PE24108

Document Category: Product Brief

3.3 Vin, 10A, Two-stage Buck Regulator for Low Output Voltage Applications

General Description

The **PE24108** is a compact, low-profile, and ultra-high efficiency step-down DC-DC converter solution capable of delivering 10A per stage output current from an input voltage range from 3.0V to 3.6V. The output voltage is selected with external feedback resistors and can be adjusted between 0.4 and 1.0V.

Based on Murata's advanced two-stage architecture, the device consists of a two-phase interleaved charge pump followed by an interleaved buck regulator stage. This power system greatly reduces the dependency on inductance for high efficiency solutions in small-footprint and height-constrained applications.

Features

- Proprietary architecture enabling industry-leading efficiency with ultra-low profile and footprint
- 92% peak efficiency
- Wide input voltage range, from 3.0V to 3.6V, that supports running off a nominal 3.3V bus supply
- Output voltage regulation accuracy better than ±1% for all line and load variations
- Output voltage set by external feedback resistors
- Output can be adjusted by external AVS DAC
- External sync pin allows synchronization to an external clock
- Parallel up to four devices

Typical Applications

- Low-profile point-of-load (POL) regulators
- Optical modules
- Core supplies
- ASICs
- FPGA

Efficiency

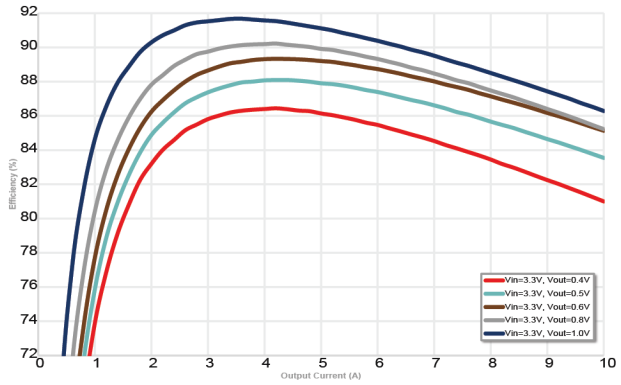


Figure 1. Efficiency Plot of Single Device

Simplified Application

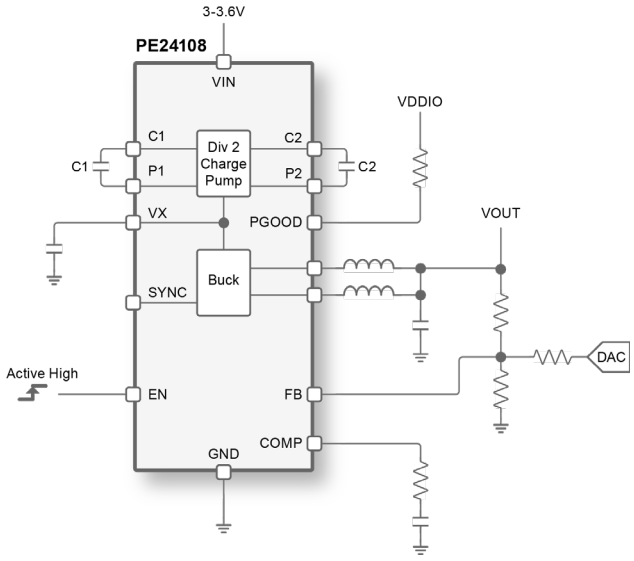


Figure 2. Typical Applications Circuit

http://www.murata.com/products/power

Copyright ©2022–2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.

Typical Performance Characteristics

Figure 3 through Figure 20 shows the typical operating performance data of the PE24108.

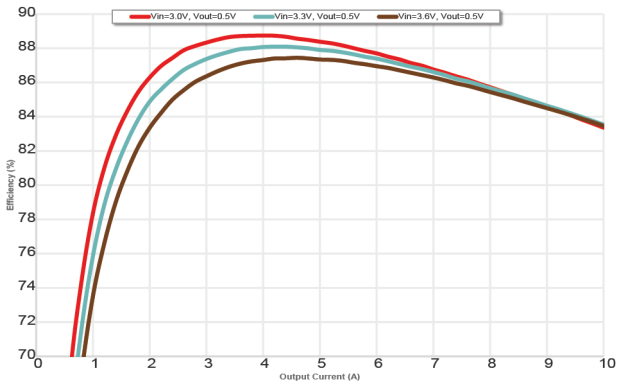


Figure 3. Efficiency vs. Load Current Vin=3.0V,3.3V,3.6V Vout=0.5V Single Device Fsw=800 kHz

