Eternal Semiconductor Inc.

YI-YUAN

ES4411

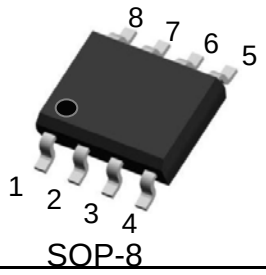
P-Channel Enhancement-Mode MOSFET (-30V, -15A)

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(on)}$ (mΩ)TYP
-30V	-15A	9 @ VGS = -10 V, ID=-15A
		15 @ VGS = -4.5V, ID=-8A

Features

- Advanced Trench Process Technology
- High Density Cell Design for Ultra Low On-Resistance
- Fully Characterized Avalanche Voltage and Current
- Improved Shoot-Through FOM
- Lead（Pb）-free and halogen-free



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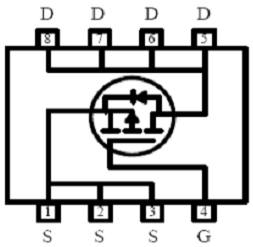
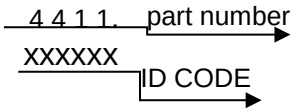


Pin1/2/3: Soure
Pin4: Gate
Pin5/6/7/8:Drain

TOP Marking



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)	-15	A
I_{DM}	Drain Current (Pulsed) [a]	-80	A
P_D	Total Power Dissipation @T_A=25°C	3.0	W
E_{AS} [b]	Avalanche Energy, Single pulse (L=0.3mH)	100	mJ
I_S	Maximum Diode Forward Current	-2.6	A
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	°C
R_{QJA}	Maximum Junction-to-Ambient (t ⩽ 10s)[c]	40	°C/W
	Maximum Junction-to-Ambient (Steady State)[c]	75	°C/W

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

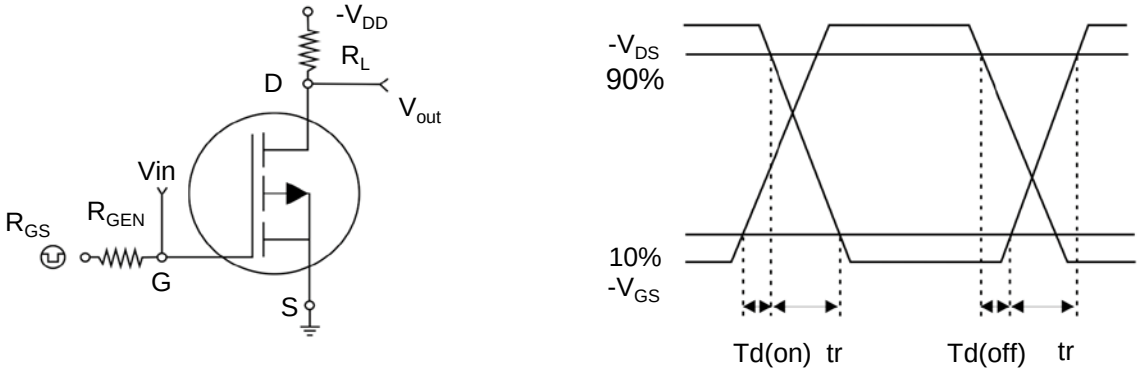
b:Surface Mounted on 1in2 pad area, t<10sec.

c: 1-in^2 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	V_{DS}=-30V, V_{GS}=0V	-	-	-1	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	-1.3	-2	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-15A	-	9	12	mΩ
		V_{GS}=-4.5V, I_D=-8A	-	15	23	
• Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz	-	2860	-	PF
C_{oss}	Output Capacitance		-	420	-	
C_{rss}	Reverse Transfer Capacitance		-	265	-	
• Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=-15V, ID=-5.3A, V_{GS}=-10V	-	47	-	nC
Q_{gs}	Gate-Source Charge		-	11	-	
Q_{gd}	Gate-Drain Charge		-	13	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-15V, RL=5Ω, ID=-3A, VGEN=-10V, RG=6Ω	-	15	-	nS
t_r	Turn-on Rise Time		-	11	-	
$t_{d(off)}$	Turn-off Delay Time		-	44	-	
t_f	Turn-off Fall Time		-	21	-	
• Drain-Source Diode Characteristics						
V_{SD}	Drain-Source Diode Forward	V_{GS}=0V, I_S=-2.0A	-	-	-1.3	V

