

# GCS300F170BM

1.7kV, 7.5m All-Silicon Carbide Half-Bridge Module

$V_{DS}$	1700 V
$I_D(@25^{\circ}\text{C})$	330 A
$R_{DS(on)}$	7.5 m

## Features

- Low On-Resistance and High Current Density
- Low Capacitance for High Frequency Operation
- Normally-off ,fail-safe Device Operation
- Positive Temperature Coefficient Device
- RoHS Compliant

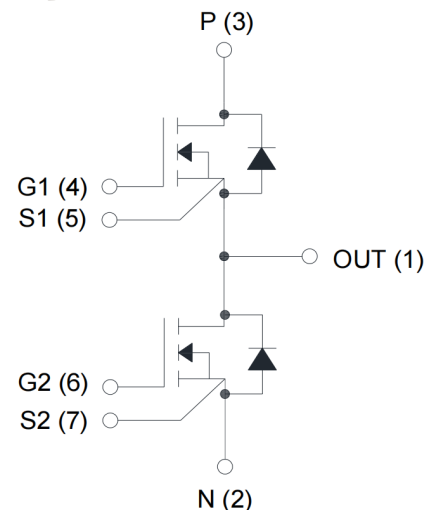
## Benefits

- Higher System Efficiency
- Increase Parallel Device Convenience
- Temperature Independent Switching Behavior
- Allow High Frequency Operation
- Realize Compact and Lightweight Systems

## Applications

- Induction Heating
- EV/HEV Motor Drives
- Motion/servo control
- Traction
- UPS and SMPS
- Solar/Wind Renewable Energy

## Product Overview



## Absolute Maximum Ratings ( $T_c = 25^{\circ}\text{C}$ unless otherwise specified)

### SiC MOSFET-inverter

Symbol	Parameter	Value	Unit	Test Conditions	Note
$V_{DS, max}$	Drain – Source Voltage	1700	V	$V_{GS}=0\text{V}, I_{DS}=600\mu\text{A}$	
$I_D$	Continuous Drain Current	330	A	$V_{GS}=20\text{V}, T_c=25^{\circ}\text{C}$	
		231		$V_{GS}=20\text{V}, T_c=100^{\circ}\text{C}$	
$P_{D\_MOS}$	Power Dissipation	TBD	W	$T_c=25^{\circ}\text{C}$	
$V_{GS, op}$	Recommend Gate Source Voltage	-5 to 20	V	Static, recommended DC operating values	
$V_{GS, max}$	Maximum Gate Source Voltage	-10 to 25		Transient operating limit (AC $f > 1\text{Hz}$ , duty cycle $< 1\%$ )	

**SiC MOSFET-inverter Electrical Characteristics** ( $T_c = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_{DS}=600\mu A$	1700			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=10V, I_{DS}=300mA$		2.6		V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=1700V, V_{GS}=0V$		<6	600	$\mu A$
		$V_{DS}=1700V, V_{GS}=0V$ $T_j=175^\circ C$		60	3000	
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$			1500	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=20V, I_{DS}=180A$		7.5	11.7	m $\Omega$
		$V_{GS}=20V, I_{DS}=180A$ , $T_j=175^\circ C$		16.7		
Transconductance	$g_{fs}$	$V_{DS}=8.5V, I_{DS}=180A$		96		S
Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=1000V$ $f=1MHz, V_{AC}=25mV$		24.9		nF
Output Capacitance	$C_{oss}$			0.9		
Reverse Transfer Capacitance	$C_{rss}$			0.2		
Turn On Delay Time	$t_{d(on)}$	$V_{DS}=1200V, V_{GS}=-4/20V$ , $I_D=180A, R_L=6.7\Omega$ , $R_{G(ext)}=2.7\Omega$		TBD		ns
Rise Time	$t_r$			TBD		
Turn Off Delay Time	$t_{d(off)}$			TBD		
Fall Time	$t_f$			TBD		
$C_{oss}$ Stored Energy	$E_{oss}$	$V_{GS}=0V, V_{DS}=1200V$ $f=1MHz, V_{AC}=25mV$		TBD		mJ
Turn-on Switching Energy	$E_{on}$	$V_{DS}=1200V, V_{GS}=0/20V$ , $I_D=180A$ ,		TBD		
Turn-off Switching Energy	$E_{off}$	$R_{G(ext)}=2.7\Omega$		TBD		
Internal Gate Resistance	$R_{G(int.)}$	$f=1MHz, V_{AC}=25mV$		0.12		$\Omega$
Gate to Source Charge	$Q_{GS}$	$V_{DS}=1200V$ ,		474		nC
Gate to Drain Charge	$Q_{GD}$	$V_{GS}=-5/+20V$ ,		594		
Total Gate Charge	$Q_G$	$I_D=180A$		1824		

