



# EconoDUAL™ 3 Black Series

Combines new features with well-known advantages



# EconoDUAL™ 3 Black Series with TRENCHSTOP™ IGBT7 at a glance



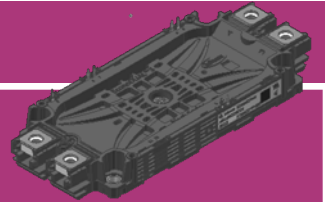
## Key Features

- › Available in established footprint of EconoDUAL™ 3
- › TRENCHSTOP™ IGBT7 technology
- › Reduced system costs
- › Modular platform concept
- › High-performance substrate for the next generation
- › Integration of shunts possible
- › H-Bridge configuration including NTC is possible
- › Ready for automated production line

## Target Applications



## Target Product Portfolio

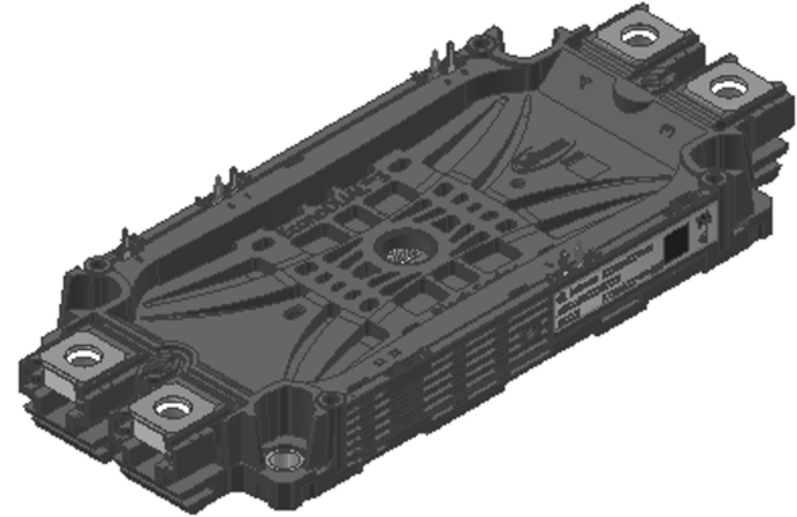
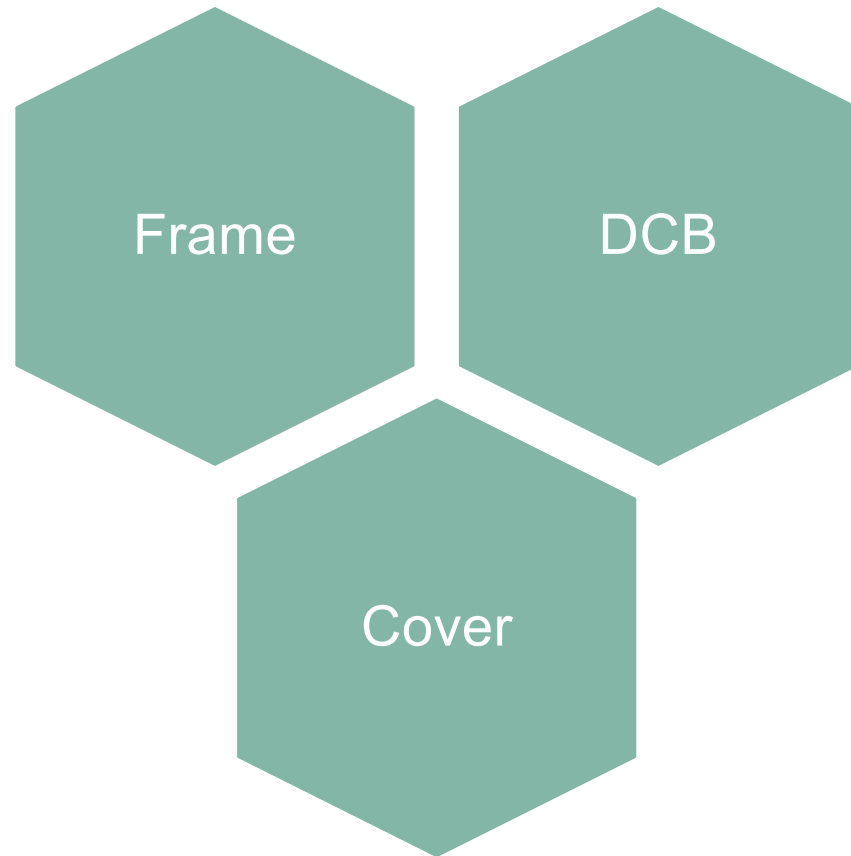


