

CoolSiC™ MOSFET 400 V G2
Application overview

Restricted

CoolSiC™ MOSFET 400 V Generation 2 (G2)
Opportunities where 400 $V_{(BR)DSS}$ fits perfectly

A unique opportunity to serve applications requiring high-performance MOSFETs with $V_{(BR)DSS}$ between 200 V and 650 V

V_{BUS}

≤ 300 V 2-level topology

≤ 600 V 3-level topology



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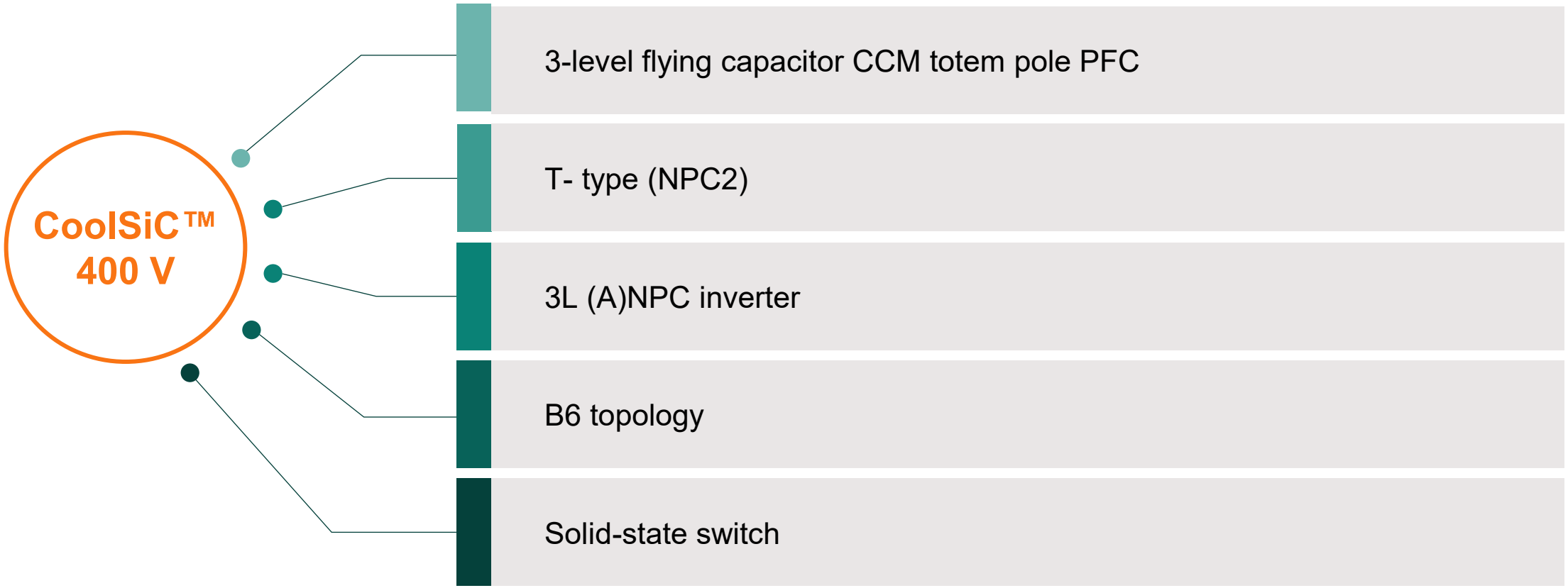
CoolSiC™ MOSFET 400 V G2
Based on the DC-link voltage, 400 V is a perfect fit

Topology \ V_{BUS}	≤ 130 V_{AC} RMS 300V_{DC}[1]	≤ 277 V_{AC} RMS 400V_{DC}[1]	347 V_{AC} RMS[2] 560V_{DC}
2-level	400 V	650 V	750 V
3-level	200 V	400 V	400 V
Application			
Battery operated			
AC line voltage			

