SemTron Microtech Corporation

SMC2333S

Single P-Channel MOSFET

■DESCRIPTION

SMC2333 is the P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced trench technology devices are well suited for high efficiency fast switching applications, low in-line power loss needed in small outline surface mount package.

■PART NUMBER INFORMATION

SMC	2333	S	-	TR	G
a	b	c		d	e

a : Company name.
b : Product Serial number.
c : Package code S: SOT-23L
d : Handling code TR: Tape&Reel
e : Green produce code G: *RoHS Compliant*

■FEATURES

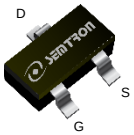
V_{DS} = -20V, I_D=-6A

$R_{DS(ON)}$=22mΩ(Typ.)@V_{GS}=-10V
$R_{DS(ON)}$=26mΩ(Typ.)@V_{GS}=-4.5V
$R_{DS(ON)}$=33mΩ(Typ.)@V_{GS}=-2.5V
$R_{DS(ON)}$=43mΩ(Typ.)@V_{GS}=-1.8V

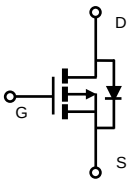
◆1.8V Low gate drive applications

■APPLICATIONS

◆Portable Equipment
◆Battery Protection
◆Power Management



SOT-23L



■ABSOLUTE MAXIMUM RATINGS (T_A=25°C Unless otherwise noted)

Symbol	Parameter		Rating	Units
V_{DSS}	Drain-Source Voltage		-20	V
V_{GSS}	Gate-Source Voltage		±12	V
I_D	Continuous Drain Current (V_{GS}=-4.5V)	T_A=25°C	-6	A
		T_A=70°C	-4.8	A
I_{DM}	Pulsed Drain Current [B]		-24	A
P_D	Power Dissipation [A]	T_A=25°C	1.6	W
		T_A=70°C	1	W
T_J	Operation Junction Temperature		-55/150	°C
T_{STG}	Storage Temperature Range		-55/150	°C

■THERMAL RESISTANCE

Symbol	Parameter		Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient [A]	t≦10s		80	°C/W
	Thermal Resistance Junction to Ambient [AC]	Steady-State		120	

ELECTRICAL CHARACTERISTICS (T_A=25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-20			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-0.4	-0.7	-1	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±12V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V, V_{GS}=0V, T_J=25°C			-1	μA
		V_{DS}=-16V, V_{GS}=0V, T_J=75°C			-10	
$R_{DS(ON)}$	Drain-source On-Resistance [D]	V_{GS}=-10V, I_D=-6A V_{GS}=-4.5V, I_D=-6A V_{GS}=-2.5V, I_D=-3.5A V_{GS}=-1.8V, I_D=-3A		22 26 33 43	25 30 38 50	mΩ
G_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-6A		12		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [D]	I_S=-1A, V_{GS}=0V			-1	V
I_S	Diode Continuous Forward Current				-3	A
Dynamic and Switching Parameters [E]						
Q_g	Total Gate Charge	V_{DS}=-10V, V_{GS}=-4.5V, I_D=-6A		16.7	23.4	nC
Q_{gs}	Gate-Source Charge			2	2.8	
Q_{gd}	Gate-Drain Charge			3.7	5.2	
C_{iss}	Input Capacitance	V_{DS}=-10V, V_{GS}=0V, f=1MHz		1410		pF
C_{oss}	Output Capacitance			165		
C_{rss}	Reverse Transfer Capacitance			110		
$t_{d(on)}$	Turn-On Time	V_{DD}=-10V, V_{GEN}=-4.5V R_G=3Ω, I_D=-1A		9.3	18	nS
t_r				34	65	
$t_{d(off)}$	Turn-Off Time			78	148	
t_f				22	42	

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

A. Surface mounted on FR4 board using 1 in^2 pad size.
B. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}$=150°C (initial temperature T_J=25°C).
C. Using ≤ 10s junction-to-ambient thermal resistance is base on $T_{J(MAX)}$=150°C.
D. Pulse test width ≤300μs and duty cycle ≤ 2%.
E. Guaranteed by design, not subject to production testing.

