SemTron Microtech Corporation

SMC3251S

Single P-Channel MOSFET

■DESCRIPTION

SMC3251S is the P-Channel trench technology devices are well suited for high efficiency fast switching applications, low in-line power loss needed in small outline surface mount package.

■FEATURES

V_{DS}=-30V, I_D=-4A

$R_{DS(ON)}$=56mΩ(Typ.)@V_{GS}=-10V
$R_{DS(ON)}$=78mΩ(Typ.)@V_{GS}=-4.5V

■PART NUMBER INFORMATION

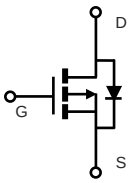
SMC	3251	S	-	TR	G
a	b	c		d	e

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*

■APPLICATIONS

◆Portable Equipment
◆Power Management
◆Load Switch

SOT-23L



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

Symbol	Parameter		Rating	Units
V_{DSS}	Drain-Source Voltage		-30	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current [A]	T_A=25°C	-4	A
		T_A=70°C	-3.2	A
I_{DM}	Pulsed Drain Current [B]		-16	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	

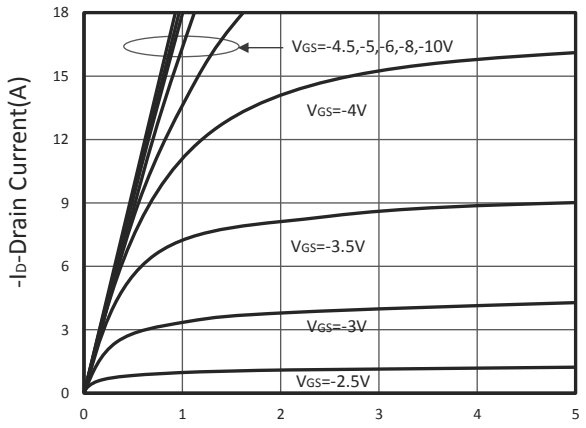
■ELECTRICAL CHARACTERISTICS(T_A=25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-30			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-1.2	-1.5	-2	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±20V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V, T_J=25°C			-1	μA
		V_{DS}=-24V, V_{GS}=0V, T_J=75°C			-10	
$R_{DS(ON)}$	Drain-source On-Resistance [D]	V_{GS}=-10V, I_D=-4A V_{GS}=-4.5V, I_D=-3A		56 78	65 90	mΩ
G_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-4A		7.1		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [D]	I_S=-1A,V_{GS}=0V		-0.7	-1	V
I_S	Diode Continuous Forward Current				-4	A
Dynamic and Switching Parameters [E]						
Q_g	Total Gate Charge	V_{DS}=-15V, V_{GS}=-10V I_D =-3.7A		9.8	13.8	nC
Q_g	Total Gate Charge (4.5V)			4.8	5.8	
Q_{gs}	Gate-Source Charge			1.7	2	
Q_{gd}	Gate-Drain Charge			2	2.8	
C_{iss}	Input Capacitance	V_{DS} =-15V,V_{GS} =0V, f =1MHz		510		pF
C_{oss}	Output Capacitance			48		
C_{rss}	Reverse Transfer Capacitance			31		
$t_{d(on)}$	Turn-On Time	V_{DD}=-15V, V_{GEN}=-10V R_G=3.3Ω, I_D=-1A		3.2	6	nS
t_r				9.5	18	
$t_{d(off)}$	Turn-Off Time			16	30	
t_f				5.7	11	

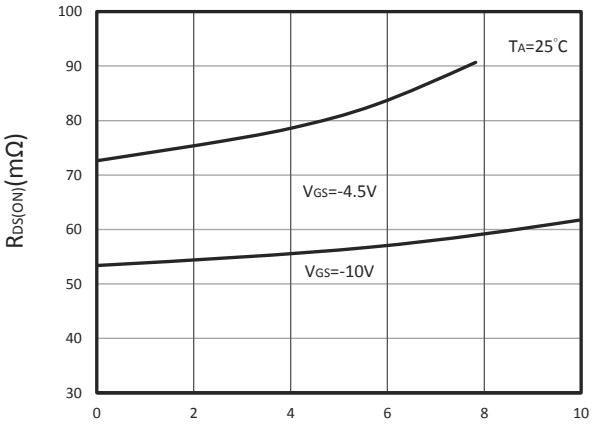
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

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.

