N-Channel Enhancement Mode Power MOSFET

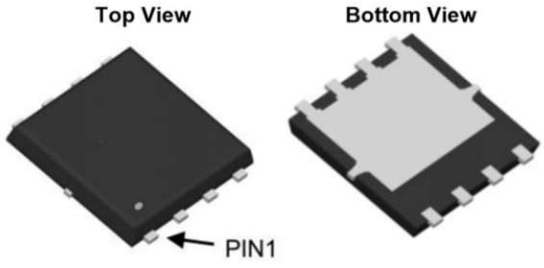
Description

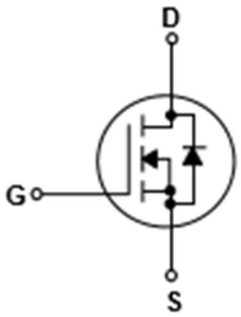
This Power MOSFET is produced using advanced SGT technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

Features

- V_{DS}=30V , I_D=178A
- $R_{DS(ON)TYP}$ = 1.1mΩ @V_{GS} =10V
- $R_{DS(ON)TYP}$ = 2.1mΩ @V_{GS} =4.5V
- Very Low On-resistance RDS(ON)
- LowCrss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

PDFN5*6-8L





Schematic

Applications

- Current Switch for DC/DC,AC/DC
- Power Management
- Motor Driving, Quick/Wireless Charging

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-source Voltage		V_{DS}	30	V
Gate-source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25℃	I_D	178	A
	T_C=100℃		110	
Pulsed Drain Current(T_C=25℃,T_p Limited By T_{jmax}) (note1)		I_{DM}	485	A
Maximum Power Dissipation(T_C=25℃)		P_D	78	W
Avalanche energy , single Pulse(L=0.5mH) (note2)		E_{AS}	101	mJ
Thermal Resistance Junction to Case		$R_{\theta JC}$	1.2	℃/W
Thermal Resistance，Junction to Ambient		$R_{\theta JA}$	50	℃/W
Operating Junction And Storage Temperature		T_j,T_{stg}	-55 To 150	℃

* Drain current limited by maximum junction temperature.

Notes:

1. This single-pulse measurement was taken under T_{j_Max}=150° C
2. This Single-pulse measurement was taken under the following condition[L=100uH,VGS=10V，VDS=30V] while its value is limited by T_{J_Max}=150° C.

Electrical Characteristic (TC=25℃unless otherwise noted)

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Off Characteristic						
Drain-source breakdown voltage	BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=1mA
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=30V, V_{GS}=0V
		-	-	5	μA	V_{DS}=30V, TC =55℃
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
On Characteristics						
Gate threshold voltage	$V_{GS(th)}$	1.2	1.7	2.5	V	V_{DS}=V_{GS}, I_D=250μA
Drain-source on-state resistance	$R_{DS(on)}$	-	1.1	1.4	mΩ	V_{GS}=10V, I_D=20A
Drain-source on-state resistance	$R_{DS(on)}$	-	2.1	2.8	mΩ	V_{GS}=4.5V, I_D=15A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	2975	-	PF	V_{GS}=0V, V_{DS}=15V, f=1.0MHz
Output Capacitance	C_{oss}	-	2650	-		
Reverse Transfer Capacitance	C_{rss}	-	117	-		
Gate Resistance	RG		1.4		Ω	VGS=0V，VDS=0V，f=1MHz
Switching Characteristics						
Turn-on delay time	$t_{d(on)}$	-	6	-	nS	V_{GS}=10V ， V_{DS}=15V, RL=0.75Ω， R_G=3Ω
Turn-on Rise time	t_r	-	9	-		
Turn-off delay time	$t_{d(off)}$	-	26			
Turn-off Fall time	t_f	-	10	-		
Gate Total Charge	Q_G	-	39	-	nC	V_{GS}=10V, V_{DS}=15V, I_D=20A
Gate-Source Charge	Q_{gS}	-	8.6	-		
Gate-Drain Charge	Q_{gd}	-	5.0	-		
Drain-Source Diode Characteristics						
Body Diode Forward Voltage	V_{SD}	-	0.68	1.0	V	V_{GS}=0V, I_{SD}=1A, T_J = 25℃
Body Diode Forward Current	Is	-	-	78	A	-
Body Diode Reverse Recovery Time	T_{rr}	-	51	-	ns	TJ=25℃， I_F=20A, D_{IF}/d_t =100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	57	-	nC	

