SemTron Microtech Corporation

SMC2351SQ

Single P-Channel MOSFET

■DESCRIPTION

SMC2351SQ 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.

■PART NUMBER INFORMATION

SMC 2351 SQ - TR G
a b c d e

a : Company name.
b : Product Serial number.
c : Package code SQ: SOT-23-6L
d : Handling code TR: Tape&Reel
e : Green produce code G: *RoHS Compliant*

■FEATURES

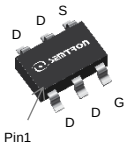
V_{DS}=-20V, I_D=-5.4A

$R_{DS(ON)}$=33mΩ(Typ.)@V_{GS}=-10V
$R_{DS(ON)}$=40mΩ(Typ.)@V_{GS}=-4.5V
$R_{DS(ON)}$=54mΩ(Typ.)@V_{GS}=-2.5V
$R_{DS(ON)}$=77mΩ(Typ.)@V_{GS}=-1.8V

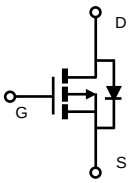
◆Fast switch
◆1.8V Low gate drive applications
◆High power and current handlingcapability

■APPLICATIONS

◆Hend-Held Instruments
◆Load Switch



SOT-23-6L



■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 [A] (V_{GS}=-4.5V)	T_A=25°C	-5.4	A
		T_A=70°C	-4.3	A
I_{DM}	Pulsed Drain Current [B]		21.6	A
I_{AS}	Avalanche Current [B]		10	A
E_{AS}	Single Pulse Avalanche energy L=0.1mH [B]		5	mJ
P_D	Power Dissipation [A]	T_A=25°C	2.1	W
		T_A=70°C	1.3	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		60	°C/W
	Thermal Resistance Junction to Ambient [AC]	Steady-State		100	

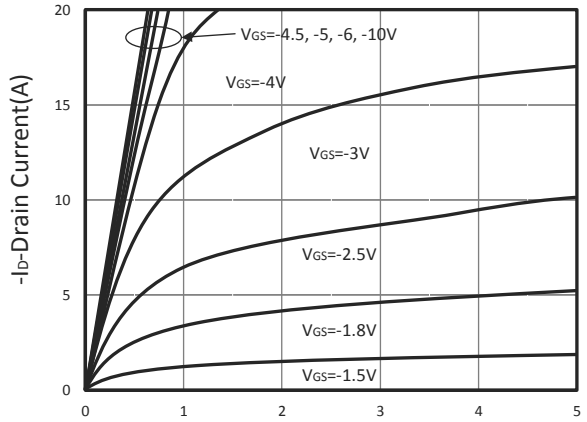
ELECTRICAL CHARACTERISTICS (T_A=25°C Unless otherwise noted)

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	-0.5	-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=-5.4A V_{GS}=-2.5V, I_D=-3A V_{GS}=-1.8V, I_D=-2A		33 40 54 77	40 48 65 95	mΩ
G_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-3A		8		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [D]	I_S=-1A,V_{GS}=0V			-1	V
I_S	Diode Continuous Forward Current				-1.8	A
Dynamic and Switching Parameters [E]						
Q_g	Total Gate Charge	V_{DS}=-10V, V_{GS}=-4.5V I_D=-4.2A		7.2	10.1	nC
Q_{gs}	Gate-Source Charge			1.2	1.7	
Q_{gd}	Gate-Drain Charge			3	4.2	
C_{iss}	Input Capacitance	V_{DS}=-10V, V_{GS}=0V, f=1MHz		650		pF
C_{oss}	Output Capacitance			95		
C_{rss}	Reverse Transfer Capacitance			62		
$t_{d(on)}$	Turn-On Time	V_{DD}=-10V, V_{GEN}=-4.5V R_G=6Ω, I_D=-1A		8.5	16	nS
t_r				13.3	25	
$t_{d(off)}$	Turn-Off Time			32	61	
t_f				25	48	

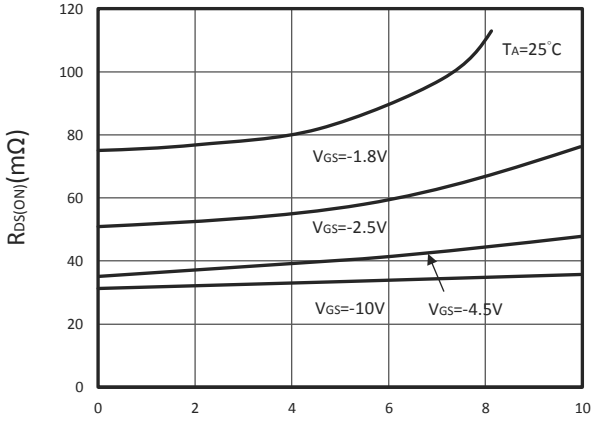
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

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.