$I_C$ [A]	1200 V & 1700 V
9xx	Planned power extension
7xx	Planned power extension
600	<b>FF600R12BE7_B11*</b> FF600R17BE7_B11
450	<b>FF450R12BE7_B11</b> FF450R17BE7_B11
300	<b>FF300R12BE7_B11</b> FF300R17BE7_B11

- › **Full portfolio from 300A to 600A 1200 V**
- › 1700 V portfolio extension and higher power extension are planned

\*Lead type

Module concept consists of frame, cover and DCB

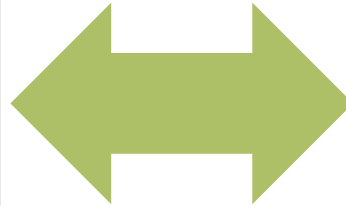
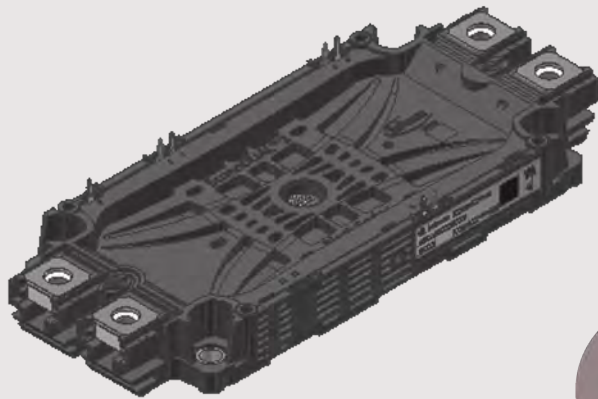


- › DCB is pressed down to the heatsink by frame and cover
- › Outer dimensions and terminal positions are the same like for the EconoDUAL™ 3 module family
- › Ultrasonic welded main and auxiliary terminals
- › New reference points for simplified automated inverter production

# Technical comparison: 600 A & 1200 V new and existing generation

## EconoDUAL™ 3 Black Series

FF600R12BE7\_B11



## EconoDUAL™ 3 Standard

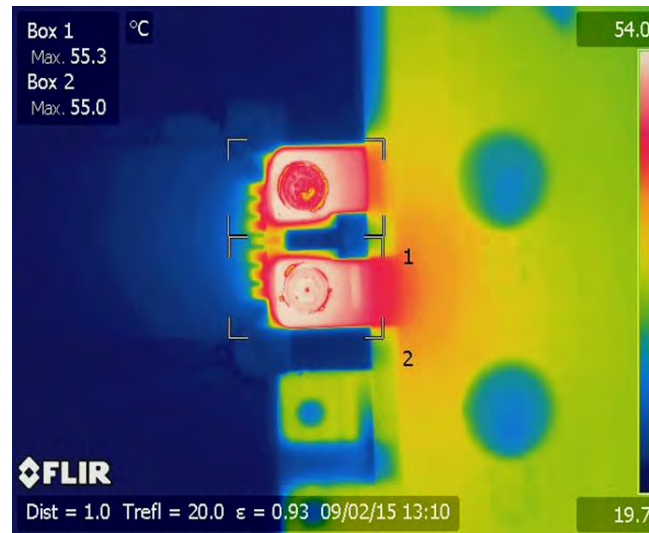
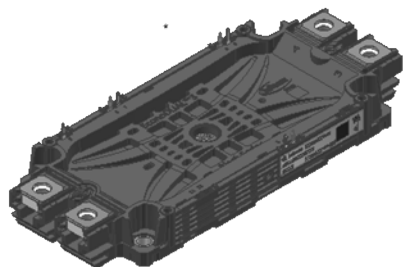
FF600R12ME4\_B72