Typical Electrical & Thermal Characteristics

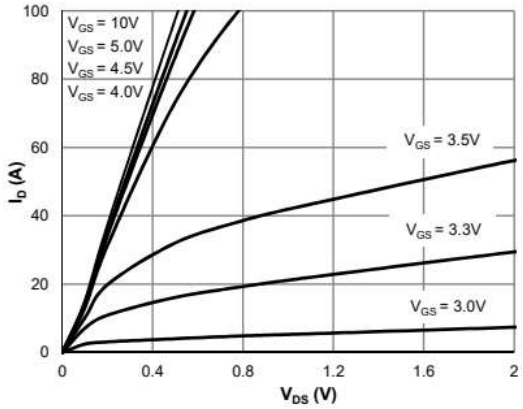


Figure 1: Saturation Characteristics

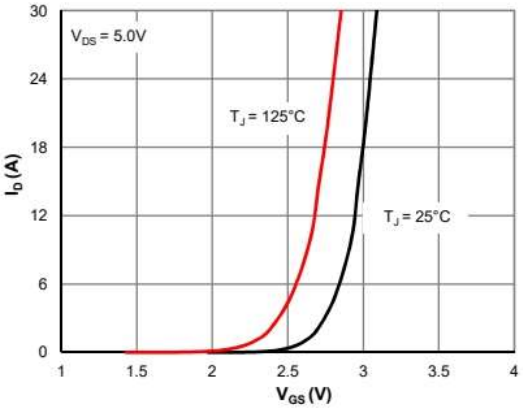


Figure 2: Transfer Characteristics

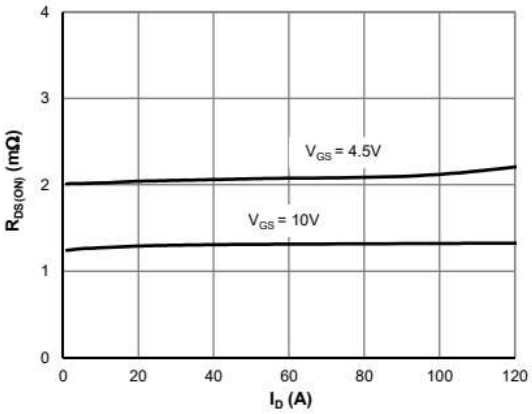


Figure 3: $R_{DS(ON)}$ vs. Drain Current

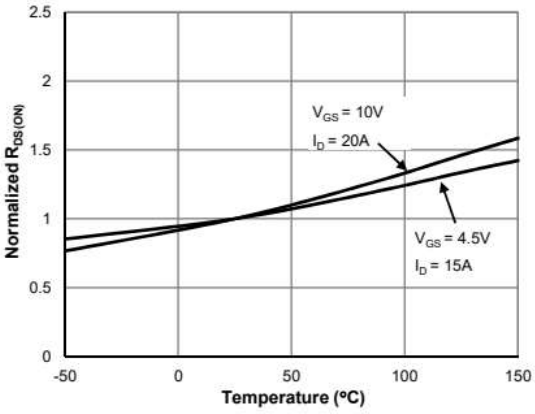


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

