Eternal Semiconductor Inc.

ET6309

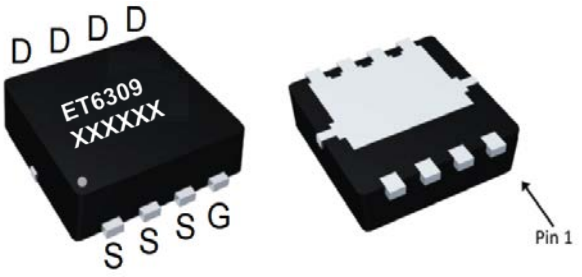
N-Channel Fast Switching MOSFET (30V, 100A)

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(on)}$ (mΩ) Typ.
30V	100A	3.3@ VGS = 10V, ID=30A
		4.5 @ VGS = 4.5V, ID=15A

Features

- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trenchtechnology
- 100% EAS Guaranteedtechnology
- Lead（Pb）-free and halogen-free



TOP Marking
ET6309 XXXXXX
XXXXXX:D/C

Absolute Maximum Ratings (T_A=25°C, unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current (Continuous)@TA=25°C	100	A
	Drain Current (Continuous)@TA=75°C	65	A
I_{DM}	Drain Current (Pulsed) [a]	200	A
P_D	Total Power Dissipation @T_A=25°C	2	W
	Total Power Dissipation @T_A=75°C	5	W
EAS	Avalanche energy，single pulsed[b]	140	mj
I_S	Maximum Diode Forward Current	100	A
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	°C
R_{QJA}	Thermal Resistance Junction to Ambient (PCB mounted)[c]	60	°C/W

a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

b: Limited by TJmax, starting TJ = 25°C, L = 0.5mH,RG = 25Ω, IAS = 10A, VGS =10V. Part not recommended for use above this value

c: 1-in2 2oz Cu PCB board

Electrical Characteristics (T_A=25°C, unless otherwise noted)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current (Tj=25℃)	V_{DS}=30V, V_{GS}=0V	0	-	1	μA
	Zero Gate Voltage Drain Current (Tj=125℃)	V_{DS}=30V, V_{GS}=0V	0	-	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
• On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1.0	1.3	2.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=30A	-	3.3	4.4	mΩ
		V_{GS}=4.5V, I_D=15A	-	4.5	6.6	
• Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz	-	3050	-	PF
C_{oss}	Output Capacitance		-	405	-	
C_{rss}	Reverse Transfer Capacitance		-	300	-	
• Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=15V, I_D=15A, V_{GS}=10V	-	30	-	nC
Q_{gs}	Gate-Source Charge		-	8	-	
Q_{gd}	Gate-Drain Charge		-	12	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=15V, R_L=3.3Ω, I_D=15A, V_{GEN}=10V, RG=6Ω	-	9	-	nS
t_r	Turn-on Rise Time		-	18	-	
$t_{d(off)}$	Turn-off Delay Time		-	55	-	
t_f	Turn-off Fall Time		-	15	-	
• Drain-Source Diode Characteristics						
V_{SD}	Drain-Source Diode Forward	V_{GS}=0V, I_S=15A	-	0.84	1	V

Note: Pulse Test: Pulse Width≤300us, Duty Cycle≤2%

Typical Characteristics Curves (Ta=25°C, unless otherwise note)

