DID YOU KNOW?

HIGH OUTPUT POWER CAPABILITY OF THE SIC46X FAMILY

In systems requiring step-down conversion from a high voltage of 24 V to 48 V bus at high power, a 60 V controller paired with discrete 80 V MOSFETs are typically used, especially when power levels exceed the 20 W range. This is mainly due to the fact that even the best BCD processes cannot offer high performance MOSFETs in the 60 V to 80 V range.

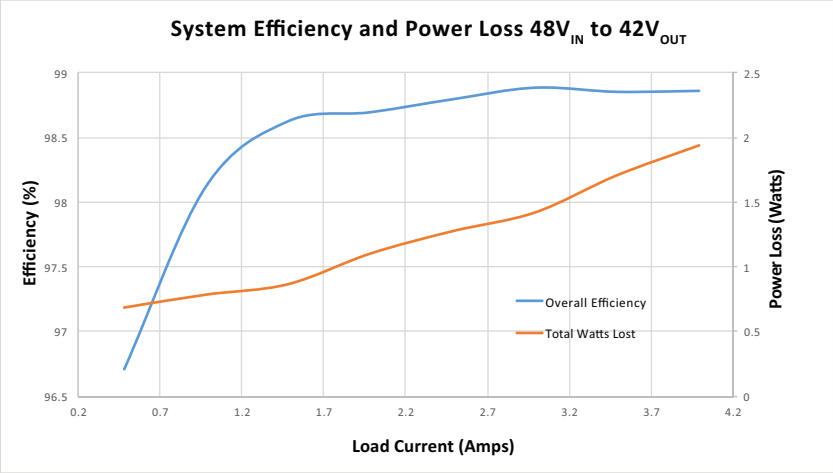
The SiC46x family of products brushes aside this limitation by integrating a controller, designed on a BCD process, with 72 V absolute maximum rated high side and low side trench MOSFETs. Trench MOSFETs with a 60 V to 80 V drain to source rating offer up to five times better figure of merit (FOM) compared BCD processes of a similar die size and voltage rating. Package design is also optimized to improve thermal performance. The low side MOSFETs in the SiC46x family is flipped, allowing the source of the MOSFET to be attached to the large quiet GND plane. The GND plane can then be connected to inner layers in the PCB using vias to improve thermal performance. A thick Cu clip connects the high side and low side MOSFETs and forms the switch node, further improving thermal performance while reducing package impedance and parasitic inductance.

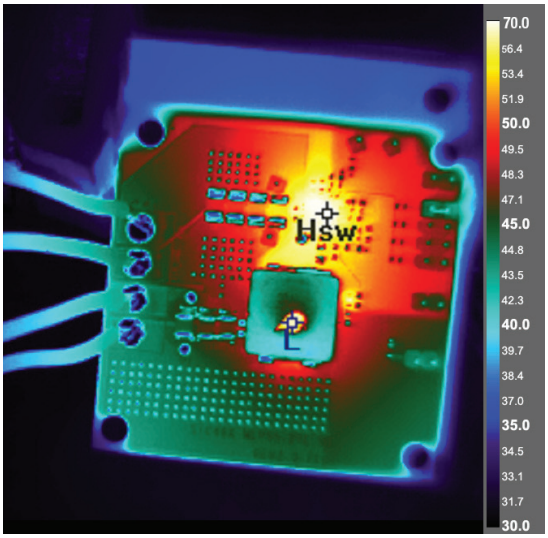
In order to achieve high output power capability, especially in industrial/ telecom applications, the power converter solution must check the following boxes:

1. It must be highly efficient, thus reducing power losses
2. Thermal management must be simple, preferably using just the PCB to dissipate heat

The use of a bespoke pair of trench MOSFETs and a thermally enhanced PowerPAK® 5 mm x 5 mm MLP package enables the SiC46x family to check both these boxes and offer cool, reliable operation while at the same time simplifying converter design.

In the below example, the SiC462, the 6 A member of the family, is used to build a 48 V input to 42 V output converter used to charge a high voltage Li-Ion battery stack. The solution delivers 168 W of output power at 99 % efficiency. The high efficiency results in a temperature rise of a mere 36 °C, even at this high power level





$T_{ambient}$ = 30 °C
Highest Temp at 168 W = 66 °C

Want to achieve this power density? Order an evaluation board and then visit our online design simulation tool at www.vishay.transim.com. It's easy to customize the design to your needs and get your prototype working.

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