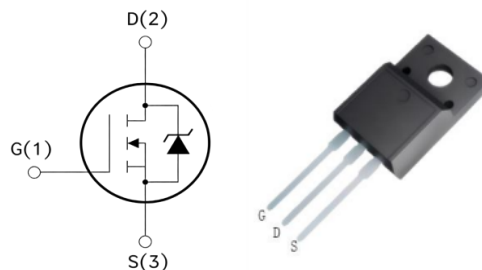


Silicon Carbide Power MOSFET

Parameter	Value	Unit
V _{DS}	650	V
I _D	20	A
R _{DS(on)}	180	mΩ
Q _G	28.6	nC



TO-220F

FEATURES

- Wide Bandgap SiC MOSFET Technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed Switching
- Low Reverse Recovery (Q_{rr})
- Easy to Parallel and Simple to Drive
- Robust against Parasitic Turn on Even 0V Turn off Gate Voltage

APPLICATIONS

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

MAXIMUM RATED VALUES (at T_J = 25 °C, unless otherwise specified)

Parameter	Symbol	Test Condition	Value	Unit
Drain to Source Voltage	V _{DS}	V _{GS} = 0V, I _D = 100μA	650	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} =15V, T _C =25°C	20	A
		V _{GS} =15V, T _C =100°C	18	
Pulsed Drain Current	I _{DM}	V _{GS} =15V, T _C =25°C	40	A
Power Dissipation	P _{tot}	T _C =25°C, T _j =175°C	33	W
Operating and Storage Temperature	T _j , T _{stg}		-55 to +175	°C

THERMAL CHARACTERISTICS

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Thermal Resistance from Junction to Case	R _{th(j-c)}	-	4.5	-	°C/W

ELECTRICAL CHARACTERISTICS (at $T_J = 25^\circ\text{C}$ unless otherwise specified)

Static Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=500\mu A$	650			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=3.5mA$	2.7		4.5	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=650V, T_J=25^\circ\text{C}$			10	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS}=18V, V_{DS}=0V$			250	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=15V, I_D=8.5A$		180	240	m Ω
		$V_{GS}=15V, I_D=8.5A, T_J=175^\circ\text{C}$		160		
		$V_{GS}=18V, I_D=8.5A$		120		
		$V_{GS}=18V, I_D=8.5A, T_J=175^\circ\text{C}$		130		

Dynamic Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=500V, f=1MHz, T_J=25^\circ\text{C}$		491		pF
Output Capacitance	C_{oss}			39		
Reverse Transfer Capacitance	C_{rss}			4.2		
Total Gate Charge	Q_g	$V_{GS}=0/15V, V_{DS}=500V, I_D=8.5A, T_J=25^\circ\text{C}$		28.6		nC
Gate-Source Charge	Q_{gs}			8.3		
Gate-Drain Charge	Q_{gd}			13.8		
Gate Resistance	R_g	$V_{AC}=25mV, f=1MHz$		6.5		Ω

Switching Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=0/15V, V_{DD}=500V, I_D=8.5A, R_g=10\Omega$		16		ns
Rise Time	t_r			55		
Turn-Off Delay Time	$t_{d(off)}$			34		
Fall Time	t_f			71		

Reverse Diode Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	VSD	VGS=0V, ISD=5A, Tj=25°C		3.4		V
Continuous Diode Forward Current	IS	VGS=0V, Tj=25°C		20		A
Reverse Recovery Time	trr	VGS = 0V, ISD=8.5A, VR=500V, di/dt=530A/us, Tj=25°C		17.6		ns
Reverse Recovery Charge	Qrr			43		nC
Peak Reverse Recovery Current	Irrm			4.2		A