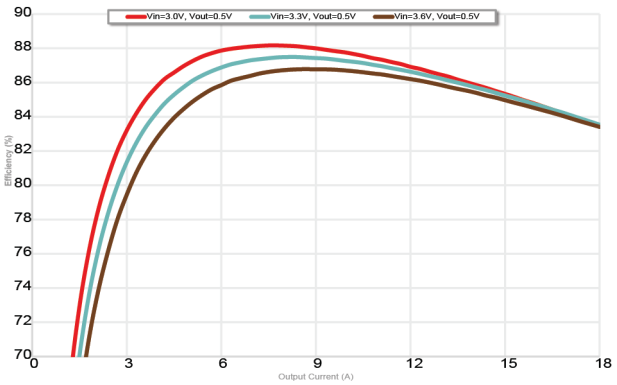


Figure 4. Efficiency vs. Load Current Vin=3.0V,3.3V,3.6V Vout=0.5V 2 Devices in Parallel Fsw=800 kHz

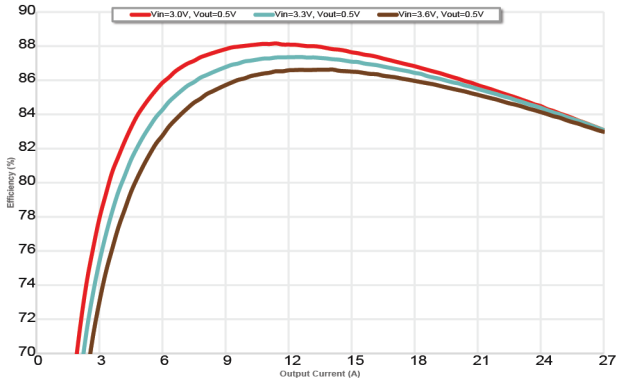


Figure 5. Efficiency vs. Load Current Vin=3.0V,3.3V,3.6V Vout=0.5V 3 Devices in Parallel Fsw=800 kHz

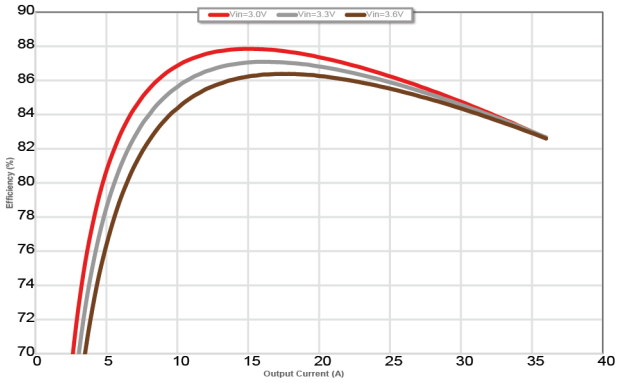


Figure 6. Efficiency vs. Load Current Vin=3.0V,3.3V,3.6V Vout=0.5V 4 Devices in Parallel Fsw=800 kHz

Copyright ©2022–2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.

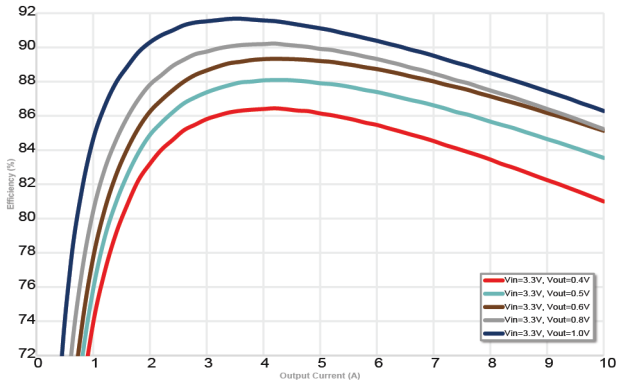


Figure 7. Efficiency vs. Load Current Vin=3.3V Vout=0.4V,0.5V,0.6V,0.8V,1.0V (Single Device)

