60 A VRPower® Integrated Power Stage
(Datasheet in Brief)

DESCRIPTION
The SiC660 is a high frequency integrated power stage optimized for synchronous buck applications to offer high current, high efficiency, and high power density performance with very low shutdown current. Packaged in Vishay’s 5 mm x 5 mm MLP package, SiC660 enables voltage regulator designs to deliver up to 60 A continuous current per phase.

The internal power MOSFETs utilize Vishay’s latest TrenchFET® technology that delivers industry benchmark performance to significantly reduce switching and conduction losses.

SiC660 incorporates an advanced MOSFET gate driver IC that features high current driving capability, adaptive dead-time control, an integrated bootstrap switch, and user selectable zero current detection to improve light load efficiency. The driver is also compatible with a wide range of PWM controllers, supports tri-state PWM, and 5 V and 3.3 V PWM logic.

The device also supports PS4 mode to reduce power consumption when the system is in standby state.

SiC660 offers operating temperature monitoring, protection features, and warning flags, that improve system monitoring and reliability.

APPLICATIONS
• Multi-phase VRDs for computing, graphics card and memory
• Intel core processor power delivery
  - VCore, VGRAPHICS, VSYSTEM AGENT
  - VCCG
• Up to 16 V rail input DC/DC VR modules

FEATURES
• Highly efficient
  - Thermally enhanced PowerPAK® MLP55-31L package
  - Vishay’s latest TrenchFET technology and low side MOSFET with integrated Schottky diode
  - Integrated, low impedance, bootstrap switch
  - Power MOSFETs optimized for 12 V input stage
  - Supports PS4 mode light load requirement with low shutdown supply current (5 V, 3 μA)
  - Zero current detection for improved light load efficiency
• Highly versatile
  - 5 V and 3.3 V PWM logic with tri-state and hold-off timer
  - 5 V DSBL#, ZCD_EN# logic with PS4 state support
  - High frequency operation up to 2 MHz
• Robust and reliable
  - Delivers in excess of 60 A continuous current, 70 A, peak (10 ms) and 100 A, peak (10 μs)
  - Over current protection
  - Over temperature flag
  - Over temperature protection
  - Undervoltage lockout protection
  - High side MOSFET short detection
• Effective monitoring and reporting
  - Accurate temperature reporting
  - Warnings and faults reporting flag
• Material categorization: for definitions of compliance please see www.vishay.com/doc?799912

TYPICAL APPLICATION DIAGRAM

Fig. 1 - Typical Application Diagram
## PRODUCT SUMMARY

<table>
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<th>Part number</th>
<th>SiC660</th>
<th>SiC660A</th>
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<tbody>
<tr>
<td>Description</td>
<td>60 A Power stage plus, 2.5 V to 16 V, 5 V&lt;sub&gt;PWM&lt;/sub&gt; with ZCD, PS4 mode</td>
<td>60 A Power stage plus, 2.5 V to 16 V, 3.3 V&lt;sub&gt;PWM&lt;/sub&gt; with ZCD, PS4 mode</td>
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<tr>
<td>Input voltage min. (V)</td>
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<td>2.5</td>
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<tr>
<td>Input voltage max. (V)</td>
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<td>16</td>
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<tr>
<td>Current rating (A)</td>
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<td>60</td>
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<tr>
<td>Switch frequency max. (kHz)</td>
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<td>2000</td>
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<tr>
<td>Enable (yes / no)</td>
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<td>Yes</td>
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<tr>
<td>Monitoring features</td>
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<td>T&lt;sub&gt;MON&lt;/sub&gt;/FAULT Monitor</td>
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<tr>
<td>Protection</td>
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<td>OCP, OTP, UVLO</td>
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<td>Light load mode</td>
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<td>ZCD</td>
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<tr>
<td>Pulse-width modulation (V)</td>
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<td>3.3</td>
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<td>Package type</td>
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<td>PowerPAK® MLP55-31L</td>
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<tr>
<td>Package size (W, L, H) (mm)</td>
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To request the full version of the datasheet, please contact: icmarketing@vishay.com

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PowerPAK® MLP55-31L Case Outline

**DIM.** | **MIN.** | **NOM.** | **MAX.** | **MIN.** | **NOM.** | **MAX.**
---|---|---|---|---|---|---
A | 0.70 | 0.75 | 0.80 | 0.027 | 0.029 | 0.031
A1 | 0.00 | - | 0.05 | 0.000 | - | 0.002
A2 | - | 0.20 ref. | - | 0.000 | - | 0.002
b | 0.20 | 0.25 | 0.30 | 0.078 | 0.098 | 0.111
b1 | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010
D | 4.90 | 5.00 | 5.10 | 0.193 | 0.196 | 0.200
e | - | 0.50 BSC | - | 0.019 BSC
e1 | 3.50 BSC | 1.38 BSC
e2 | 1.50 BSC | 0.060 BSC
e3 | 1.00 BSC | 0.040 BSC
E | 4.90 | 5.00 | 5.10 | 0.193 | 0.196 | 0.200
L | 0.35 | 0.40 | 0.45 | 0.013 | 0.015 | 0.017
D2-1 | 0.98 | 1.03 | 1.08 | 0.039 | 0.041 | 0.043
D2-2 | 0.98 | 1.03 | 1.08 | 0.039 | 0.041 | 0.043
D2-3 | 1.87 | 1.92 | 1.97 | 0.074 | 0.076 | 0.078
D2-4 | 0.30 BSC | 0.012 BSC
D2-5 | 1.05 | 1.10 | 1.15 | 0.041 | 0.043 | 0.045
E2-1 | 1.27 | 1.32 | 1.37 | 0.050 | 0.052 | 0.054
E2-2 | 1.93 | 1.98 | 2.03 | 0.076 | 0.078 | 0.080
E2-3 | 3.75 | 3.80 | 3.85 | 0.148 | 0.150 | 0.152
E2-4 | 0.45 BSC | 0.018 BSC
F1 | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010
F2 | 0.20 ref. | 0.008 ref.
F3 | 0.15 ref. | 0.006 ref.
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<th>INCHES</th>
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<td>K9</td>
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<td>K12</td>
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<tr>
<td>K13</td>
<td>0.75 BSC</td>
<td>0.030 BSC</td>
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</table>

Notes
1. Use millimeters as the primary measurement
2. Dimensioning and tolerances conform to ASME Y14.5M. - 1994
3. Dimension b applies to plated terminal and is measured between 0.20 mm and 0.25 mm from terminal tip
4. The pin #1 identifier must be existed on the top surface of the package by using indentation mark or other feature of package body
5. Exact shape and size of this feature is optional
6. Package warpage max. 0.08 mm
7. Applied only for terminals
Recommended Land Pattern
PowerPAK® MLP55-31L

Top side transparent view
(not bottom view)

Land pattern for MLP55-31L

All dimensions in millimeters

Component for MLP55-31L

Land pattern for MLP55-31L
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