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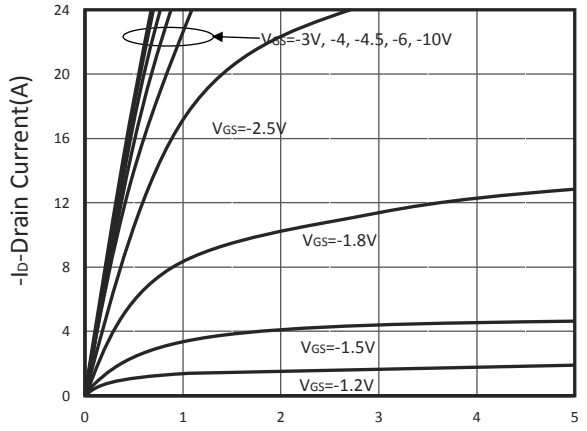
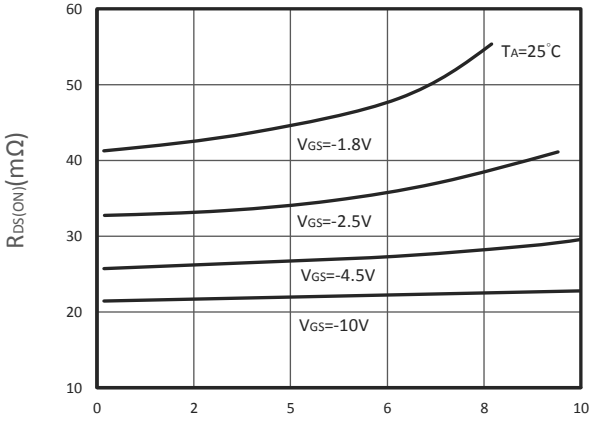
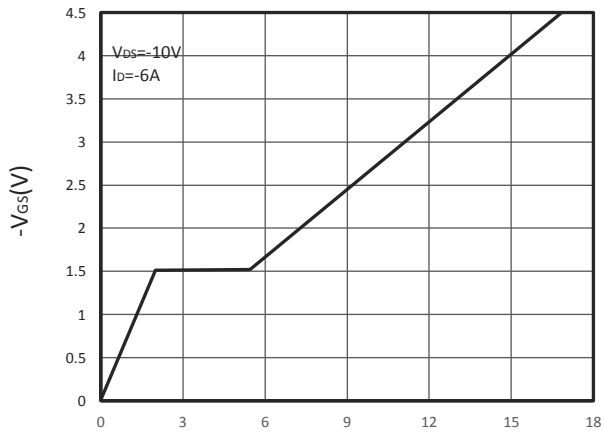
TYPICAL CHARACTERISTICS