[1] PFC or battery regulated
[2] Generation 2 AI Server PSU

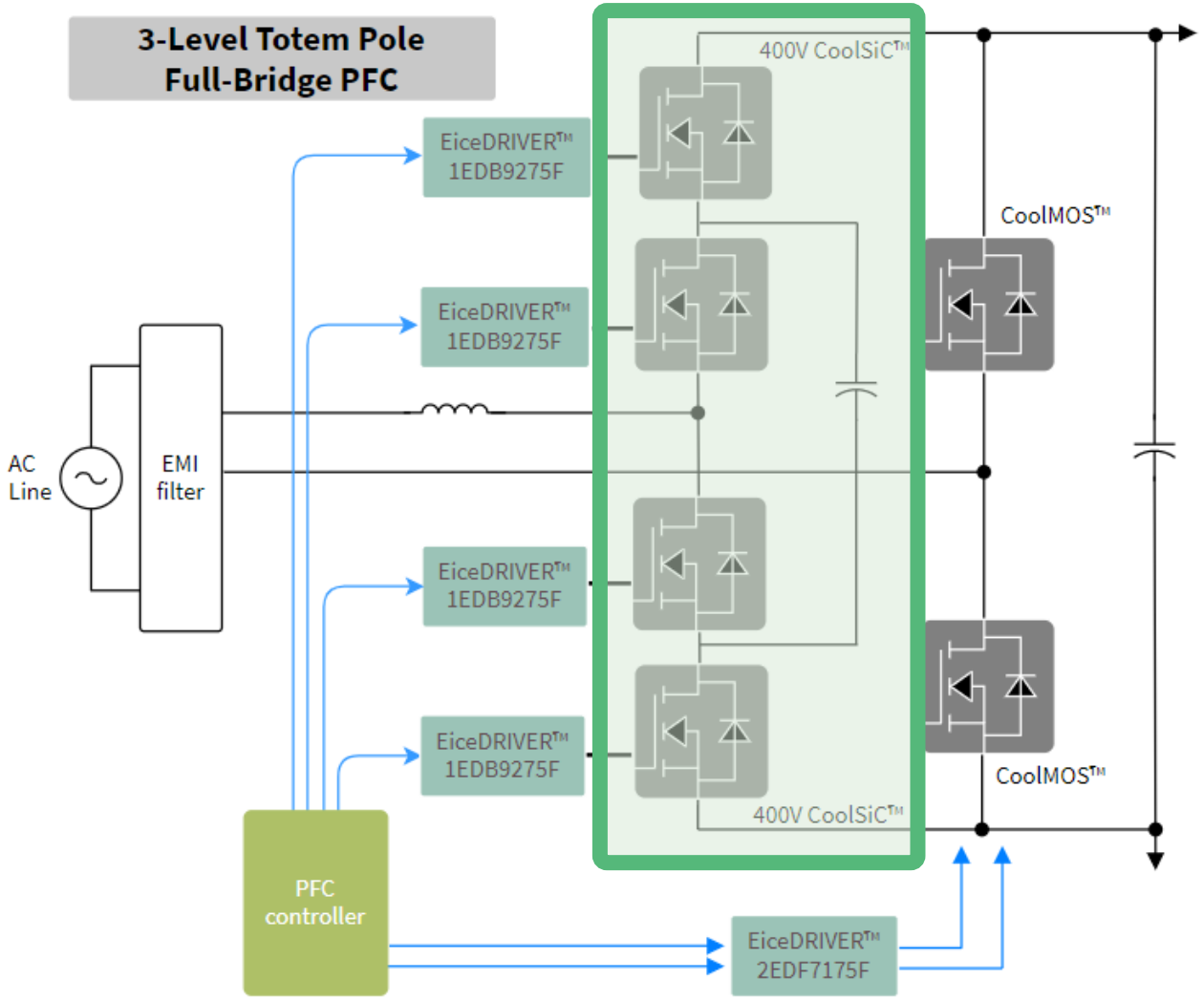
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CoolSiC™ MOSFET 400 V G2
Target topologies and SiC advantage



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CoolSiC™ MOSFET 400 V G2
Suitable topologies: 3-level flying capacitor CCM totem pole PFC



Suitable for:

PFC design with higher power density (greater than 100 W/in³) and >99.4% efficiency

Benefits:

