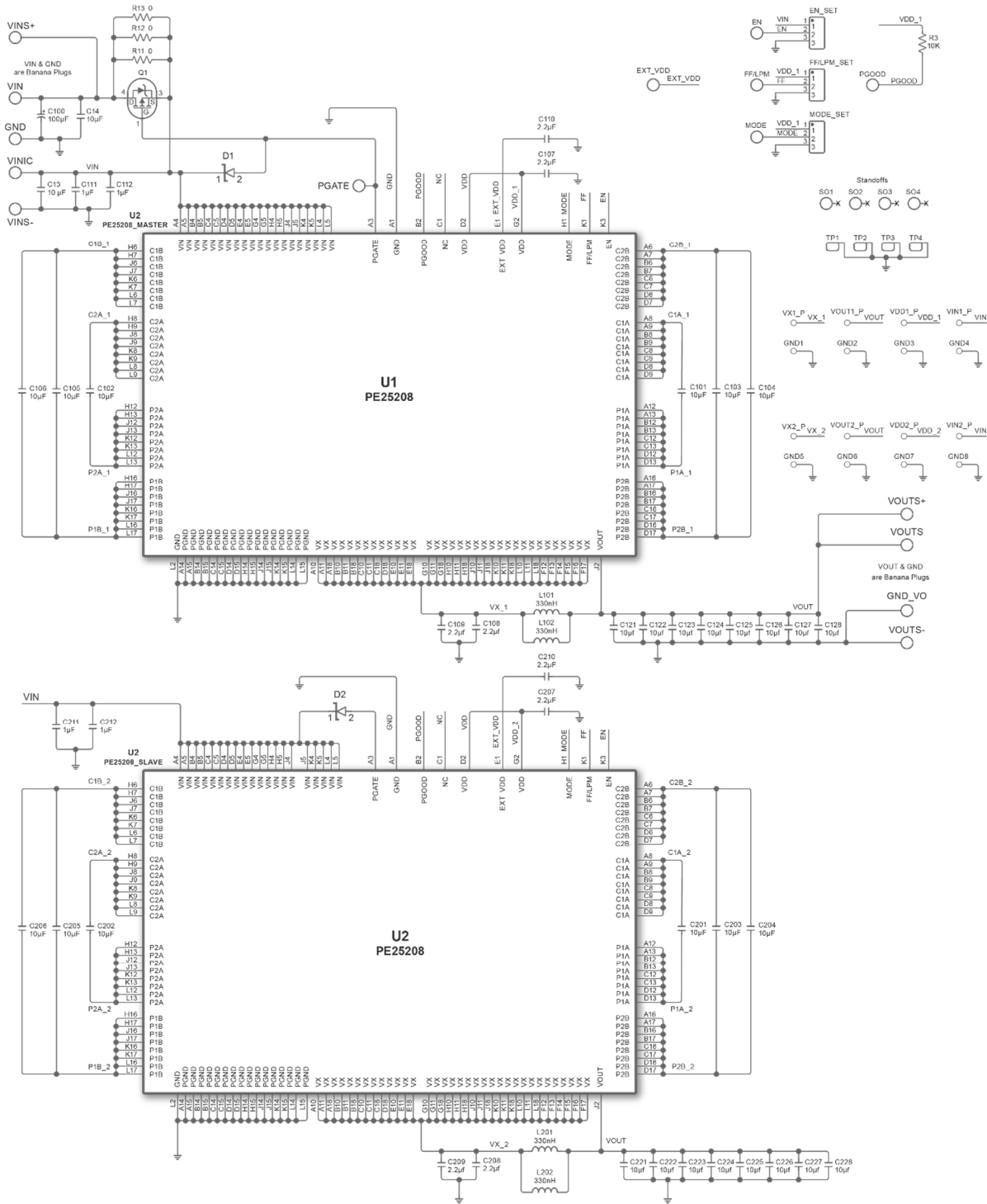


Figure 6. PE25208 Parallel Operation Schematic

Recommended Components

Table 1 lists examples of the standard components for the single application schematic in Figure 5. Table 2 lists examples of the standard components for the parallel application schematic in Figure 6. The components must be chosen by referring to system requirements, such as voltage, temperature, and so on. The information in these table is under evaluation and subject to change.

