

150 kVA 3-phase SiC Power Stack Evaluation Kit

SOLUTIONS FOR POWER MANAGEMENT

STACK REFERENCE DATASHEET

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

MERSEN

POWERED BY:

MICROCHIP

CONTROLLED BY:

AgileSwitch
Digital Programmable
Gate Drivers

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

Part Number: SiC-Eval-Kit-150

FEATURES

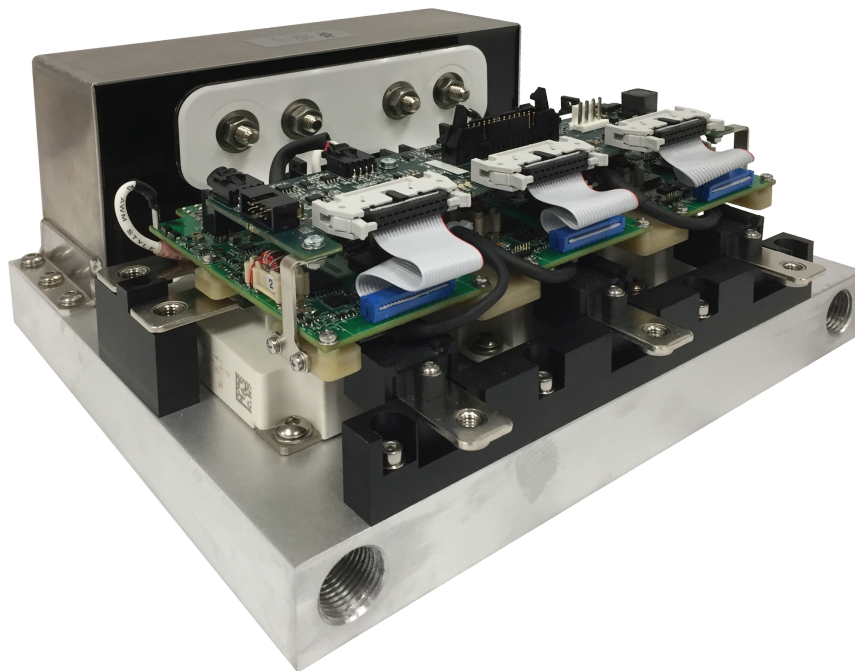
- 16 kW/L power density
- Up to 130°C T_j
- Peak efficiency 98%
- SiC MOSFET power modules:
 - Microchip® MSCSM120AM042CD3AG
- AgileSwitch® 2ASC-12A1HP Gate Driver core
- 700 VDC / 200 A_{RMS}
- Compact water cooled
- Up to 20 kHz switching frequency

BENEFITS

- Power modules, bus bar, cooling, gate drivers, and capacitors can now be optimally designed together in one step to answer electrical, mechanical, and thermal challenges of the system.

