Eternal Semiconductor Inc.

ET6003

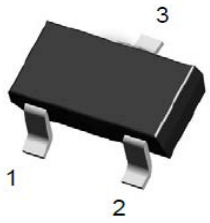
N-Channel High Density Trench MOSFET (60V, 3A)

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(on)}$ (mΩ) Typ
60V	3	78mΩ @ VGS=10V,ID=3A
		95mΩ @ VGS=4.5V,ID=3A

Features

- Super high density cell design for extremely low RDS(ON)
- Exceptional on-resistance and maximum DC current capability
- Lead（Pb）-free and halogen-free



ET6003 Pin Assignment & Symbol
3-Lead Plastic SOT-23-3L
Pin 1: Gate Pin 2: Source Pin3: Drain

TOP Marking

6003

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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current (Continuous)@TA=25°C	3	A
	Drain Current (Continuous)@TA=75°C	2	A
I_{DM}	Drain Current (Pulsed) [a]	10	A
P_D	Total Power Dissipation @T_A=25°C	1.7	W
	Total Power Dissipation @T_A=75°C	1.2	W
I_S	Maximum Diode Forward Current	50	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]	75	°C/W

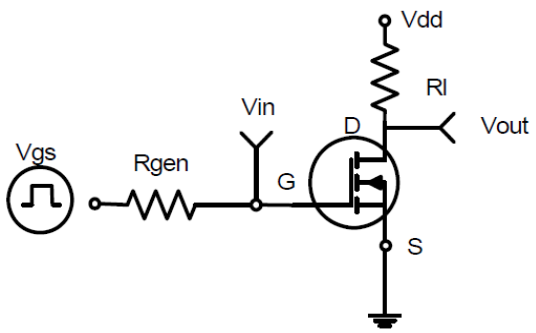
a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

b: 1-in2 2oz Cu PCB board

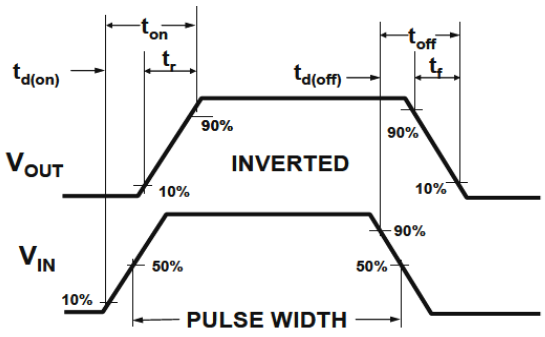
Electrical Characteristics (T_A=25°C, unless otherwise noted)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current (Tj=25℃)	V_{DS}=60V, V_{GS}=0V	0	-	1	μA
	Zero Gate Voltage Drain Current (Tj=125℃)	V_{DS}=60V, 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=3A	-	78	105	mΩ
		V_{GS}=4.5V, I_D=3A	-	95	125	
• Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=30V, V_{GS}=0V, f=1MHz	-	247	-	PF
C_{oss}	Output Capacitance		-	34	-	
C_{rss}	Reverse Transfer Capacitance		-	19.5	-	
• Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=30V, I_D=3A, V_{GS}=4.5V	-	6	-	nC
Q_{gs}	Gate-Source Charge		-	1.1	-	
Q_{gd}	Gate-Drain Charge		-	1.5	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V, R_L=15Ω, I_D=1A, V_{GEN}=10V, RG=1Ω	-	6	-	nS
t_r	Turn-on Rise Time		-	15	-	
$t_{d(off)}$	Turn-off Delay Time		-	15	-	
t_f	Turn-off Fall Time		-	10	-	
• Drain-Source Diode Characteristics						
V_{SD}	Drain-Source Diode Forward	V_{GS}=0V, I_S=3A	-	0.84	1.2	V

