Eternal Semiconductor Inc.

EN2301A

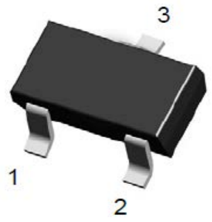
P-Channel Enhancement-Mode MOSFET (-20V, -2.0A)

PRODUCT SUMMARY

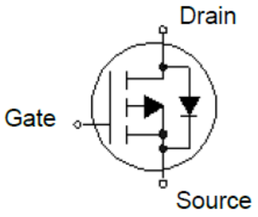
V_{DSS}	I_D	$R_{DS(on)}$ (mΩ)Typ.
-20V	-2.0A	88 @ VGS = -4.5V,ID=-2.0A
		120 @ VGS = -2.5V,ID=-1.0A

Features

- Super high dense cell trench design for low RDS(on)
- Advanced Trench Process Technology
- SOT-23 package
- Lead（Pb）-free and halogen-free



EN2301A Pin Assignment & Symbol
3-Lead Plastic SOT-23
Pin 1: Gate Pin 2: Source Pin3: Drain



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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±10	V
I_D	Drain Current (Continuous)	-2	A
I_{DM}	Drain Current (Pulsed) [a]	-8	A
P_D	Total Power Dissipation @T_A=25°C	0.9	W
I_S	Maximum Diode Forward Current	-1.5	A
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	°C
R_{QJA}	Thermal Resistance Junction to Ambient (PCB mounted)[b]	180	°C/W

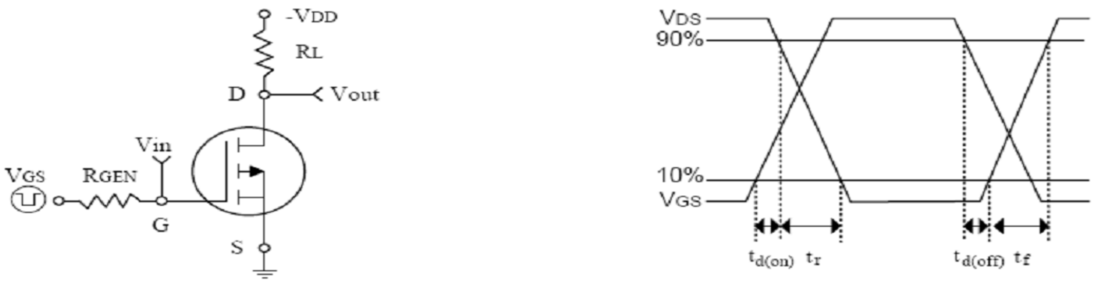
a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

b: 1-in^2 2oz Cu PCB board

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

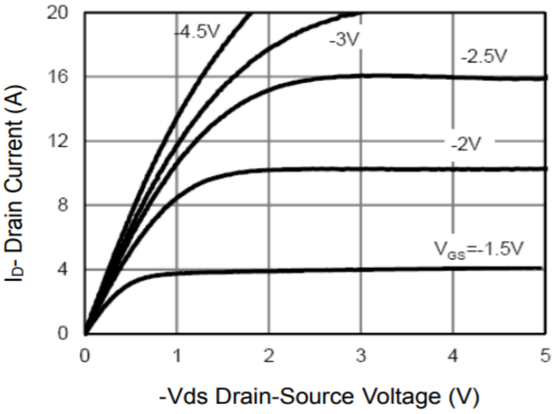
Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V, V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±10V, V_{DS}=0V	-	-	±100	nA
• On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-0.4		-0.9	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-4.5V, I_D=-2.0A	-	88	120	mΩ
		V_{GS}=-2.5V, I_D=-1A	-	120	150	
• Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-6V, V_{GS}=0V, f=1MHz	-	279	-	PF
C_{oss}	Output Capacitance		-	55	-	
C_{rss}	Reverse Transfer Capacitance		-	33	-	
• Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=-6V, I_D=-2.8A, V_{GS}=-4.5V	-	2.8	-	nC
Q_{gs}	Gate-Source Charge		-	0.55	-	
Q_{gd}	Gate-Drain Charge		-	0.78	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-6V, R_L=6Ω, I_D=1A, VGEN=-4.5V, RG=6Ω	-	9.6	-	nS
t_r	Turn-on Rise Time		-	4.8	-	
$t_{d(off)}$	Turn-off Delay Time		-	21	-	
t_f	Turn-off Fall Time		-	7	-	
• Drain-Source Diode Characteristics						
V_{SD}	Drain-Source Diode Forward	V_{GS}=0V, I_S=-1A	-	-	-1.2	V