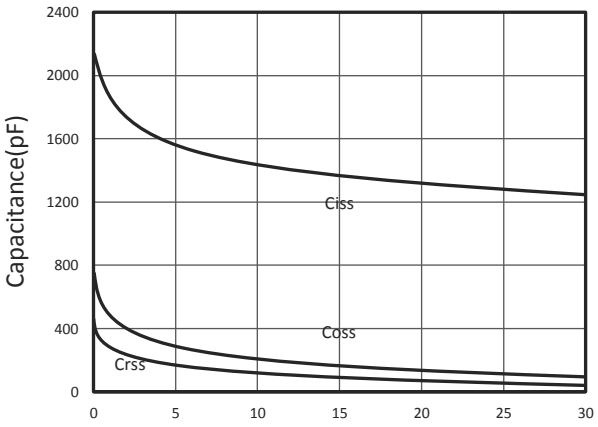
Output Characteristics



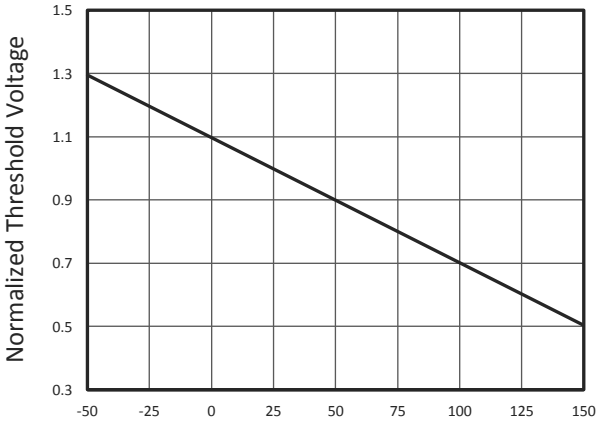
Drain-Source On Resistance



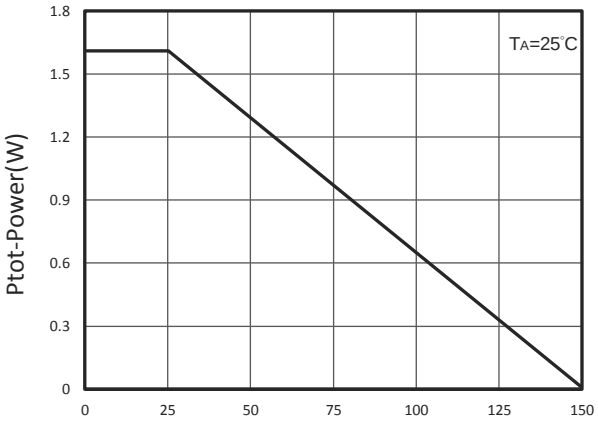
Gate Charge



Capacitance

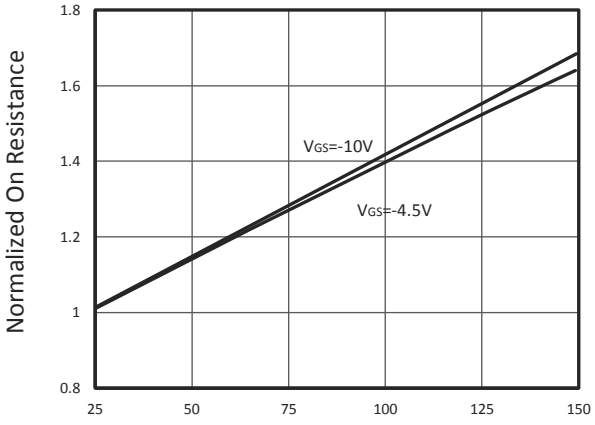


Gate Threshold Voltage

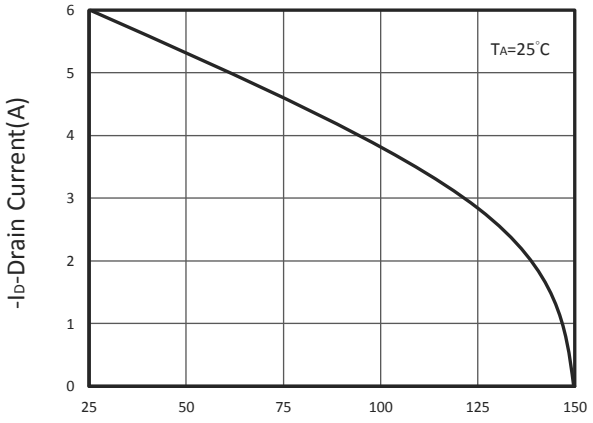


Power Dissipation

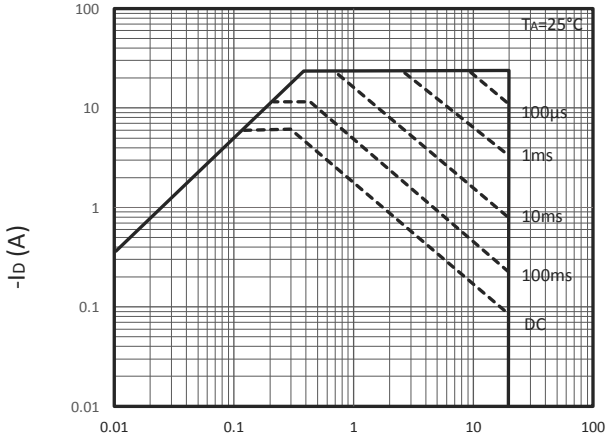
TYPICAL CHARACTERISTICS



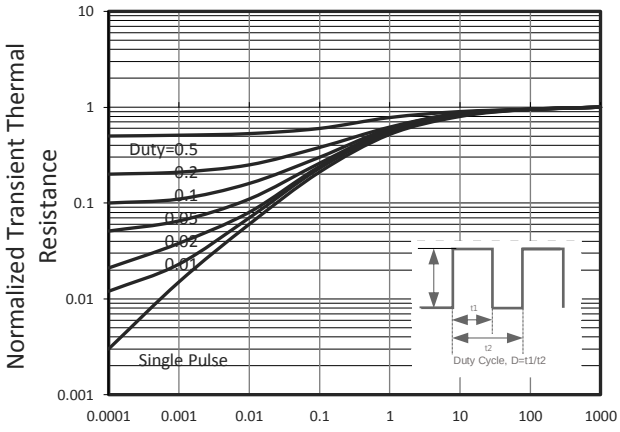
RDS(ON) vs Junction Temperature



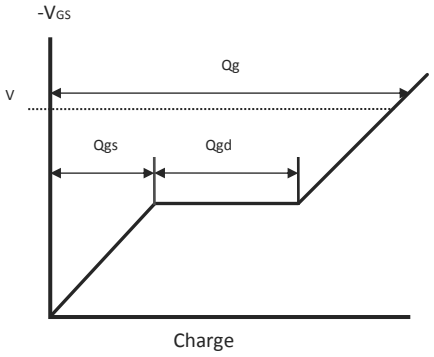
Drain Current vs TJ



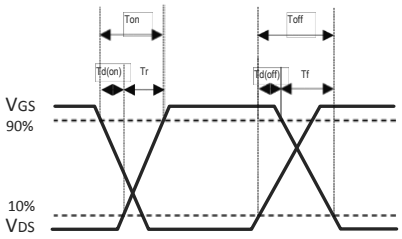
