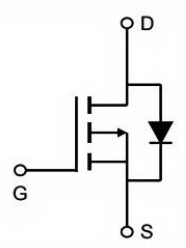
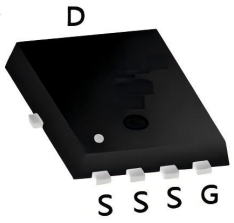
P-Channel Enhancement Mode MOSFET

Parameter	Value	Unit
V_{DS}	-40	V
$R_{DS(on)}$	16	mΩ
I_D	-20	A





PDFN3x3

Features

- Advanced trench cell design
- Low Thermal Resistance
- Low Gate Charge

Applications

- Motor/Body Load Control
- Load Switch
- PWM Application
- DC-DC converters

Absolute Maximum Ratings (Tc=25℃,unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25℃	I_D	-20	A
	T_C= 100℃		-11	
Pulsed Drain Current 1		I_{DM}	-80	A
Single Pulse Avalanche Energy 2		E_{AS}	57.8	mJ
Total Power Dissipation	T_C=25℃	P_D	40.3	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction-Ambient [3]	$R_{\theta JA}$	---	62	℃/W
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	---	3.1	℃/W

Electrical Characteristics(TJ=25℃,unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250μA	-40	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25℃	I_{DSS}	V_{DS}= -40V, V_{GS}=0V	-	-	-1	μA
	T_J= 100℃			-	-	-100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0	-1.5	-2.2	V
Drain-Source On-Resistance4		$R_{DS(on)}$	V_{GS}=-10V, I_D=-20A	-	16	20	mΩ
			V_{GS}=-4.5V, I_D=-15A	-	19	25	
Forward Transconductance4		g_{fs}	V_{DS} = -10V, I_D=-20A	-	44	-	S
Input Capacitance		C_{iss}	V_{DS}=-20V, V_{GS}=0V, f =1MHz	-	2525	-	pF
Output Capacitance		C_{oss}		-	190	-	
Reverse Transfer Capacitance		C_{rss}		-	172	-	
Gate Resistance		R_g	f =1MHz	-	10	-	Ω
Total Gate Charge		Q_g	V_{GS}= -10V,V_{DS}= -20V, I_D= -20A	-	35	-	nC
Gate-Source Charge		Q_{gs}		-	5.5	-	
Gate-Drain Charge		Q_{gd}		-	8	-	
Turn-On Delay Time		$t_{d(on)}$	V_{GS}=-10V, V_{DD}=-20V, R_G=3Ω , I_D=-20A	-	14.5	-	ns
Rise Time		t_r		-	20.2	-	
Turn-Off Delay Time		$t_{d(off)}$		-	32	-	
Fall Time		t_f		-	10	-	
Diode Forward Voltage4		V_{SD}	I_S=-20A, V_{GS}=0V	-	-	-1.2	V
Continuous Source Current	T_C=25℃	I_S	-	-	-	-20	A

Note :
1. Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150° C.
2. The EAS data shows Max. rating . The test condition is VDD= -25V, VGS= -10V, L= 0.1mH, IAS= -34A.
3. The data is tested by surface mounted on a 1 inch2 FR-4 board with 2 OZ copper, The value in any given application depends on the user's specific board design.
4. The data is tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

