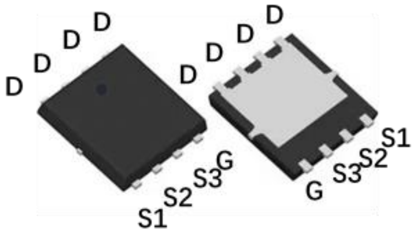
GSN680R080MC

800V Planar SiC Power MOSFET

Parameter		Value	Unit
V_{DS}		800	V
$R_{DS(on)\_typ.}$	V_{GS}=18V	680	mΩ
I_D		7.2	A

Features

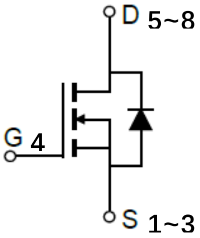
- Wide Bandgap SiC MOSFET Technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed Switching
- Low Reverse Recovery (Qrr)
- Robust against Parasitic Turn on Even 0V Turn off Gate Voltage



PDFN5*6 TopView

Benefits

- Reduced Switching Losses
- Increased System Switching Frequency
- Increased Power Density
- Reduction of Heat Sink Requirements
- Reduced EMI



Schematic Diagram

Application

- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Motor Drives
- Pulsed Power Applications

Package parameters

Part Number	Marking	Package	Packaging Method
GSN680R080MC	GSN680R080MC	PDFN5*6	Tape & Reel

Maximum ratings at T_j=25℃, Unless otherwise specified

Parameter	Symbol	Test Condition	Value	Unit
Drain to Source Voltage	V_{DS}	V_{GS} = 0V	800	V
Gate to Source Voltage	V_{GS}	Absolute maximum values	-10/+22	V
Recommended Operation Voltage of Gate to Source	V_{GSop}	Recommended operational values	0/+18	V
Continuous Drain Current	I_D	V_{GS}=18V，T_C=25℃	7.2	A
		V_{GS}=18V，T_C=100℃	5.1	
Pulsed Drain Current	I_{DM}	V_{GS}=18V，T_C=25℃	14.4	A
Power Dissipation	P_{tot}	T_C=25℃, T_j=175℃	47	W
Operating and Storage Temperature	T_j, T_{stg}		-55 to +175	℃

Thermal Characteristics

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Thermal Resistance from Junction to Case	$R_{th(j\text{-}c)}$	-	3.2	-	℃/W

Electrical Characteristics

Static Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=500μA	800			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}= V_{DS}, I_D=0.65mA	2.6		4.6	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V, V_{DS}=800V, T_j=25℃			100	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=18V, V_{DS}=0V			250	nA
Drain to Source on Resistance	$R_{DS(on)}$	V_{GS}=15V, I_D=1.8A		1000		mΩ
		V_{GS}=15V, I_D=1.8A，T_j=175℃		820		
		V_{GS}=18V, I_D=1.8A		680	884	
		V_{GS}=18V, I_D=1.8A，T_j=175℃		694		

Dynamic Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=400V, f=100KHz, T_j=25℃		125		pF
Output Capacitance	C_{oss}			11		
Reverse Transfer Capacitance	C_{rss}			1		
Total Gate Charge	Q_g	V_{GS}=0/18V, V_{DS}=400V, I_D=2A, T_j=25℃		16.5		nC
Gate-Source Charge	Q_{gs}			6.5		
Gate-Drain Charge	Q_{gd}			3.6		
Gate Resistance	R_g	V_{AC}=25mV, f=1MHz		11.8		Ω

Switching Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Turn-On Delay Time	$t_{d(on)}$	V_{GS}=0/18V， V_{DD}=400V, I_D=2A, R_g=5Ω ，L=200uH		10.2		ns
Rise Time	t_r			36.5		
Turn-Off Delay Time	$t_{d(off)}$			14.2		
Fall Time	t_f			35.6		

Reverse Diode Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=1.1A, T_j=25℃	-	3.5		V
Continuous Diode Forward Current	I_S	V_{GS}=0V, T_j=25℃		7.2		A
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_{SD}=2A, V_R=400V, di/dt=465A/us, T_j=25℃		11.6		ns
Reverse Recovery Charge	Q_{rr}			18.6		nC
Peak Reverse Recovery Current	I_{rrm}			2.8		A