CHARACTERISTICS DIAGRAMS

Fig1. Output Characteristics Tj=25°C

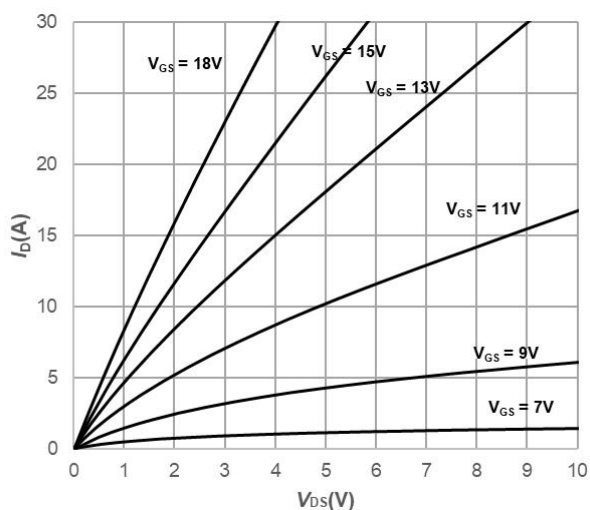


Fig2. Output Characteristics Tj=175°C

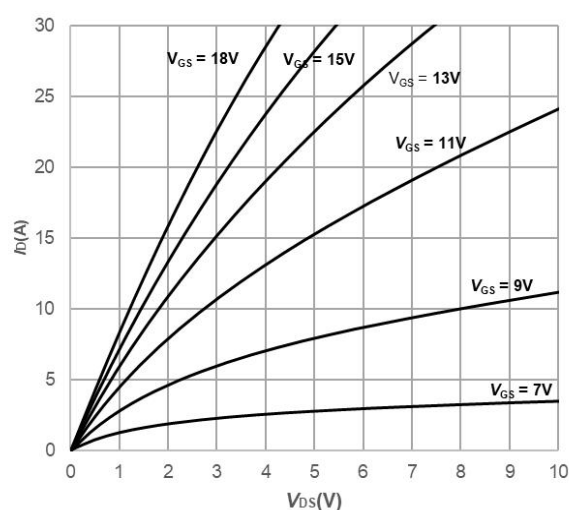


Fig3. Typical Transfer Characteristics

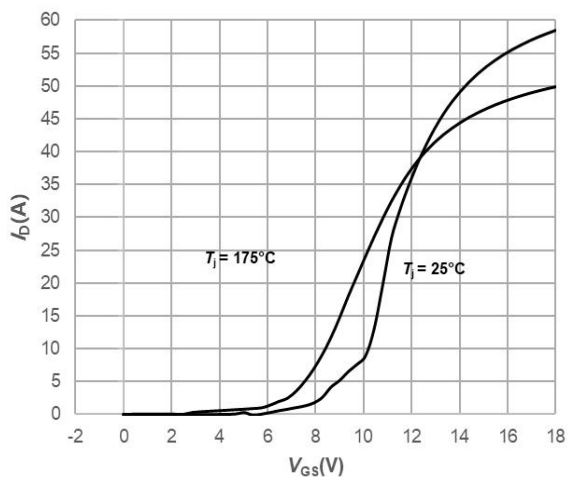


Fig4. Normalized On-Resistance vs. Temperature

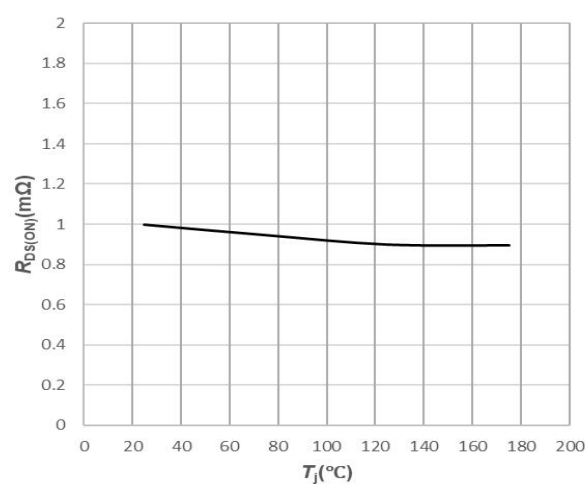


