SOLUTIONS FOR POWER MANAGEMENT

Mersen
Expertise, our source of energy

PRELIMINARY

500 KVA - 1.7 KV SIC POWER STACK EVALUATION KIT

COOLED, CONNECTED, PROTECTED, FILTERED, ASSEMBLED, AND TESTED BY:

Mersen

POWERED AND CONTROLLED BY:

Microchip

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 Tj 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, H_2, Wind...)
- Power supply
- Rail auxiliary converter
- Marine, transportation

* *Customization or derating can be studied on request*

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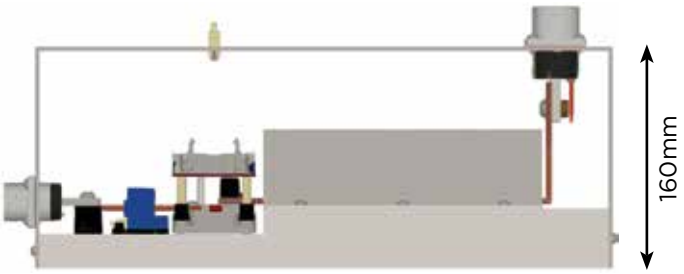
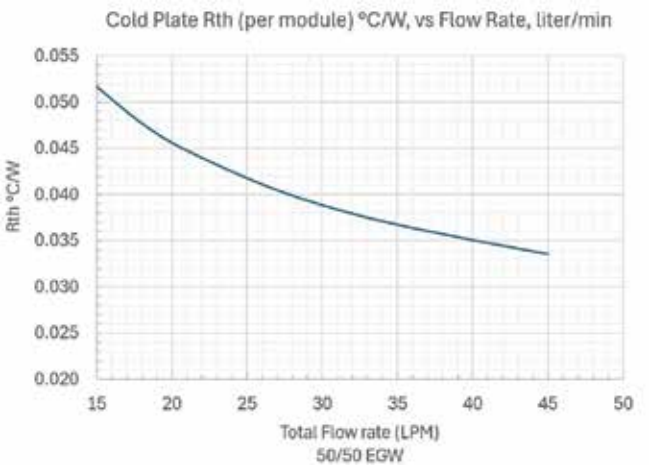
TECHNICAL SPECIFICATIONS

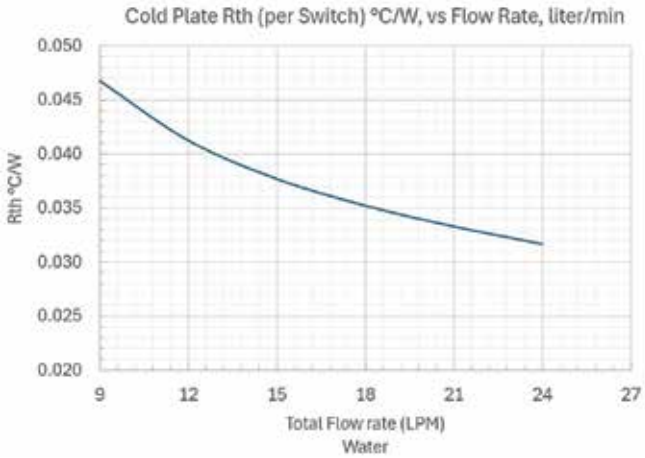
ELECTRICAL		MIN	TYP.	MAX	UNIT
Semiconductor	3x 1.7 kV / 2. 9 mΩ / 538A mSiC™ MOSFET phase-legs in SP6LI modules Microchip® MSCSM170AM029CT6LIAG		1700		V
VDC	DC Bus Voltage/ DC Supply Voltage		1200	1300	V
Io	Flow: 21 l/min, Coolant: 50% Water/50% Glycol, Tcoolant = 60 °C, Vdc = 1200V, Fsw = 25 kHz		300	400 (500 if <1min)	A_{RMS}
fsw	Switching frequency, PWM type		25	30	kHz
Cdc	DC Link Capacitor value 1500V	540	600	660	µF
Ldc	DC Link Bus Bar - Capacitor inductance (@25kHz Fsw)		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**
Tsto	Storage Temperature	-40		85	°C
T coolant	Coolant inlet temperature (140 ° Tj 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 Fsw)		2300	3900	W
Altitude	@Vdc = 1200V			4000	m
Humidity	No condensation, Pollution Degree 2	5		85	%
DISCHARGE OF DC BUS (OPTIONAL)		**MIN**	**TYP.**	**MAX**	**UNIT**
tdis	No active discharge to VDC < 50V			30	min
tadis	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
Tt	Fastener torque for power terminals		TBD		Nm
T1	Torque for TBD		TBD		Nm
Vibration	According to IEC60721			5	m/s^2
Shock	According to IEC60721			40	m/s^2