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



Switching Test Circuit



Switching Waveforms

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

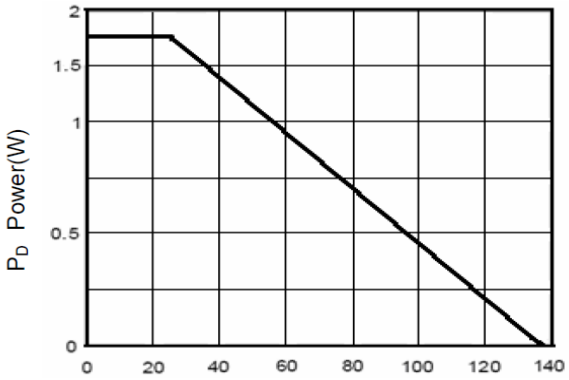


Figure 1 Power Dissipation

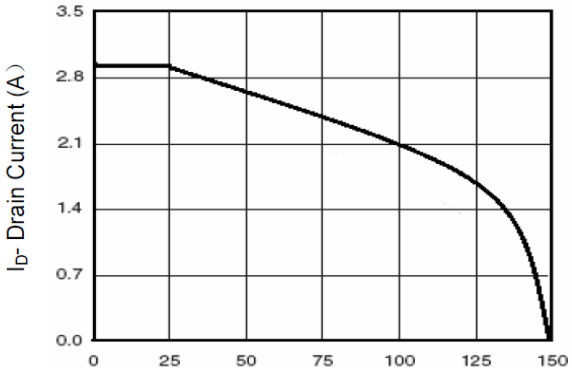


Figure 2 Drain Current

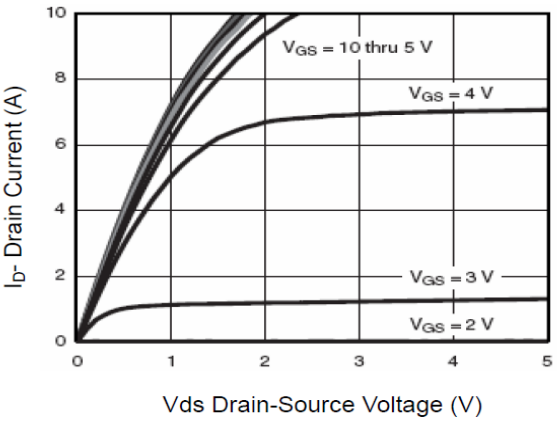


Figure 3 Output Characteristics

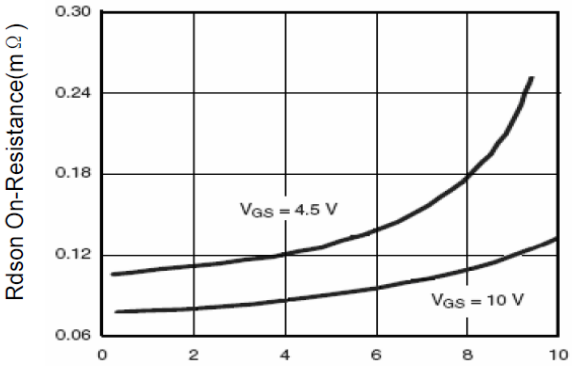