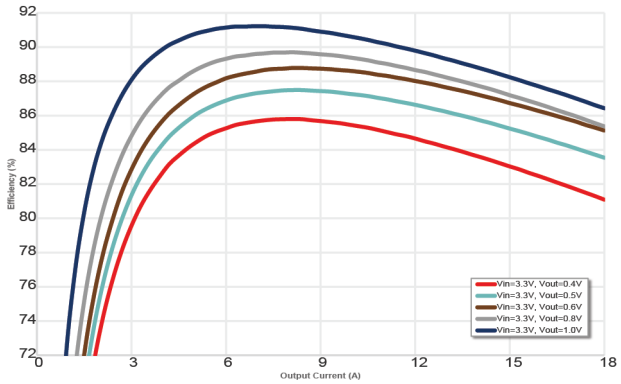


Figure 8. Efficiency vs. Load Current Vin=3.3V Vout=0.4V,0.5V,0.6V,0.8V,1.0V (2 Devices)

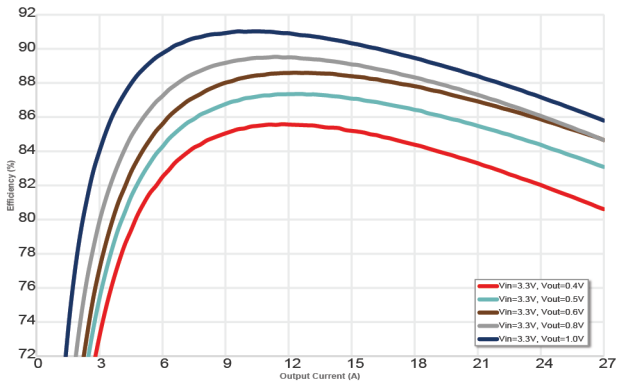


Figure 9. Efficiency vs. Load Current Vin=3.3V Vout=0.4V,0.5V,0.6V,0.8V,1.0V (2 Devices)

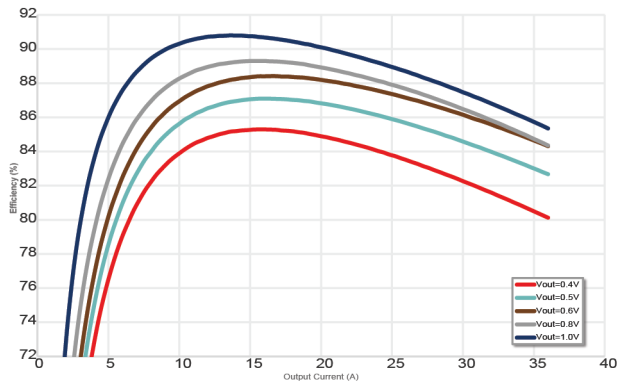


Figure 10. Efficiency vs. Load Current Vin=3.3V Vout=0.4V,0.5V,0.6V,0.8V,1.0V (4 Devices)

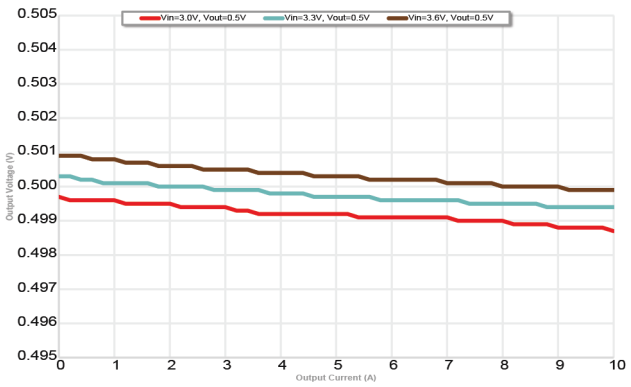


Figure 11. Output Voltage vs. Output Current Single-device, Vout=0.5V

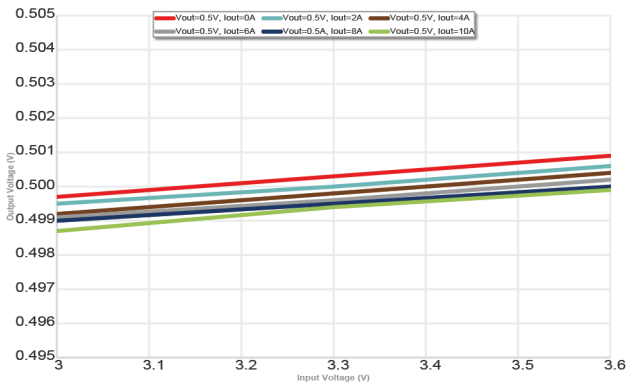


Figure 12. Line Step Output Voltage vs. Input Voltage Single-device, Vout=0.5V (Line Regulation, mV/V)

Copyright ©2022–2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.