Fig5. Normalized On-Resistance vs. Drain Current For Various Temperatures

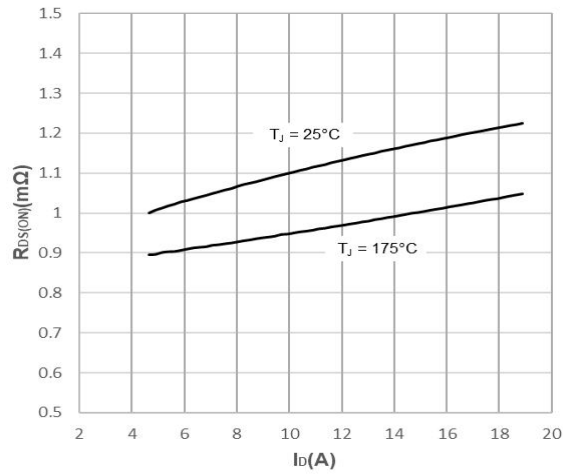


Fig6. Normalized Threshold Voltage vs. Temperature

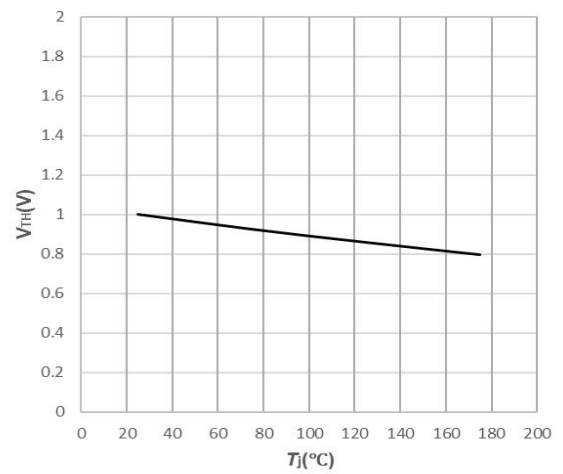


Fig7. Capacitances vs. Drain-Source Voltage (0-200V)

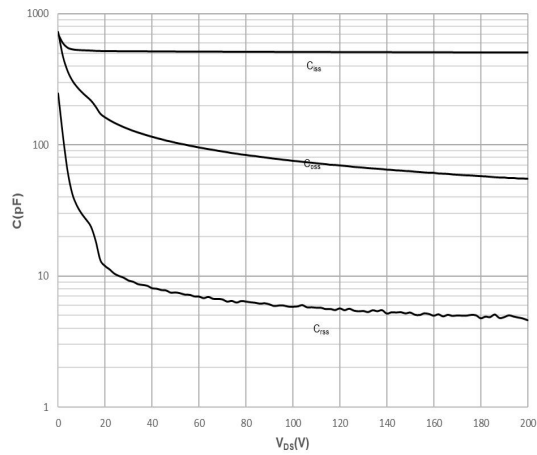


Fig8. Capacitances vs. Drain-Source Voltage (0-600V)

