



P-Channel Enhancement Mode Field Effect Transistor


Product Summary

V_{DS}	-30 V
I_D	-12 A
$R_{DS(ON)}$ (at $V_{GS}=-20V$)	<10 m
$R_{DS(ON)}$ (at $V_{GS}=-10V$)	<12 m
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)	<20 m
100% EAS Tested	

General Description

Trench Power LV MOSFET technology
 High density cell design for Low $R_{DS(ON)}$
 High Speed switching
 Moisture Sensitivity Level 3
 Epoxy Meets UL 94 V-0 Flammability Rating
 Halogen Free

Applications

Battery protection
 Power management
 9 NQ 

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	-30	V
Gate-source Voltage		V_{GS}	± 25	V
Drain Current	$T_A=25$	I_D	-12	A
	$T_A=100$		-7.5	
Pulsed Drain Current ^A		I_{DM}	-100	A
Avalanche energy ^B		EAS	100	mJ
Total Power Dissipation ^C	$T_A=25$	P_D	2.5	W
	$T_A=100$		1	
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	

Thermal resistance

Parameter	Symbol	Typ	



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Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-	-30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-30V, V _{GS} =0V	-	-	-1	-
		V _{DS} =-30V, V _{GS} =0V, T _J =150	-	-	-100	
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±25V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-	-1.2	-1.8	-2.8	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-20V, I _D =-12A	-	7.5	10	Z
		V _{GS} =-10V, I _D =-12A	-	9	12	
		V _{GS} =-6V, I _D =-10A	-	11	15	
		V _{GS} =-4.5V, I _D =-10A	-	14.5	20	
Diode Forward Voltage	V _{SD}	I _S =-12A, V _{GS} =0V	-	-0.85	-1.2	V
Gate resistance	R _G	f=1MHz	-	16	-	
Maximum Body-Diode Continuous Current	I _S		-	-	-12	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, f=1MHz	-	1860	-	pF
Output Capacitance	C _{oss}		-	310	-	
Reverse Transfer Capacitance	C _{rss}		-	280	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =-10V, V _{DS} =-15V, I _D =-12A	-	38	-	nC
Gate-Source Charge	Q _{gs}		-	5	-	
Gate-Drain Charge	Q _{gd}		-	10	-	
Reverse Recovery Charge	Q _{rr}	I _F =-12A, di/dt=100A/us	-	19	-	nC
Reverse Recovery Time	t _{rr}		-	40	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =-10V, V _{DD} =-15V, I _D =-12A R _{GEN} =2.3	-	8	-	ns
Turn-on Rise Time	t _r		-	6	-	
Turn-off Delay Time	t _{D(off)}		-	95	-	
Turn-off fall Time	t _f		-	62	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B. T_J=25, V_{DD}=-20V, V_G=-10V, R_G 9 0.5mH, I_{AS}=-20A.

C. P_d is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.

D. The value of R₇ is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in the still air environment with T_A=25. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