Typical Performance

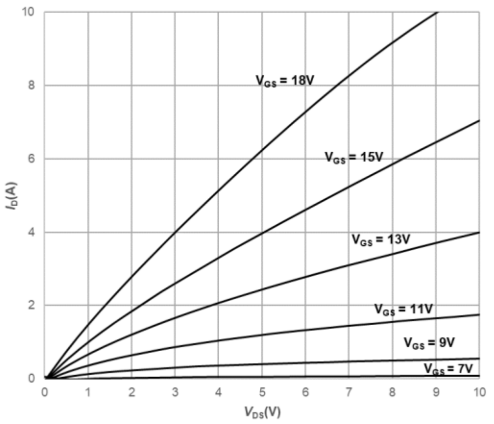


Fig1. Output Characteristics T_j=25℃

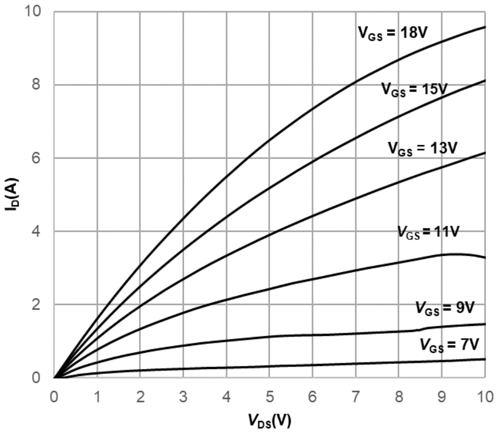


Fig2. Output Characteristics T_j=175℃

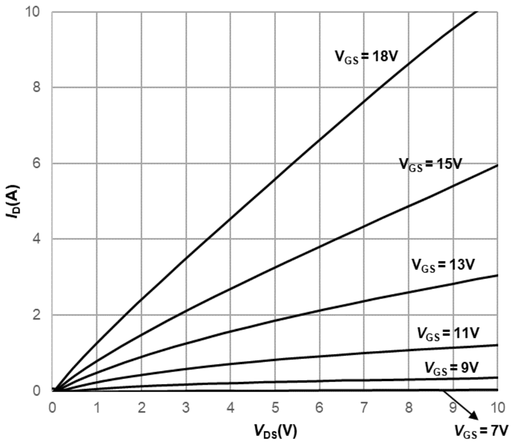


Fig3. Output Characteristics T_j= -40℃

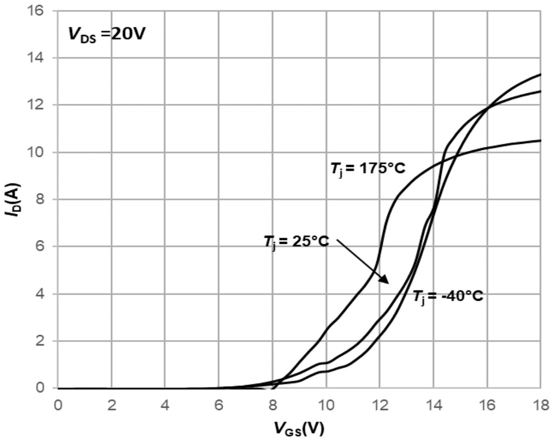


Fig4. Typical Transfer Characteristics

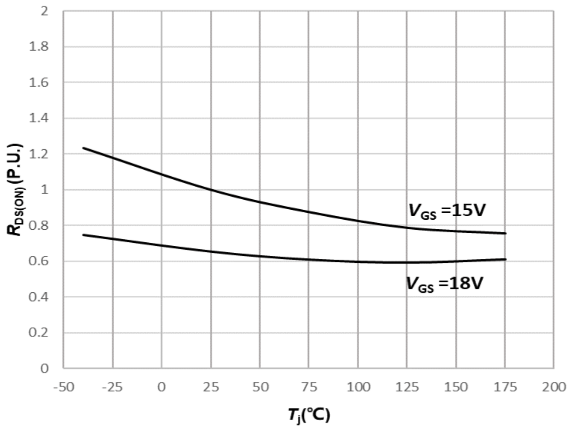


Fig5. Normalized On-Resistance vs. Temperature