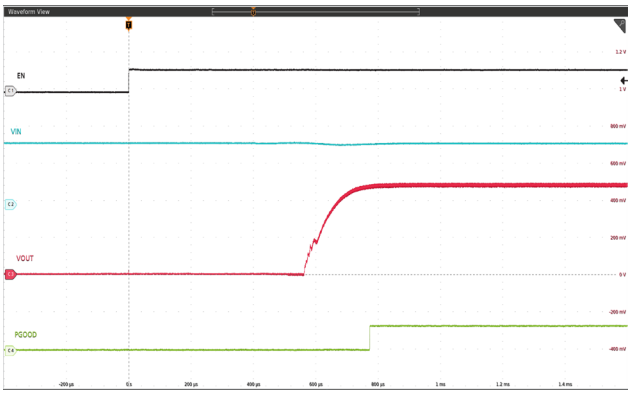


Figure 13. Startup into Load VIN=3.3V VOUT=0.5V IOUT=6A

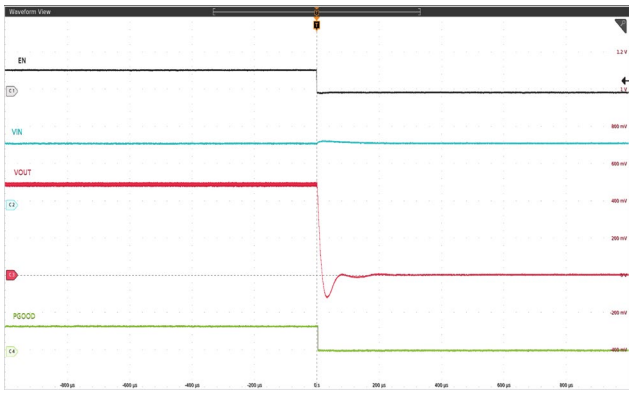


Figure 14. Shutdown into Load VIN=3.3V VOUT=0.5V IOUT=6A

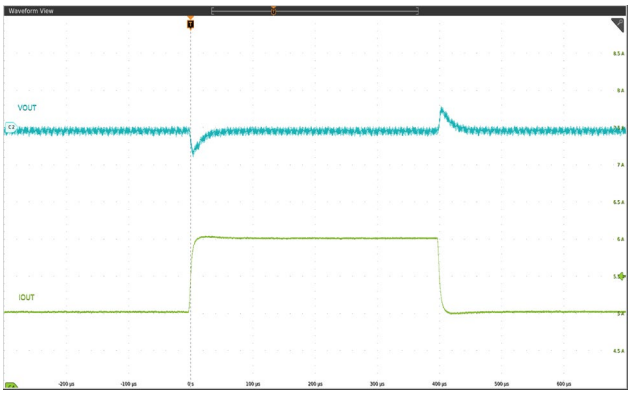


Figure 15. Load Transient 5A to 6A, 0.2A/µs VIN=3.3V, VOUT=0.5V

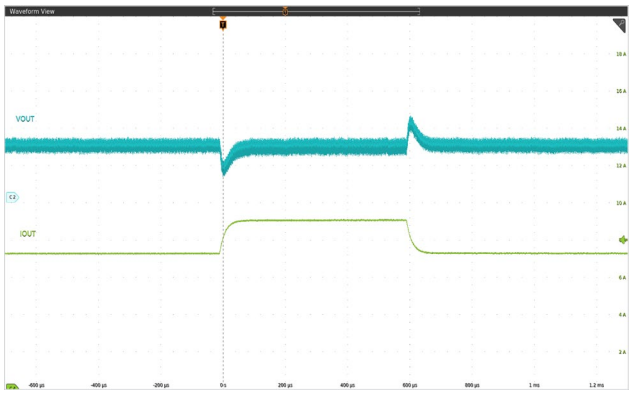


Figure 16. Load Transient 20% 7.2A-9A, 0.5A/µs VIN=3.3V, VOUT=0.5V

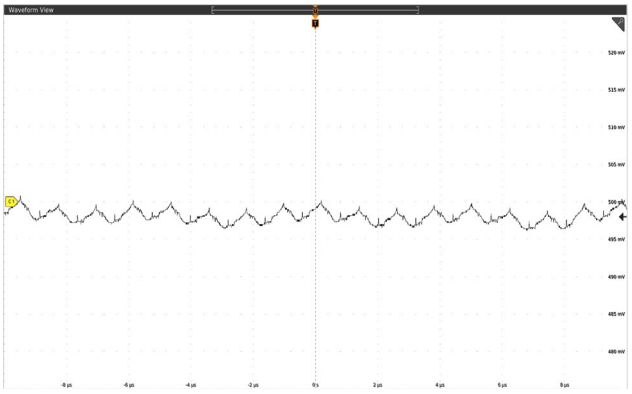


Figure 17. Output Ripple Single EVK VIN=3.3V VOUT= 0.5V I=9A

