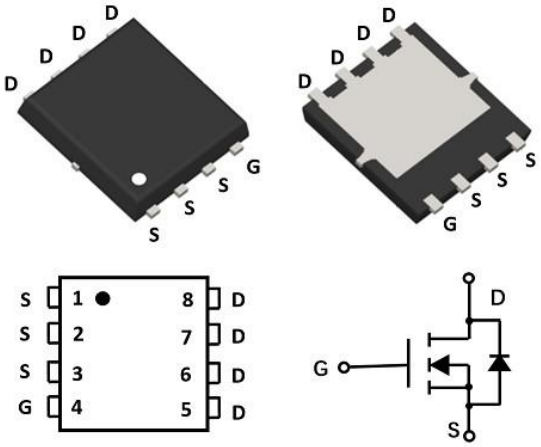
N-Channel Enhancement Mode Field Effect Transistor

Product Summary

- V_{DS} 60V
- I_D 50A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜10 mohm
- $R_{DS(ON)}$(at V_{GS}=4.5V) ＜13 mohm
- 100% UIS Tested
- 100% ▽V_{DS} Tested

PDFN5x6-8



General Description

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Applications

- DC-DC Converters
- Power management functions
- Industrial and Motor Drive application

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

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	60	V
Gate-source Voltage		V_{GS}	±20	V
Drain Current (Silicon limited)	Tc=25℃	I_D	50	A
	Tc=100℃		15	
Pulsed Drain Current [A]		I_{DM}	200	A
Avalanche energy [B]		E_{AS}	66	mJ
Total Power Dissipation [C]	Tc=25℃	P_D	83	W
	Tc=100℃		28	
Junction and Storage Temperature Range		T_J ,T_{STG}	-55～+150	℃

■Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient [D]	t≤10S	$R_{\theta JA}$	10	12	℃/W
Thermal Resistance Junction-to-Ambient [D]	Steady-State		20	30	
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	1.3	1.8	

■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
PL50N06BGD5	F1	50N06BG	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		60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	T_J=25℃			1	μA
			T_J=55℃			5	
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		2.0	2.5	4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}= 10V, I_D=20A			9.1	10	mΩ
		V_{GS}= 4.5V, I_D=10A			11.5	13	
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS}=0V			0.85	1.3	V
Maximum Body-Diode Continuous Current	I_S					50	A
Dynamic Parameters							
Input Capacitance	C_{iss}	V_{DS}=35V,V_{GS}=0V,f=1MHZ			1072		pF
Output Capacitance	C_{oss}				192		
Reverse Transfer Capacitance	C_{rss}				8		
Gate Resistance	R_g	f=1MHZ, Open drain			1.6		Ω
Switching Parameters							
Total Gate Charge	Q_g(10V)	V_{DS}=30V,I_D=20A			34		nC
Total Gate Charge	Q_g(4.5V)				15.8		
Gate-Source Charge	Q_{gs}				7.8		
Gate-Drain Charge	Q_{gd}				5.2		
Reverse Recovery Charge	Q_{rr}	I_F=20A, di/dt=200A/us			36		
Reverse Recovery Time	t_{rr}				27		ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DD}=30V,I_D=12A R_{GEN}=3Ω			10		
Turn-on Rise Time	t_r				36		
Turn-off Delay Time	$t_{D(off)}$				30		
Turn-off fall Time	t_f				57		

A. Repetitive rating; pulse width limited by max. junction temperature.
B. V_{DD}=50V, R_G=25Ω, L=1mH, I_{AS}=18A,.
C. Pd 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 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ t≤ 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

