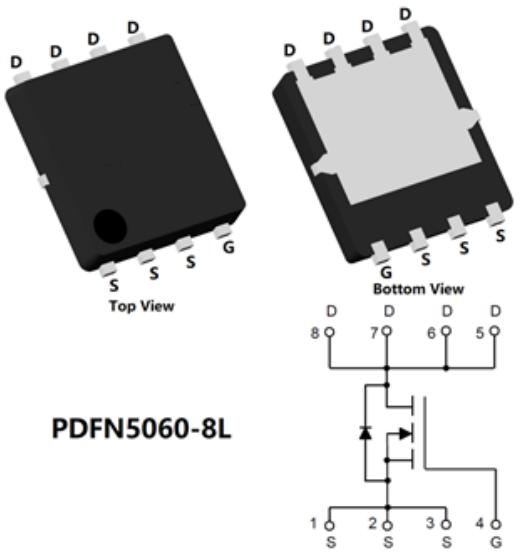
N-Channel Enhancement Mode Field Effect Transistor



Product Summary

- V_{DS} 30V
- I_D 220A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜0.9mΩ
- $R_{DS(ON)}$(at V_{GS}=4.5V) ＜1.8mΩ
- 100% EAS Tested
- 100% ▽V_{DS} Tested

General Description

- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 3
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Switching Voltage Regulators
- DC-DC convertor

■ Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	30	V
Gate-source Voltage		V_{GS}	±20	V
Drain Current	T_A=25℃	I_D	38	A
	T_A=100℃		24	
	T_C=25℃		220	
	T_C =100℃		139	
Pulsed Drain Current [A]		I_{DM}	600	A
Avalanche energy [B]		EAS	676	mJ
Total Power Dissipation [C]	T_A=25℃	P_D	2.5	W
	T_A=100℃		1	
	T_C=25℃		138	
	T_C =100℃		55	
Junction and Storage Temperature Range		T_J ,T_{STG}	-55～+150	℃

■Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient [D]	Steady-State	$R_{\theta JA}$	40	50	℃/W
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	0.75	0.9	

■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
G220G03AJR	F1	220G03AJR	5000	10000	100000	13“ reel

■ Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
		V_{DS}=30V, V_{GS}=0V, Tj=150℃	-	-	100	
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA	1.2	1.8	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=110A	-	0.7	0.9	mΩ
		V_{GS}=10V, I_D=20A	-	0.65	0.9	
		V_{GS}=4.5V, I_D=20A	-	1.1	1.8	
Diode Forward Voltage	V_{SD}	I_S=110A, V_{GS}=0V	-	0.85	1.3	V
Gate resistance	R_G	f=1MHz	-	1.4	-	Ω
Maximum Body-Diode Continuous Current	I_S		-	-	220	A
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, f=100KHz	-	9600	-	pF
Output Capacitance	C_{oss}		-	5600	-	
Reverse Transfer Capacitance	C_{rss}		-	230	-	
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V, V_{DS}=15V, I_D=50A	-	103	-	nC
Gate-Source Charge	Q_{gs}		-	22	-	
Gate-Drain Charge	Q_{gd}		-	25	-	
Reverse Recovery Charge	Q_{rr}	I_F=50A, di/dt=100A/us	-	96	-	nC
Reverse Recovery Time	t_{rr}		-	70	-	ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DD}=15V, I_D=50A R_{GEN}=3Ω	-	26	-	ns
Turn-on Rise Time	t_r		-	43	-	
Turn-off Delay Time	$t_{D(off)}$		-	68	-	
Turn-off fall Time	t_f		-	35	-	

A. Repetitive rating; pulse width limited by max. junction temperature.
B. T_J=25℃, V_{DD}=25V, V_G=10V, R_G=25Ω, L=2mH, IAS=26A.
C. P_d is based on max. junction temperature, using junction-case thermal resistance.
D. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in the still air environment with T_A =25℃. The maximum allowed junction temperature of 150℃. The value in any given application depends on the user's specific board design.