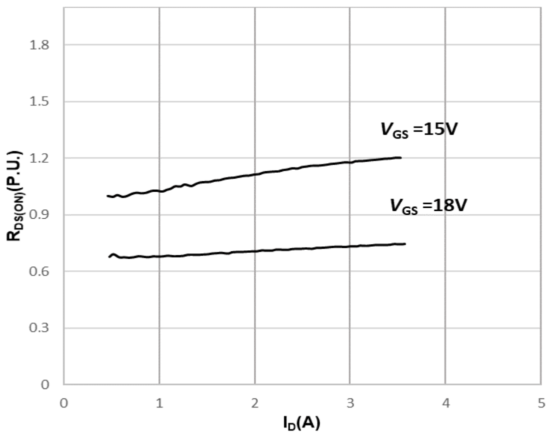


Fig6. Normalized On-Resistance vs. Drain Current For T_j=25℃

Typical Performance

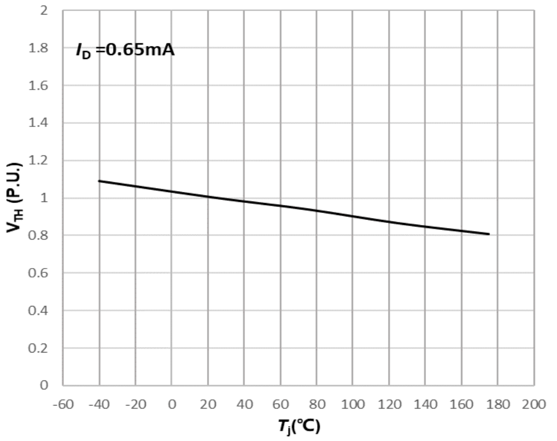


Fig7. Normalized Threshold Voltage vs. Temperature

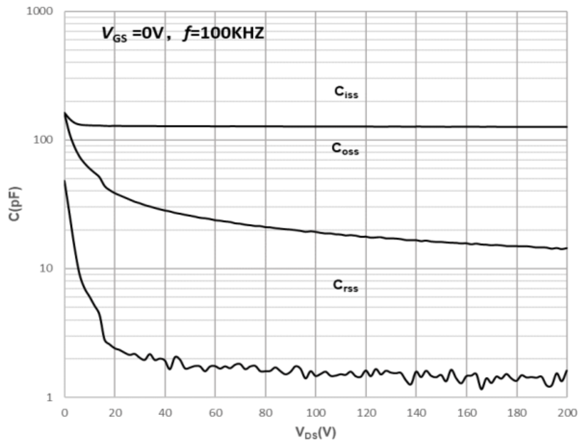


Fig8. Capacitances vs. Drain-Source Voltage (0-200V)

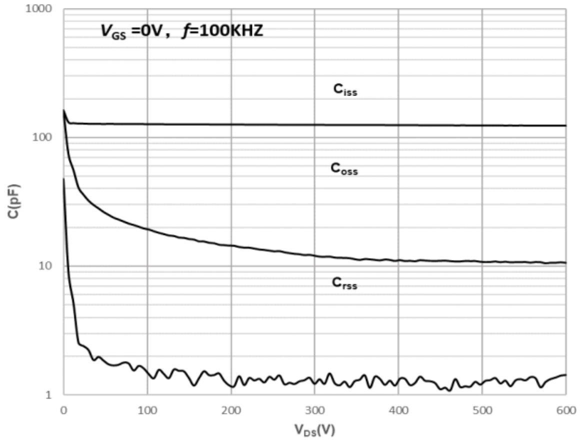


Fig9. Capacitances vs. Drain-Source Voltage (0-600V)

