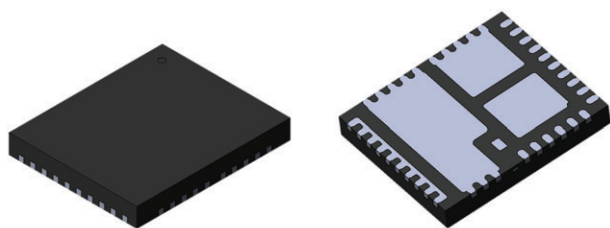


# 100 A VRPower<sup>®</sup>, Smart Power Stage With Current Sensing and Temperature Monitor

(Datasheet in Brief)



## DESCRIPTION

The SiC870A/SiC871A is an integrated power stage solution optimized for synchronous buck applications to offer high current, high efficiency, and high power density. SiC870A/SiC871A integrates the gate driver, high-side MOSFET, and low-side MOSFET together to provide high performance in a small package. It enables simple voltage regulator design to deliver up to 100 A of peak current.

The internal power MOSFETs utilize Vishay's state-of-the-art TrenchFET<sup>®</sup> Gen V technology that delivers industry bench mark performance to significantly reduce switching and conduction losses.

The SiC870A/SiC871A incorporates an advanced MOSFET gate driver IC that features high current driving capability, adaptive dead-time control, integrated bootstrap switch, and a thermal monitor that alerts the system of excessive junction temperature. The driver is compatible with a wide range of PWM controllers, supporting 3.3 V PWM logic with tri-state. The device also integrates a current monitor to provide a real-time representation of the inductor current ( $I_{MON}$ ). An on-board temperature monitor ( $T_{MON}$ ) provides the system an indication of the power stage internal temperature which can be used to throttle the system operation down to a safer level if needed. The device also integrates fault protections and reporting such as over-current, over-temperature, and undervoltage.

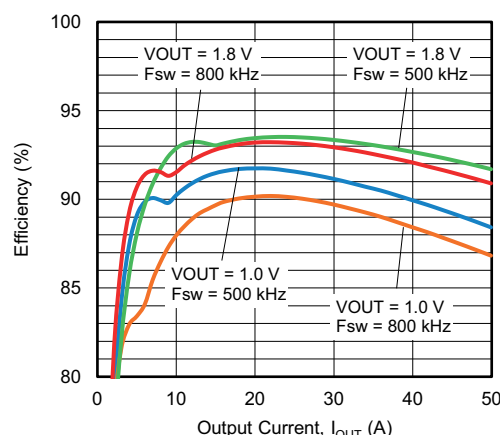
## FEATURES

- Gen V TrenchFET technology optimized for 12 V input bus
- Integrated Schottky diode in low-side MOSFET
- 100 A peak current capability
- High frequency operation up to 1.5 MHz
- Current monitor with 5  $\mu\text{A/A}$  gain (SiC870A) or 5 mV/A (SiC871A)
- Temperature monitor output with 8 mV/ $^{\circ}\text{C}$  gain
- 3.3 V PWM with tri-state support
- Accurate positive and negative over-current protections
- Over-temperature protection
- $V_{CC}$  /  $V_{DRV}$  / BOOT under voltage lockout
- Fault reporting and identification through  $T_{MON}$  and  $I_{MON}$
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

## APPLICATIONS

- Datacenter and server multiphase controller voltage regulators
- High-power SoC and FPGA
- DC/DC VR modules

## EFFICIENCY



**Fig. 1 - Efficiency vs. Output Current**  
( $V_{IN} = 12\text{ V}$ ,  $L = 100\text{ nH}$ ,  $V_{CC} = V_{DRV} = 5\text{ V}$ ,  
driver and inductor loss included)



