Eternal Semiconductor Inc.

EN3401

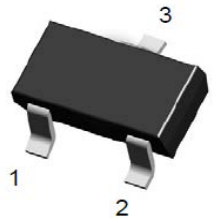
P-Channel Enhancement-Mode MOSFET (-30V, -4.2A)

PRODUCT SUMMARY

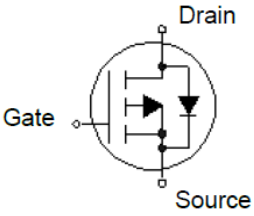
V_{DSS}	I_D	$R_{DS(on)}$ (mΩ) Typ.
-30V	-4.2A	53 @ VGS = -10 V,ID=-4.2A
		64 @ VGS = -4.5V,ID=-4.0A
		86@ VGS = -2.5V,ID=-1.0A

Features

- Super high dense cell trench design for low RDS(on)
- Rugged and reliable
- SOT-23 package
- Lead（Pb）-free and halogen-free



EN3401 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	-30	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current (Continuous)	-4.2	A
I_{DM}	Drain Current (Pulsed) [a]	-30	A
P_D	Total Power Dissipation @T_A=25°C	-2.2	W
I_S	Maximum Diode Forward Current	1.25	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]	140	°C/W

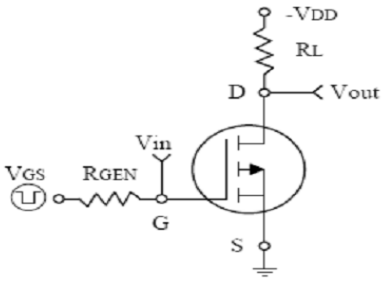
a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

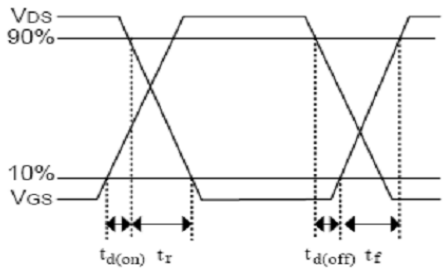
b: 1-in^2 2oz Cu PCB board

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	-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}=±12V, V_{DS}=0V	-	-	±100	nA
• On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-0.7		-1.3	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-4.2A	-	53	60	mΩ
		V_{GS}=-4.5V, I_D=-4A		64	75	
		V_{GS}=-2.5V, I_D=1A	-	86	120	
• Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz	-	1325	-	PF
C_{oss}	Output Capacitance		-	172	-	
C_{rss}	Reverse Transfer Capacitance		-	140	-	
• Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=-15V, I_D=-1A, V_{GS}=-10V	-	27.8	-	nC
Q_{gs}	Gate-Source Charge		-	3.2	-	
Q_{gd}	Gate-Drain Charge		-	2.72	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-15V, R_L=15Ω, I_D=1A, VGEN=-4.5V, RG=10Ω	-	5	-	nS
t_r	Turn-on Rise Time		-	3	-	
$t_{d(off)}$	Turn-off Delay Time		-	30	-	
t_f	Turn-off Fall Time		-	10	-	
• Drain-Source Diode Characteristics						
V_{SD}	Drain-Source Diode Forward	V_{GS}=0V, I_S=-1A	-	-	-1	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)