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



Switching Test Circuit and Swithcing Waveforms

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

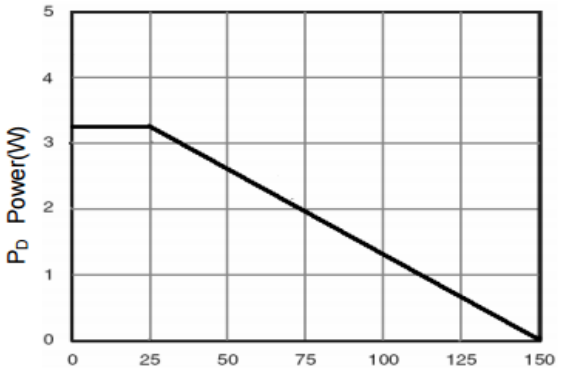


Figure 1 Power Dissipation

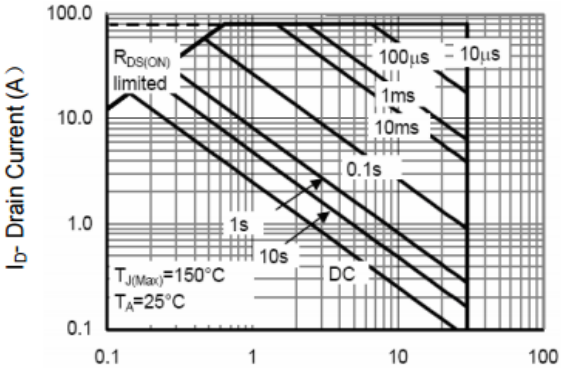


Figure 2 Safe Operation Area

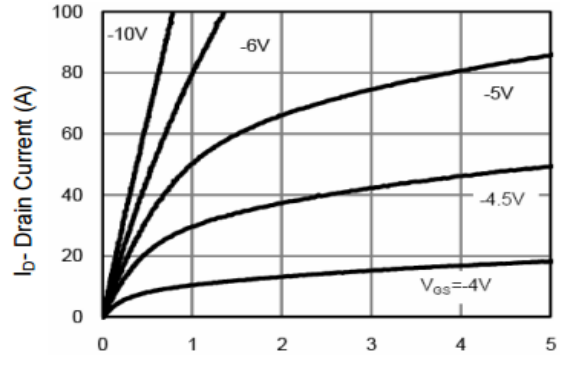


Figure 3 Output Characteristics

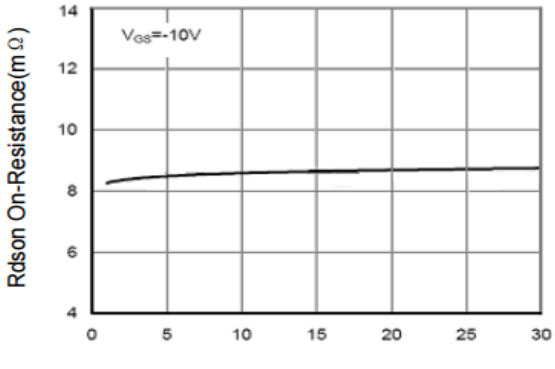