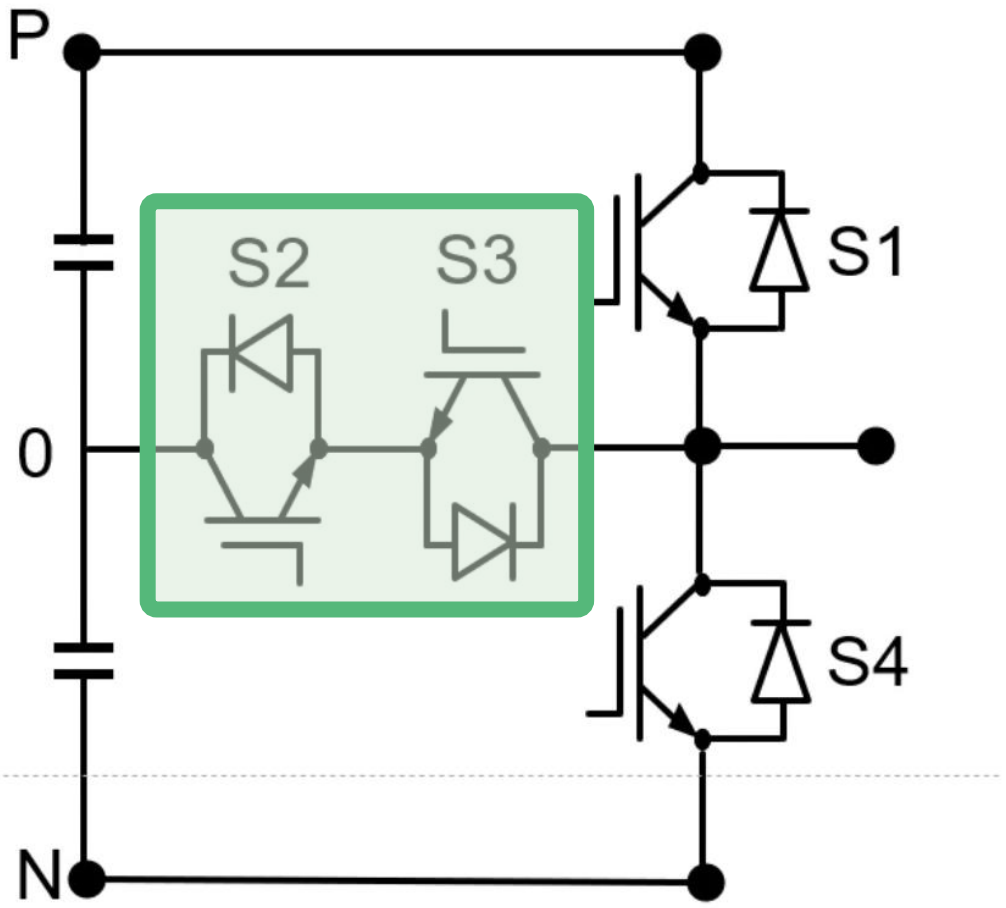
- Highest efficiency
- Highest power density
- Reduced EMI

Applications:

Server | Telecom | Energy storage | Solar

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CoolSiC™ MOSFET 400 V G2
Suitable topologies: T-type (NPC2) inverter



Suitable if:

- High-efficiency system, operating at mid to high switching frequency (up to 30 kHz)
- Improved cost and performance replacement of IGBTs with 400 V CoolSiC™ MOSFETs

Benefits:

