

Preliminary 500 kVA - 1.7 kV SiC Power Stack Evaluation Kit

SOLUTIONS FOR POWER MANAGEMENT

DATASHEET AND SPECIFICATIONS

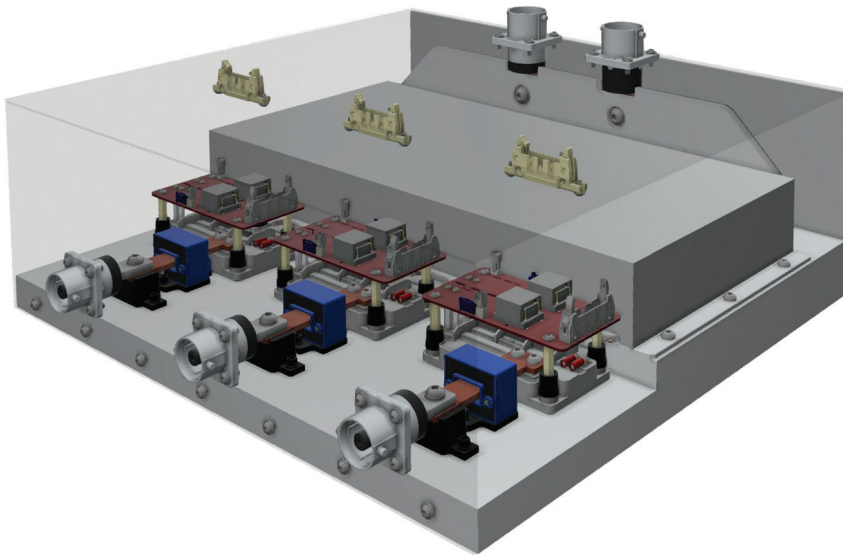
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CONTROLLED BY:



Mersen SiC Power Stack reference designs help inverter designers save time and confusion in selecting individual components. Designers can greatly benefit from a solution that is optimally pre-designed for their specific application.



PART NUMBER: SIC-EVAL-KIT-500

FEATURES*

- 1200V DC bus
- 500 kVA / 500 A_{rms} DC-DC interleaved
- 300 kVA / 300 A_{rms} DC-AC 3-phase
- 25 kHz switching Frequency
- > 98% peak efficiency
- >20 kW/L power density
- Up to 150°C T_j under switching conditions
- Microchip® 1.7 kV / 2.9 mΩ mSiC™ SP6LI MOSFET module
- Microchip® Dual Channel Plug-and-Play mSiC™ Gate Driver
- < 7 nH bus bar-capacitor inductance

BENEFITS

- Large range of applications and operating points
- Quick turn reference design for reduced time to market
- Power stack integrated for small form factor

APPLICATIONS

- DC distribution, smart DC grid, EES
- Heavy-duty and off-road EV
- DC fast power charging station
- Battery testing
- Renewable energies (PV, H₂, Wind...)
- Power supply
- Rail auxiliary converter
- Marine, transportation