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

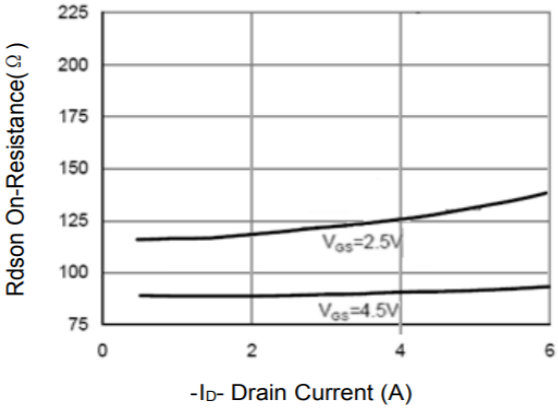


Switching Test Circuit and Swithcing Waveforms

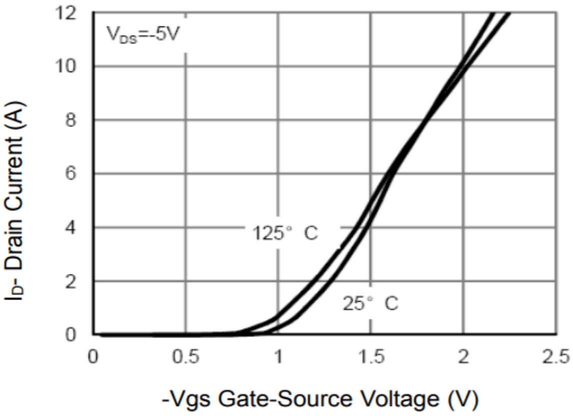
Typical Characteristics Curves (Ta=25°C, unless otherwise note)