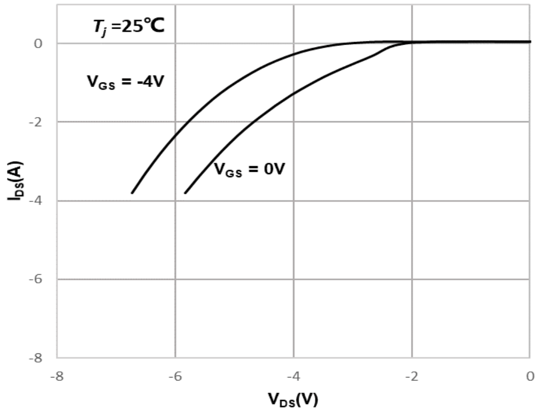


Fig10. Body Diode Characteristics

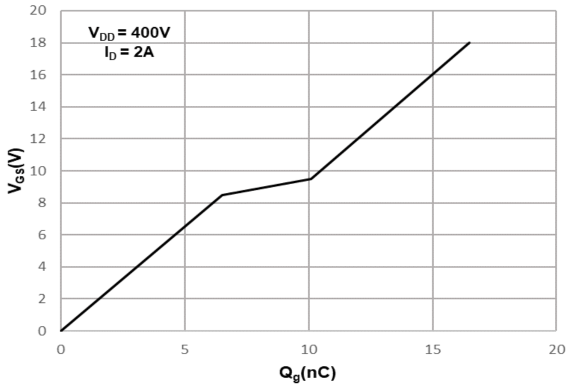


Fig11. Gate Charge Characteristic

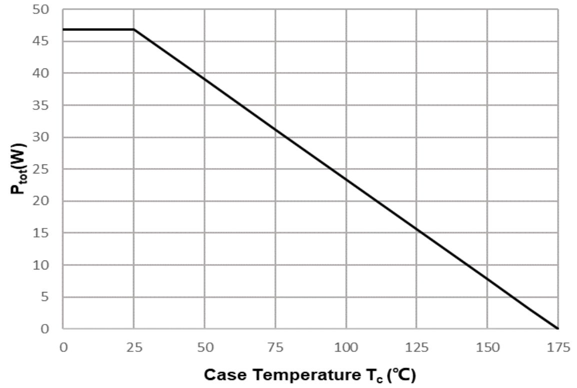


Fig12. Power Dissipation vs. Case temperature

Typical Performance

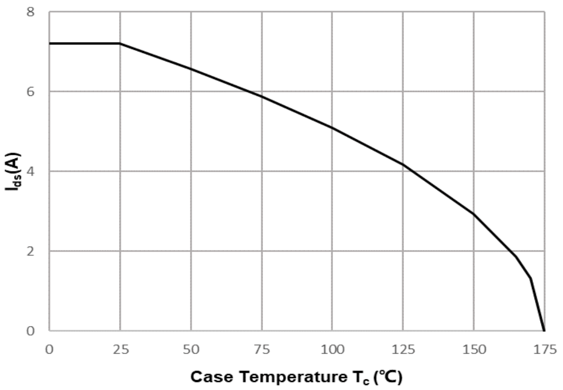
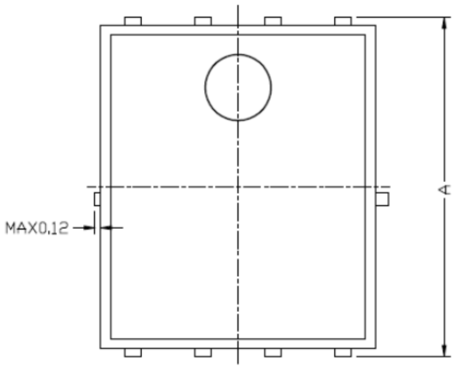
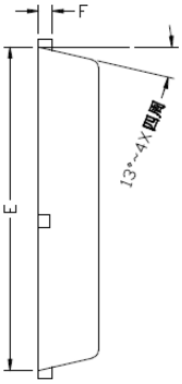
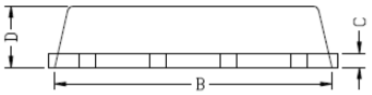


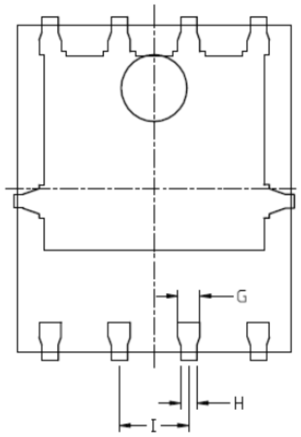
Fig13. Continuous Drain Current vs. Case Temperature

PDFN5*6 Package Dimensions









Symbol	Dimensions in Millimeter	
	MIN	MAX
A	6.05	6.25
B	4.975	5.025
C	0.246	0.262
D	1.075	1.125
E	5.835	5.885
F	0.246	0.262
G	0.3	0.5
H	0.2	0.4
I	1.26	1.28

Disclaimer

Groupsemi reserves the right to make changes of the information contained herein at any time without notice.

Groupsemi exerts the greatest possible effort to ensure high quality and reliability. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing Groupsemi products, to comply with the standards of safety in making a safe design for the entire system to prevent any accidents, fires, or community damage that may ensue. In developing your designs, please ensure that Groupsemi products are used with specified operating ranges as set forth in the most recent Groupsemi products specifications.

The Groupsemi products listed in this document are intended for usage in general electronics applications. These Groupsemi products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure if which may cause loss of human life or bodily injury, such as medical instruments, transportation instruments, combustion control instruments, atomic energy control instruments, airplane or spaceship instruments etc. all types of safety devices.

Reversion History

Rev.	Date	Change Description
1.0	2025-08-30	Form the initial version