Typical Electrical and Thermal Characteristics Diagrams

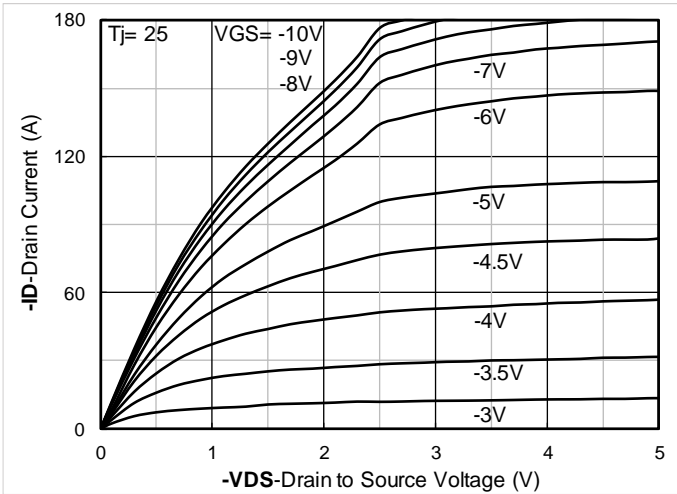


Figure 1. Output Characteristics

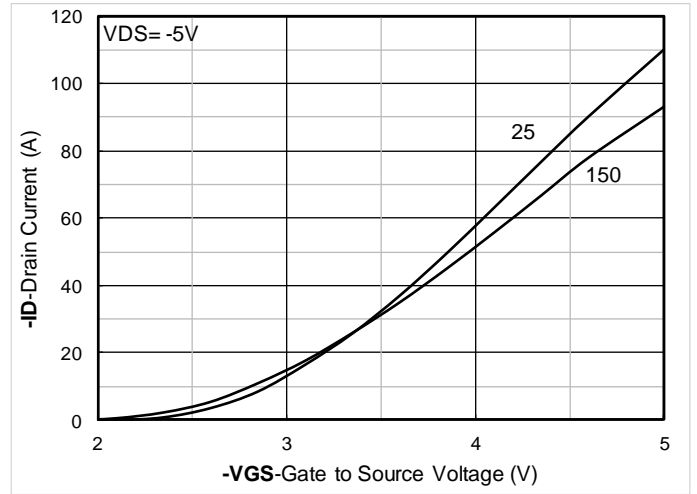


Figure 2. Transfer Characteristics

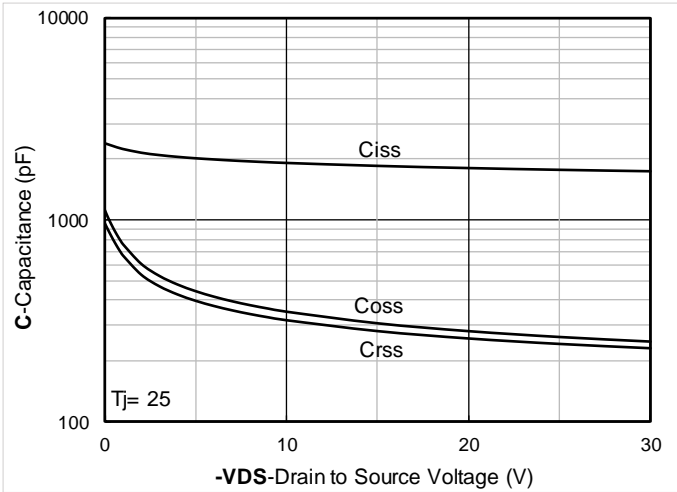


Figure 3. Capacitance Characteristics

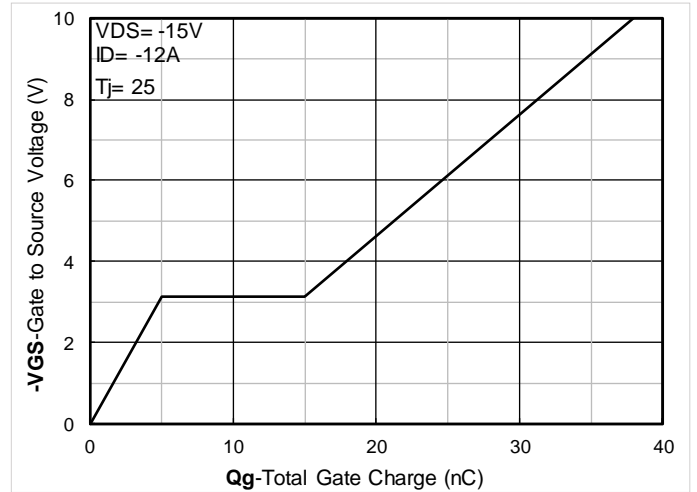


Figure 4. Gate Charge

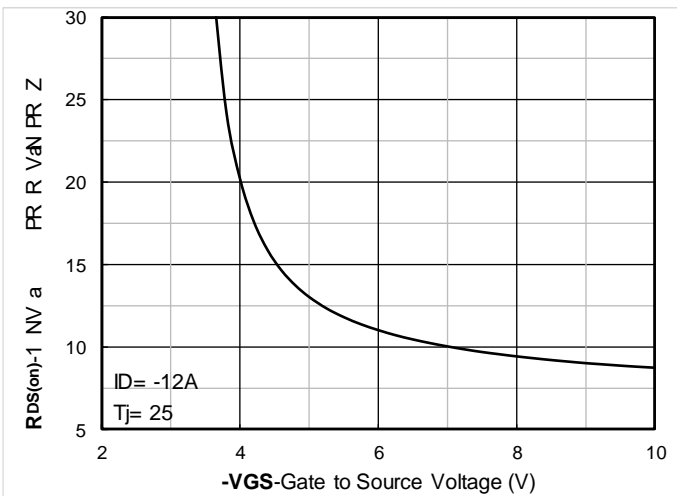


Figure 5. On-Resistance vs Gate to Source Voltage

