Executive Summary

- PV inverter customers expect reliability and uptime.
- Sense-IT™ delivers sophisticated current (I) and temperature (T) protection.
- Powerex IPMs are more than integrated, they are intelligent.

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L-Series Power Devices Application Note (Key Word 907)

- 1200V Gen. 4 Large DIPIM Application Note (Key Word 959)
- 600V Gen. 4 Large DIPIM Application Note (Key Word 958)
- Need help with your solar inverter application? Contact us at PVhelp@pwrx.com

Consumers of solar inverters are increasingly savvy regarding system reliability. From residential to commercial to utility, customers recognize the importance of uptime and total lifecycle costs. To resolve the issues that plague inverter reliability – and to separate your design from the competition – you need to isolate the root causes of failures and implement practical countermeasures.

Electrical Stresses – PV inverters must endure a wide range of inputs and outputs. Overloads, including potential short circuit conditions, must be survived and normal operation must resume once the fault has been cleared.

Powerex Intelligent Power Modules (IPMs) utilize Sense-IT™ technology to provide rapid and effective protection against potentially damaging over-current conditions. A current mirror on the IGBT chip continuously tracks the output current. When an overload is detected, the IGBT is turned off, and the fault is reported to the controller. Sense-IT responds faster than standard desaturation detection. Furthermore, because Sense-IT protection activates while the IGBT is still in saturation, the overall power stresses (V*I) are orders of magnitude lower.

Thermal Stresses – PV inverters are installed in places that may have ambient temperatures in excess of 120°F. They are expected to continue to operate for decades, even as air vents become clogged and cooling systems malfunction.

Powerex Sense-IT again provides protection where it matters – at the IGBT chip. The junction temperature is also continuously sensed. Like the electrical stresses, when a thermal stress is detected, the IGBTs are turned off, and the fault is reported to the controller. Other modules use NTC sensors located on the heatsink or on a separate substrate on the module’s baseplate. The NTC approach is slow to respond and only gives an average temperature of the surroundings. In short, you are not getting the whole picture.

System Complexity – Designers are tasked with selecting and evaluating each electronic component that makes up the inverter circuit. Each component adds not only to the stack-up of tolerances to be considered, but also adds to the potential manufacturing failure modes.

Powerex IPMs offer integration and intelligence, by matching the IGBTs with optimized drive circuitry. Combined with the sophistication of Sense-IT technology, you get power, control, and protection in one package. The module is designed, built, and tested as a complete unit. Problem solved.