* Customization or derating can be studied on request

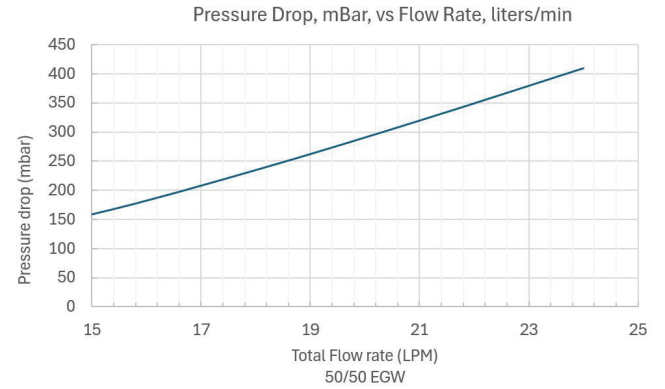
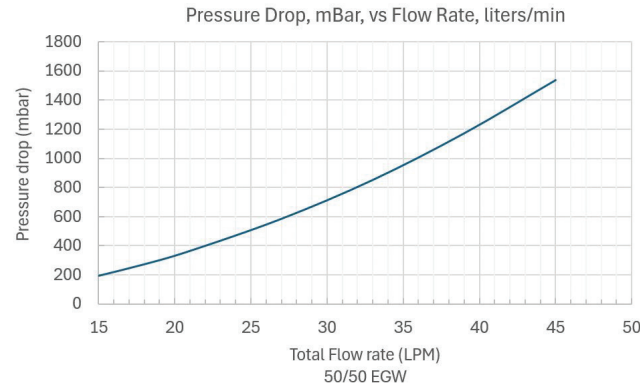
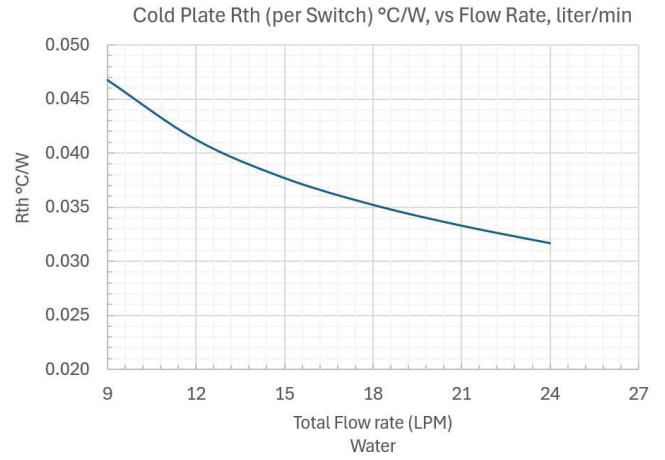
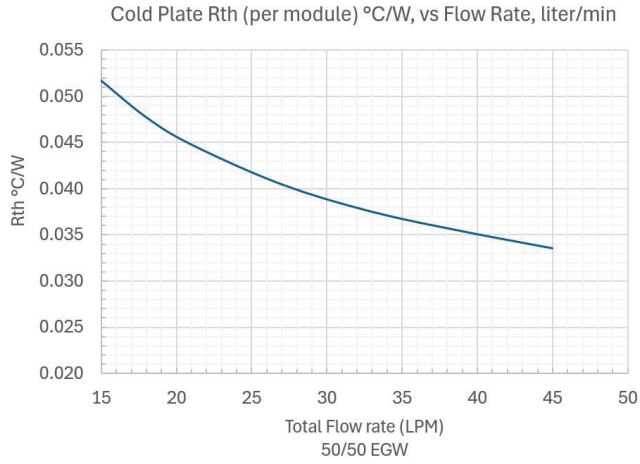
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TECHNICAL SPECIFICATIONS