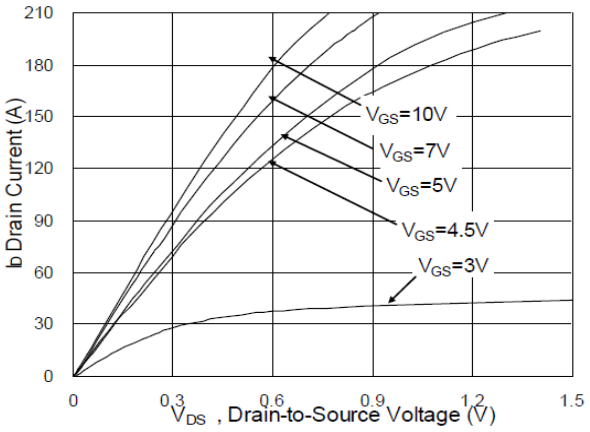


Fig.1 Typical Output Characteristics

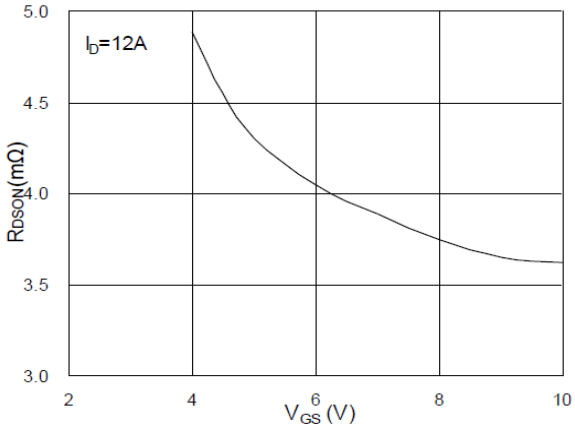


Fig.2 On-Resistance vs. G-S Voltage

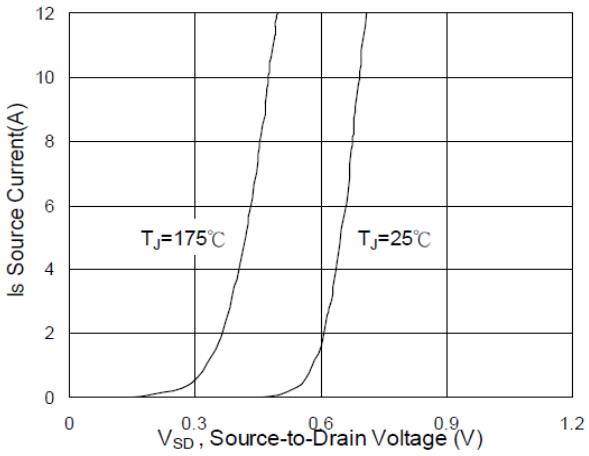


Fig.3 Forward Characteristics of Reverse

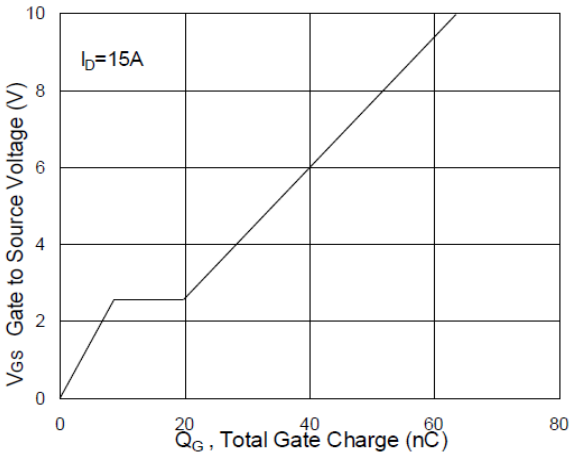


Fig.4 Gate-charge Characteristics

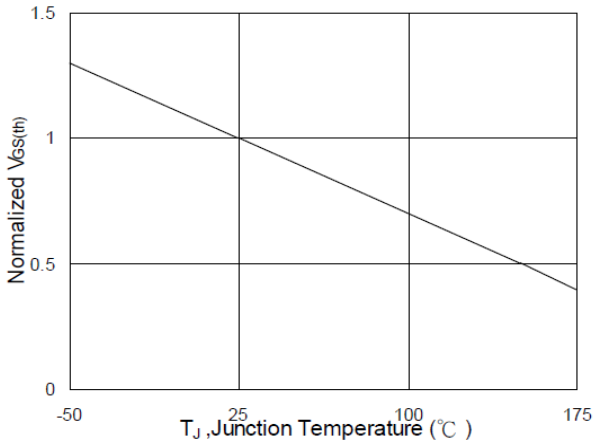


Fig.5 Normalized VGS(th) vs. TJ

