

IPG5-x PRELIMINARY PRODUCT SUMMARY

IPG5-x INTEGRATED 800V SILICON CARBIDE INVERTER

McLaren Applied's Inverter Platform Generation 5-x (IPG5-x) product harnesses many years of Silicon Carbide (SiC) experience. The IPG5-x inverter can directly integrate to, and power, electric motors to over 400 kW¹ peak, 250 kW² continuous.

Designed to seamlessly integrate with any motor and transmission combination to form complete electric drive units (EDUs), the unmatched flexibility and modularity of IPG5-x delivers high performance solutions that can be brought to market quickly and cost-effectively.



Example IPG5-x EDU integration concept only

KEY FEATURES

- SiC technology for ultimate compactness and efficiency
- 800V architecture to enable ultra-fast charging
- High speed motor drive capability, electrical frequency up to 2.5 kHz
- Variable switching frequency 1 - 32 kHz
- Peak power density (mass)^{3,4} >130 kVA/kg
- Peak power density (volume)^{3,4} >130 kVA/L
- AUTOSAR 4.3

ELECTRICAL INPUTS

- High voltage input up to 900 V
- Low voltage input 8 V - 32 V

ELECTRICAL OUTPUTS

- 3 phase output
- Peak current 540 A_{rms}⁴
- Continuous current 320 A_{rms}⁵

ELECTRICAL PERFORMANCE

- Efficiency 97% typical, 99% peak

SAFETY

- ISO 26262 capable, up to ASIL-D
- Integrated HVIL protection

COMMUNICATION AND MOTOR FEEDBACK

- 3 CAN2.0b interfaces (2 with FD option)
- Vehicle CAN message scheme defined according to customer requirements
- Resolver or SinCos Encoder for motor position sensor feedback
- Up to 3 PTC or NTC sensors for motor temperature feedback
- ePump control over CAN
- Park brake control over CAN
- 12V driveline disconnect actuation
- 1 Ethernet interface for development units

MECHANICAL

- Dry mass³ <3.5 kg
- Volume³ <3.8 L
- Dimensions³ <265 x 175 x 80 mm

ENVIRONMENTAL AND COOLING

- Water/glycol cooled
- Max. coolant inlet temperature 70°C⁶
- Min. coolant flowrate 10 L/min⁶
- Max. coolant pressure 2Bargauge
- Operating temperature range -40°C to +105°C

1 Subject to further testing - 750 V input voltage, phase current 524 A_{rms}, power factor 0.875, 10 seconds duration, 8 kHz switching frequency

2 750 V input voltage, phase current 320 A_{rms}, power factor 0.875

3 Based on known nominal packaging solution, without casing

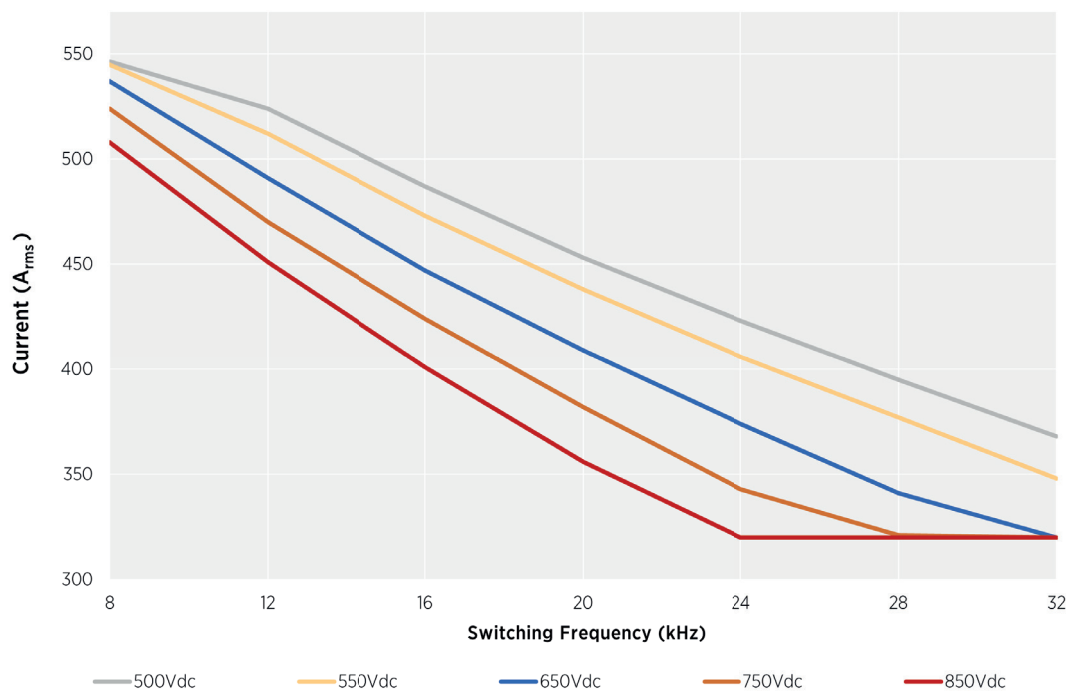
4 Peak apparent power, 750 V input voltage, phase current 524 A_{rms}, 10 seconds duration

5 Subject to further testing - 70°C coolant, 10 L/min flowrate, 8 kHz switching frequency

6 To achieve rated specification

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Peak Current vs Switching Frequency Map: 10s rating, 70°C Coolant @ 10L/min, Modulation Index = 1.0, Power Factor = 0.875

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