Table 1. PE25208 Single Recommended Components

Reference	Value	Description	Manufacturer	Part Number
C1, C2, C3, C4, C5, C6, C13, C14	10 μ F	Charge pump fly capacitor 10 μ F 100V X7S 1210	Murata	GRM32EC72A106KE05
C11, C12	1 μ F	Input capacitor 1 μ F 100V X7S 0805	Murata	GRM21BC72A105KE01
C7, C10	2.2 μ F	VDD and EXT_VDD capacitors 2.2 μ F 25V X5R 0402	Murata	GRM155R61E225ME15
C8, C9	2.2 μ F	VX capacitor 2.2 μ F 50V X5R 06 03	Murata	GRM188R61H225ME11
C21, C22, C23, C24, C25, C26, C27, C28 ¹	10 μ F	VOUT capacitor 10 μ F 50V X5R 0805	Murata	GRM21BR61H106KE43
L1, L2	330 nH	VX inductor 330 nH 7.8A 8 MOHM SMD	Cyntec	HTEL25201B-R33MXR-01
D1	Diode	Zener single diode, 5.6V, SOD-523, 2 pins	ONSEMI	MM5Z5V6T1G
R3	10 k Ω	PGOOD pull-up resistor 10 k Ω 1% 1/10W 0603	Panasonic	ERJ-3EKF1002V
Q1 ²	MOSFET	MOSFET P-CH 100V 37.1A TO252	Vishay	SUD50P10-43L-GE3
U1	PE25208	High voltage divide-by-2/3 charge pump	pSemi	PE25208A-R
Notes:				
1. The minimum required VOUT capacitance is 47 μ F. The maximum VOUT capacitance is 1 mF.				
2. The Q1 external P-channel FET is optional.				

Table 2. PE25208 Parallel Recommended Components

Reference	Value	Description	Manufacturer	Part Number
C101, C102, C103, C104, C105, C106, C201, C202, C203, C204, C205, C206, C13, C14	10 μ F	Charge pump fly capacitor 10 μ F 100V X7S 1210	Murata	GRM32EC72A106KE05
C111, C112, C211, C212	1 μ F	Input capacitor 1 μ F 100V X7S 0805	Murata	GRM21BC72A105KE01
C107, C110, C207, C210	2.2 μ F	VDD and EXT_VDD capacitors 2.2 μ F 25V X5R 0402	Murata	GRM155R61E225ME15
C108, C109, C208, C209	2.2 μ F	VX capacitor 2.2 μ F 50V X5R 06 03	Murata	GRM188R61H225ME11
C121, C122, C123, C124, C221, C222, C223, C224 ¹	10 μ F	VOUT capacitor 10 μ F 50V X5R 0805	Murata	GRM21BR61H106KE43
L101, L102, L201, L202	330 nH	VX inductor 330 nH 7.8A 8 MOHM SMD	Cyntec	HTEL25201B-R33MXR-01
D1, D2	Diode	Zener single diode, 5.6V, SOD-523, 2 pins	ONSEMI	MM5Z5V6T1G
R3	10 k Ω	PGOOD pull-up resistor 10 k Ω 1% 1/10W 0603	Panasonic	ERJ-3EKF1002V
Q1 ²	MOSFET	MOSFET P-CH 100V 37.1A TO252	Vishay	SUD50P10-43L-GE3
U1, U2	PE25208	High voltage divide-by-2/3 charge pump	pSemi	PE25208A-R
Notes:				
1. The minimum required VOUT capacitance is 47 μ F. The maximum VOUT capacitance is 1 mF.				
2. The Q1 external P-channel FET is optional.				

Ordering Information

Table 3 lists the PE25208 ordering codes and shipping methods.

Table 3. PE25208 Order Codes and Shipping Methods

Order Codes	Description	Packaging	Shipping Method
PE25208A-R	8A Charge Pump Divide by 2 or 3	WLCSP	5000 Units/Tape and Reel
PE25208A-V (not for production use)	8A Charge Pump Divide by 2 or 3	WLCSP	250 Units/Tape and Reel

Document Categories

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Product Brief

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

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