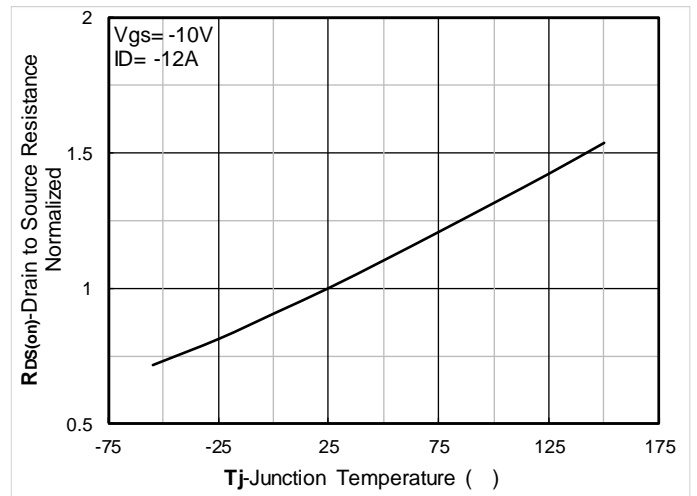


Figure 6. Normalized On-Resistance

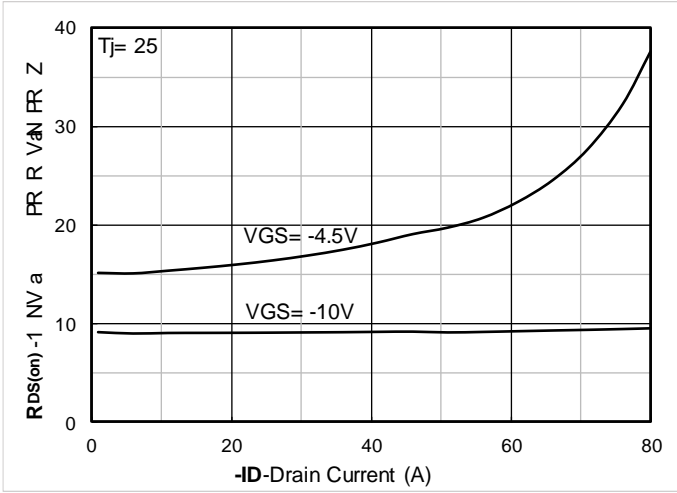


Figure 7. RDS(on) VS Drain Current

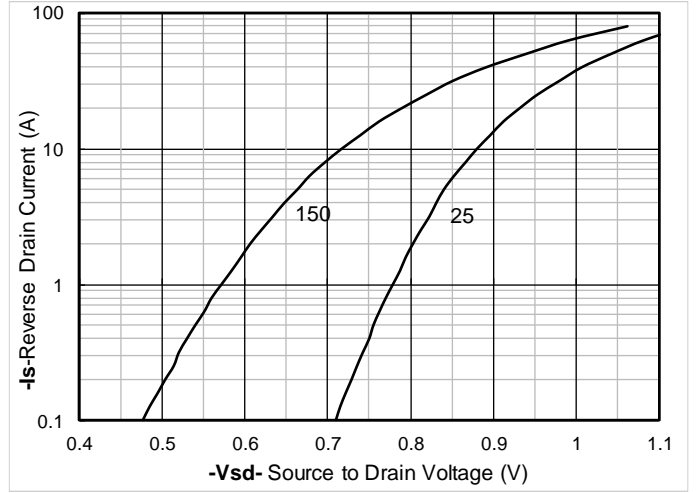


Figure 8. Forward characteristics of reverse diode

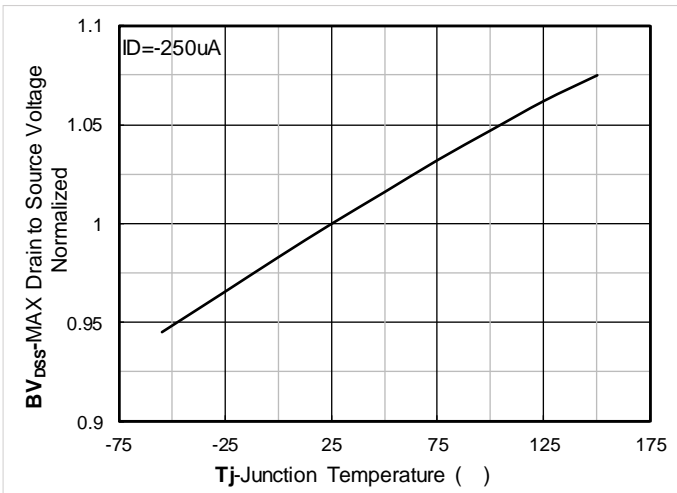


Figure 9. Normalized breakdown voltage

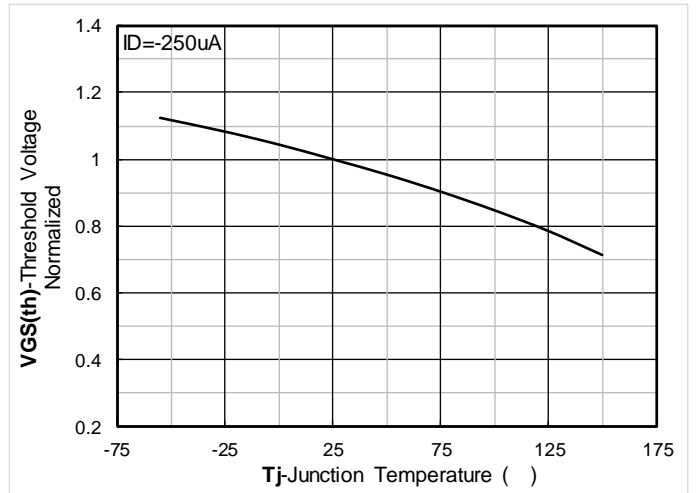


Figure 10. Normalized Threshold voltage