Figure 4 Drain-Source On-Resistance

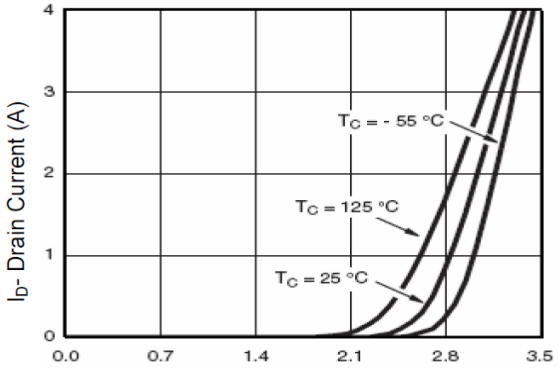


Figure 5 Transfer Characteristics

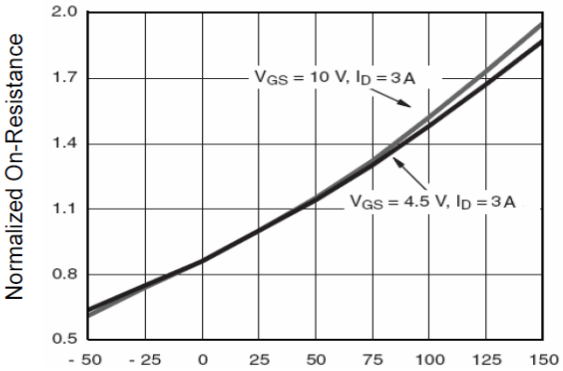


Figure 6 Drain-Source On-Resistance

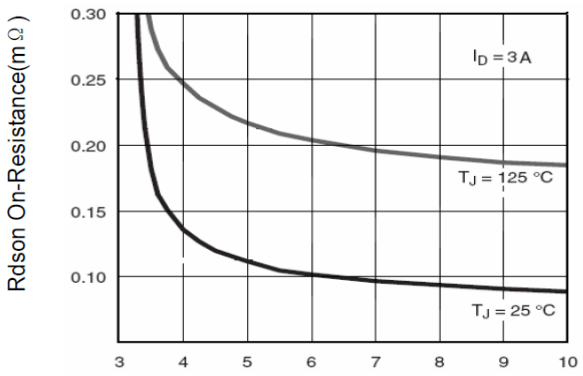


Figure 7 Rdson vs Vgs

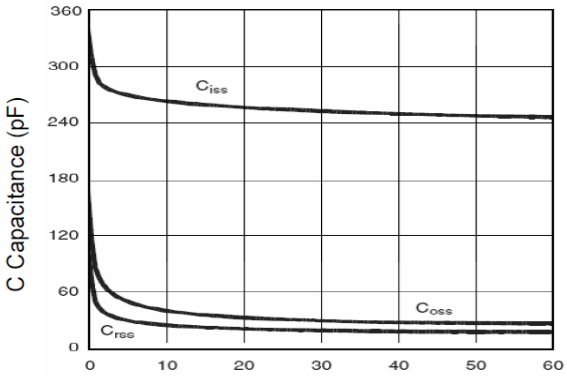


Figure 8 Capacitance vs Vds

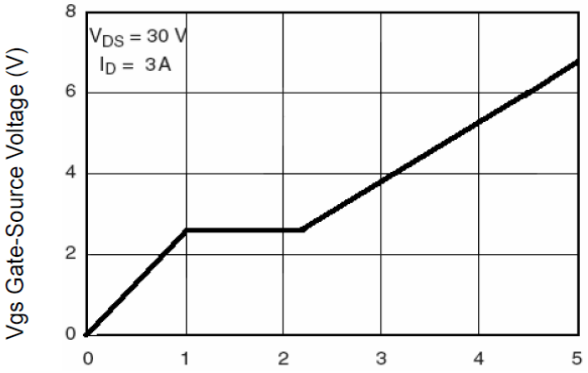


Figure 9 Gate Charge

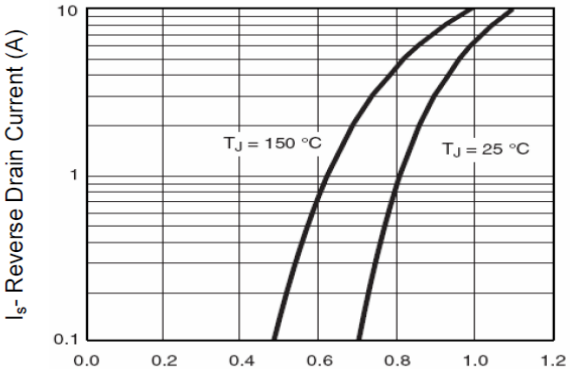