# EconoDUAL™ 3 Black Series vs. EconoDUAL™ 3 Standard

## Improvement of main terminal temperature



Lower temperature

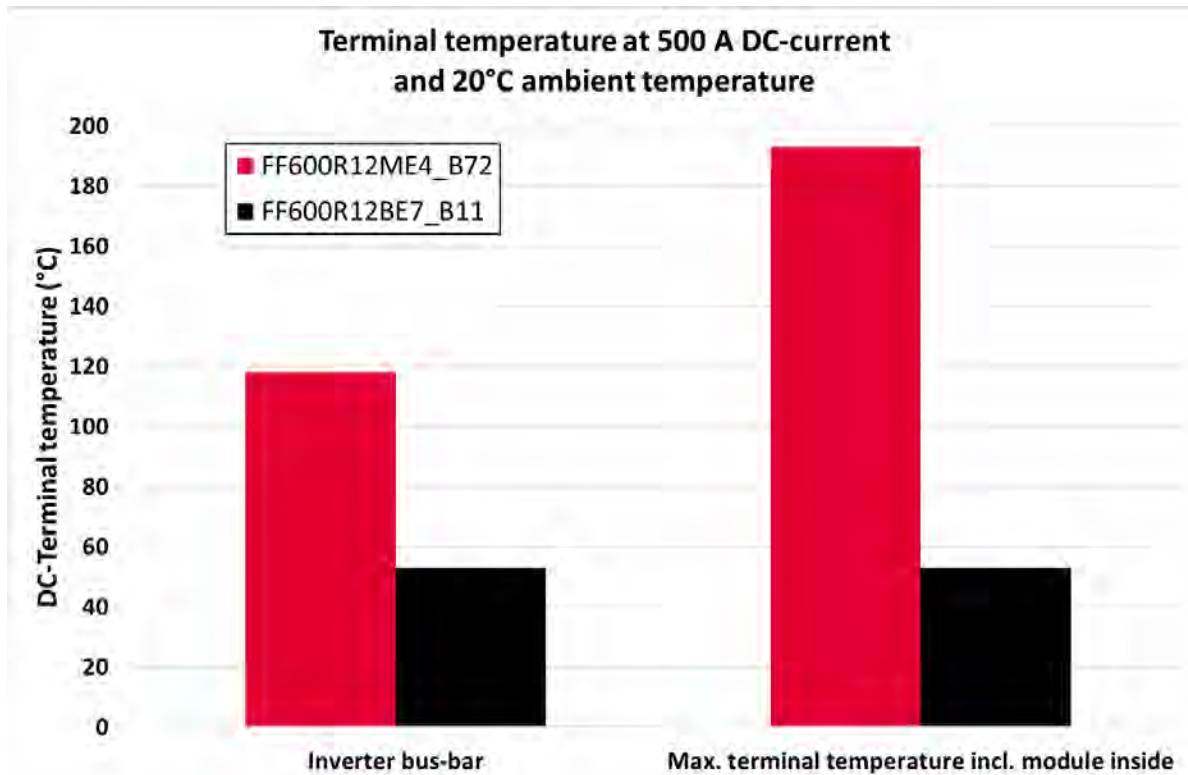


**65 K improvement at customer  
bus bar**

**140 K improvement module terminal**

# EconoDUAL™ 3 Black Series vs. EconoDUAL™ 3 Standard

## Improvement of main terminal temperature



**Lower temperature**

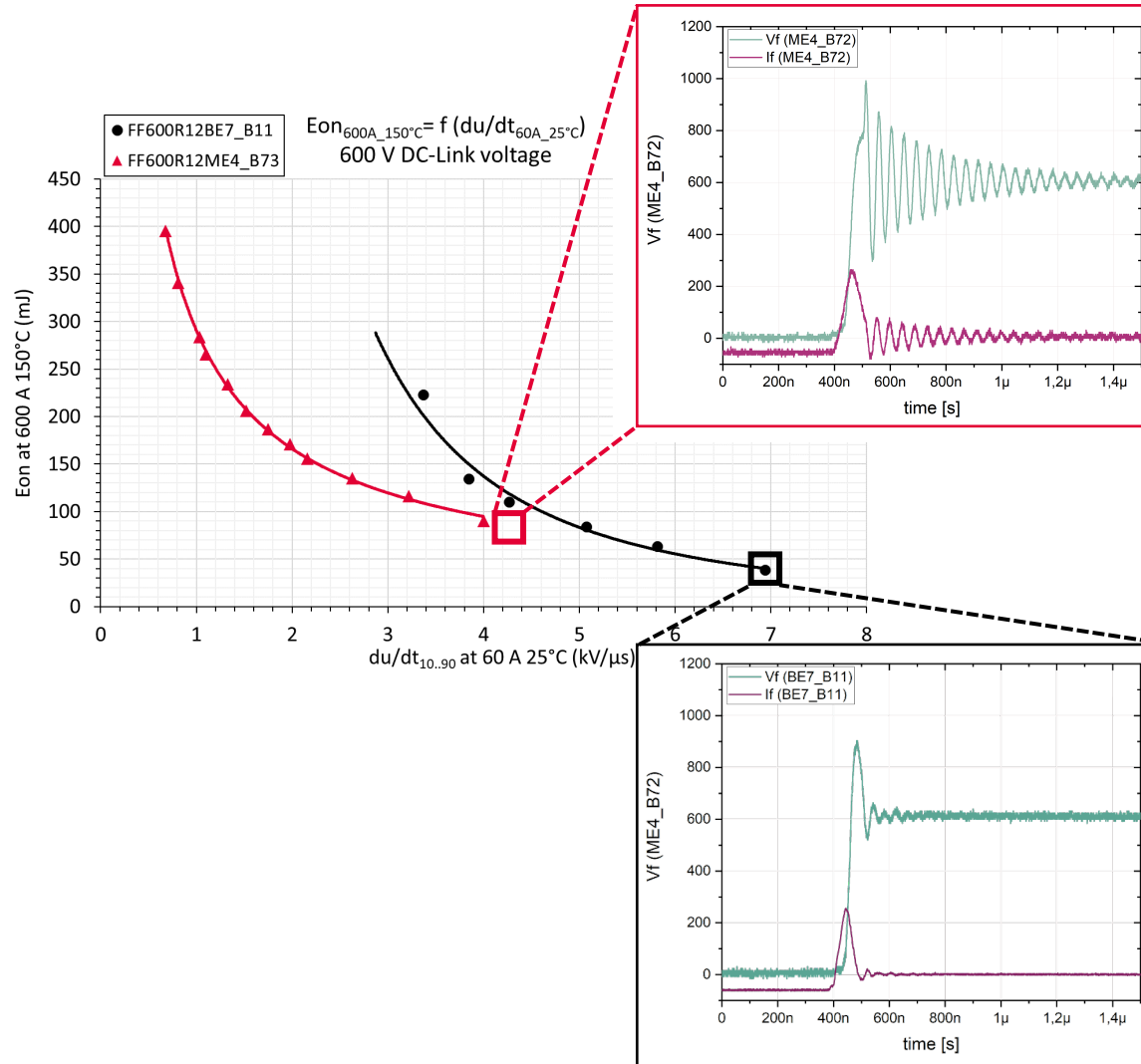


**65 K improvement at customer  
bus bar**