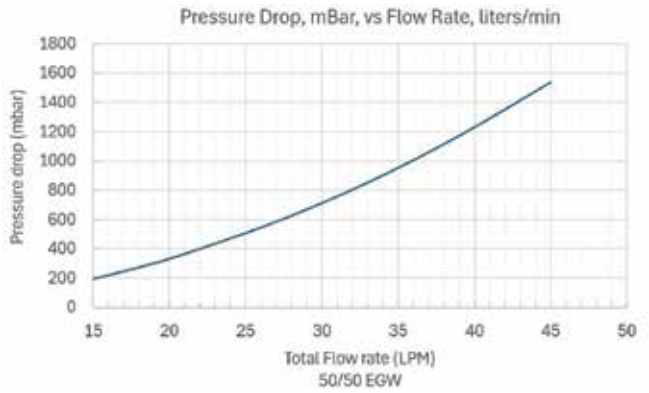
DIMENSIONS

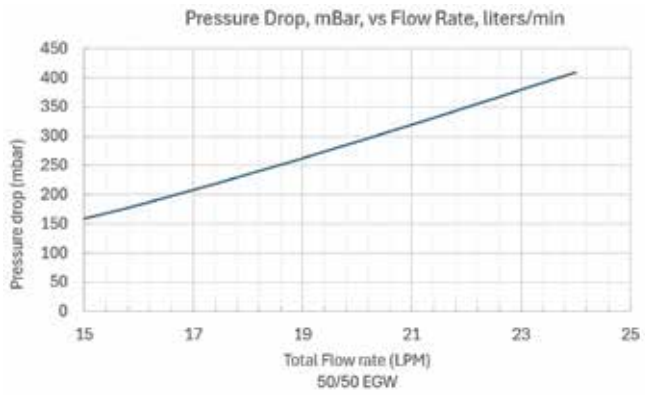


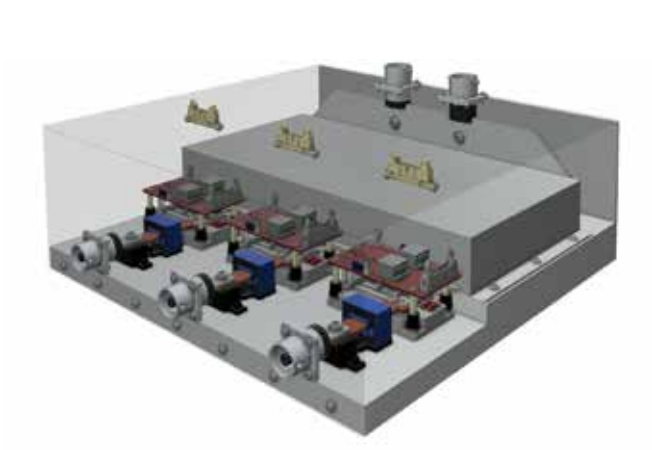
COOLING PERFORMANCE

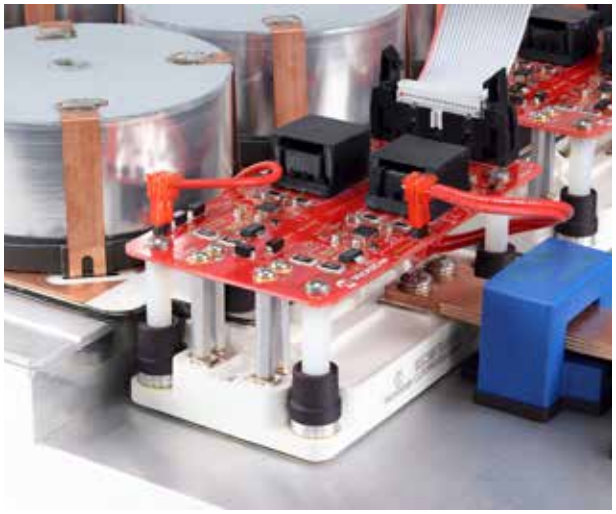












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