APPLICATIONS

- E-Mobility
- DC smart grid
- Industrial
- Renewable energies



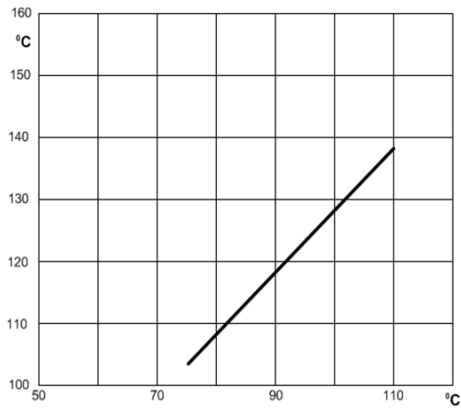
PART NUMBER: SIC-EVAL-KIT-150

TECHNICAL SPECIFICATIONS

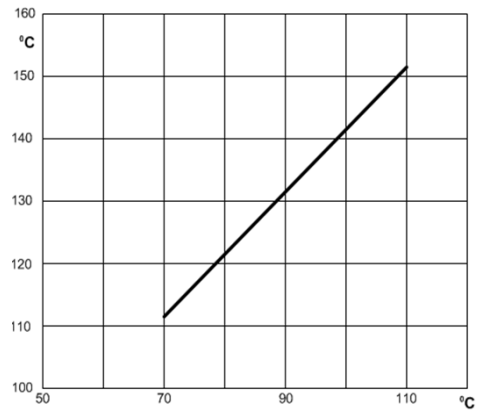
Electrical		Min	Typ.	Max	Unit
Modules	3x SiC MOSFET half-bridge modules (Microchip®)		1200		V
Vo	Three Phase Output Voltage, VDC > 700V		480		V _{RMS}
Io	Flow: 4 l/min, Coolant: 50% Water/50% Glycol, Tcoolant = 70 C, VDC = 700V, fsw = 15kHz		200		A _{RMS}
VDC	DC Bus Voltage/ DC Supply Voltage		700	800	V
fsw	Switching frequency, PWM type	10	15	20	kHz
Cdc	DC Link Capacitor, 760uF, 1100V	0.65	0.7	0.75	mF
Cdd*	EMC decoupling capacitors		0.68		μF
Viso	Power Terminals to chassis, DC, 1 min		3000	4000	V
Cooling and Environment		Min	Typ.	Max	Unit
Tsto	Storage Temperature	-40		85	°C
Tair*	Ambient air temperature. See Note 1	-40		65	°C
T coolant	Coolant inlet temperature, derate > 70°C	-40		105	°C
IP	Enclosure Ingress Protection		IP00		
dp	Pressure Drop, nominal flow 4 ltr/min		29		mbar
P	Power dissipated to liquid coolant		2400	3000	W
Altitude	VDC = 800V			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	AgileSwitch 2ASC-12A1HP – 1200V Dual-Channel Augmented High Performance SiC Core				
Mechanical		Min	Typ.	Max	Unit
Height			131		mm
Length			272		mm
Width			259		mm
Weight	Average value		18		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

COOLING PERFORMANCE

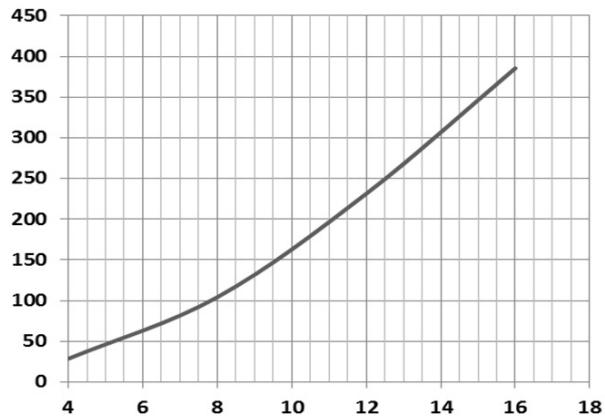
FET T_j vs Coolant inlet Temperature.
R_{th} = .012 K/W, I_o = 200A, f_{sw} = 15 kHz



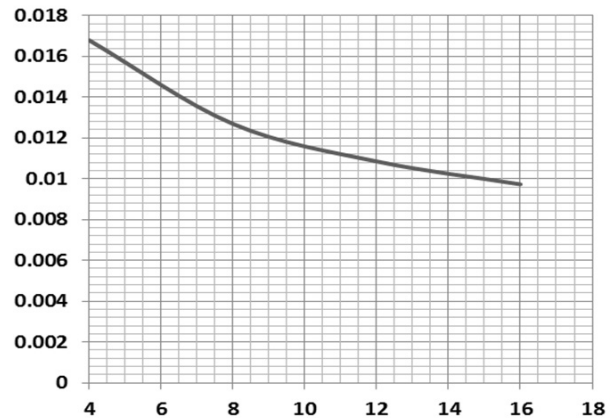
FET T_j vs Coolant inlet Temperature.
R_{th} = .0168 K/W, I_o = 200A, f_{sw} = 15 kHz



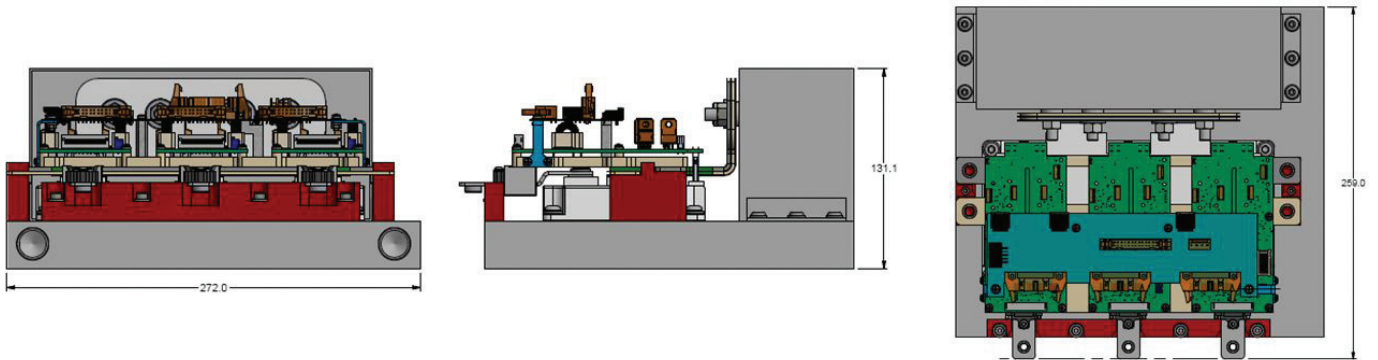
Pressure Drop, mBar, vs Flow Rate, liters/min