Figure 10 Source- Drain Diode Forward

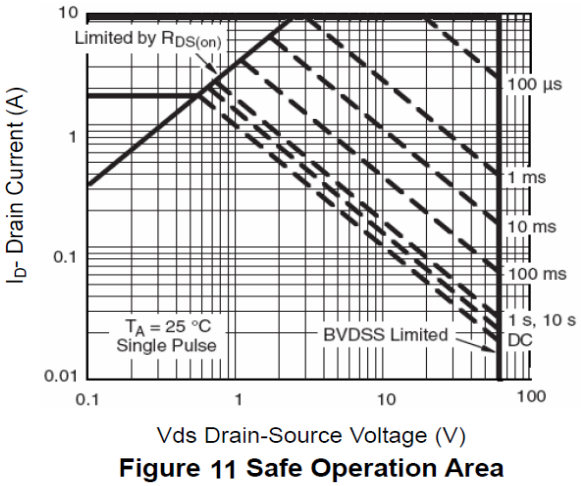


Figure 11 Safe Operation Area

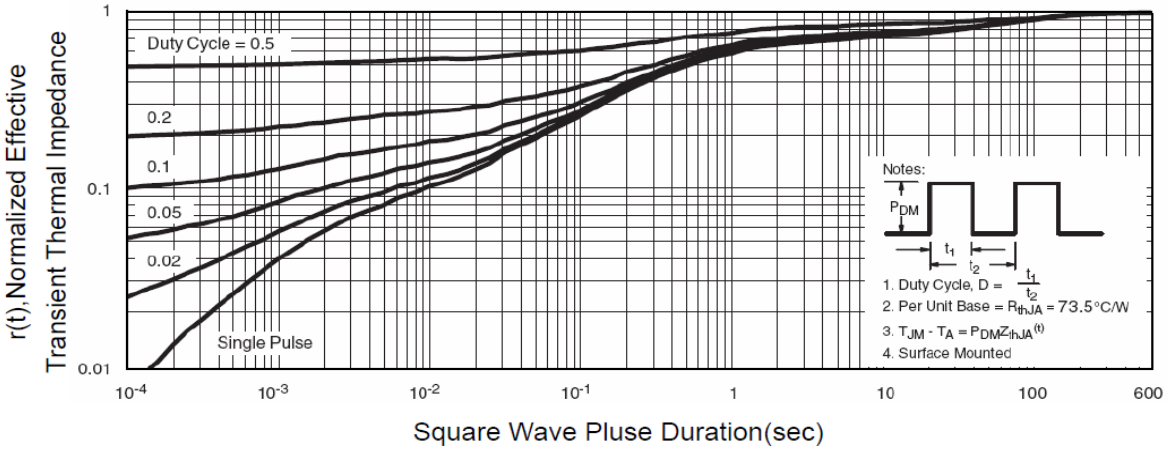
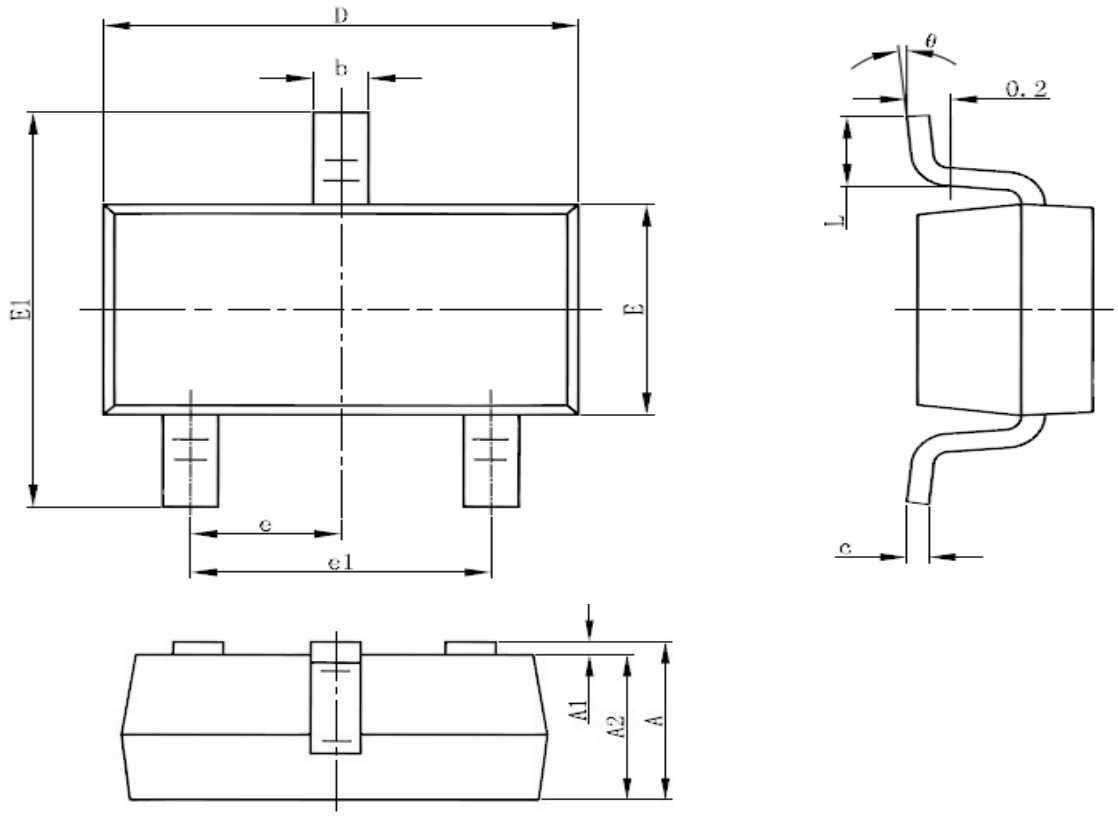


Figure 12 Normalized Maximum Transient Thermal Impedance

SOT23-3L PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.850	1.250	0.033	0.049
A1	0.000	0.100	0.000	0.004
A2	0.7	1.150	0.028	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°