**140 K improvement module terminal**

# EconoDUAL™ 3 Black Series vs. EconoDUAL™ 3 Standard

## Faster switching leads to lower turn-on losses



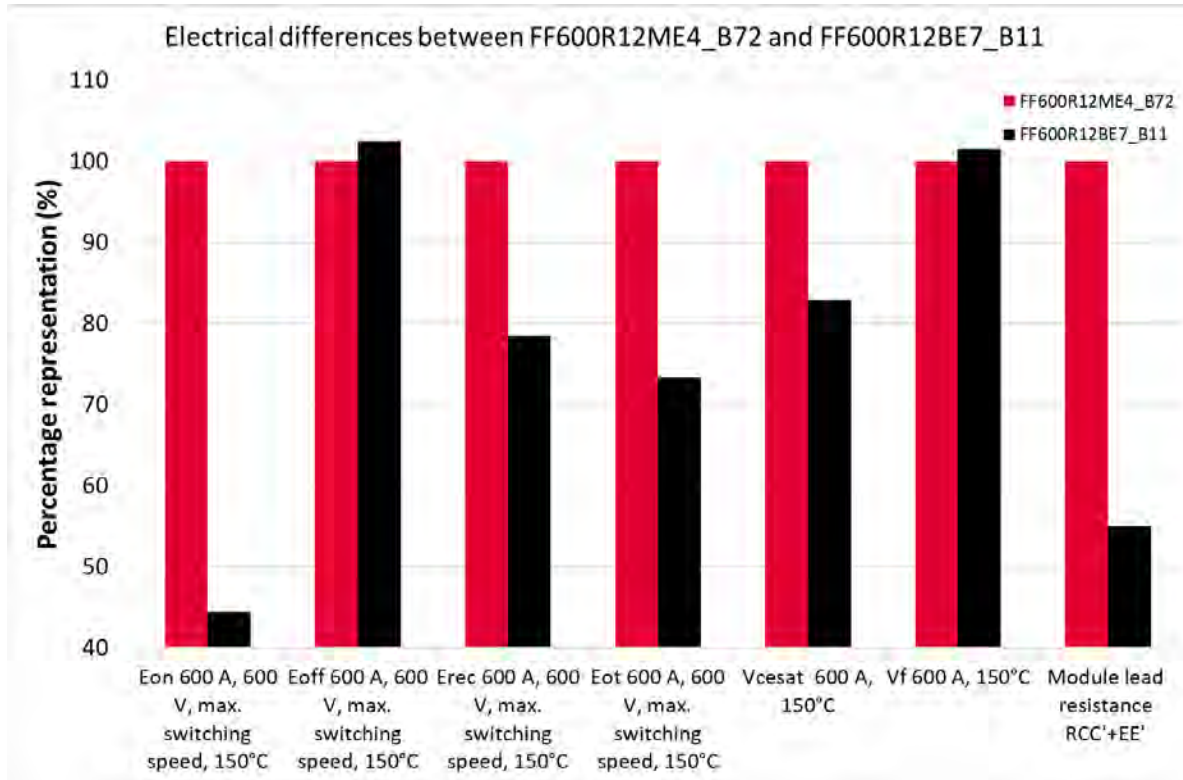
Lower switching losses



Faster switching speed possible

# EconoDUAL™ 3 Black Series vs. EconoDUAL™ 3 Standard

## Overview of electrical performance



**Lower losses**



**27% lower overall switching losses**

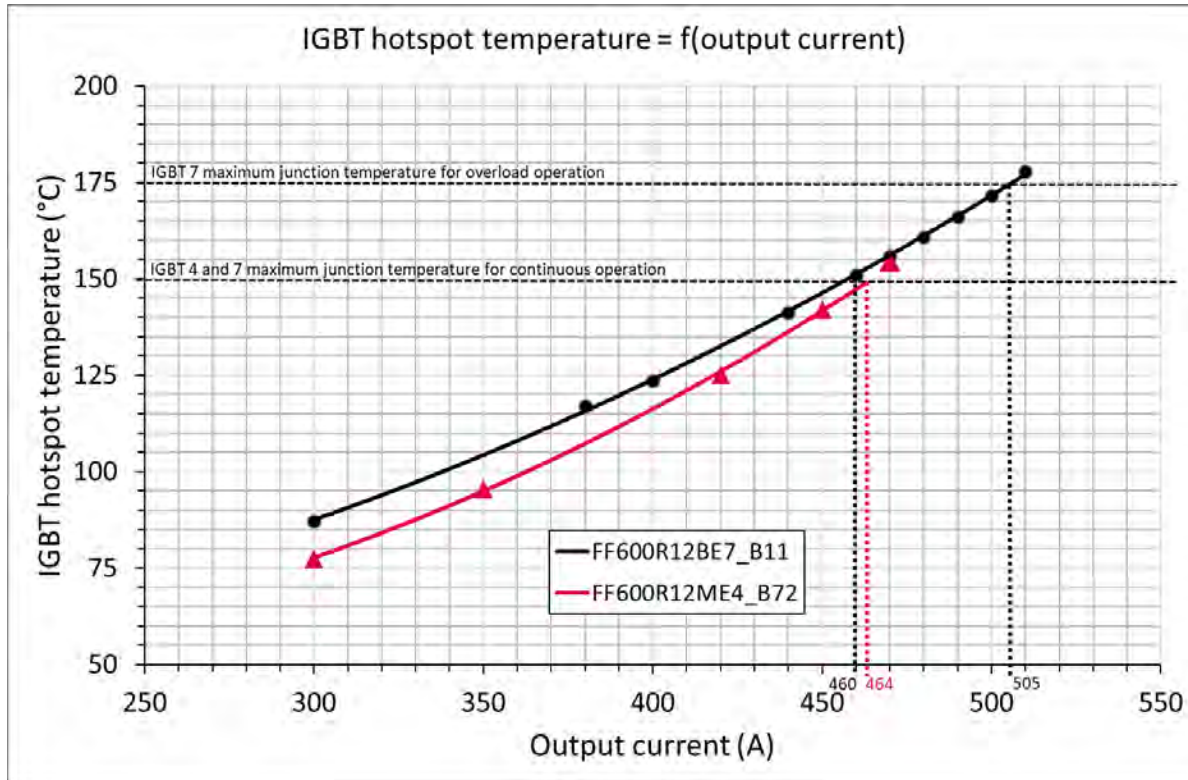
**18% lower IGBT static losses**

**50% lower module lead resistance**



# EconoDUAL™ 3 Black Series vs. EconoDUAL™ 