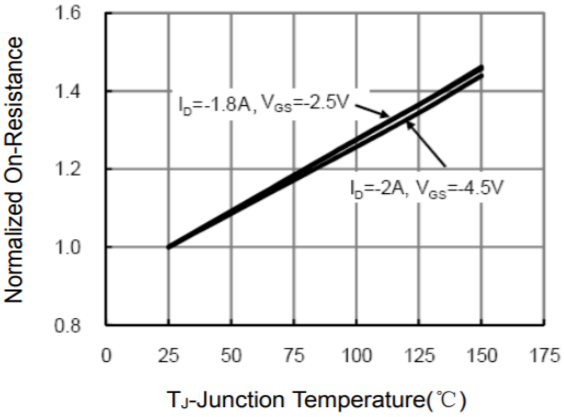
Output Characteristics



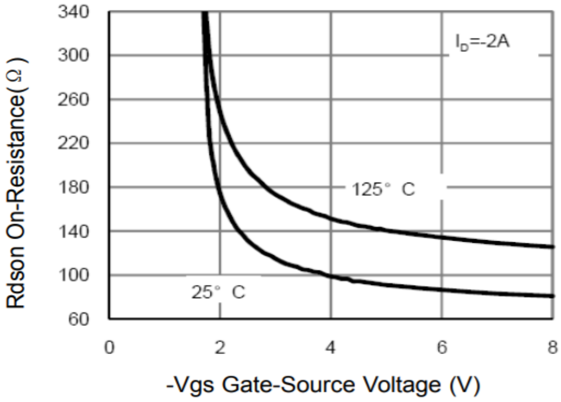
Drain-Source On-Resistance



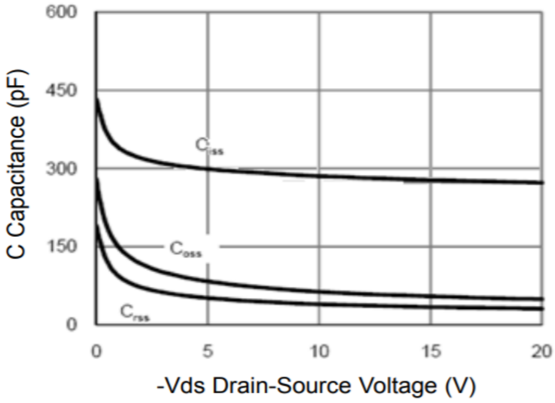
Transfer Characteristics



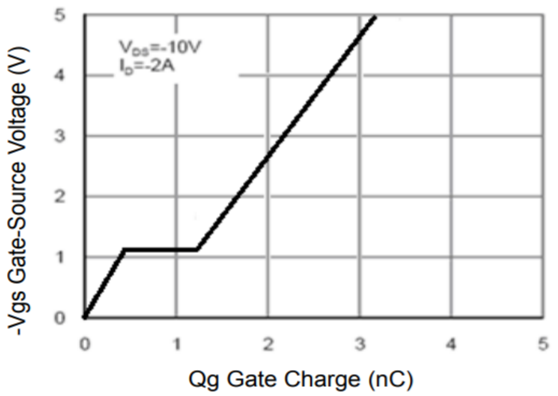
Drain-Source On-Resistance



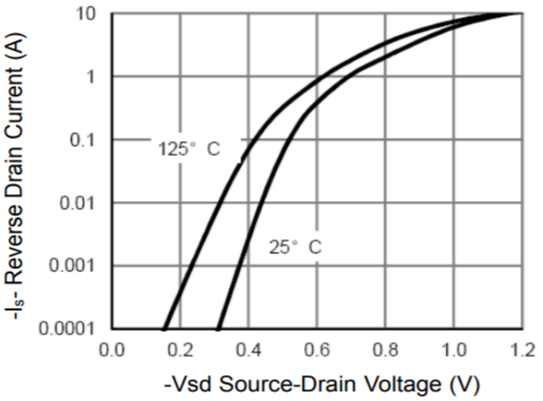
Rdson vs Vgs