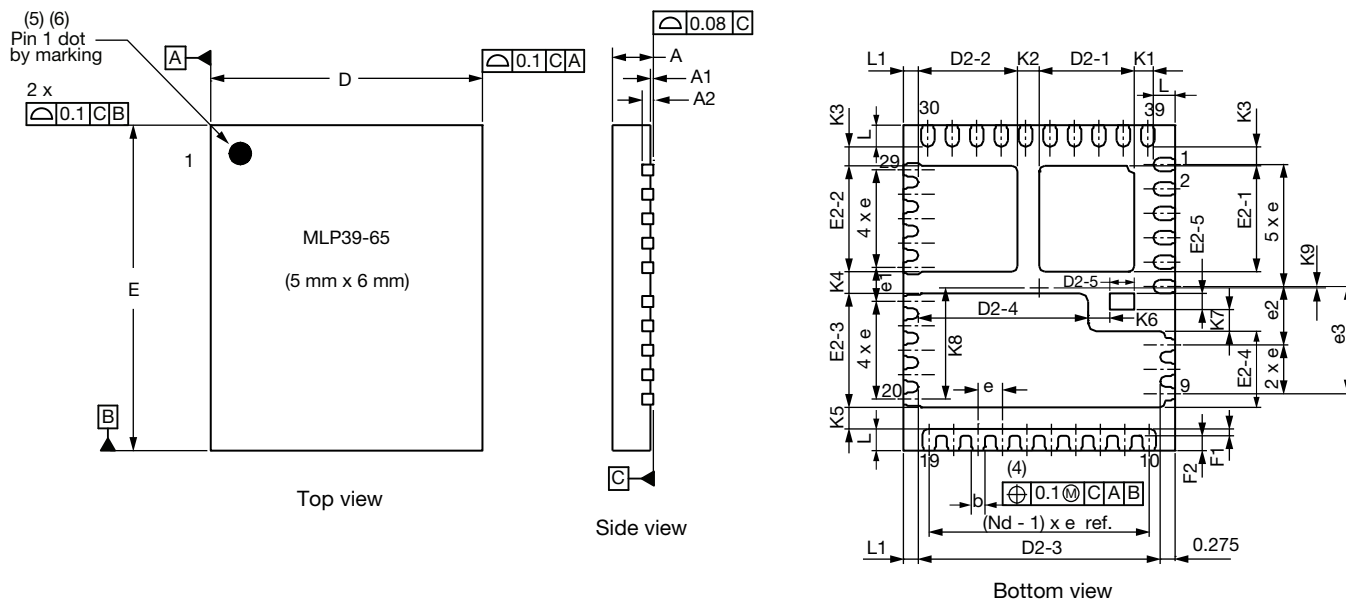
| PRODUCT SUMMARY             |                                                                                 |                                                                                 |
|-----------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Part number                 | SiC870A                                                                         | SiC871A                                                                         |
| Description                 | 100 A smart power stage with current sensing and temperature monitor, 3.3 V PWM | 100 A smart power stage with current sensing and temperature monitor, 3.3 V PWM |
| Input voltage min. (V)      | 4.5                                                                             | 4.5                                                                             |
| Input voltage max. (V)      | 16                                                                              | 16                                                                              |
| Current rating (A)          | 100                                                                             | 100                                                                             |
| Switch frequency max. (kHz) | 1500                                                                            | 1500                                                                            |
| Enable (yes / no)           | Yes                                                                             | Yes                                                                             |
| Monitoring features         | I <sub>MON</sub> , T <sub>MON</sub>                                             | I <sub>MON</sub> , T <sub>MON</sub>                                             |
| IMON output                 | Current mode                                                                    | Voltage mode                                                                    |
| Protection                  | UVLO, OTP, OCP                                                                  | UVLO, OTP, OCP                                                                  |
| Light load mode             | None                                                                            | None                                                                            |
| Pulse-width modulation (V)  | 3.3                                                                             | 3.3                                                                             |
| Package type                | MLP39-65                                                                        | MLP39-65                                                                        |
| Package size (W, L, H) (mm) | 5 x 6 x 0.75                                                                    | 5 x 6 x 0.75                                                                    |
| Status code                 | 1                                                                               | 1                                                                               |
| Product type                | VRPower                                                                         | VRPower                                                                         |
| Applications                | Multiphase voltage regulators                                                   | Multiphase voltage regulators                                                   |

To request the full version of the datasheet, please contact: [ICmarketing@vishay.com](mailto:ICmarketing@vishay.com)