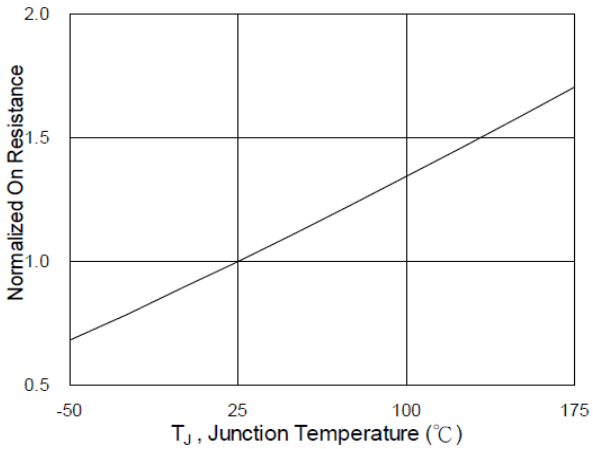


Fig.6 Normalized RDSON vs. TJ

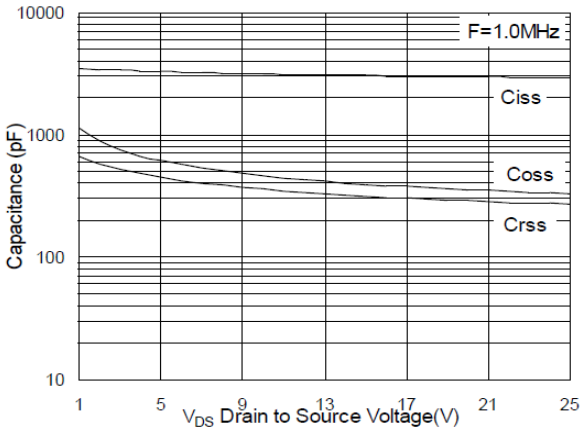


Fig.7 Capacitance

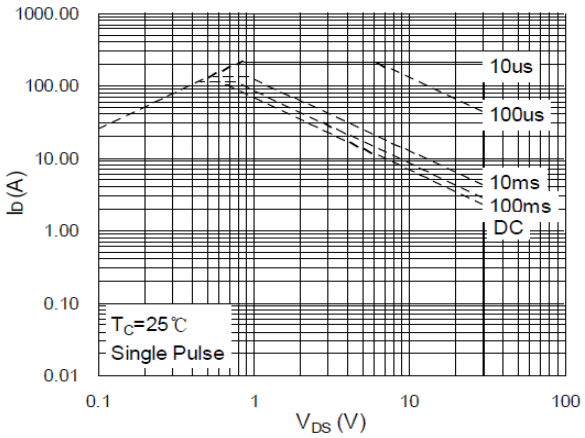


Fig.8 Safe Operating Area

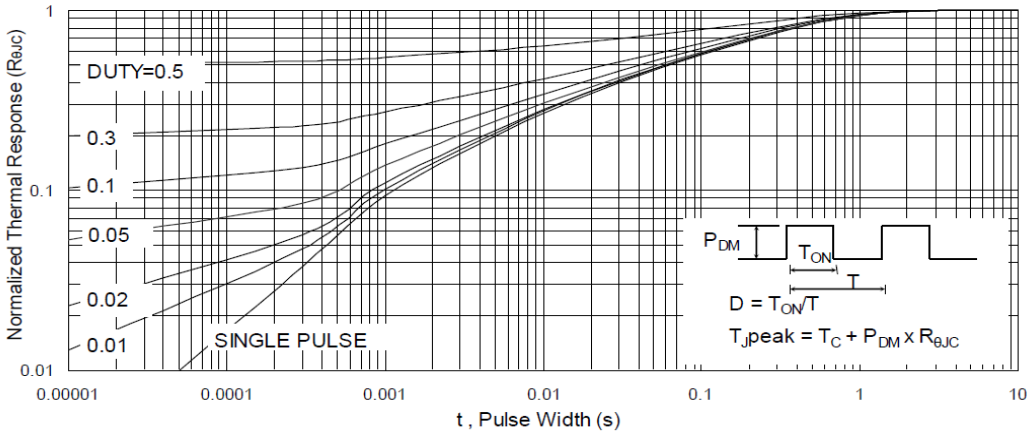


Fig.9 Normalized Maximum Transient Thermal Impedance

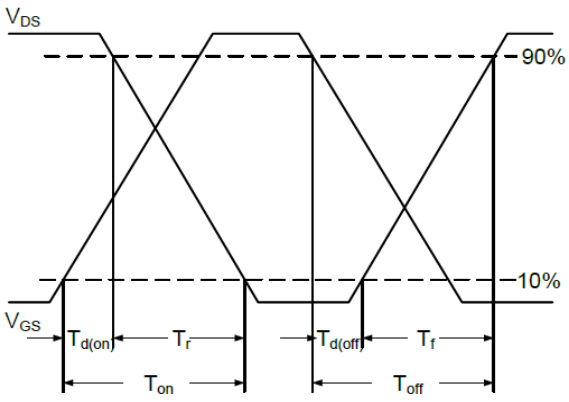


Fig.10 Switching Time Waveform

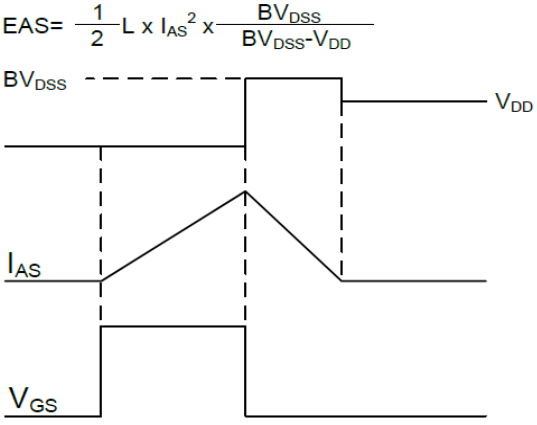