■Typical Electrical and Thermal Characteristics Diagrams

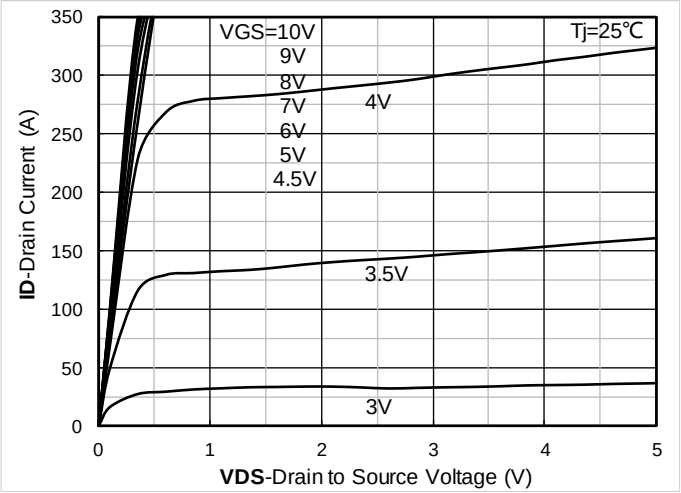


Figure 1. Output Characteristics

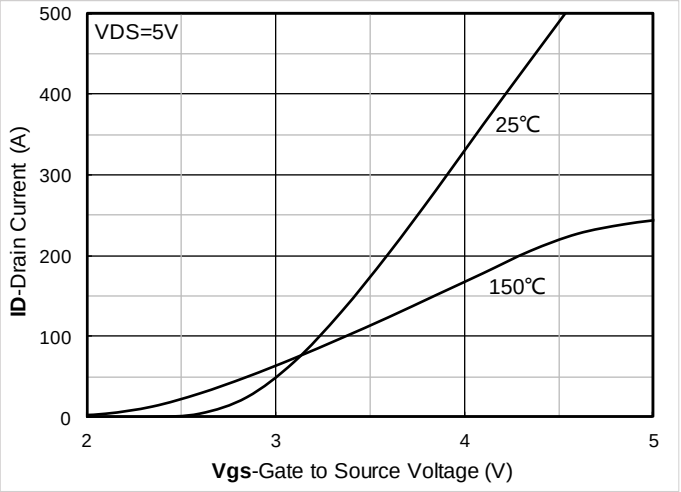


Figure 2. Transfer Characteristics

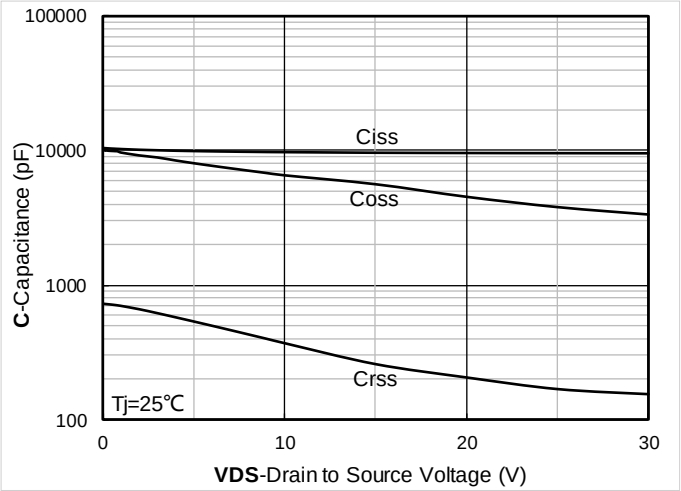


Figure 3. Capacitance Characteristics

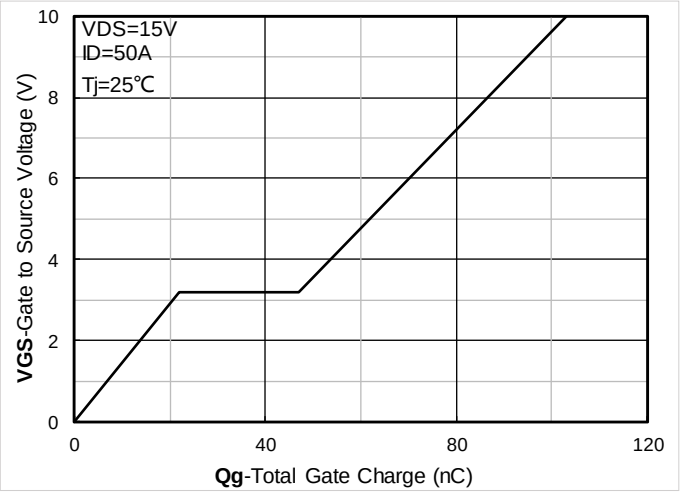


Figure 4. Gate Charge

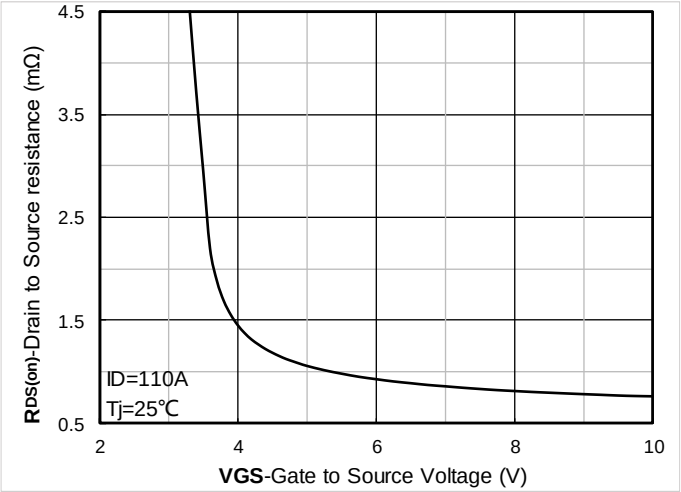


Figure 5. On-Resistance vs Gate to Source Voltage

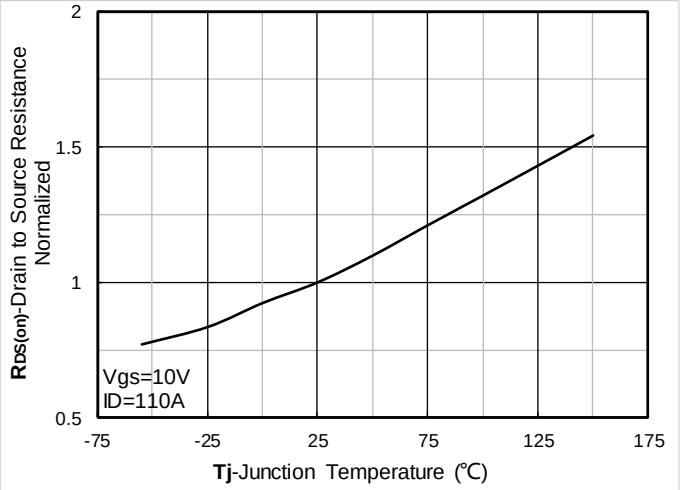


