

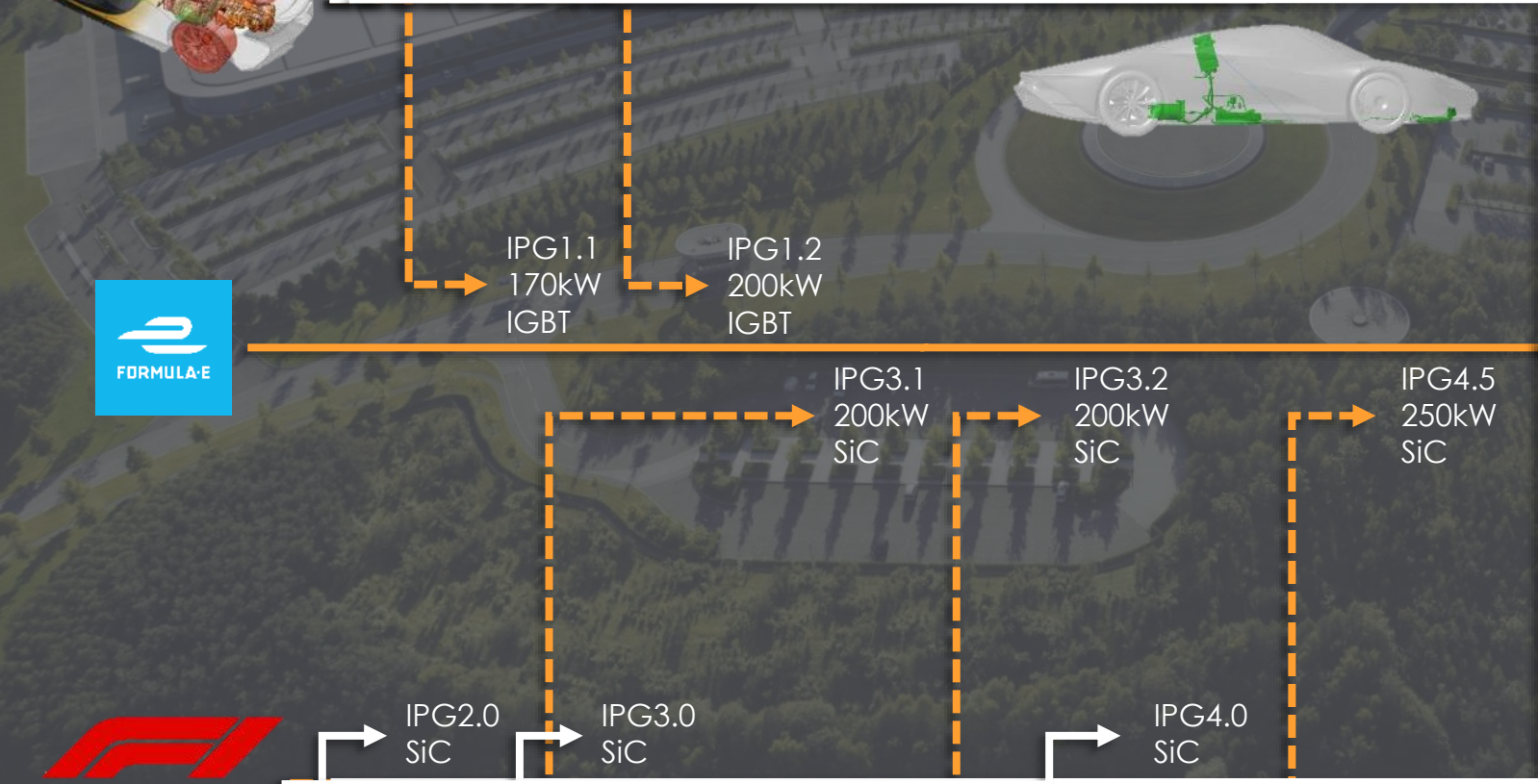
# How inverter technology can help differentiate in a maturing market