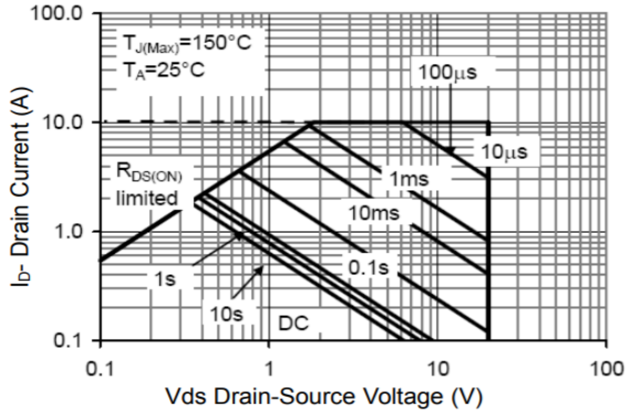
Capacitance vs Vds



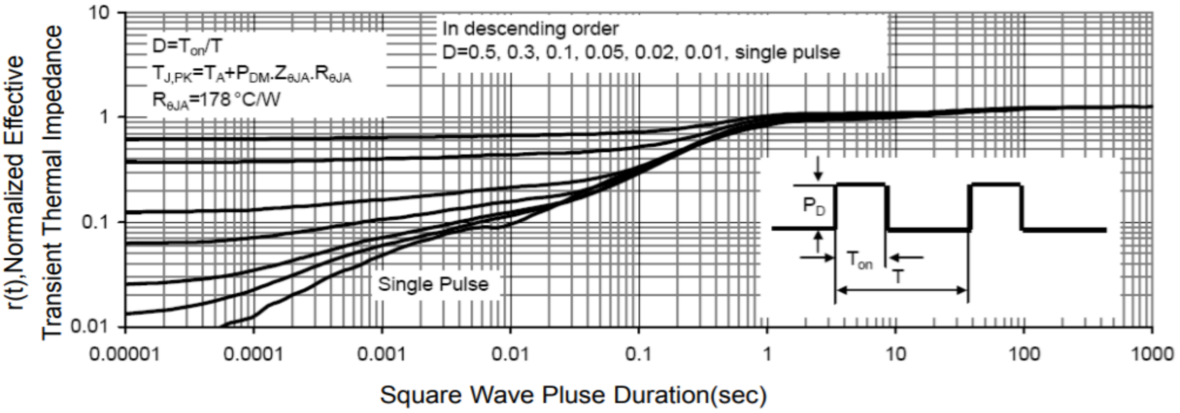
Gate Charge



Source- Drain Diode Forward

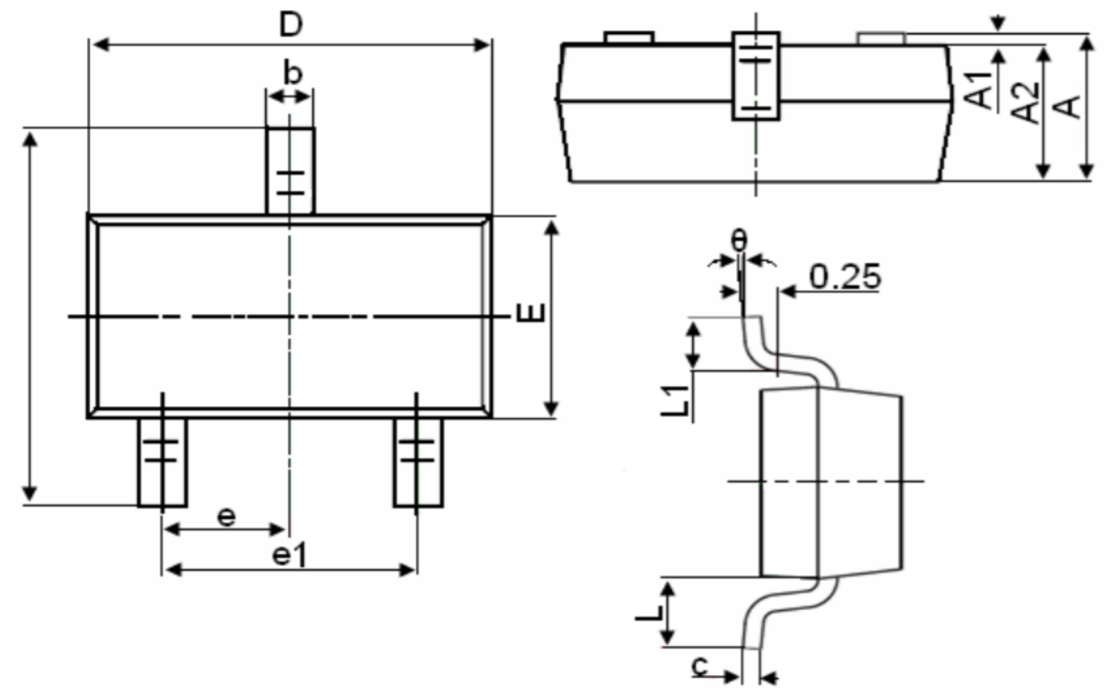


Safe Operation Area



Normalized Maximum Transient Thermal Impedance

EN2301A PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°