Figure 6. Normalized On-Resistance

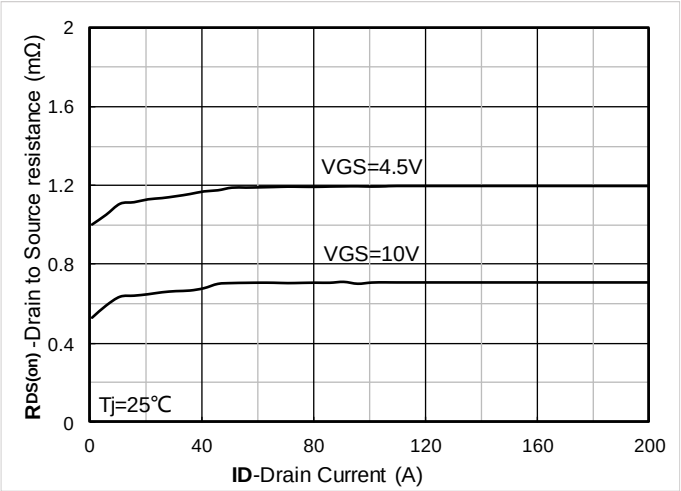


Figure 7. $R_{DS(on)}$ VS Drain Current

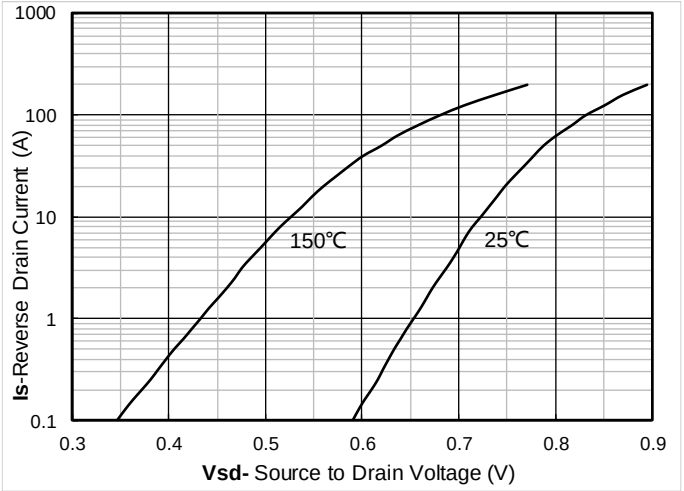


Figure 8. Forward characteristics of reverse diode

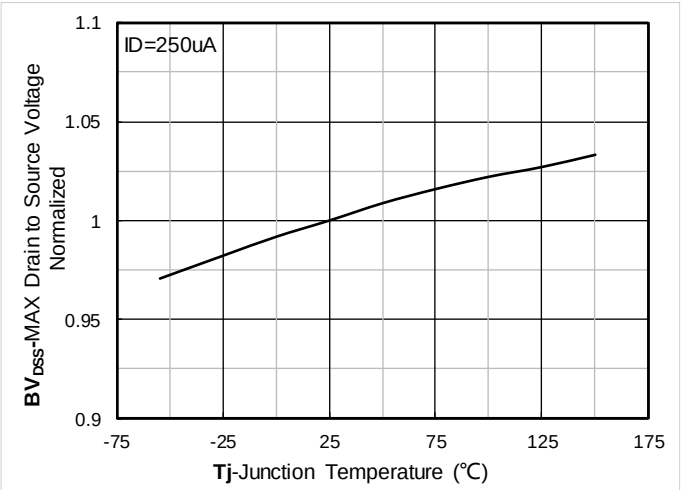


Figure 9. Normalized breakdown voltage

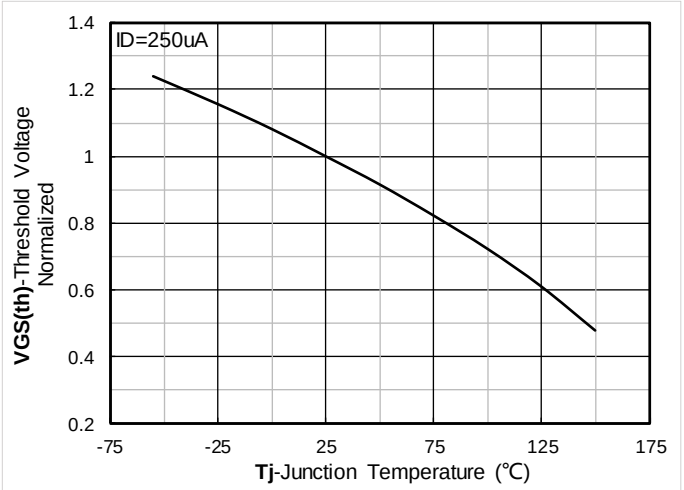


Figure 10. Normalized Threshold voltage

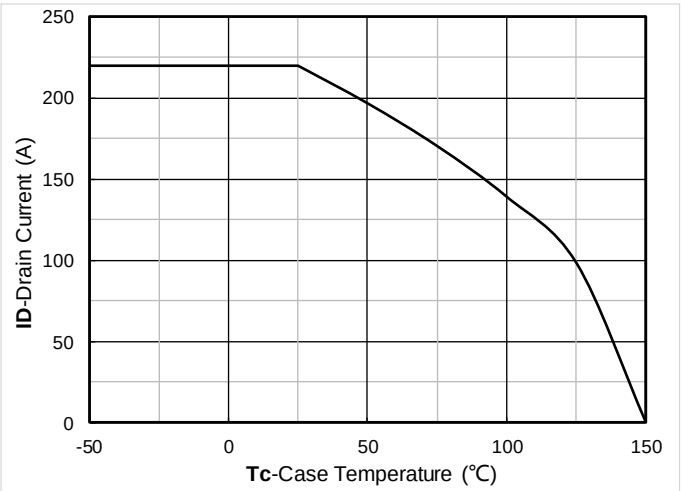


Figure 11. Current dissipation

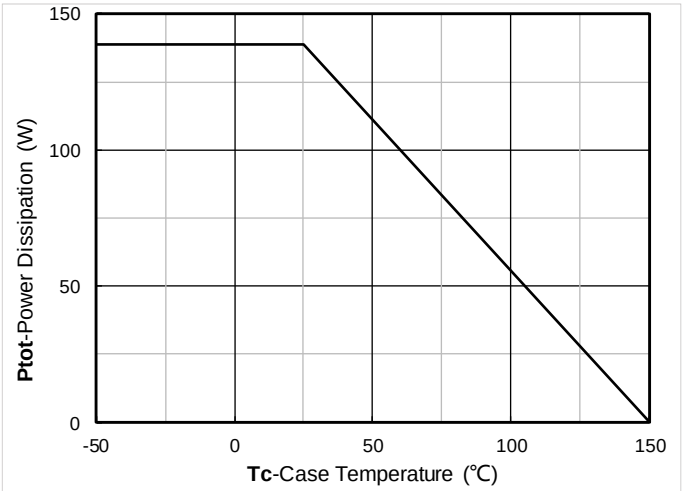