- Higher efficiency
- Increased power density
- Excellent diode performances

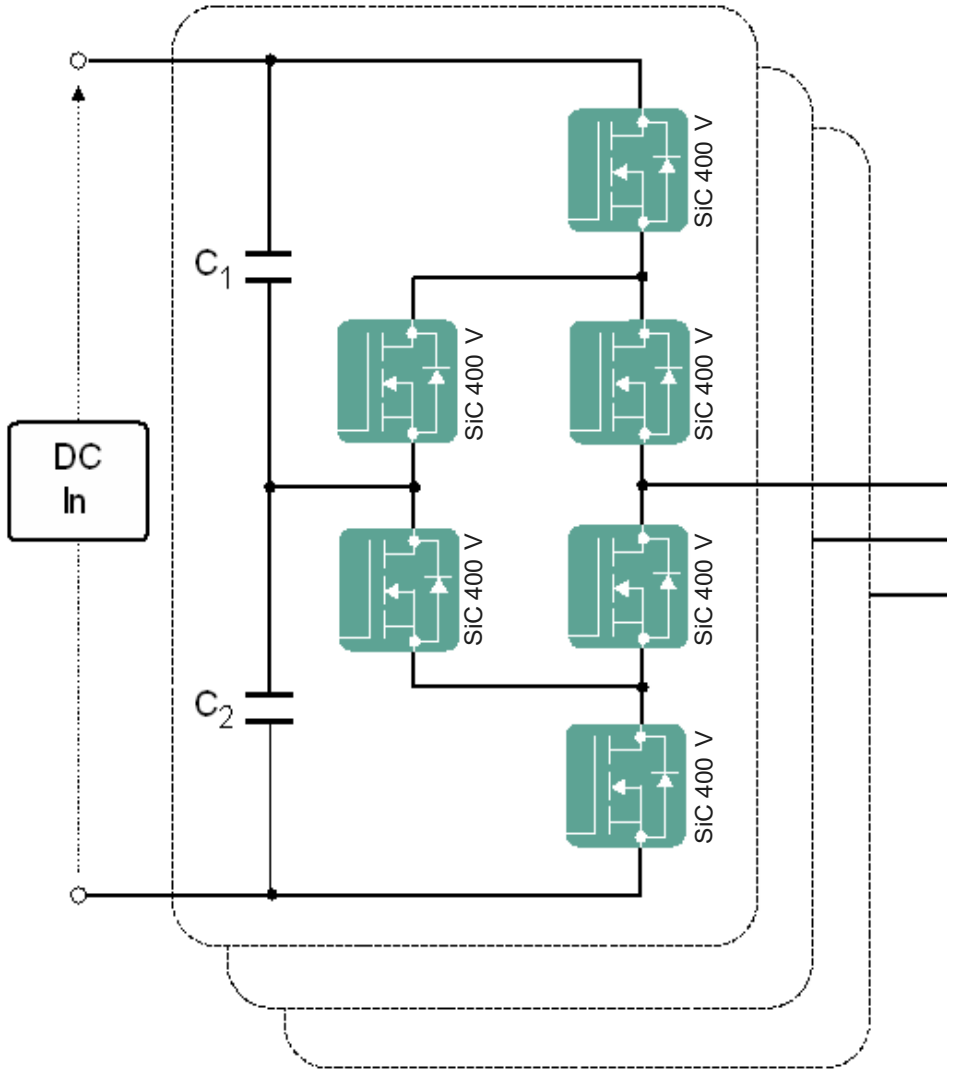
Applications:

Solar

Energy storage

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CoolSiC™ MOSFET 400 V G2
Suitable topologies: 3 level ANPC



Suitable if:

400 V SiC enables 3L topologies (ANPC) with blocking voltage capability of 800 V_{DC}

Benefits:

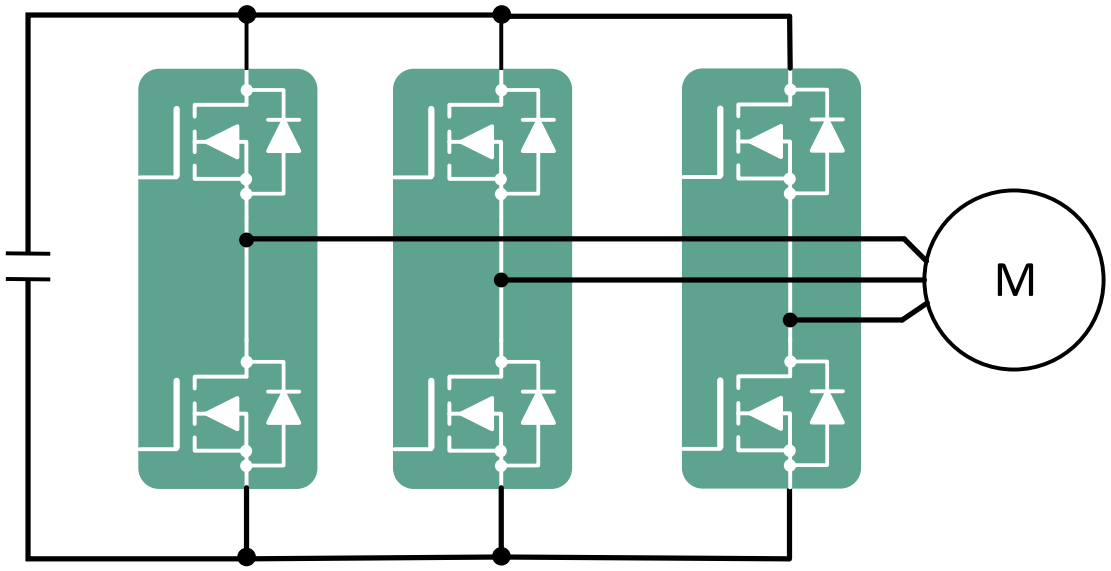
- Improves efficiency and power density, reduces PCB copper, and eliminates need for paralleling
- Inductor size reduction due to inherent lower current ripple of multilevel topology
- Better EMI performance due to inherent lower dv/dt of the topology
- Better thermal management due to heat spreading over 18 MOSFETs