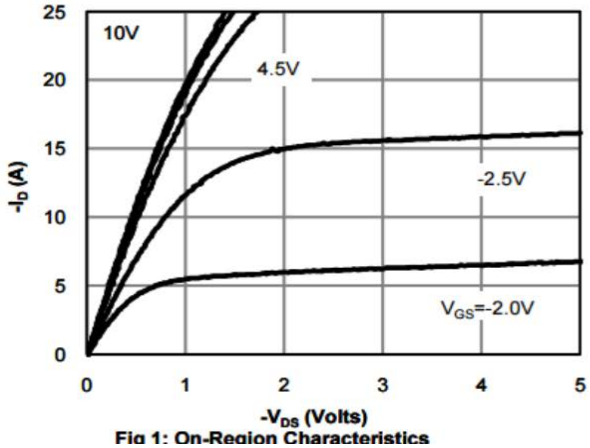


Fig 1: On-Region Characteristics

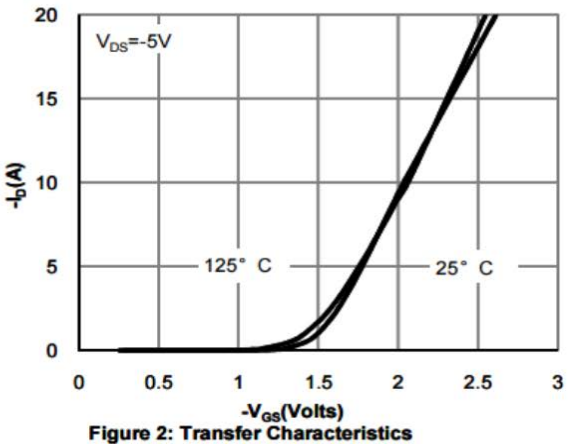


Figure 2: Transfer Characteristics

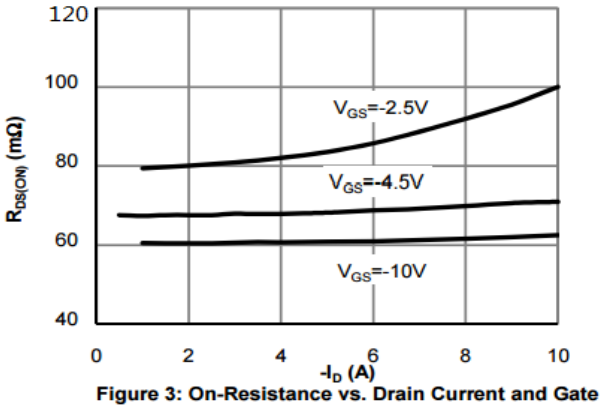


Figure 3: On-Resistance vs. Drain Current and Gate

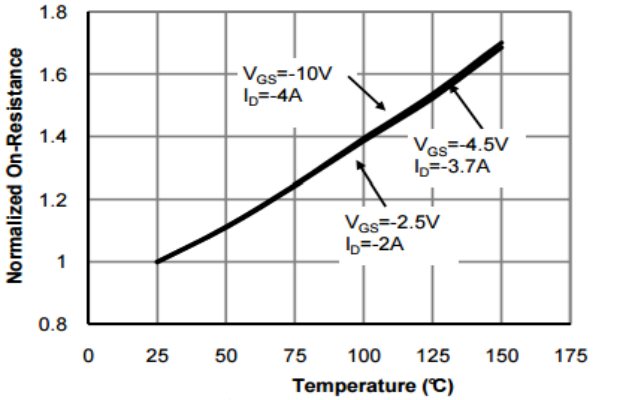


Figure 4: On-Resistance vs. Junction Temperature