Figure 12. Power dissipation

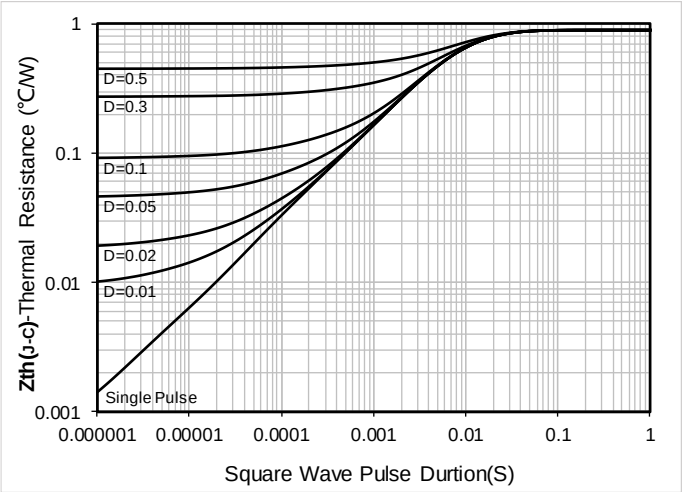


Figure 13. Maximum Transient Thermal Impedance

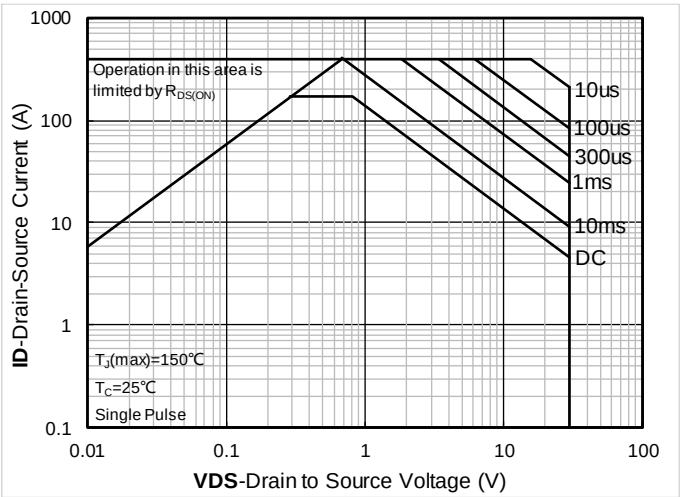
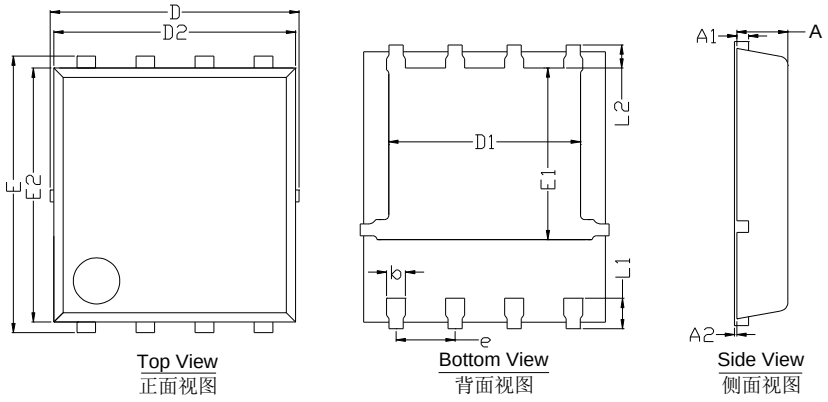
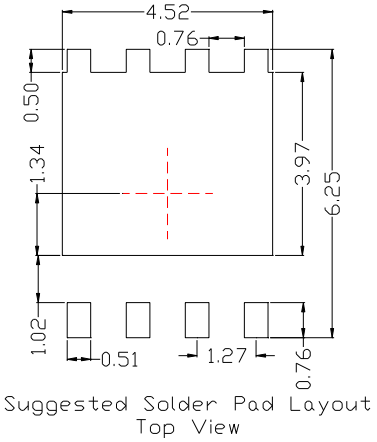


Figure 14. Safe Operation Area

■ PDFN5060-8L-D-0.95MM Package information



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.10mm.
3.The pad layout is for reference purposes only.



Suggested Solder Pad Layout
Top View

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	5.15	5.35	5.55
E	5.95	6.05	6.15
A	0.85	0.95	1.00
A1	0.203 BSC		
A2			0.08
D1	4.25	4.35	4.45
E1	3.525	3.625	3.725
D2		5.20	
E2		5.55	
L1	0.45	0.55	0.65
L2	0.68 BSC		
b	0.3	0.4	0.5
e	1.27 BSC		

Notice

All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in STARSEA's terms and conditions of sale for such products, STARSEA assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of STARSEA products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.