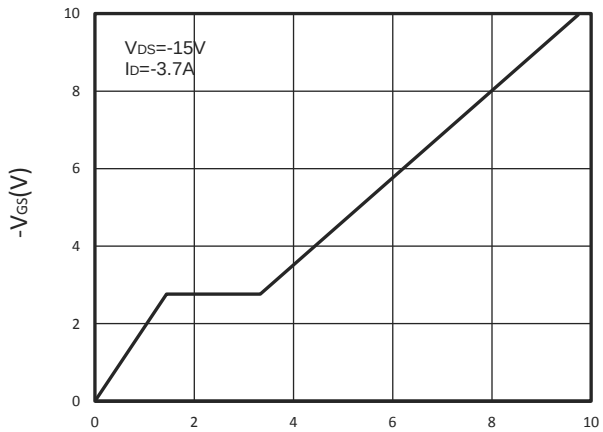
TYPICAL CHARACTERISTICS



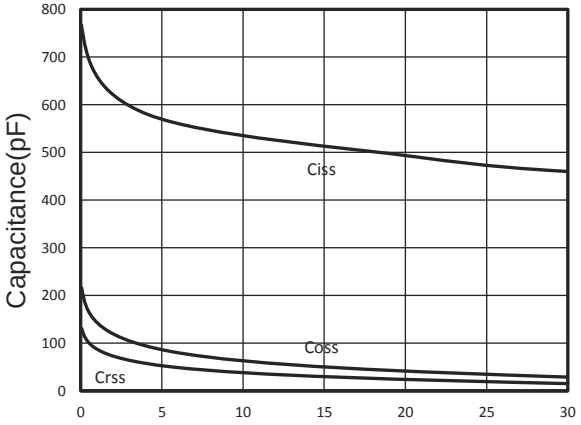
Output Characteristics



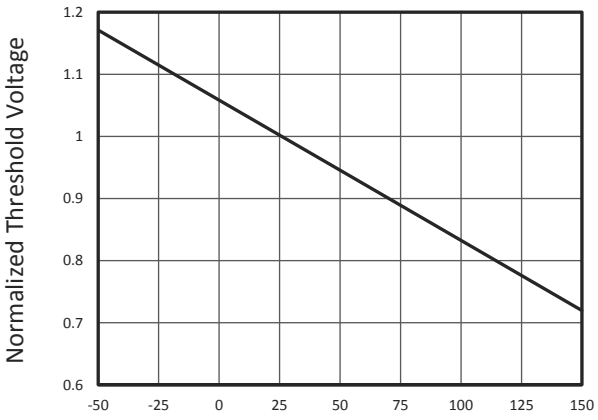
Drain-Source On Resistance



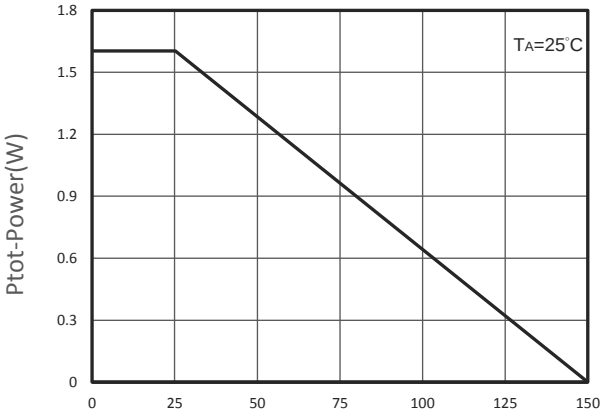
Gate Charge



Capacitance

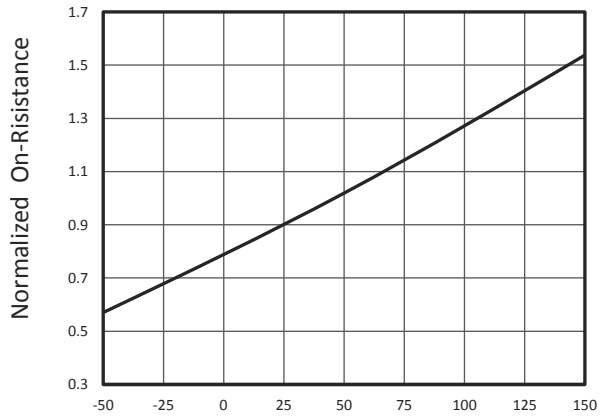


Gate Threshold Voltage



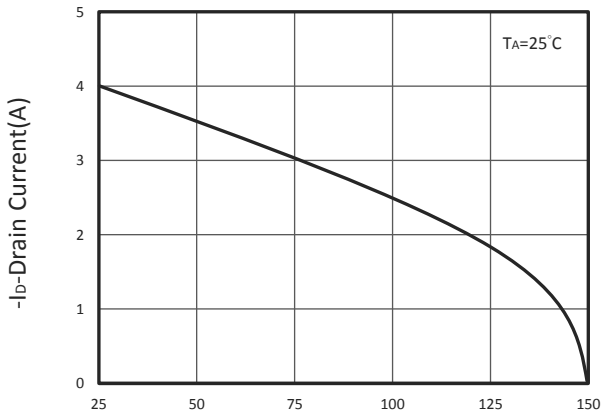
Power Dissipation

TYPICAL CHARACTERISTICS



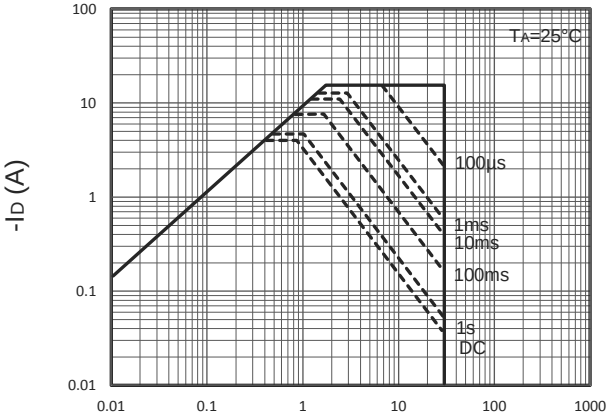
T_J-Junction Temperature(°C)