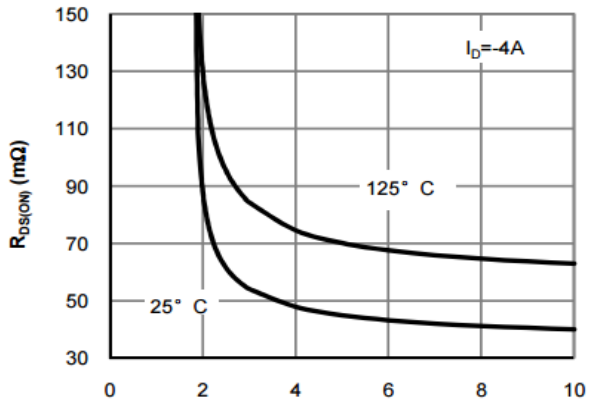


Figure 5: On-Resistance vs. Gate-Source Voltage

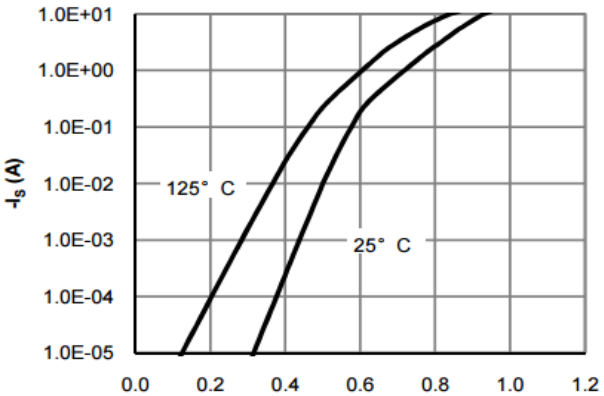


Figure 6: Body-Diode Characteristics

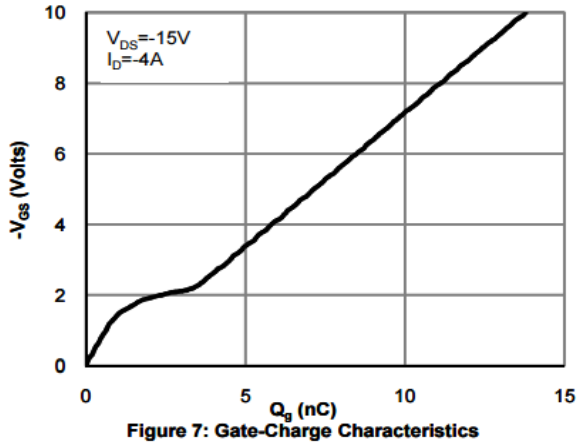


Figure 7: Gate-Charge Characteristics

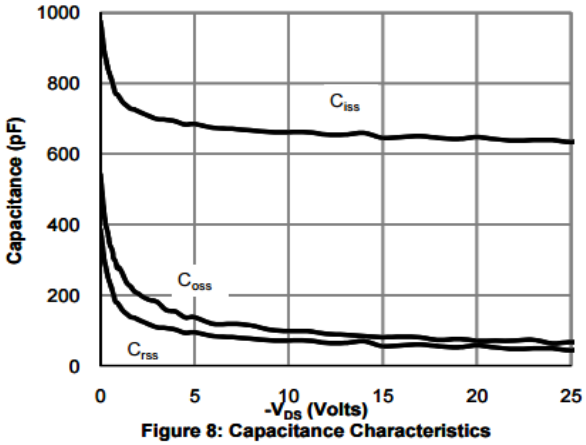


Figure 8: Capacitance Characteristics

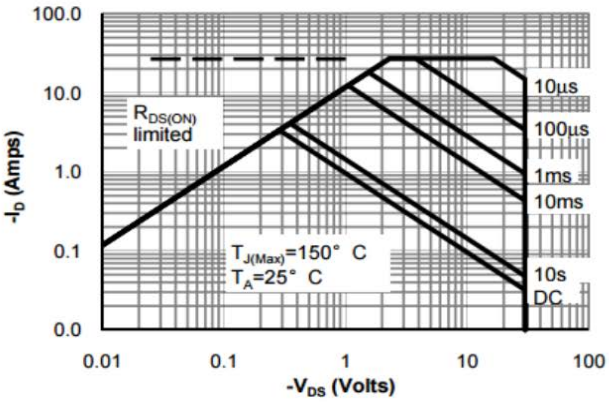