Applications:



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CoolSiC™ MOSFET 400 V G2
Suitable topologies: B6



Suitable if:

- V_{BATT} of 288 V
- Highest efficiency and power density required

Benefits:

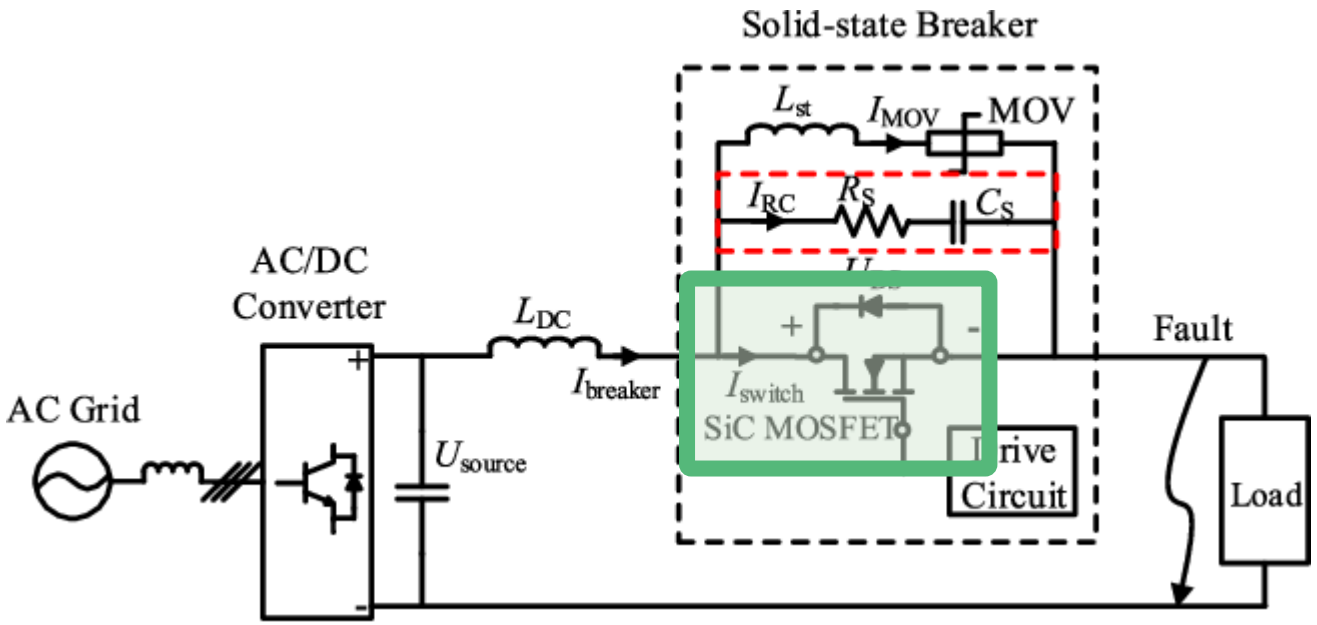
- Increasing the system voltage yields increase in the system efficiency and power density for drive applications
- High power output without paralleling MOSFETs
- No heavy coper on PCB or copper bars needed

Applications:

Forklift LSEV

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CoolSiC™ MOSFET 400 V G2
Suitable topologies: Solid-state circuit breaker



Suitable for:

Industrial and residential circuit breakers
100 V-200 V protection

Benefits:

- Heat sink reduction
- Less losses help fit into standard form factors
- Efficiency lowers TCO
- Fastest operation
- Energy efficiency to meet standards
- Less losses help to fit into standard form factors

Applications:



SSCB

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