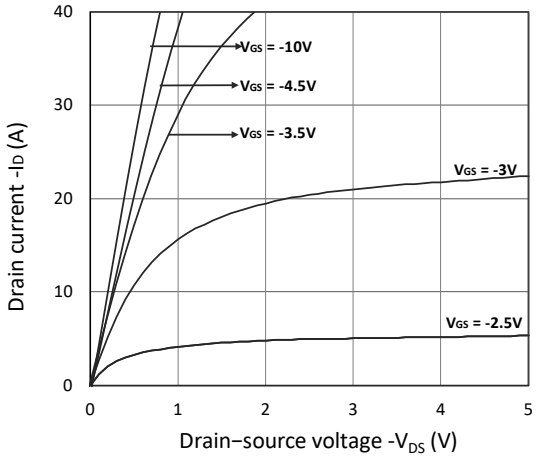


Figure 1. Output Characteristics

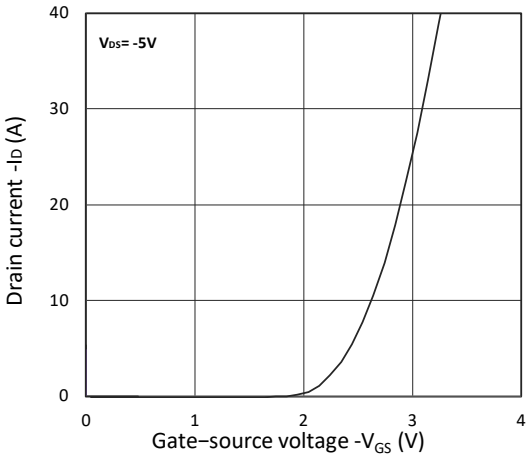


Figure 2. Transfer Characteristics

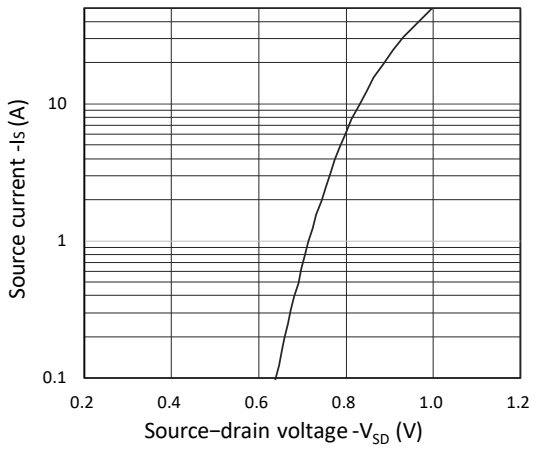


Figure 3. Forward Characteristics of Reverse

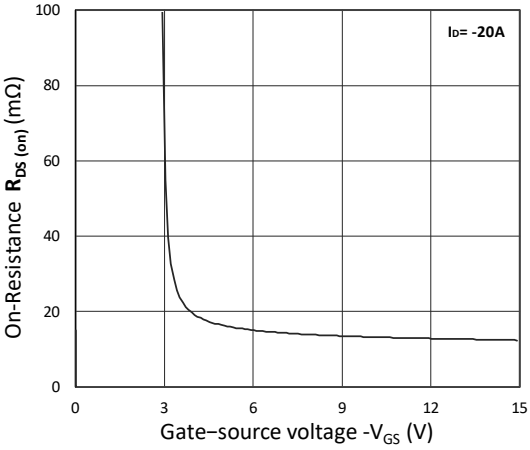


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

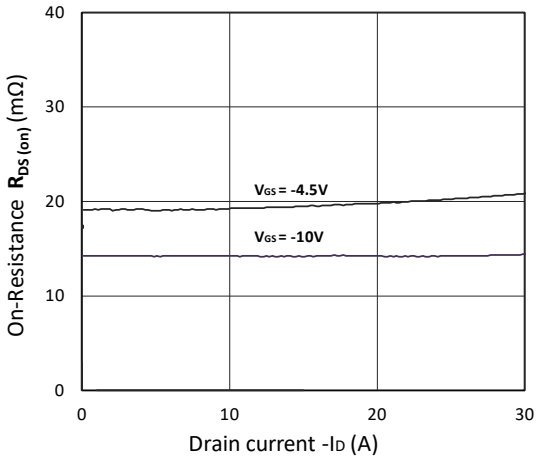


Figure 5. $R_{DS(ON)}$ vs. I_D

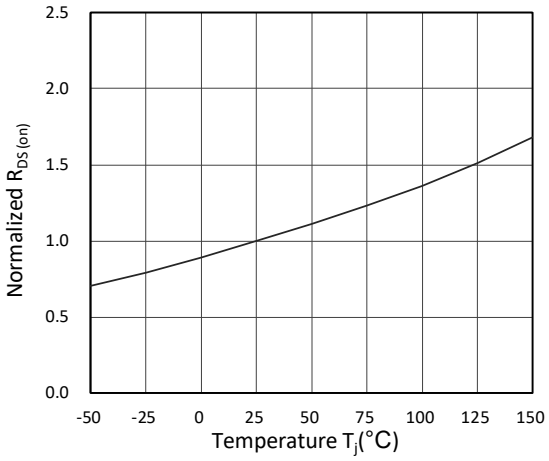