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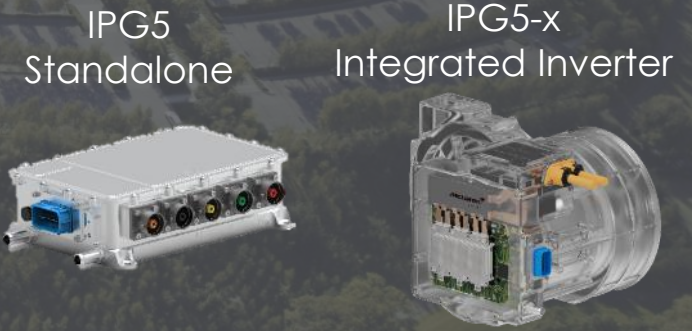
McLaren Applied

FEBRUARY 2024

# McLaren Applied's inverter journey



## 800V SiC Automotive Inverter Platform



## Automotive Optimised

ISO 26262, ASIL-D  
APQP  
IATF 16949



# We're at a critical stage in the electric revolution, with the upcoming 4<sup>th</sup> wave focusing on product differentiation

1 c. 2008



Pioneering Innovation

2 c. 2018



OEM rush to market

3 Today



Dedicated EV architectures, focusing on efficiency

4 The future



Differentiating the customer experience as the EV market matures

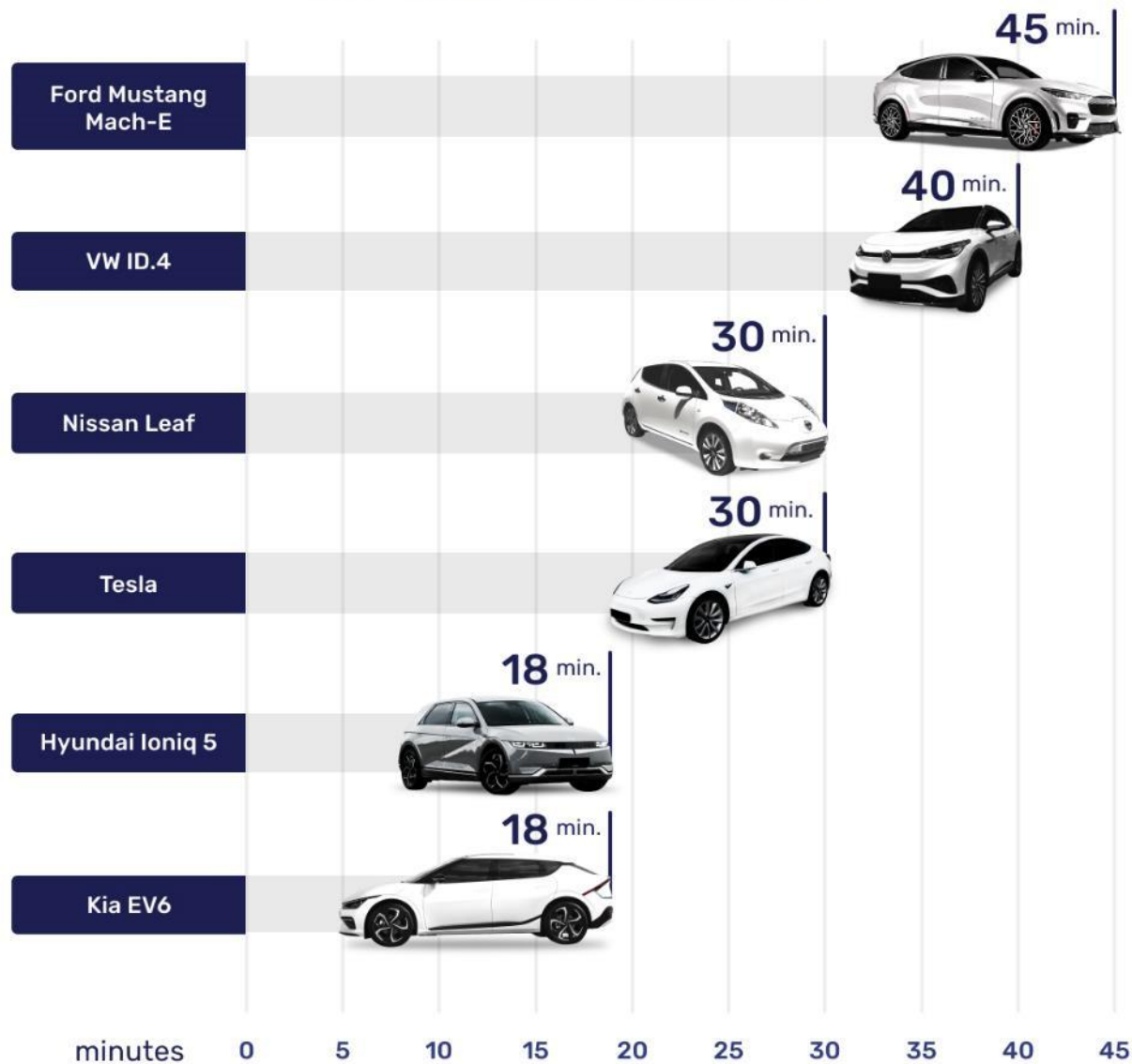


800V  
architecture  
enables ultra-  
fast charging

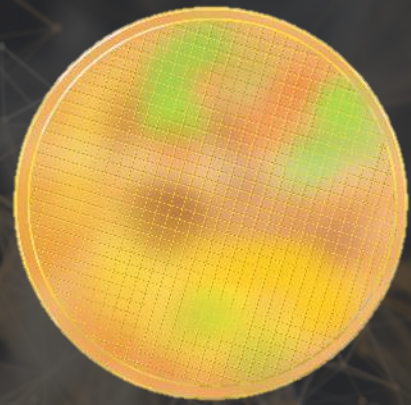


## Fastest Charging EVs

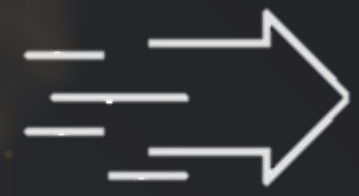
