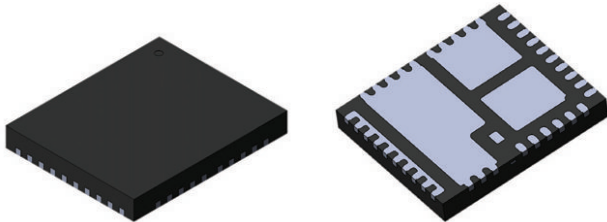


# 80 A VRPower<sup>®</sup>, Smart Power Stage With Current Sensing and Temperature Monitor

(Datasheet in Brief)



## DESCRIPTION

The SiC820 is an integrated power stage solution optimized for synchronous buck applications to offer high current, high efficiency, and high power density performance. Packaged in Vishay's 5 mm x 6 mm MLP package, SiC820 enables voltage regulator design to deliver in excess of 80 A per phase current.

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

The SiC820 incorporates an advanced MOSFET gate driver IC that features high current driving capability, adaptive dead-time control, and integrated bootstrap switch, a thermal monitor that alerts the system of excessive junction temperature. This driver is also compatible with wide range of PWM controllers with the support of both 3.3 V and 5 V PWM logic with tri-state. Diode emulation mode can be enabled at light loads through the use of GLCTRL signal. The device also integrates a current monitor to provide a real time scale down of inductor current ( $I_{MON}$ ). A temperature monitor provides the system an indication of the power stage internal temperature ( $T_{MON}$ ) and can be used to throttle the system operation down to a safer level if needed. The device also integrates fault alerts such as HS FET overcurrent, over temperature and HS MOSFET short failures.

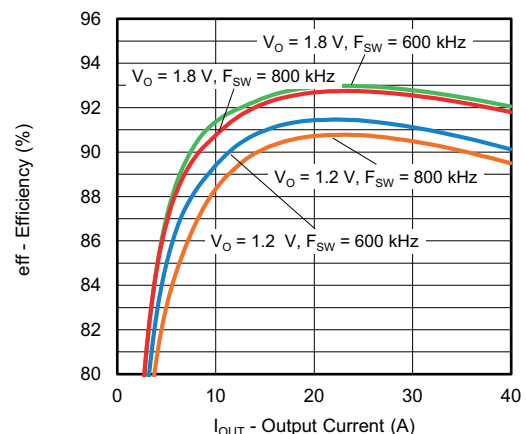
## FEATURES

- Thermally enhanced PowerPAK<sup>®</sup> MLP39-65 package
- Optimize MOSFET switching performance with integrated Schottky diode in LS MOSFET
- Up to 80 A continuous current
- High frequency operation up to 2 MHz
- Power MOSFETs optimized for 12 V input stage and 10 % to 15 % duty cycle operation
- 3.3 V / 5 V PWM logic with tri-state and hold-off
- PWM minimum controllable on time of 30 ns
- Diode emulation mode at light loads for high efficiency over the full load range using GLCTRL pin
- Low PWM propagation delay (< 20 ns)
- Current sense monitor ( $I_{MON}$ )
- Temperature monitor ( $T_{MON}$ )
- Over temperature alert
- HS MOSFET over-current and short alert
- Under voltage lockout for  $V_{DRV}$
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

## APPLICATIONS

- Synchronous buck converters
- Multi-phase VRDs for CPU, GPU, and memory
- DC/DC VR modules

## EFFICIENCY



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



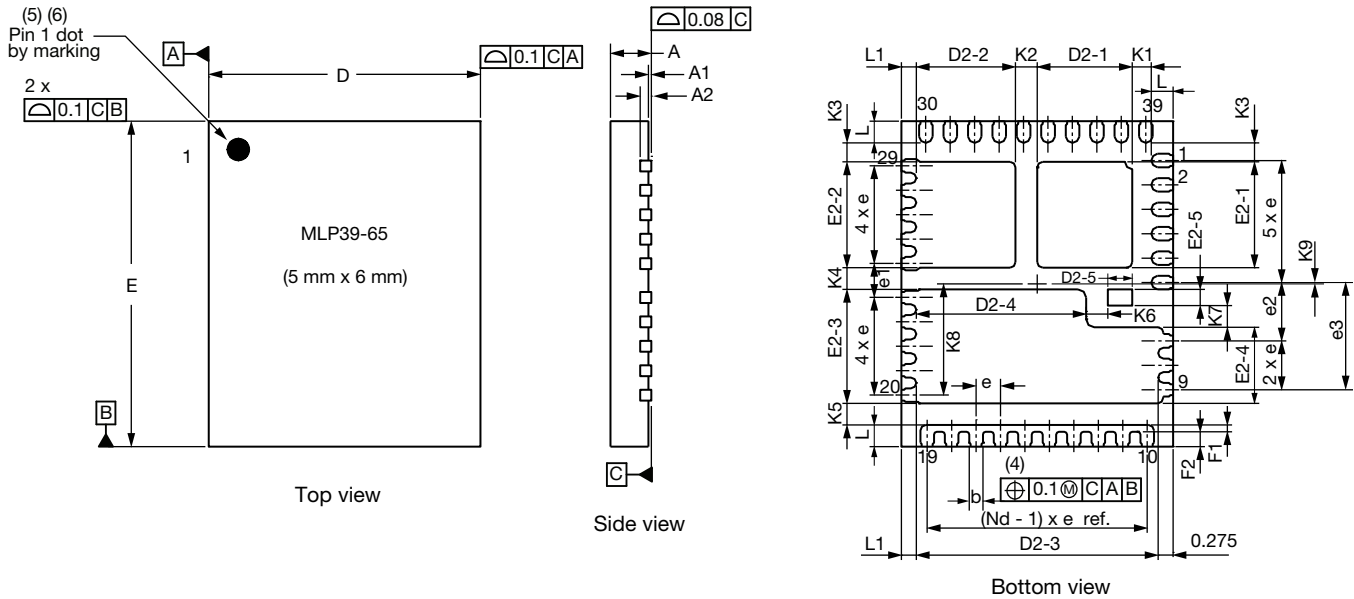
PRODUCT SUMMARY		
Part number	SiC820	SiC820A
Description	80 A smart power stage, 4.5 V to 16 V <sub>IN</sub> , 5 V P <sub>WM</sub> with diode emulation mode	80 A smart power stage, 4.5 V to 16 V <sub>IN</sub> , 3.3 V P <sub>WM</sub> with diode emulation mode
Input voltage min. (V)	4.5	4.5
Input voltage max. (V)	16	16
Continuous current rating max. (A)	80	80
Switch frequency max. (kHz)	2000	2000
Enable (yes / no)	No	No
Monitoring features	T <sub>MON</sub> , I <sub>MON</sub>	T <sub>MON</sub> , I <sub>MON</sub>
Protection	UVLO, OTP, OC flag	UVLO, OTP, OC flag
Light load mode	SMOD	SMOD
Pulse-width modulation (V)	5	3.3
Package type	PowerPAK MLP39-65	PowerPAK MLP39-65
Package size (W, L, H) (mm)	5.0 x 6.0 x 0.75	5.0 x 6.0 x 0.75
Status code	1	1
Product type	VRPower (DrMOS)	VRPower (DrMOS)
Applications	Computer, industrial, networking	Computer, industrial, networking

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

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package / tape drawings, part marking, and reliability data, see [www.vishay.com/ppg?77084](http://www.vishay.com/ppg?77084).



# 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 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



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.