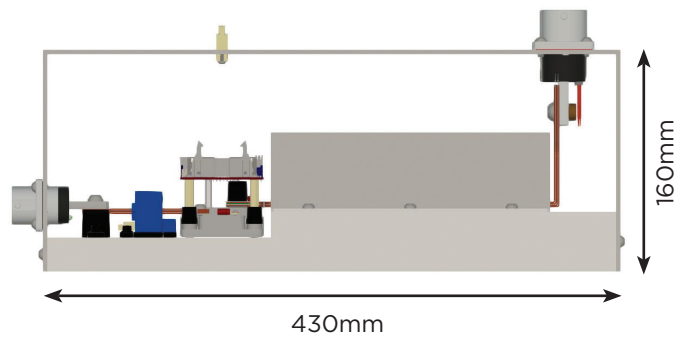
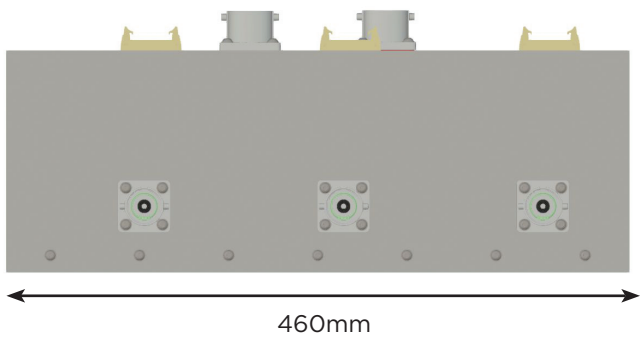
Electrical		Min	Typ.	Max	Unit
Semiconductor	3x 1.7 kV / 2.9 mΩ / 538A mSiC™ MOSFET phase-legs in SP6Li modules Microchip® MSCSM170AM029CT6LIAG		1700		V
VDC	DC Bus Voltage/ DC Supply Voltage		1200	1300	V
I _o	Flow: 21 l/min, Coolant: 50% Water/50% Glycol, T _{coolant} = 60 °C, V _{dc} = 1200V, F _{sw} = 25 kHz		300	400 (500 if < 1min)	A _{RMS}
f _{sw}	Switching frequency, PWM type		25	30	kHz
C _{dc}	DC Link Capacitor value 1500V	540	600	660	μF
L _{dc}	DC Link Bus Bar - Capacitor inductance (@25kHz F _{sw})		6.5	7	nH
Vinsulation	HiPot DC test over 3 zones (bus bars, gate drivers and heat sink to ground), 1 min		3000	4000	V
Cooling and Environment		Min	Typ.	Max	Unit
T _{sto}	Storage Temperature	-40		85	°C
T _{coolant}	Coolant inlet temperature (140° T _j max)		60		°C
IP	Enclosure Ingress Protection		IP00		
dp	Pressure Drop, nominal flow 21l/min 50/50 EGW		320		mbar
P	Power dissipated to liquid coolant (full rated power, 25 kHz F _{sw})		2300	3900	W
Altitude	@V _{dc} = 1200V			4000	m
Humidity	No condensation, Pollution Degree 2	5		85	%
Discharge of DC Bus (Optional)		Min	Typ.	Max	Unit
t _{dis}	No active discharge to VDC < 50V			30	min
t _{adis}	With active discharge to VDC < 50V			5	S
Control Interface					
Gate Driver	1700V, SP6Li compatible Plug-and-Play mSiC™ Gate Driver Microchip® MSCDGD170A6LIEMG				
Mechanical		Min	Typ.	Max	Unit
Height			160		mm
Length			430		mm
Width			460		mm
Weight	Average value		30		kg
T _t	Fastener torque for power terminals		TBD		Nm
T ₁	Torque for TBD		TBD		Nm
Vibration	According to IEC60721			5	m/s ²
Shock	According to IEC60721			40	m/s ²