DC charge speeds up to 80%



# Silicon Carbide drives a domino effect of efficiency benefits



Reduced Conductivity Losses & Switching Losses



Faster Switching



Cooling System Downsizing



Motor Downsizing



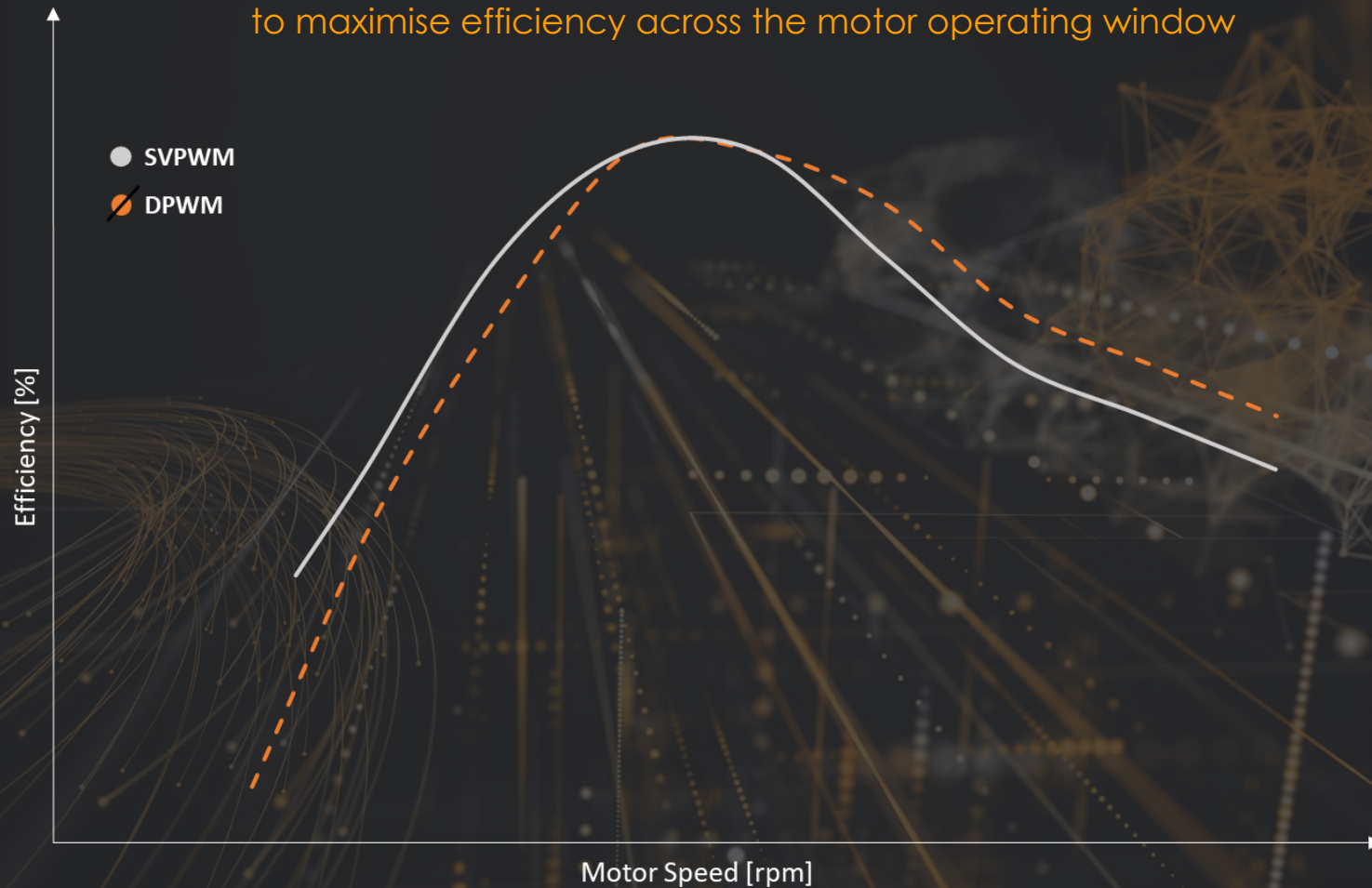
>7% increase in WLTP range





# The latest hardware provides a platform from which to deploy advanced motor control software to maximise performance & efficiency