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

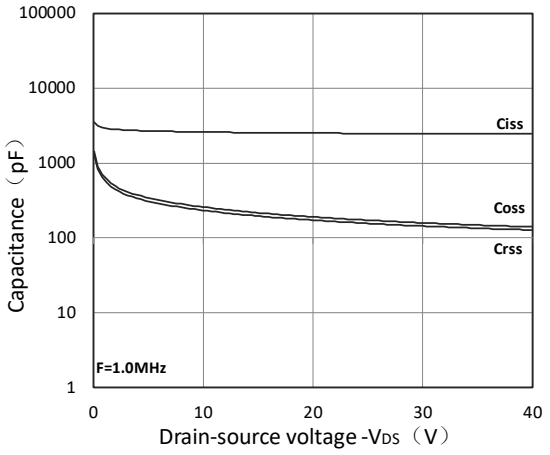


Figure 7. Capacitance Characteristics

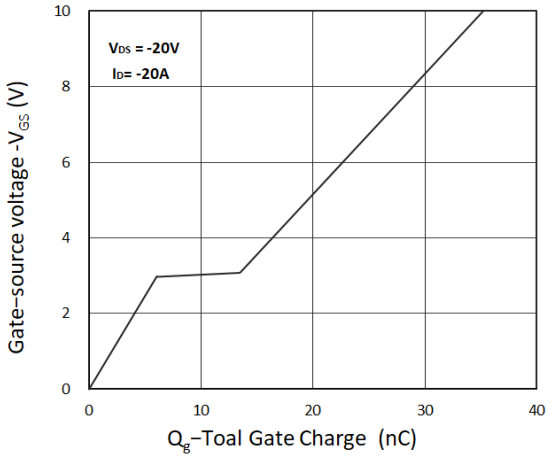


Figure 8. Gate Charge Characteristics

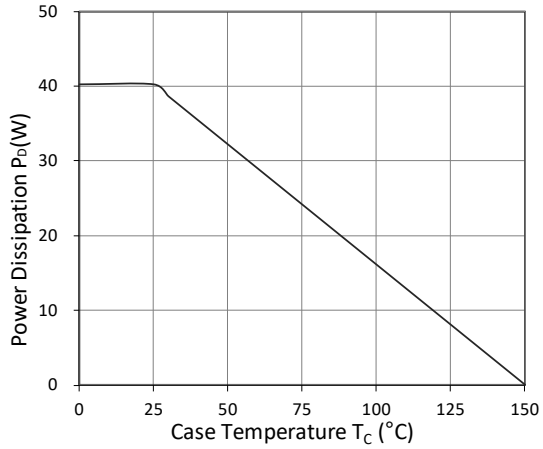


Figure 9. Power Dissipation

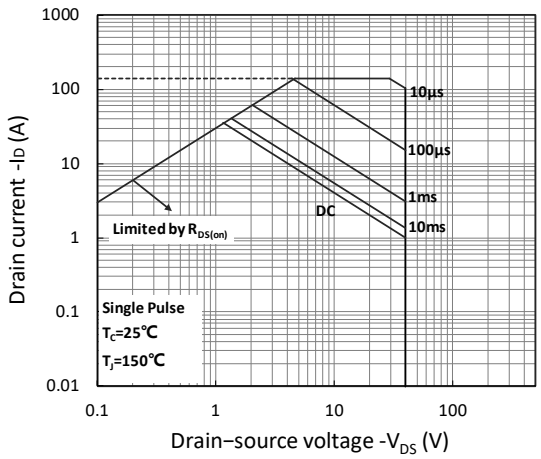


Figure10. Safe Operating Area

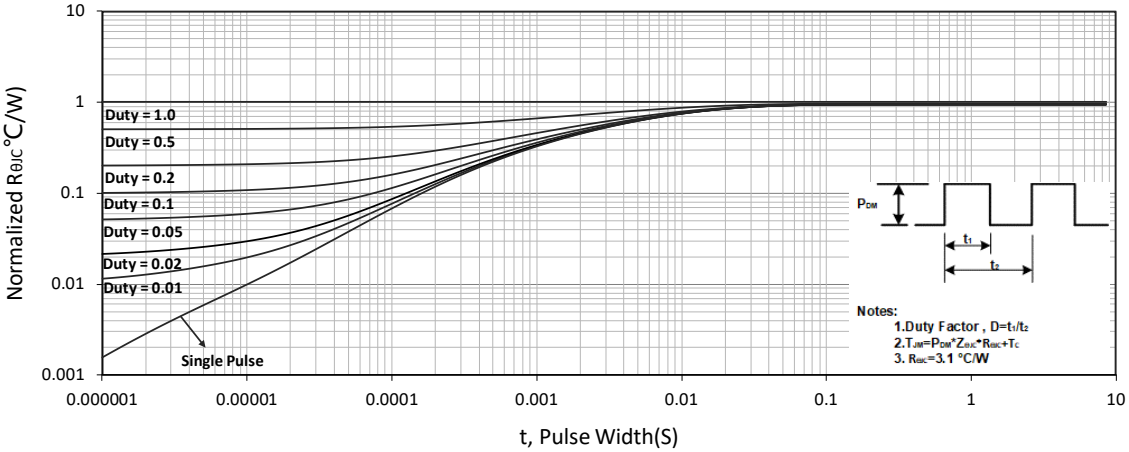
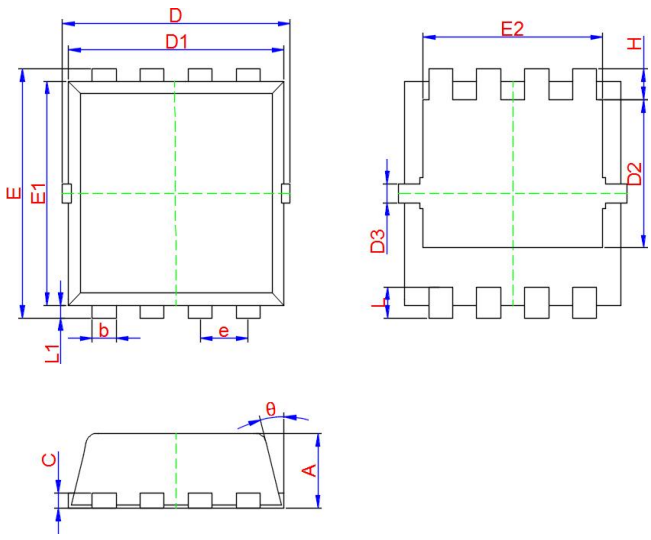


Figure 11. Normalized Maximum Transient Thermal Impedance

Package Outlines



Symbol	Dimensions in mm		
	Min.	Typ.	Max.
A	0.650	0.770	0.900
b	0.250	0.300	0.350
c	0.100	0.150	0.250
D	3.150	3.300	3.400
D1	2.950	3.100	3.200
D2	1.600	1.800	1.930
D3	-	0.130	-
E	3.050	3.300	3.450
E1	2.950	3.150	3.200
E2	2.300	2.400	2.550
e	0.650 TYP.		
H	0.330	0.430	0.530
L	0.300	0.400	0.500
L1	0.080	0.130	0.180
θ	-	10°	-

***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.