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COOLING PERFORMANCE

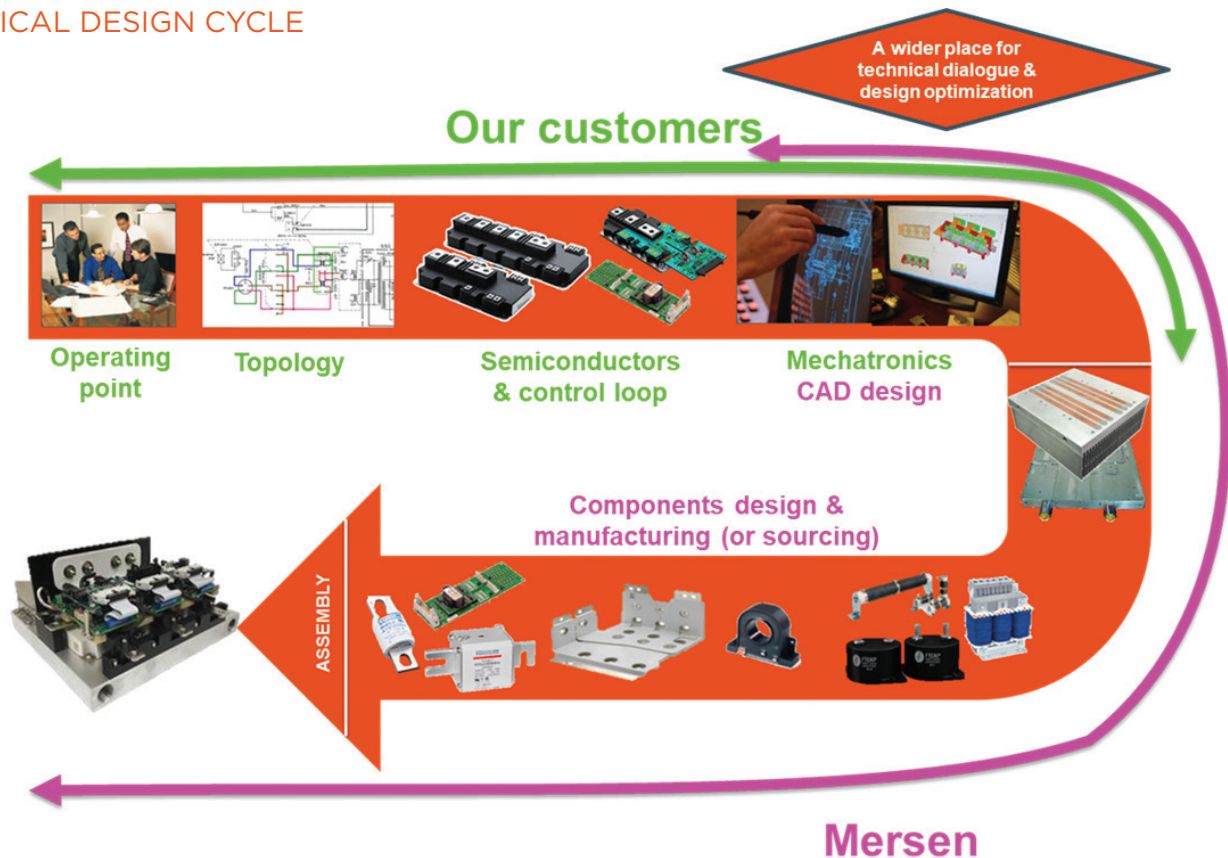


DIMENSIONS



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TYPICAL DESIGN CYCLE

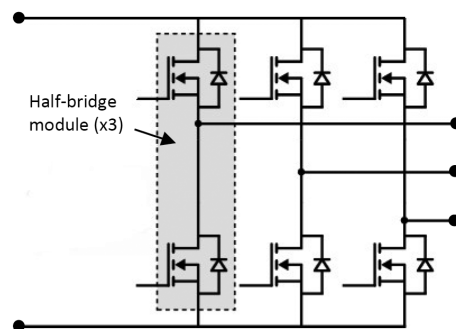


TARGETED CUSTOMERS

- Inverter / Stack design-house and R&D lab with limited or no production capability.
- OEM / stack and inverter manufacturers: specialists and generalists
- System Integrators

POSSIBLE CUSTOMIZATION AND ADAPTATION (UPON REQUEST)

- Overall dimensions and form-factor of the mechanical frame
- Bracket and hardware for integration
- SiC MOSFET module model and type
- Gate Driver control, optical driving and fault tracking
- Increase of Power, Fsw, Inom or Vdc
- Air- or heat-pipe cooling (instead or liquid-cooled)
- Integration of output filter inductors
- Pre-charge / active discharge
- Specific tests and qualification



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More information at:

<https://ep-us.mersen.com/products/engineering/inverterstack-design-optimization-assembly>

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