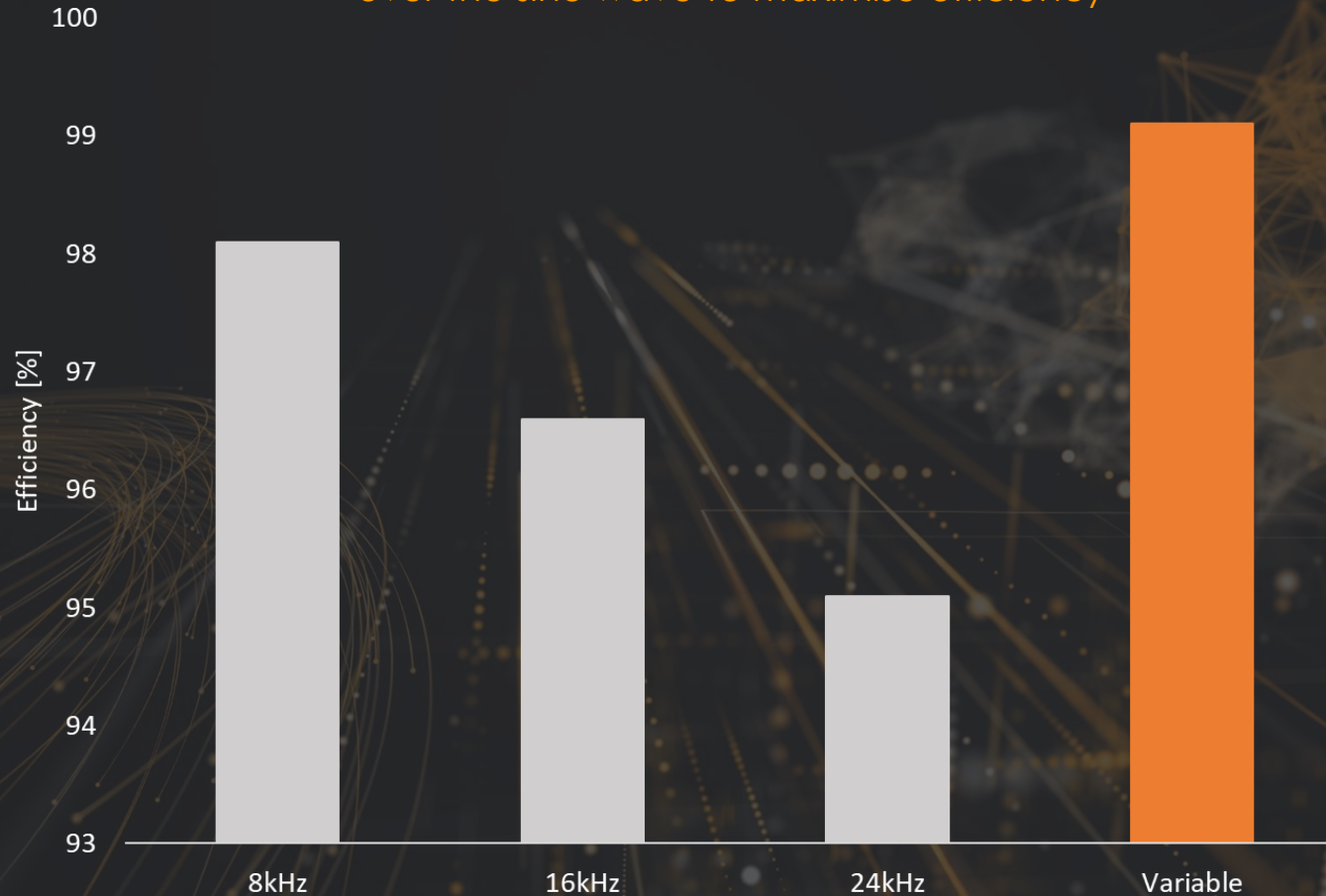
Seamless hybrid switching between SVPWM and DPWM control to maximise efficiency across the motor operating window





# Pushing the 3<sup>rd</sup> wave of electrification further by leveraging pioneering motorsport-derived motor control knowhow to deliver best-in-class efficiency

Dynamically and continuously variable switching frequency over the sine wave to maximise efficiency