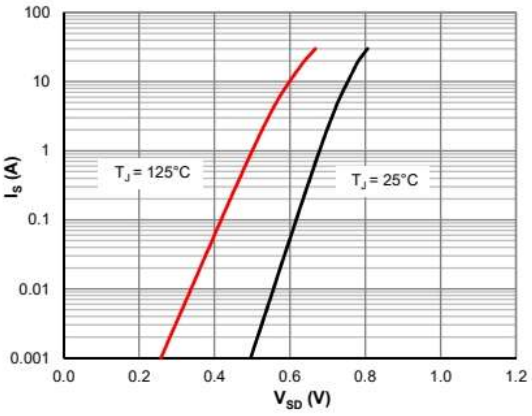


Figure 5: Body-Diode Characteristics

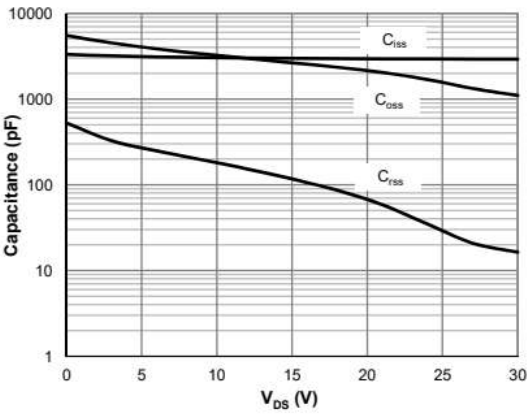


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

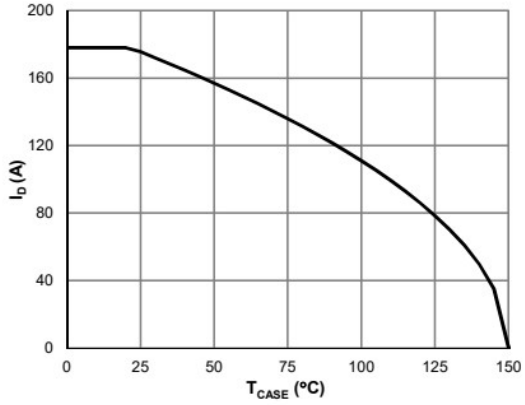


Figure 7: Current De-rating

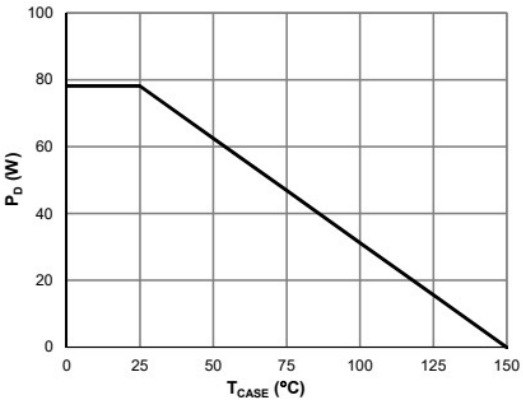


Figure 8: Power De-rating

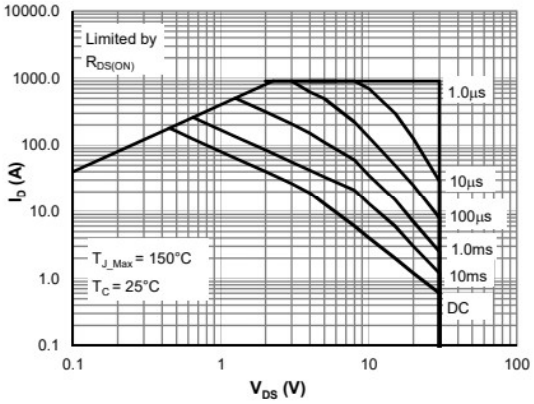


Figure 9: Maximum Safe Operating Area

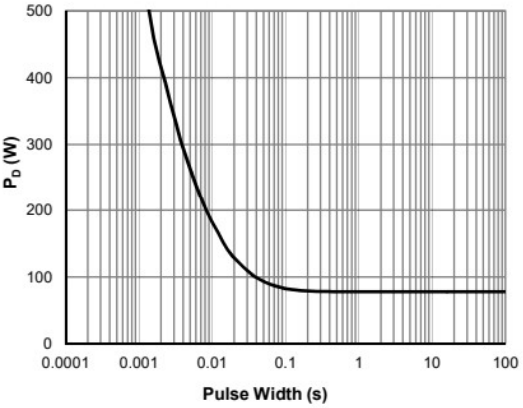