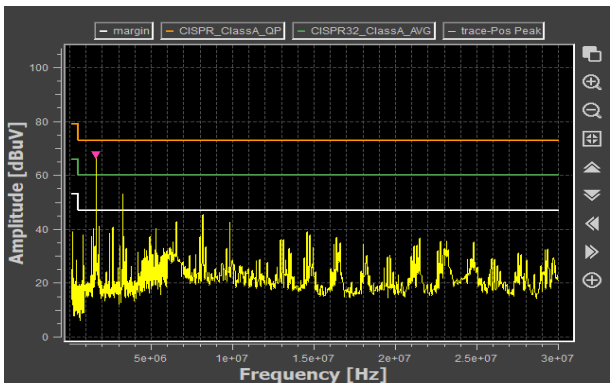


Figure 18. Conducted EMI (Input) Single EVK VIN=3.3V, VOUT=0.5V IOUT=6A

Copyright ©2022–2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.

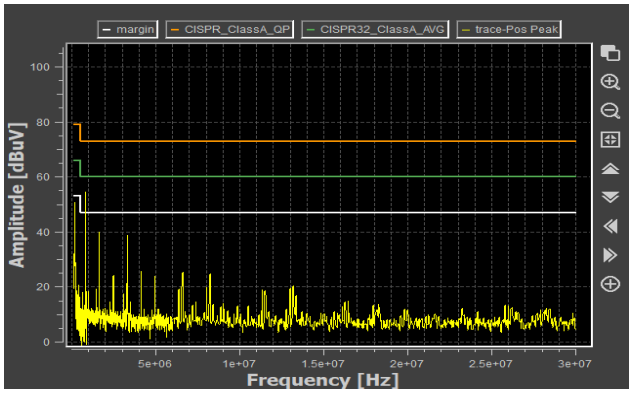


Figure 19. Conducted EMI (VOUT) Single EVK VIN=3.3V, VOUT=0.5V IOUT=6A

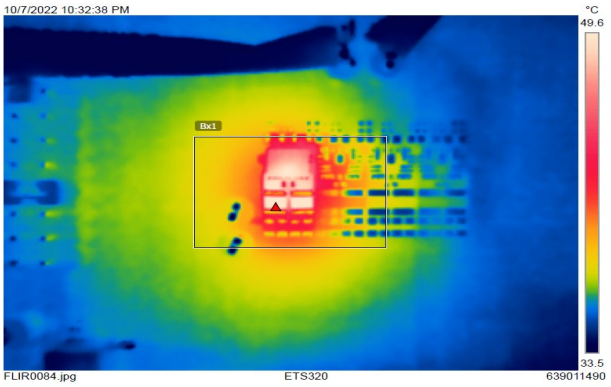


Figure 20. Thermal Plot Single Device VIN=3.3V, VOUT=0.5V IOUT=10A

Copyright ©2022–2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.

Evaluation Board

Figure 21 shows the PE24108 device evaluation board.