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# PowerPAK® MLP39-65 Case Outline



| DIM.             | MILLIMETERS |      |      | INCHES     |       |       |
|------------------|-------------|------|------|------------|-------|-------|
|                  | MIN.        | NOM. | MAX. | MIN.       | NOM.  | MAX.  |
| A <sup>(8)</sup> | 0.65        | 0.75 | 0.85 | 0.026      | 0.030 | 0.033 |
| A1               | 0.00        | -    | 0.05 | 0.000      | -     | 0.002 |
| A2               | 0.20 ref.   |      |      | 0.008 ref. |       |       |
| b <sup>(4)</sup> | 0.20        | 0.25 | 0.30 | 0.078      | 0.098 | 0.011 |
| D                | 4.90        | 5.00 | 5.10 | 0.193      | 0.197 | 0.201 |
| e                | 0.450 BSC   |      |      | 0.018 BSC  |       |       |
| e1               | 0.625 BSC   |      |      | 0.025 BSC  |       |       |
| e2               | 1.075 BSC   |      |      | 0.042 BSC  |       |       |
| e3               | 1.975 BSC   |      |      | 0.078 BSC  |       |       |
| E                | 5.90        | 6.00 | 6.10 | 0.232      | 0.236 | 0.240 |
| D2-1             | 1.65        | 1.75 | 1.85 | 0.065      | 0.069 | 0.073 |
| D2-2             | 1.73        | 1.83 | 1.93 | 0.068      | 0.072 | 0.076 |
| D2-3             | 4.35        | 4.45 | 4.55 | 0.171      | 0.175 | 0.179 |
| D2-4             | 3.03        | 3.13 | 3.23 | 0.119      | 0.123 | 0.127 |
| D2-5             | 0.35        | 0.45 | 0.55 | 0.014      | 0.018 | 0.022 |
| E2-1             | 1.85        | 1.95 | 2.05 | 0.073      | 0.077 | 0.081 |
| E2-2             | 1.85        | 1.95 | 2.05 | 0.073      | 0.077 | 0.081 |
| E2-3             | 2.00        | 2.10 | 2.20 | 0.079      | 0.083 | 0.087 |
| E2-4             | 1.30        | 1.40 | 1.50 | 0.051      | 0.055 | 0.059 |
| E2-5             | 0.20        | 0.30 | 0.40 | 0.008      | 0.012 | 0.016 |
| L                | 0.30        | 0.40 | 0.50 | 0.012      | 0.016 | 0.020 |
| L1               | 0.18        | 0.28 | 0.38 | 0.007      | 0.011 | 0.015 |
| F1               | 0.125 BSC   |      |      | 0.005 BSC  |       |       |
| F2               | 0.275 BSC   |      |      | 0.011 BSC  |       |       |



| DIM.                                           | MILLIMETERS |            |      | INCHES |            |      |
|------------------------------------------------|-------------|------------|------|--------|------------|------|
|                                                | MIN.        | NOM.       | MAX. | MIN.   | NOM.       | MAX. |
| K1                                             |             | 0.35 ref.  |      |        | 0.014 ref. |      |
| K2                                             |             | 0.40 ref.  |      |        | 0.016 ref. |      |
| K3                                             |             | 0.35 ref.  |      |        | 0.014 ref. |      |
| K4                                             |             | 0.40 ref.  |      |        | 0.016 ref. |      |
| K5                                             |             | 0.40 ref.  |      |        | 0.016 ref. |      |
| K6                                             |             | 0.40 ref.  |      |        | 0.016 ref. |      |
| K7                                             |             | 0.40 ref.  |      |        | 0.016 ref. |      |
| K8                                             |             | 2.048 ref. |      |        | 0.081 ref. |      |
| K9                                             |             | 0.025 ref. |      |        | 0.001 ref. |      |
| N <sup>(3)</sup>                               |             | 39         |      |        | 39         |      |
| Nd <sup>(3)</sup>                              |             | 10         |      |        | 10         |      |
| Ne <sup>(3)</sup>                              |             | 10         |      |        | 10         |      |
| ECN: T19-0296-Rev. D, 23-Sep-2019<br>DWG: 6074 |             |            |      |        |            |      |

**Notes**

- (1) Use millimeters as the primary measurement
- (2) Dimensioning and tolerances conform to ASME Y14.5M. - 1994
- (3) N is the number of terminals  
Nd is the number of terminals in X-direction and  
Ne is the number of terminals in Y-direction
- (4) Dimension b applies to plated terminal and is measured between 0.20 mm and 0.25 mm from terminal tip
- (5) The pin #1 identifier must be existed on the top surface of the package by using indentation mark or other feature of package body
- (6) Exact shape and size of this feature is optional
- (7) Package warpage max. 0.08 mm
- (8) Applied only for terminals



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