Figure 10: Single Pulse Power Rating, Junction-to-Case

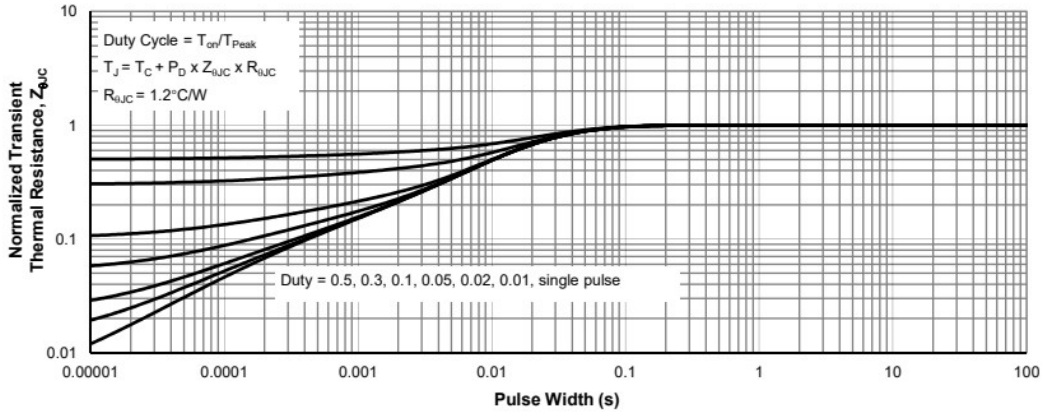
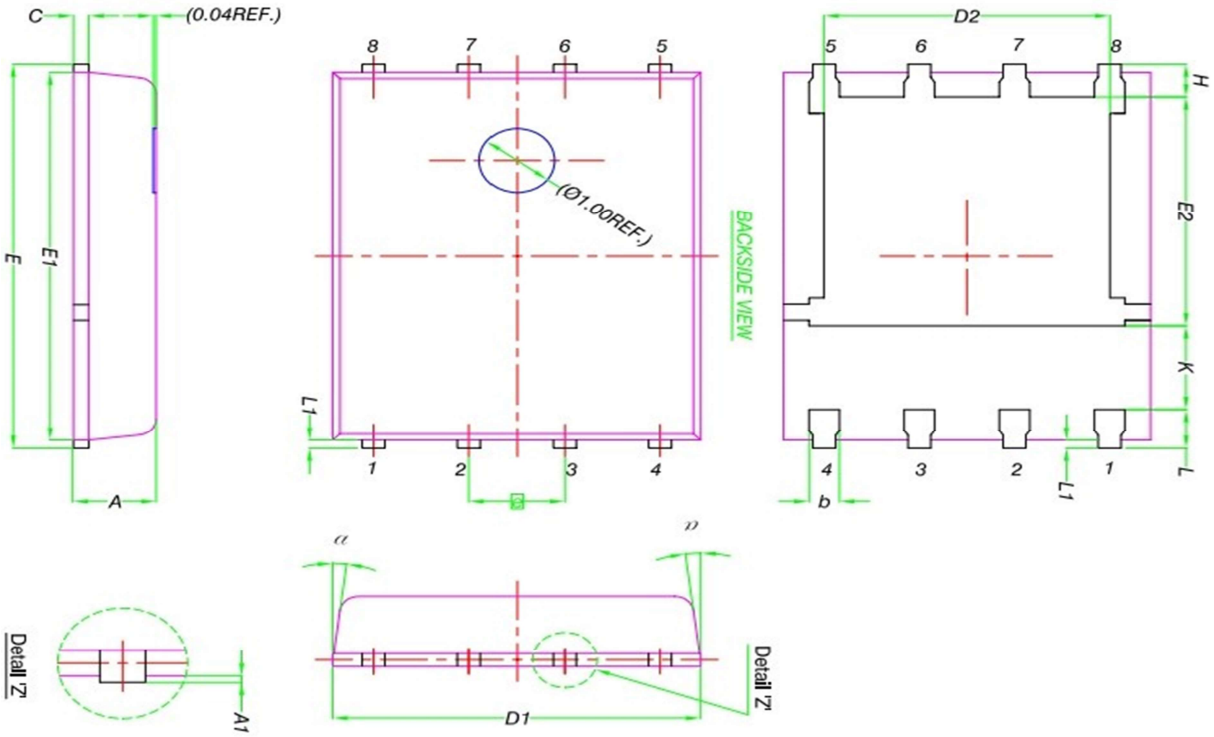


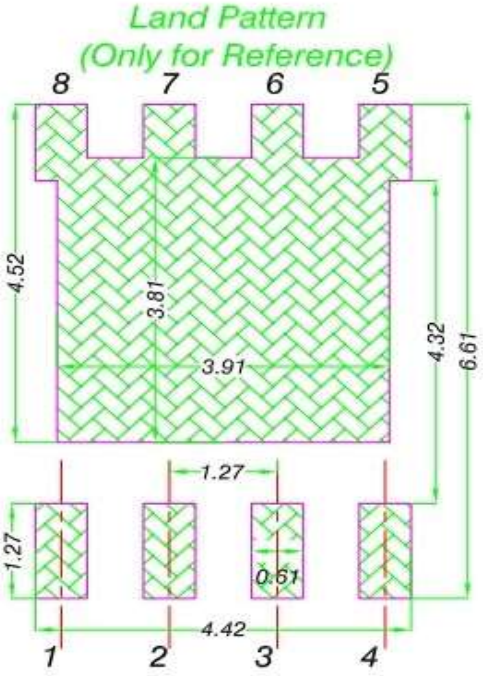
Figure 11: Normalized Maximum Transient Thermal Impedance

Package Information

PDFN5*6-8L



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°



Note:

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