Maximum Safe Operation Area



Thermal Transient Impedance

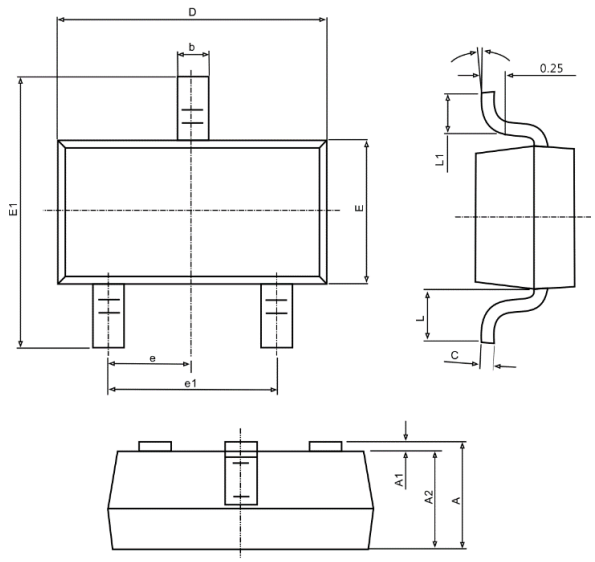


Gate Chrge Waveform

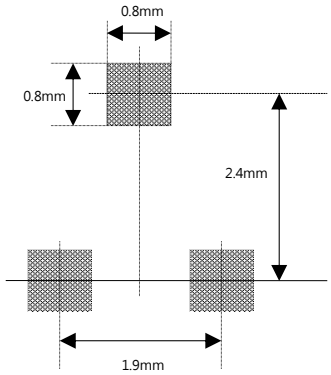


Switching Time Waveform

■SOT-23L PACKAGE DIMENSIONS



Recommended Minimum Pad(mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.000	1.300	0.039	0.049
A1	0.000	0.100	0.000	0.004
A2	1.000	1.200	0.039	0.047
b	0.300	0.500	0.012	0.020
c	0.047	0.207	0.002	0.008
D	2.800	3.000	0.110	0.118
E	1.500	1.700	0.059	0.067
E1	2.600	3.000	0.102	0.118
e	0.950 TYP.		0.037 TYP.	
e1	1.900 TYP.		0.075 TYP.	
L1	0.250	0.550	0.010	0.022
θ	0°	8°	0°	8°