Figure 4 Drain-Source On-Resistance

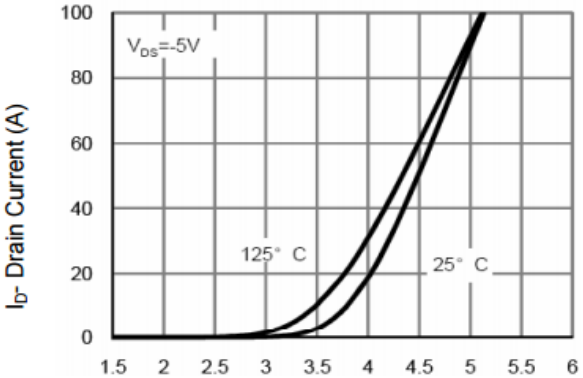


Figure 5 Transfer Characteristics

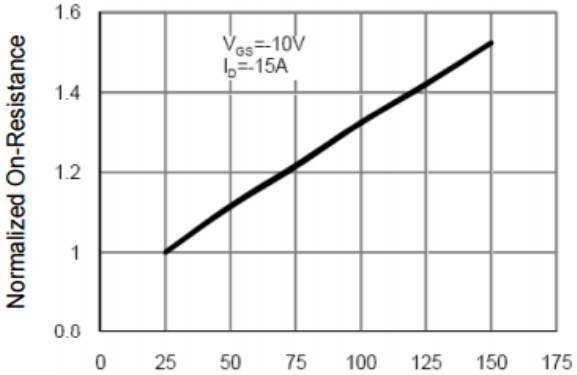


Figure 6 Drain-Source On-Resistance

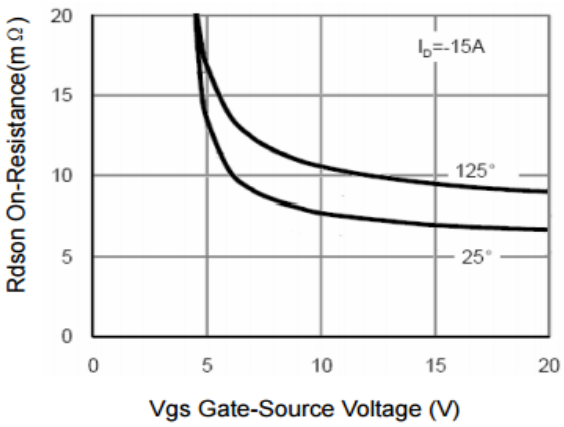


Figure 7 Rdson vs Vgs

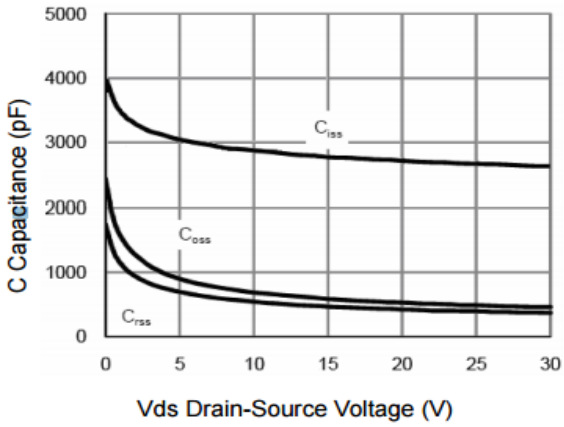


Figure 8 Capacitance vs Vds

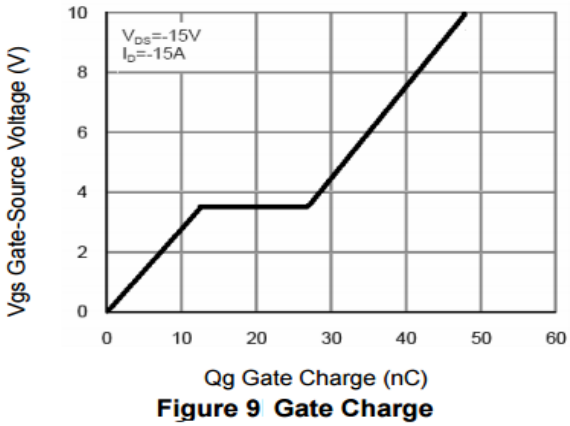


Figure 9 Gate Charge