Cold Plate R_{th}, °C/W, vs Flow Rate, liters/min

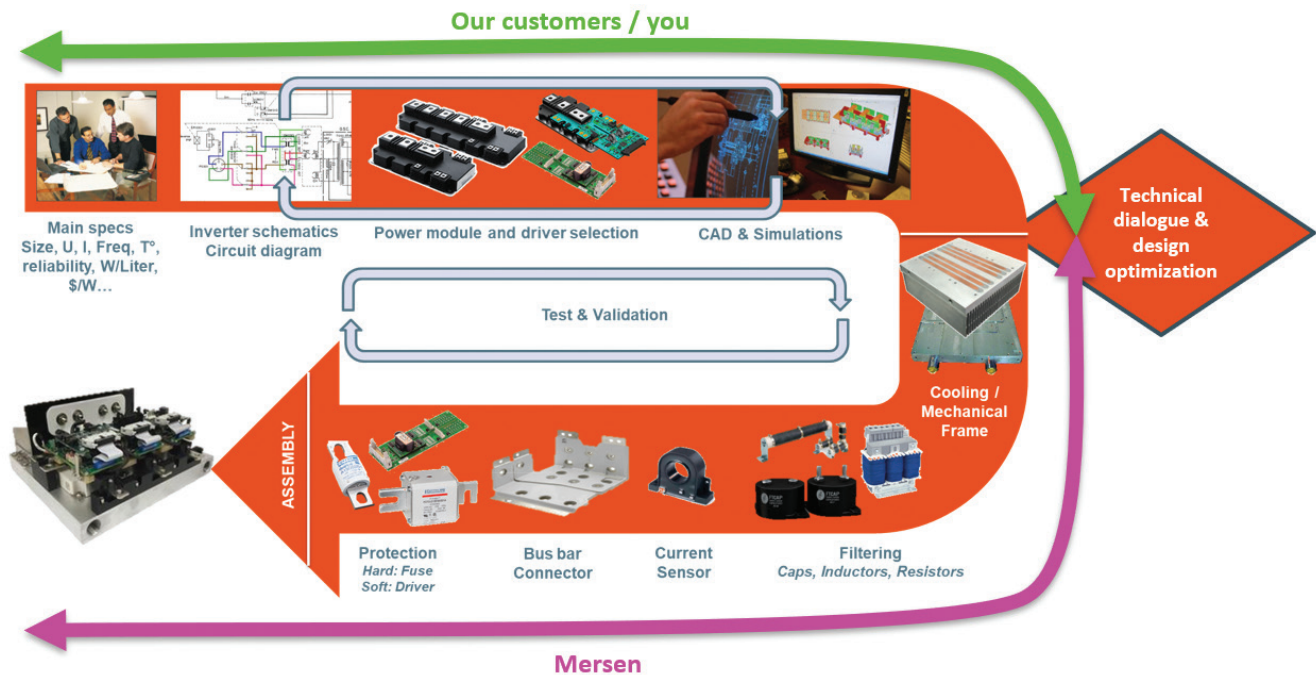


DIMENSIONS



Mersen reserves the right to change, update, or correct, without notice, any information contained in this datasheet.

TYPICAL DESIGN CYCLE

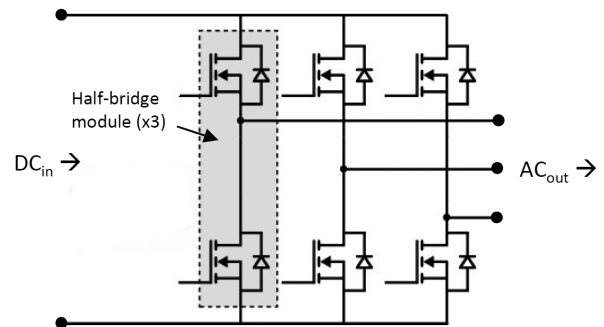


TARGETED CUSTOMERS

- 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
- 1700V SiC module
- Air-cooling (instead or liquid-cooled)
- Increase of F_{sw} , I_{nom} or V_{dc}
- Integration of output filter inductors
- Test and qualification
- Purchase of individual stand-alone components only (no assembly service)



CONTACT

Philippe ROUSSEL, PhD
VP Strategic Marketing / Executive expert
Email: philippe.rousseau@mersen.com

More information at:

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