■ Typical Performance Characteristics

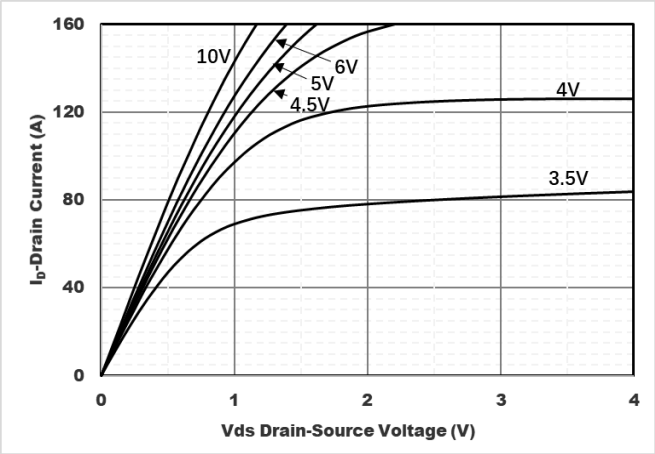


Figure1. Output Characteristics

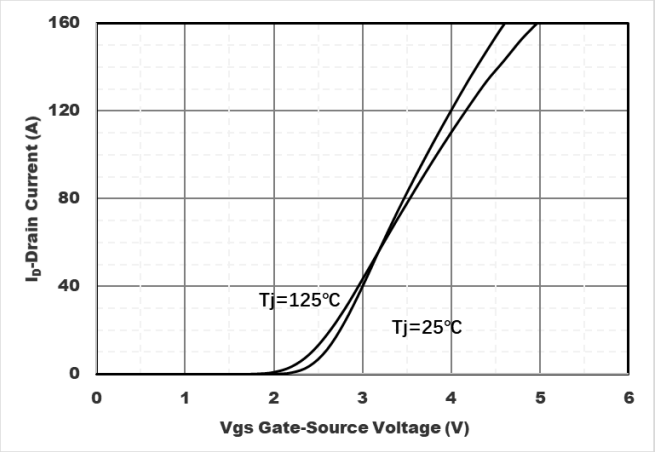


Figure2. Transfer Characteristics

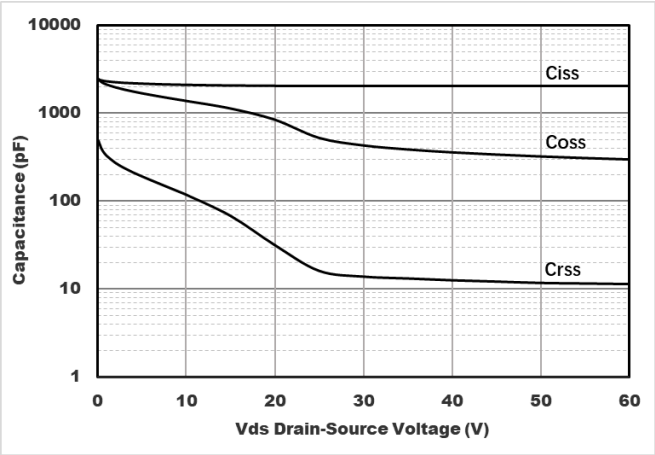


Figure3. Capacitance Characteristics

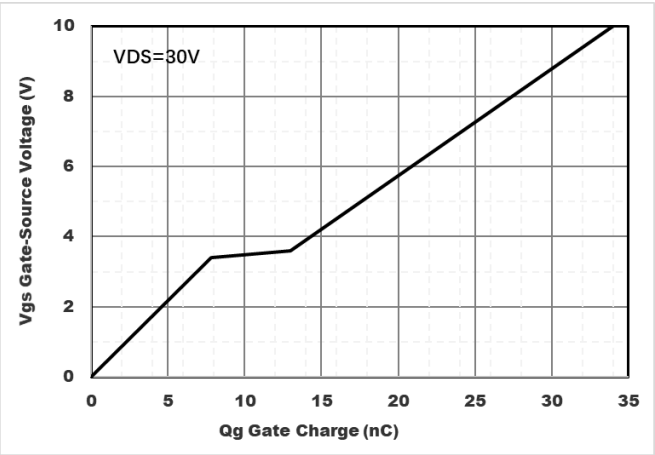


Figure4. Gate Charge

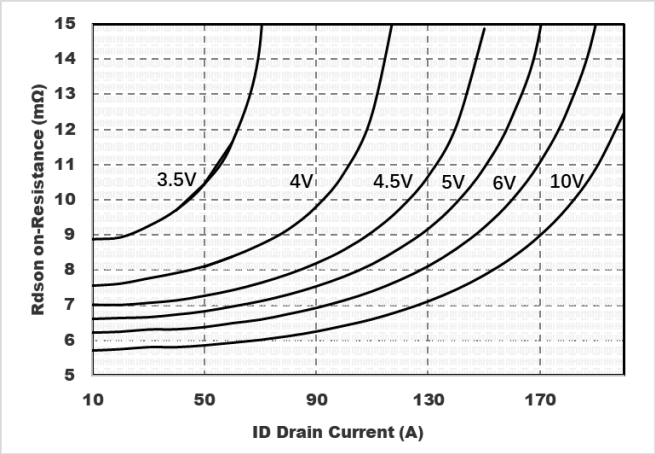