3 Standard

## Application test demonstrates higher current level at 175°C



Enhanced performance

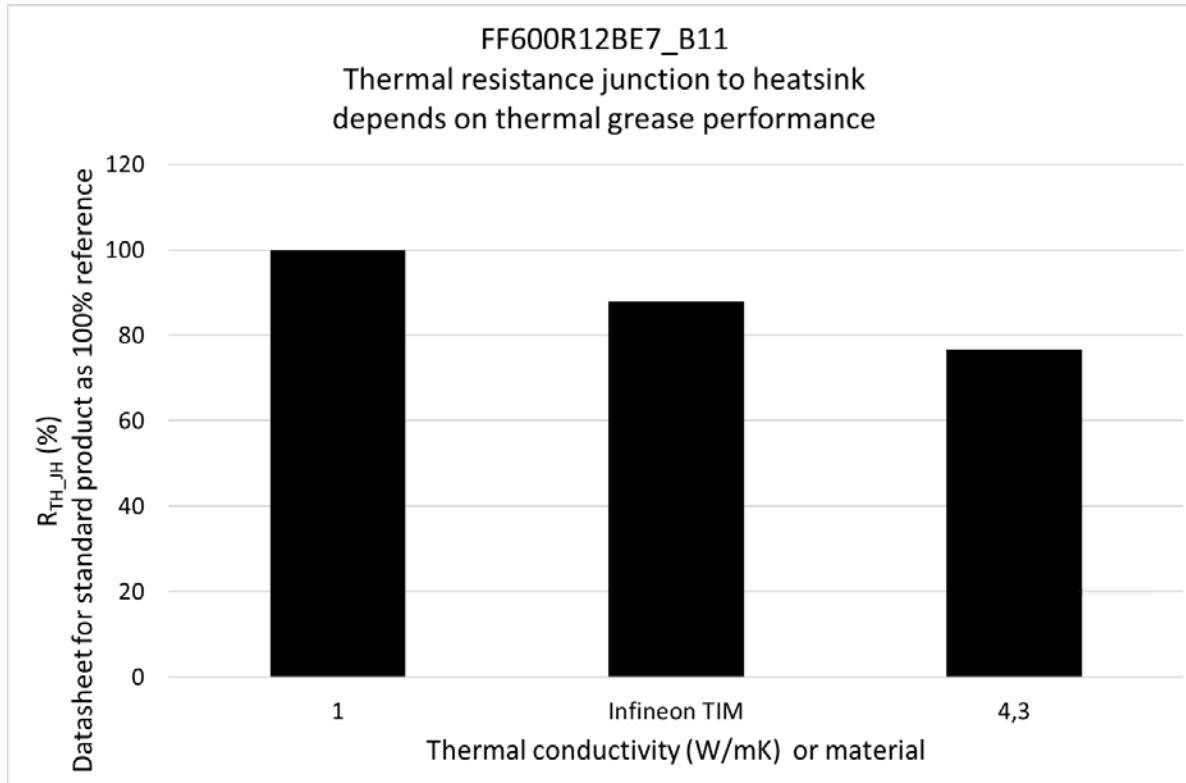


**Up to 9% higher output performance  
at 2.5 kHz and air cooled heatsink**

**More pronounced benefits at higher  
switching frequency**

# EconoDUAL™ 3 Black Series vs. EconoDUAL™ 3 Standard

## Thermal grease makes lower thermal resistance possible



### Thermal performance



**Up to 24% better thermal performance possible depending on used thermal