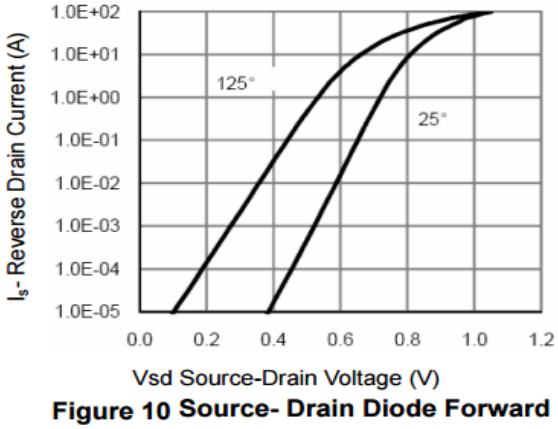


Figure 10 Source- Drain Diode Forward

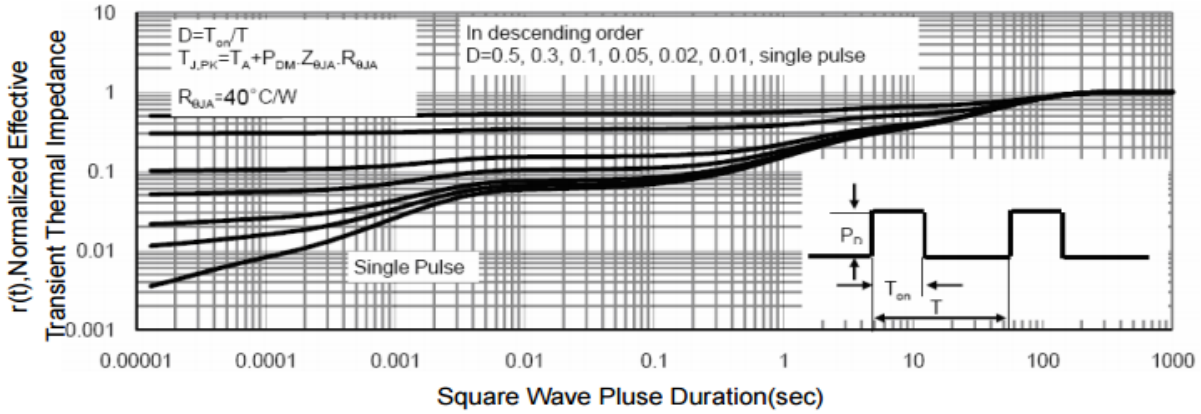
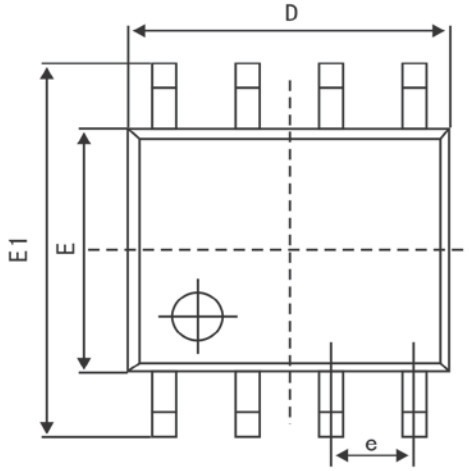
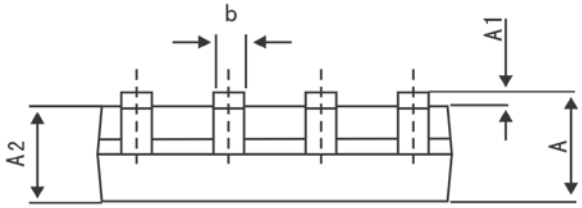


Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8 PACKAGE OUTLINE DIMENSIONS





A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270（BSC)		0.050（BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°