Figure5. Drain-Source on Resistance

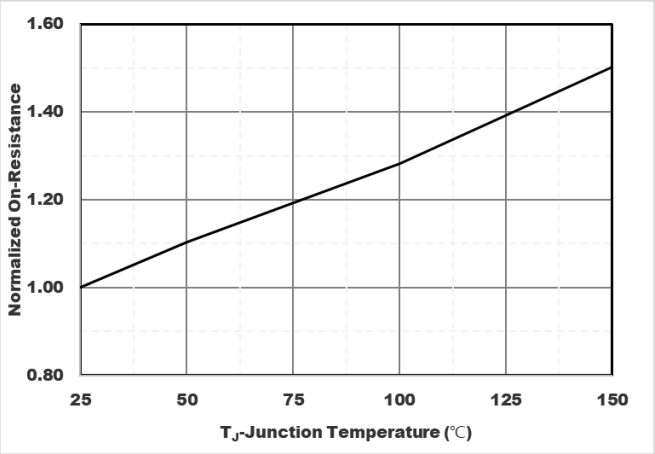


Figure6. Normalized On-Resistance

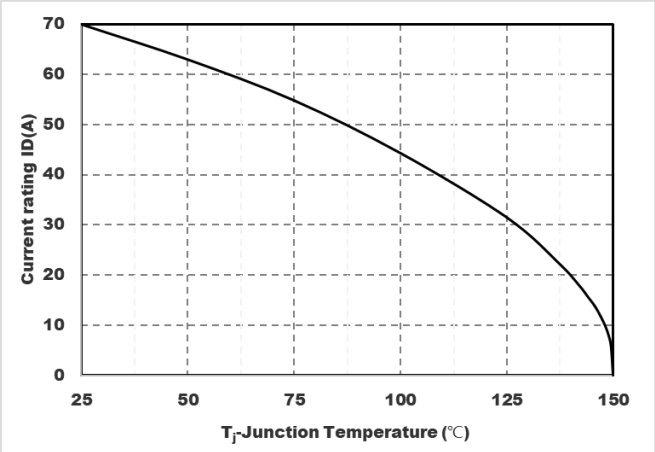


Figure7. Drain current

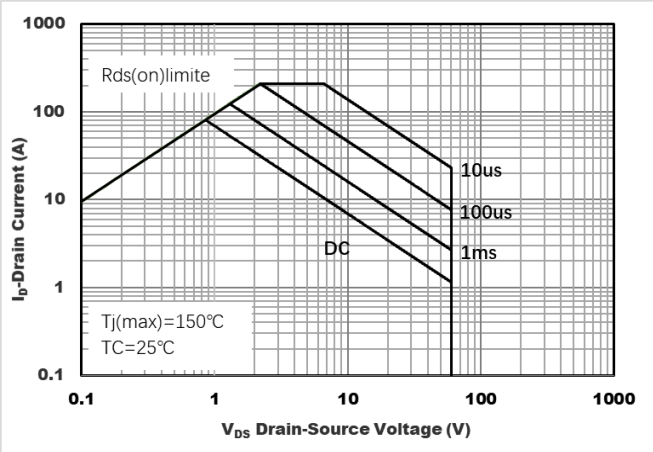


Figure8. Safe Operation Area

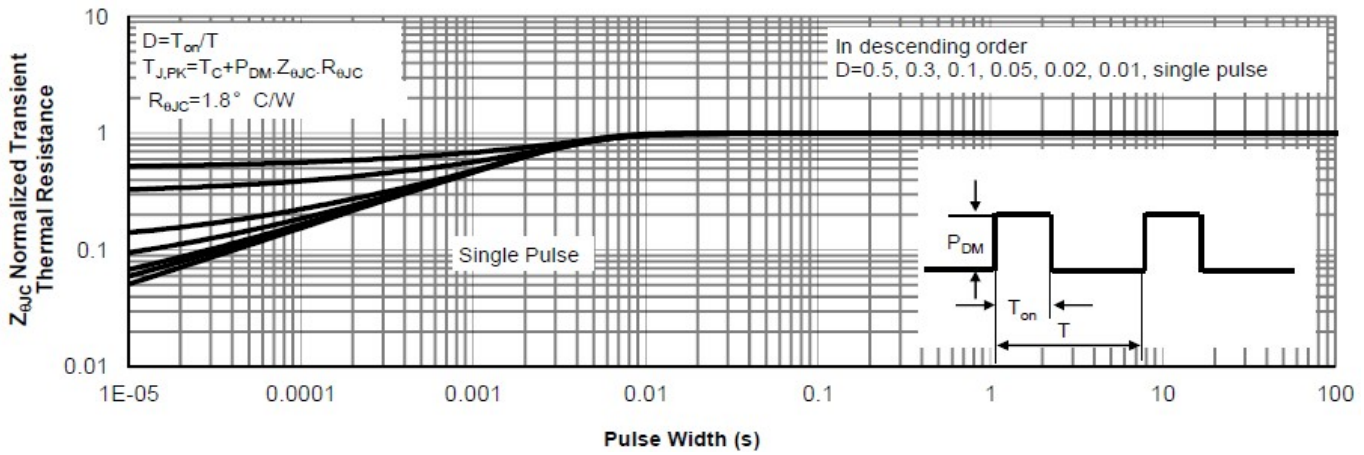
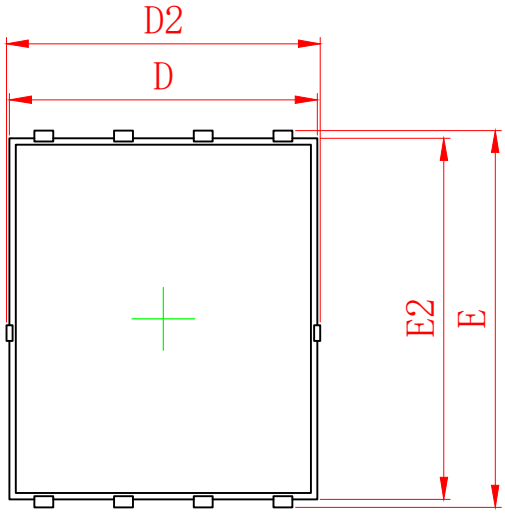
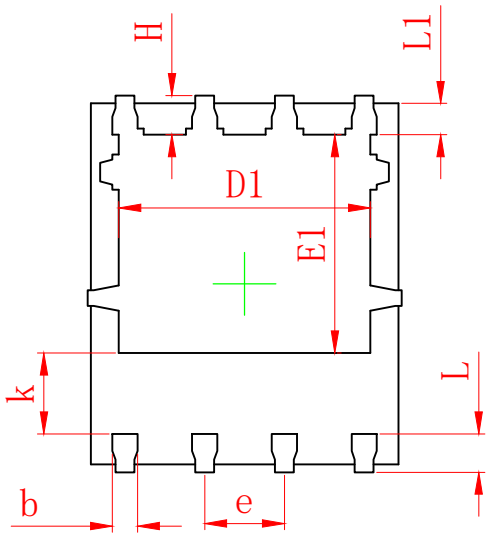
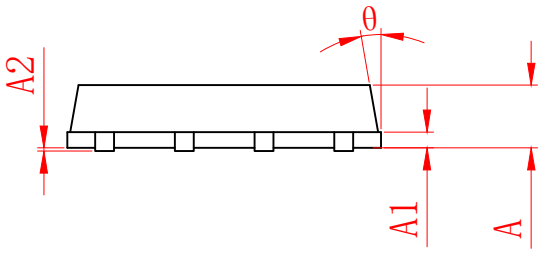


Figure8. Normalized Maximum Transient Thermal Impedance

■ PDFN5x6-8 Package information







SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254REF.		
A2	0~0.05		
D	4.824	4.900	4.976
D1	3.910	4.010	4.110
D2	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
k	1.190	1.290	1.390
H	0.549	0.625	0.701
θ	8°	10°	12°