grease**

# The next generation of EconoDUAL™ 3: Always the right choice

## Black Series



## Standard



## Wave



### Key benefit

- › Optimal price/performance ratio

- › High power density and performance

- › Highest power density and performance with higher lifetime (e.g. 8x)\* than standard module

### Ideal for...

- › ...high performance applications and simplified design-in for high current ratings

- › ...applications with long lifetime and highest performance requirements.

- › ...applications with open water cooled heatsink

\*depending on application conditions





Optimal price/performance ratio



Lower terminal temperature due to high performance terminals



Faster switching speed possible



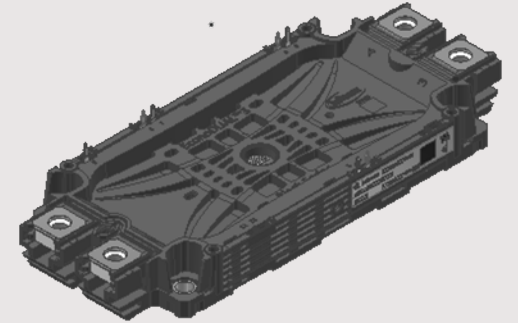
Reduced overall electrical losses and improved module lead resistance



Higher current level achievable



Ready for automated inverter production



**EconoDual™ 3  
Black Series**



# Disclaimer

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