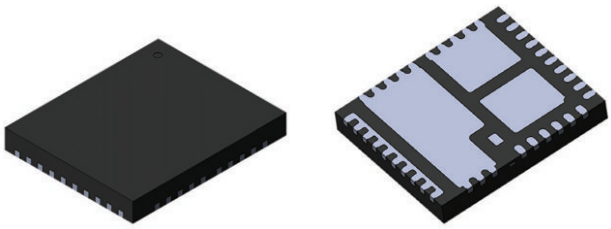
80 A VRPower®, Smart Power Stage With Current Sensing and Temperature Monitor

(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® 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® 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

APPLICATIONS

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

EFFICIENCY

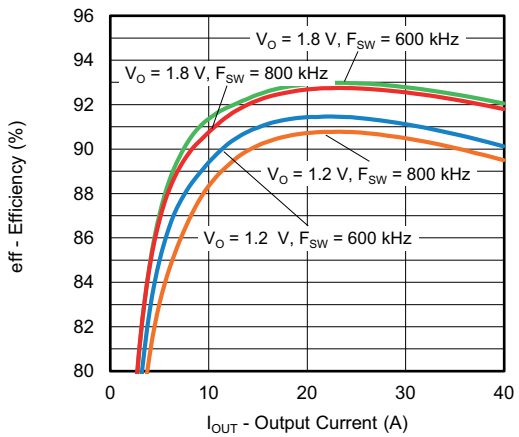


Fig. 1 - Efficiency vs. Output Current
(V_{IN} = 12 V, L = 100 nH, V_{CC} = V_{DRV} = 5 V)

PRODUCT SUMMARY		
Part number	SiC820	SiC820A
Description	80 A smart power stage, 4.5 V to 16 V_{IN}, 5 V P_{WM} with diode emulation mode	80 A smart power stage, 4.5 V to 16 V_{IN}, 3.3 V P_{WM} 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_{MON}, I_{MON}	T_{MON}, I_{MON}
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

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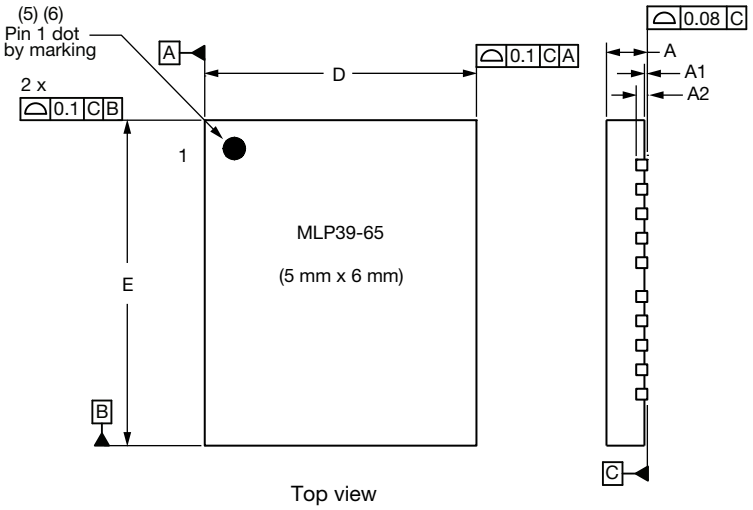
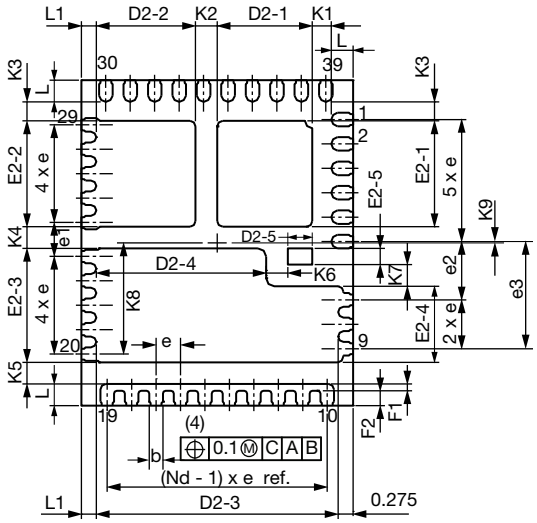
PowerPAK® MLP39-65 Case Outline



Top view

Side view



Bottom view

DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A [8]	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 [4]	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 [3]		39			39	
Nd [3]		10			10	
Ne [3]		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

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