

# Photovoltaic inverters require IGBT

Are insulated-gate bipolar transistors a good choice for solar inverter applications?

For solar inverter applications, it is well known that insulated-gate bipolar transistors (IGBTs) offer benefits compared to other types of power devices, like high-current-carrying capability, gate control using voltage instead of current and the ability to match the co-pack diode with the IGBT.

How do IGBTs work in a PV inverter?

During operation inside a PV inverter, IGBTs are subject to AC stress conditions as opposed to DC stress conditions. This typically consists of a 60 Hz on-off cycle, with a Pulse-Width-Modulated (PWM) signal on the order of 10 - 15 kHz superimposed on the lower-frequency cycle.

How does the IGBT case temperature affect a photovoltaic inverter?

As a result, the IGBT case temperature will respond rapidly to a temperature swing by changing of load conditions. That means on days with fluctuating wind conditions the IGBT module baseplate will experience many thermal cycles. Also photovoltaic inverters experience at minimum one huge thermal cycle per day.

Can IGBT degradation cause a failure of an inverter?

This IGBT degradation would most likely not cause the failure of an inverter, but could degrade performance. Furthermore, it is highly questionable if a device exhibiting significant instability would operate for the expected lifetime of an inverter (i.e. 5 to 20 years).

Do IGBT modules experience thermal cycling in high power industrial drive applications?

IGBT modules in high power industrial drive applications experience thermal cycling in case of fluctuating (or non-continuous) loads. Wind power converters are usually liquid-cooled with the cooler having a thermal time constant of a couple of seconds.

Which efficiency is possible for a solar inverter design?

The latest 600-V trench IGBT is optimized for switching at 20 kHz. It can be seen that this IGBT has lower total power dissipation compared to the previous-generation planar IGBT (Fig. 4). We can conclude that the highest efficiency possible for a solar inverter design, a trench-gate

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output to the outside world. These applications require short circuit rated devices. For inverters this is often





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the inverter. TYCORUN's all series of inverters, including 3000 watt solar inverter and 2000 watt inverter pure sine ...

In the last decades, the interest in solar photovoltaic (PV) energy has increased considerable around the world. That are many publications that focus on the temperature assessment of PV ...

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