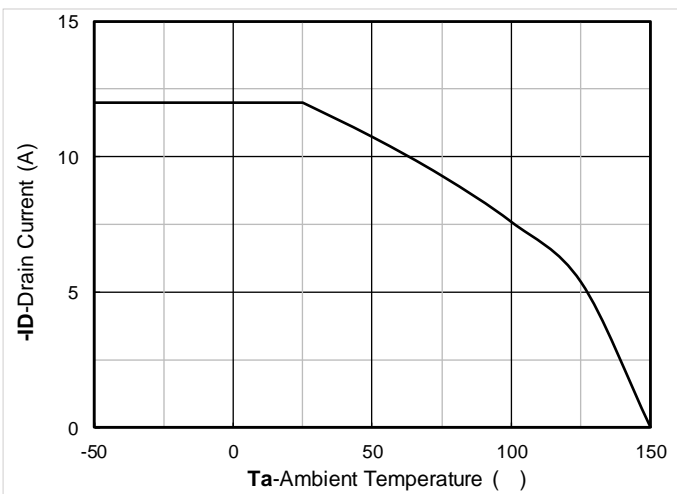


Figure 11. Current dissipation

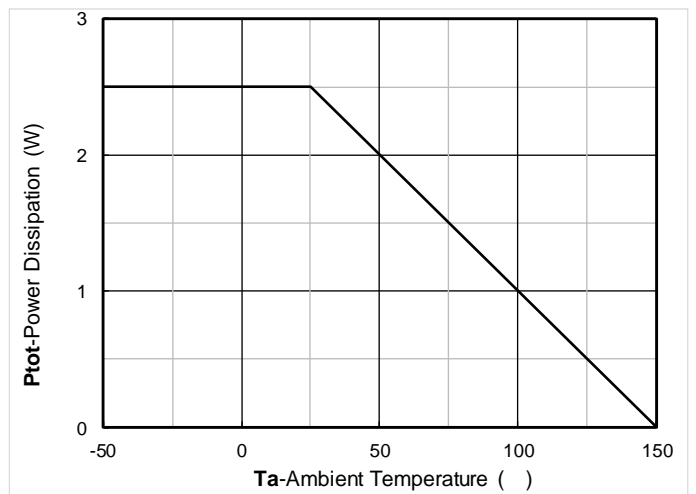


Figure 12. Power dissipation



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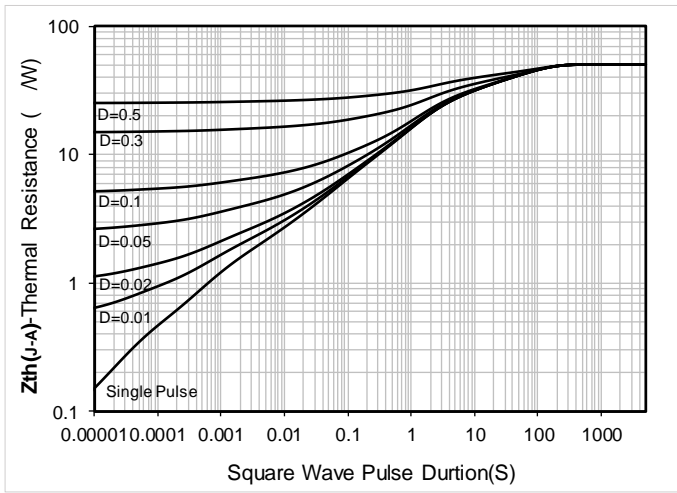


Figure 13. Maximum Transient Thermal Impedance

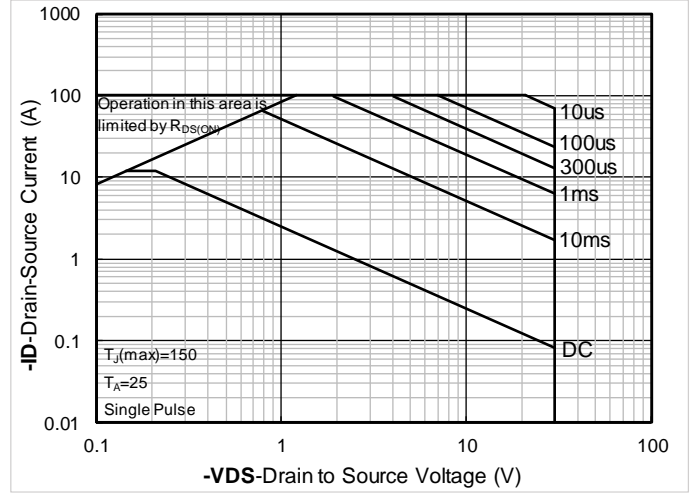
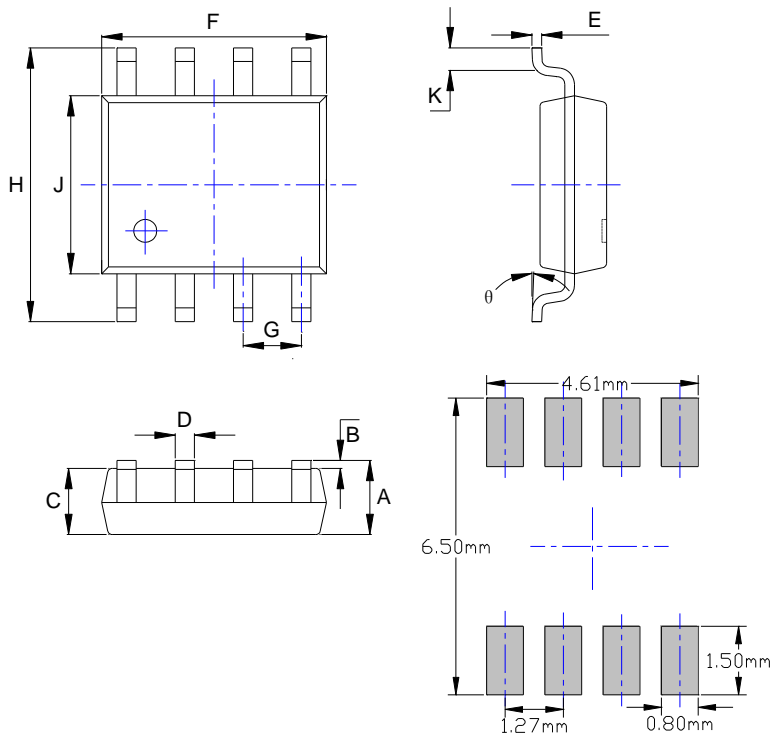


Figure 14. Safe Operation Area

SOP8 Package information



SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.053	0.069	1.350	1.750
B	0.004	0.010	0.100	0.250
C	0.053	0.061	1.350	1.550
D	0.013	0.020	0.330	0.510
E	0.007	0.010	0.170	0.250
F	0.189	0.197	4.800	5.000
G	0.050BSC		1.270BSC	
H	0.228	0.244	5.800	6.200
J	0.150	0.157	3.800	4.000
K	0.016	0.050	0.400	1.270
θ	0°	8°	0°	8°

Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.



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