Medium- and High-Voltage Silicon Carbide Power Products: Power Electronics for Hydrogen Technologies

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H2-PACE: POWER AND CONTROL ELECTRONICS FOR HYDROGEN TECHNOLOGIES

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INVESTING $720M OVER FIVE YEARS TO EXPAND SILICON CARBIDE CAPACITY

NEW

484,000 SQ FT
fabrication facility

200 mm
capable

INCREASE IN OUTPUT

> 30×
increase in silicon carbide
wafer fabrication

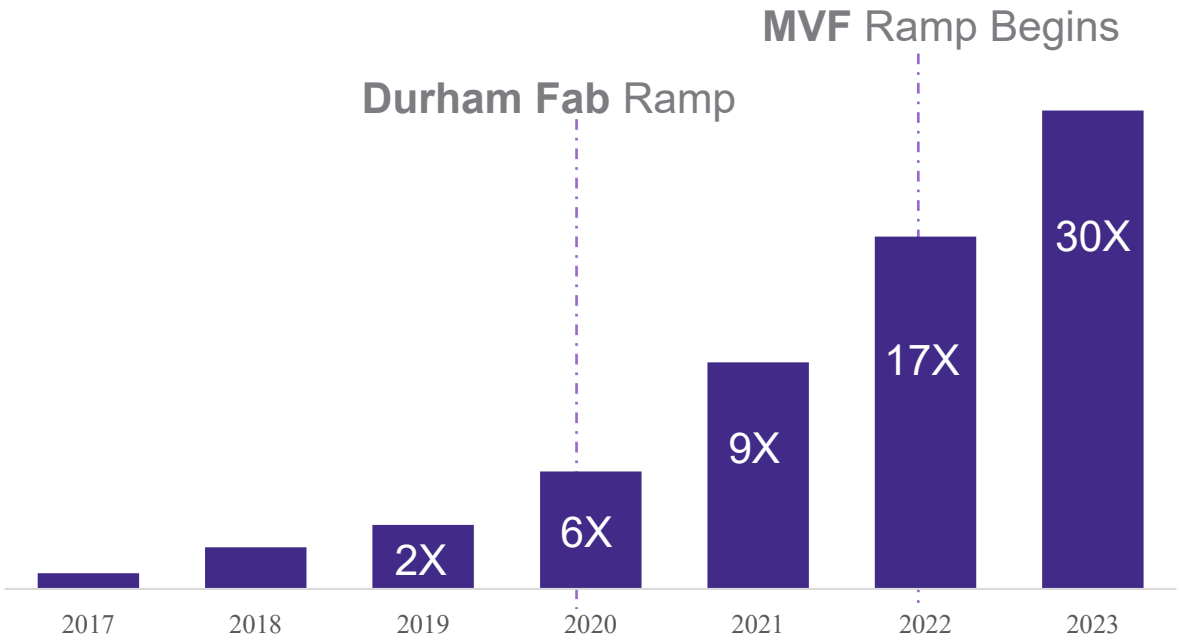
> 30×
increase in silicon carbide
materials production

DELIVERING

> 25%
More output compared to the previously planned facility

state-of-the-art
automotive-qualified production facility in Marcy, NY

MOHAWK VALLEY FAB CAPACITY RAMP



Rendering of Mohawk Valley Fab (MVF) in Marcy, NY

- On track to have New York Mohawk Valley Fab up and running by March 2022 and expansion of materials factory in Durham, NC progressing as planned

VALUE PROPOSITIONS ENABLED BY SiC MOSFETs VERSUS Si IGBTs

System Benefits

- Reduced system first cost
- Reduced levelized cost of electricity (LCOE) for most every application
- Reduced weight/mass; increased gravimetric power density
- Reduced volume/form factor; increased volumetric power density
- Fast switching for increased control system bandwidth
- Faster fault interruption via high-speed switching
- Better rated- and light-load efficiencies across all applications
- Enabling > 1 kHz fundamental frequency for high-speed, MW-class PMSMs
- Better heavy ion performance for extreme environments

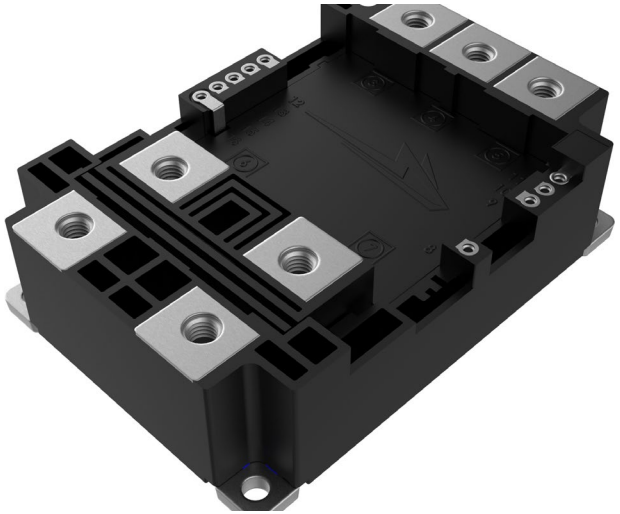
SiC MOSFETs vs. Si IGBTs

There is no "knee" voltage drop in SiC MOSFETs like Si IGBTs, much more efficient at light load (better conduction losses)

~10× lower switching losses, so can be more efficient and increase RMS current as a result…or just be more efficient at the same RMS current

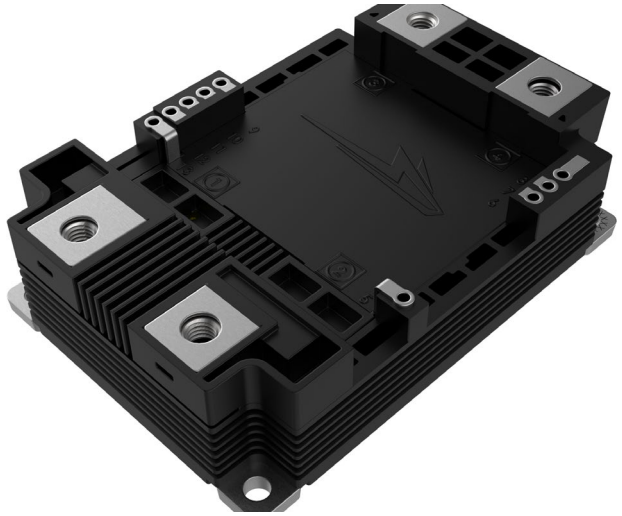
Typically with a Si IGBT there is a PiN diode in parallel. This diode is slow and has a large reverse-recovery peak current. As a result, you must oversize the Si IGBT to handle the IGBT on-state peak current at temperature and the reverse-recovery maximum peak current.

MV/HV PACKAGE PLATFORMS ADDRESSING BROAD APPLICATIONS



LM3

- 1700 V(Enhanced isolation)
- 3300 V

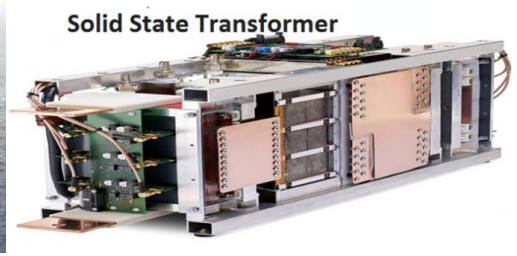


MM3

- 3300 V(Enhanced isolation)
- 6500 V

XHV-9

- 3300 V(Enhanced isolation)
- 6500 V(Enhanced isolation)
- 10 kVand beyond…



We harness the power of Silicon Carbide to change the world for the better

Wolfspeed® Unleashing the Power of Possibilities™