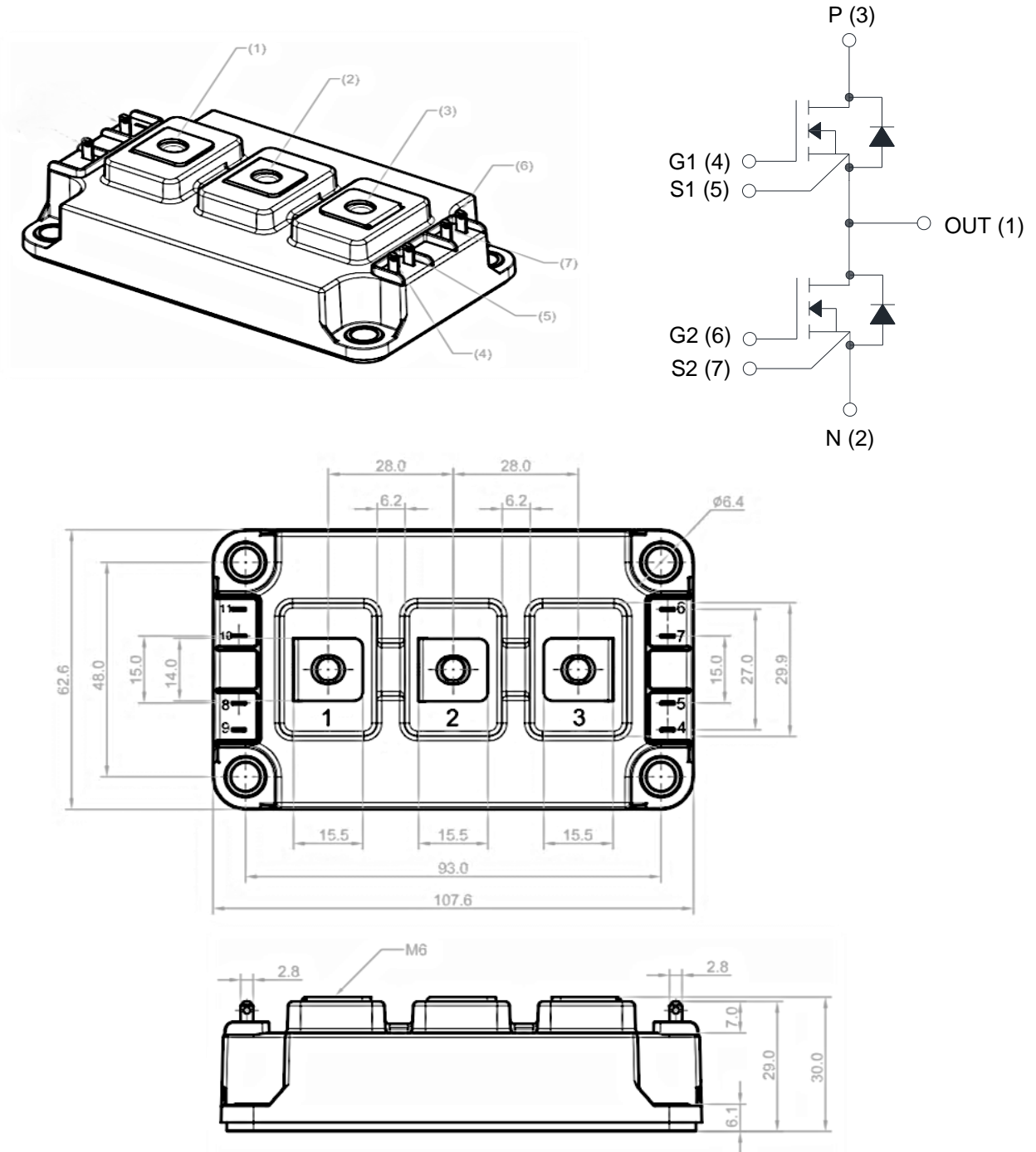
## Thermal Characteristics ( $T_c = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Value	Unit
Max. MOSFET Junction Temperature	$T_{Jmax\_MOS}$		175	°C
Operating Temperature	$T_{Jop}$		-55~150	
Storage Temperature	$T_{stg}$		-55~150	
MOSFET Thermal Resistance, Junction to Case	$R_{th\_MOS(j-c)}$	JESD51-14	250	°C/kW

## Mechanical Characteristics

Parameter	Symbol	Test Conditions	Value	Unit
Isolation Breakdown Voltage	$V_{iso}$	AC, 50Hz (R.M.S), t=1minute	3000	V
Mounting Torque to heat-sink	$\tau_h$	Recommended (M5 screw)	2.5~5	Nm
Terminal connection Torque	$\tau_{tc}$	Recommended (M6 screw)	3~5	
Weight	W		350	g

## Package Dimensions



## Notes

- The information provided herein is subject to change without notice.
- For other information that does not show on this datasheet, please contact us for inquiry.