Drain-Source On Resistance



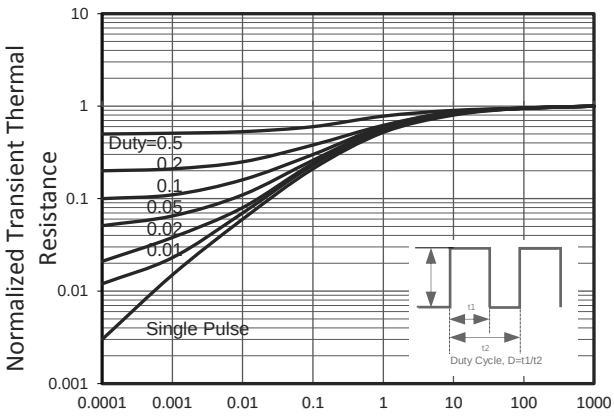
T_J-Junction Temperature(°C)

Drain Current vs T_J



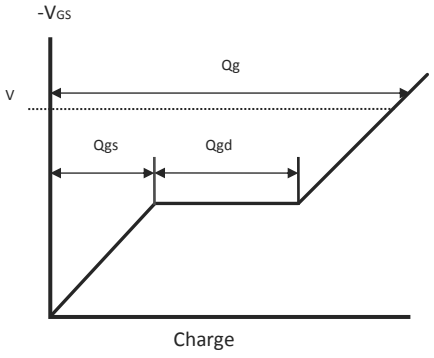
- V_{DS} Voltage (V)

Maximum Safe Operation Area

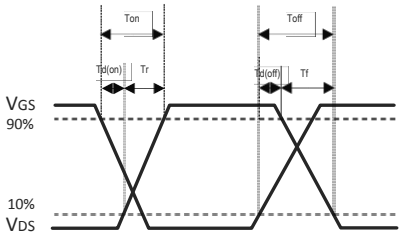


Square Wave Pulse Duration(Sec)

Thermal Transient Impedance

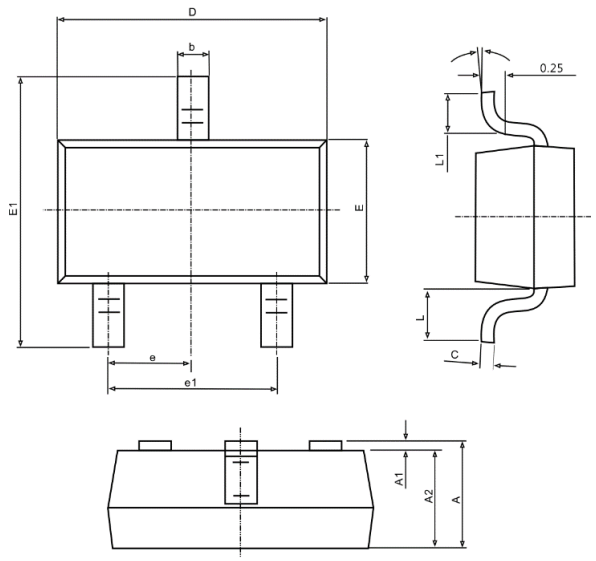


Gate Chrge Waveform

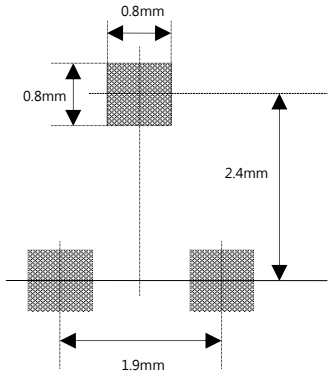


Switching Time Waveform

■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°