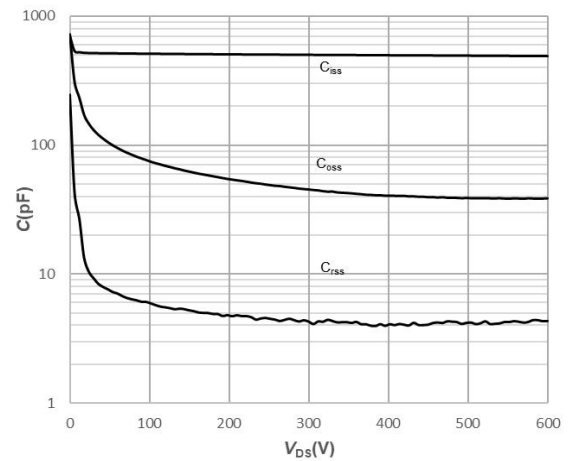
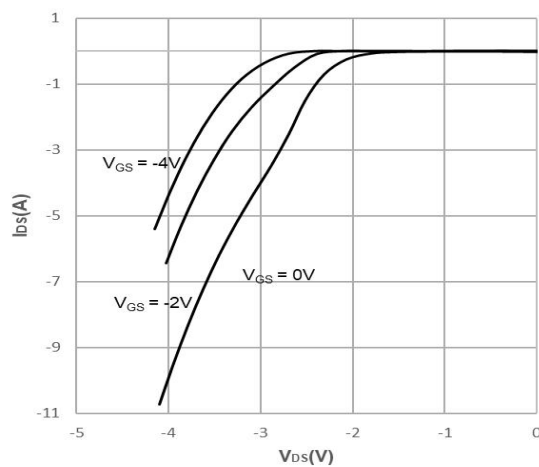
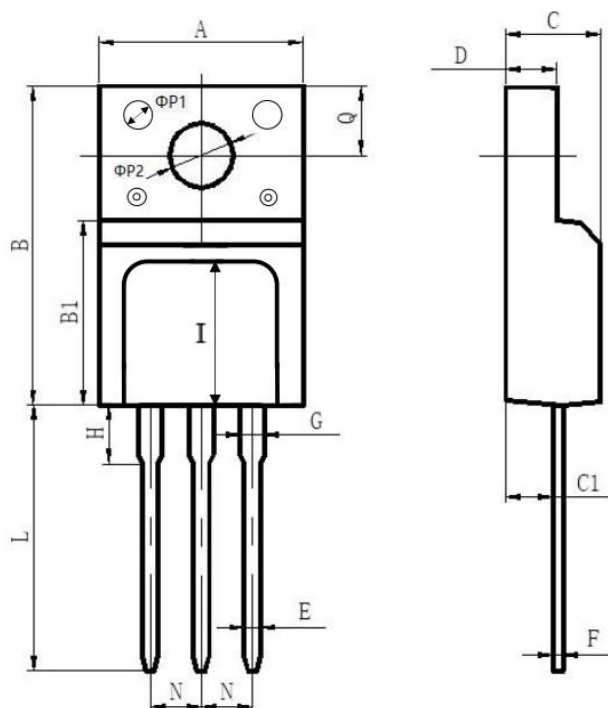


Fig9. Body Diode Characteristics



PACKAGE OUTLINE



Ref.	Dimensions(mm)	
	MIN	MAX
A	9.70	10.30
B	15.50	16.10
B1	8.99	9.39
C	4.40	4.80
C1	2.15	2.55
D	2.44	2.64
E	0.70	0.90
F	0.40	0.60
G	1.12	1.42
H	3.40	3.80
I	7.40	7.60
L	12.6	13.6
N	2.34	2.74
Q	3.15	3.55
ΦP1	1.40	1.60
ΦP2	3.00	3.30

***Important Usage Information and Disclaimer**

The specifications of Zhuhai Hypersemi Co., Ltd. products are not guarantees of product characteristics. They reflect typical performance expected in standard applications, which may vary with specific uses. Users must conduct prior testing for their applications and make necessary adjustments.

Users are responsible for the safety of applications utilizing our products and must implement adequate safety measures to prevent physical injury, fire, or other risks in case of product failure. It is the user's duty to ensure that application designs comply with all applicable laws and standards. Our products must not be used in any applications where a product failure could reasonably result in personal injury, unless specifically authorized in a signed document by Zhuhai Hypersemi Co., Ltd.

No representations or warranties are made regarding the accuracy or completeness of this information, including any claims of non-infringement of third-party intellectual property rights. Zhuhai Hypersemi Co., Ltd. assumes no liability for any applications or uses of its products and does not grant any licenses to its intellectual property rights or those of others. We also make no claims regarding non-infringement of third-party intellectual property rights that may arise from applications.

Due to technical requirements, our products may contain hazardous substances. For details, please contact your nearest sales office. This document replaces all previous information and may be updated. We reserve the right to make changes.