Figure 9: Maximum Forward Biased Safe Operating Area

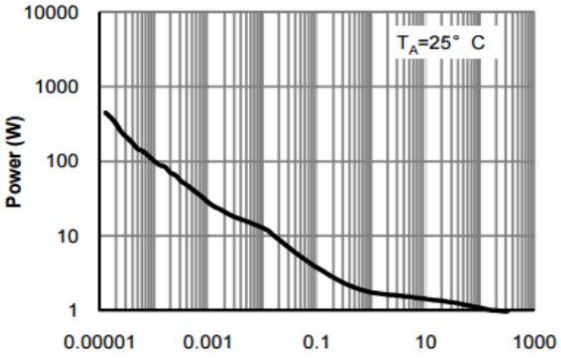


Figure 10: Single Pulse Power Rating Junction-to-Ambient

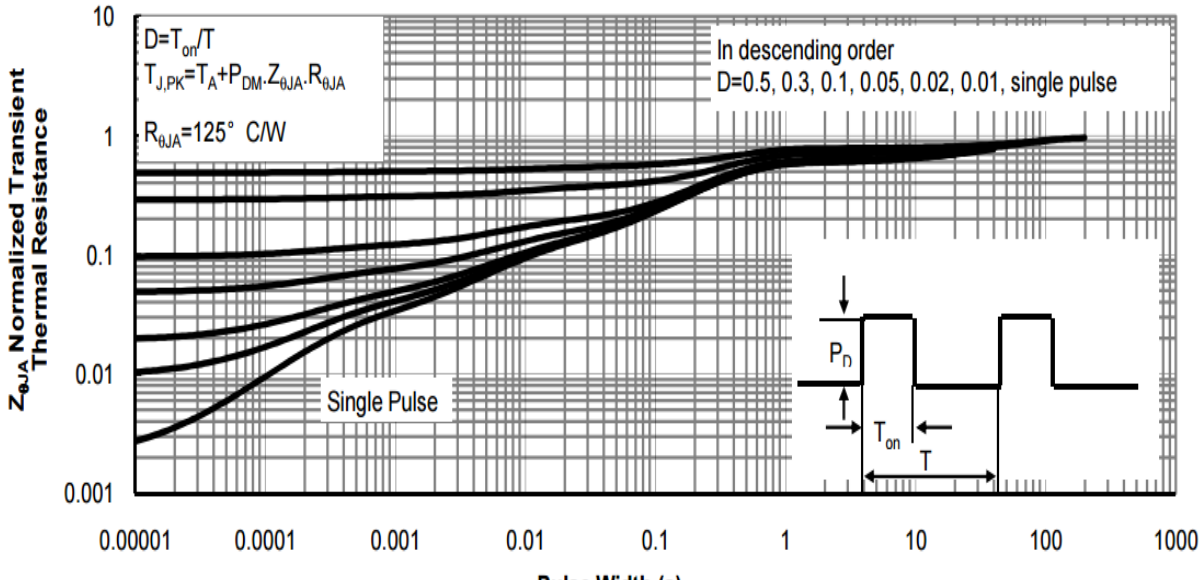
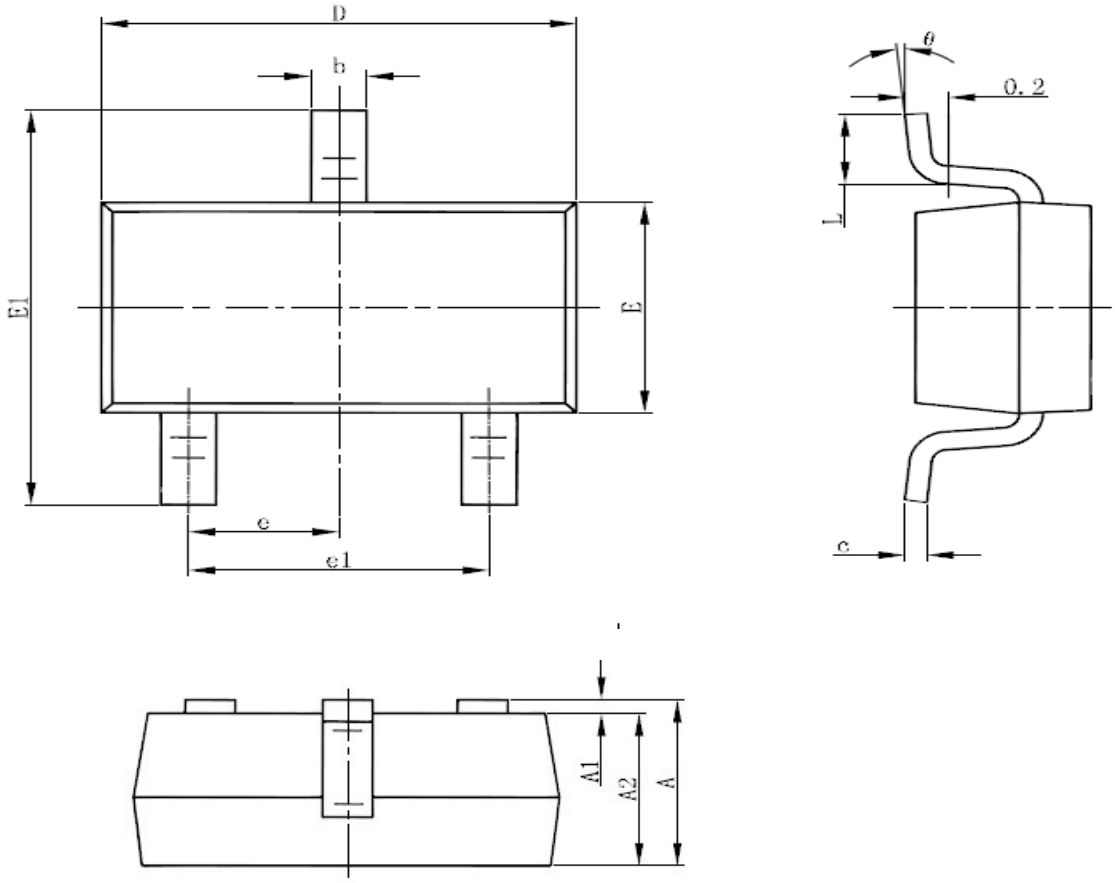


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

SOT-23 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°