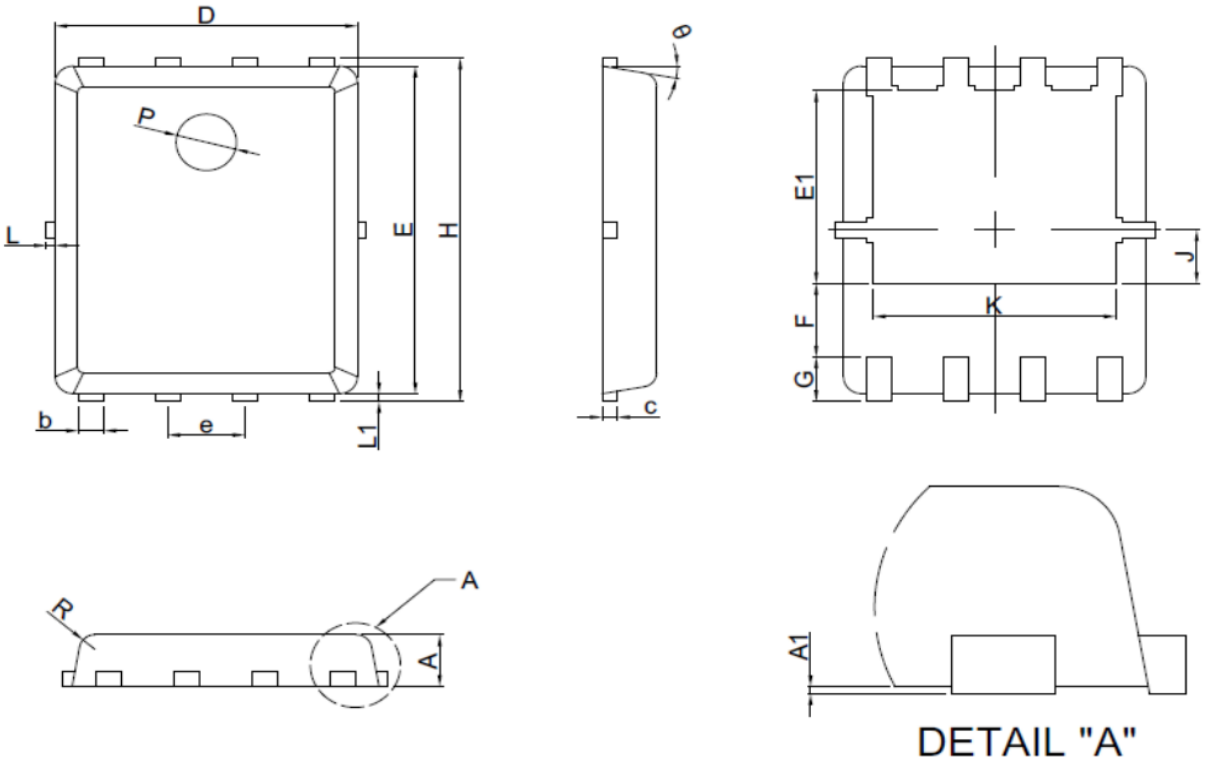


Fig.11 Unclamped Inductive Switching Waveform

PRPAK5x6-8L Package Outline



Symbol	Dimensions （unit： mm)		
	Min	TYP	Max
A	0.80	0.90	1.00
A1	0.00	0.03	0.05
b	0.35	0.42	0.49
c		0.254REF	
D	4.90	5.00	5.10
F		1.4REF	
E	5.70	5.80	5.90
e		1.27BSC	
H	5.95	6.08	6.20
L1	0.10	0.14	0.18
G		0.60REF	
K		4.00REF	
L	-	-	0.15
J		0.85BSC	
P		1.00REF	
θ	6°	10°	14°
E1		3.40REF	
R		0.25REF	