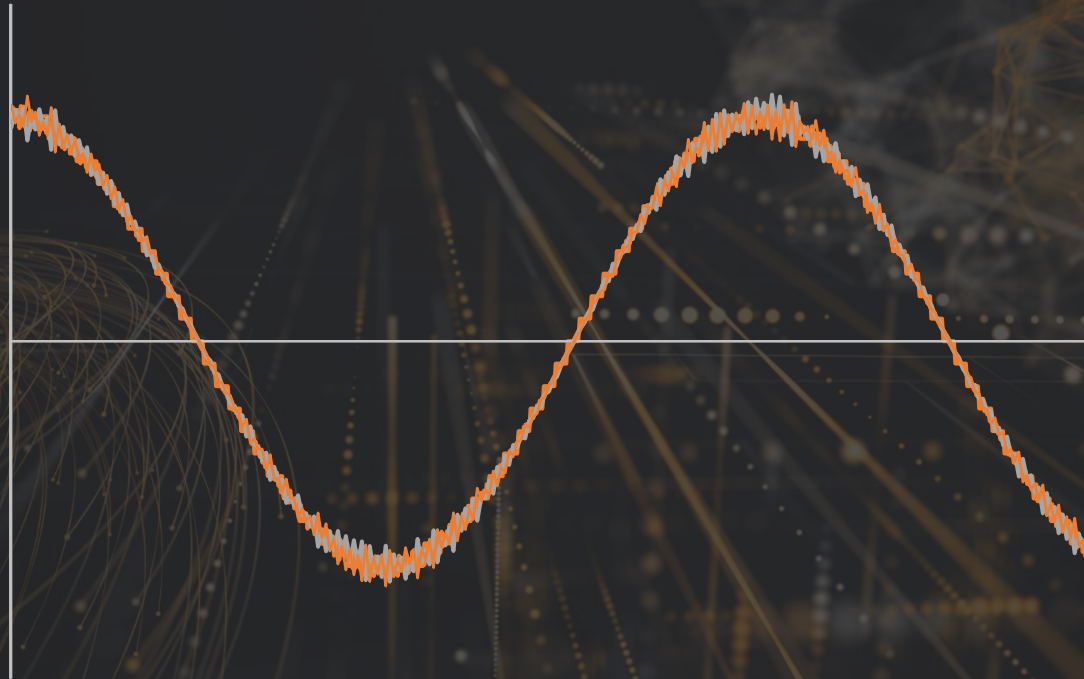






As we enter the 4th wave of electrification, motor control software will play an increasingly important role in differentiation going forward

High fidelity switching over the sine wave enables tuning of the motor harmonic resonance & distortion





# OEMs can hone a variety of powertrain attributes to align to their brand character

## Noise, vibration & harshness



- Suppression of harmonics for refinement
- Injection of harmonics for augmentation

## Driveability



DC & AC power measurement with closed loop control for minimised torque ripple

## Anti-lash Transmission Control



Forward prediction on 0 speed crossing to reduce transmission gearset backlash

# IPG5 Standalone & IPG5-x Integrated 800V Silicon Carbide Inverters



Supports ultra-fast charging:  
<900V HV Input

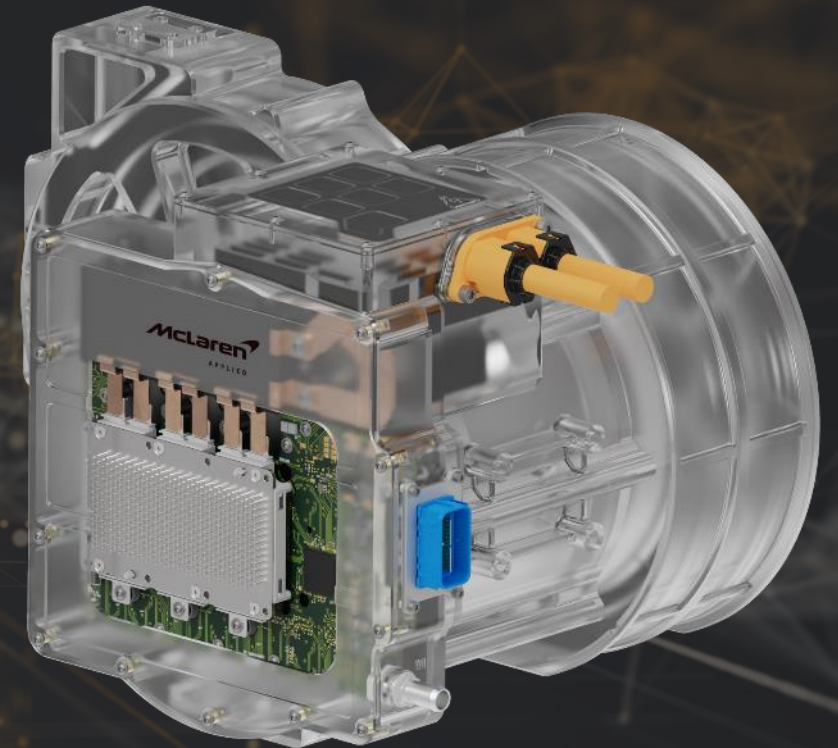
Lightweight & compact<sup>1</sup>:  
5.5kg & 3.88L

Class-leading power density<sup>1</sup>:  
>90kVA/kg >130kVA/L

High Efficiency:  
97% typical, 99% peak

High Current Capability:  
540A<sub>rms</sub> Peak & 320A<sub>rms</sub> Continuous

Advanced SW control:  
Variable Switching Frequency 1 – 32kHz



<sup>1</sup> For standalone IPG5 inverter. Weight/volume reduction of integrated IPG5-x inverter subject to EDU application

[mclarenapplied.com](http://mclarenapplied.com)



Contact us to find out how we can help you

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