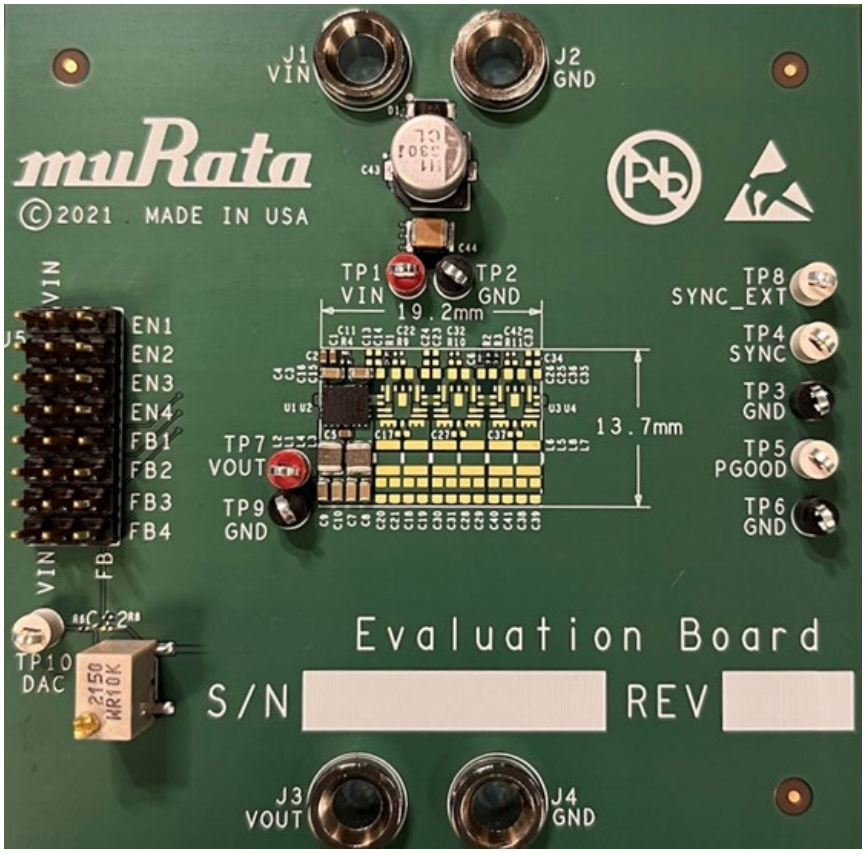


Figure 21. Device Evaluation Board

Copyright ©2022–2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.

Order Codes

Table 1 lists the available ordering codes for the PE24108 as well as available shipping methods.

ORDER CODES	DESCRIPTION	PACKAGING	SHIPPING METHOD
PE24108A-X	10A buck regulator	QFN on tape and reel	500 units / T&R
PE24108A-Z	10A buck regulator	QFN on tape and reel	3000 units / T&R
EK24108-01	PE24108 Evaluation board (EVK)	Evaluation board	1 unit

Table 1. Order Codes

Copyright ©2022–2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.

Notices

⚠ CAUTION

Limitation of Applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might lead to damage to life, body or property.

- Aircraft equipment
- Aerospace equipment
- Undersea equipment
- Power plant control equipment
- Surgical implants
- Transportation equipment (vehicles, trains, ships, etc.)
- Traffic signal equipment
- Disaster prevention / crime prevention equipment
- Application of similar complexity and/or reliability requirements to the applications listed in the above

⚠ Note

1. Please make sure that your product has been evaluated and confirmed to your specifications when our product is used in your product.
2. All the items and parameters in this approval sheet for product specification are based on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us. You are requested not to use our product in a manner deviating from such agreement.
3. If you have any concerns about materials other than those listed in the RoHS directive, please contact us.
4. Be sure to provide an appropriate fail-safe functionality in your product to prevent secondary damage that could be caused by the abnormal function or failure of our product.
5. Do not allow our product to be exposed to excess moisture under any circumstances.

Copyright ©2022–2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.

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. Murata 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 Murata decides to change the specifications, Murata will notify customers of the intended changes by issuing a CNF (Customer Notification Form).

Product Brief

The datasheet contains summary product information.

Sales Contact

For additional information, contact Sales at https://www.murata.com/contactform.

Disclaimers

The information in this document is believed to be reliable. However, Murata and its affiliates do not assume any liability for the use of this information or use of this product. Use shall be entirely at the user's own risk. No patent rights or licenses to any circuits described in this document are implied or granted to any third party. Further, Murata and its affiliates do not assume any liability for damages, including consequential or incidental damages, arising out of the use of this product by customer or any third party in any application for any purpose.

Patent Statement

The products described herein are protected under one or more U.S. patents as further described at: patents.psemi.com

Copyright ©2022–2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.

Copyright and Trademark

2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.

This product is subject to the following operating requirements and the Life and Safety Critical Application Sales Policy.
Refer to: https://power.murata.com/en/requirements

Murata Manufacturing Co., Ltd makes no representation that the use of its products in the circuits described herein, or the use of other technical information contained herein, will not infringe upon existing or future patent rights. The descriptions contained herein do not imply the granting of licenses to make, use, or sell equipment constructed in accordance therewith. Spec and cautions are subject to change without notice.
© 2023 Murata Manufacturing Co., Ltd

Copyright ©2022–2023 Murata Manufacturing Co., Ltd. and pSemi Corporation, a Murata Company. All rights reserved.