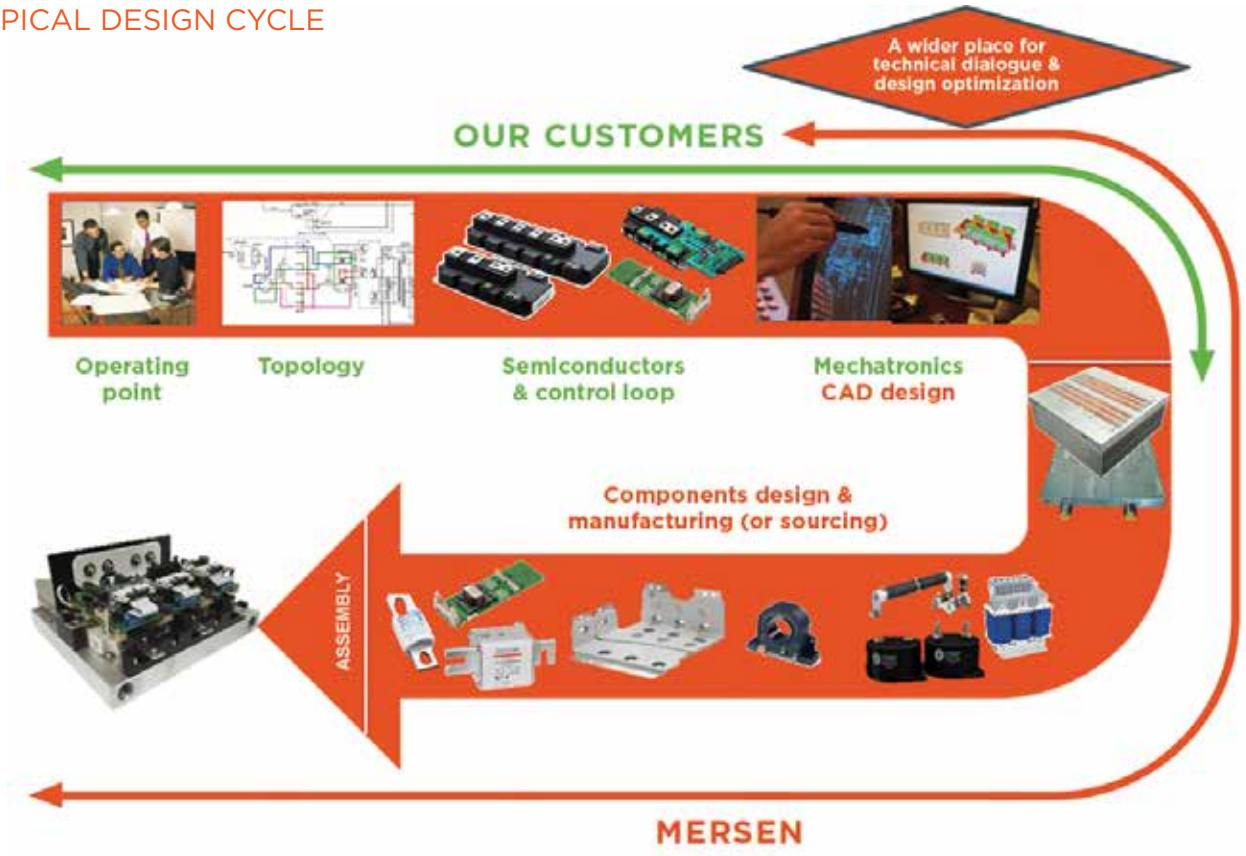
TYPICAL DESIGN CYCLE

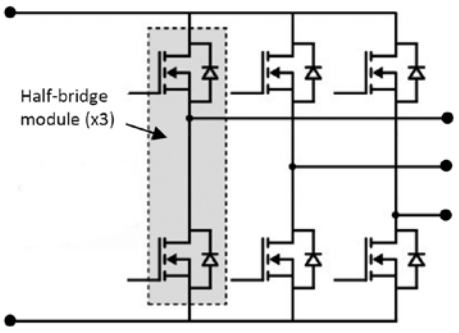


TARGETED CUSTOMERS

- 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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