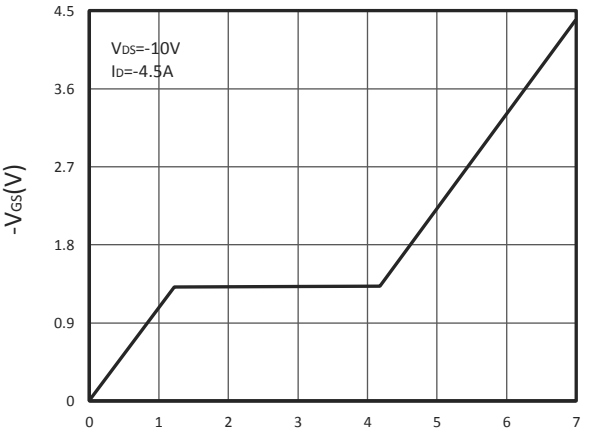
TYPICAL CHARACTERISTICS



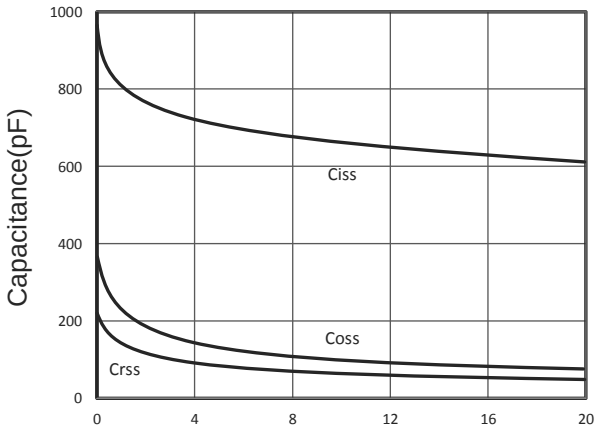
Output Characteristics



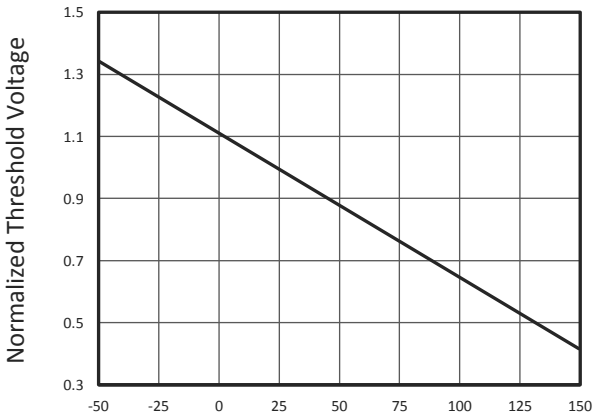
Drain-Source On Resistance



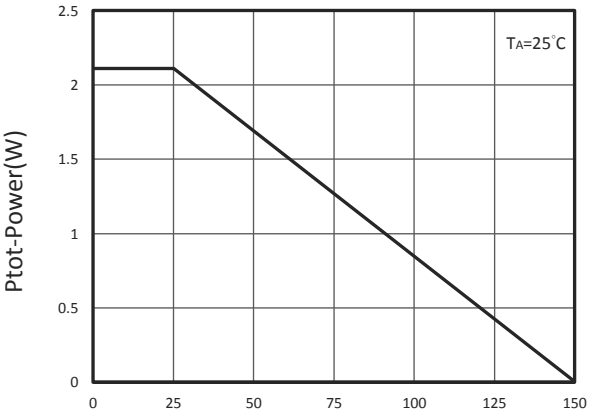
Gate Charge



Capacitance

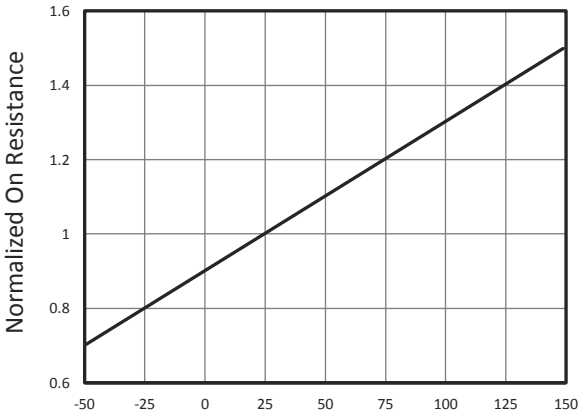


Gate Threshold Voltage



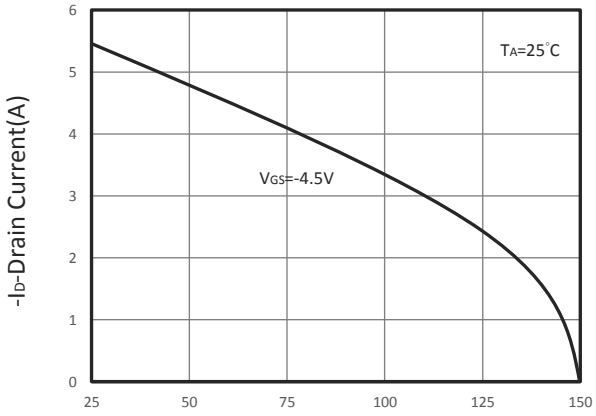
Power Dissipation

TYPICAL CHARACTERISTICS



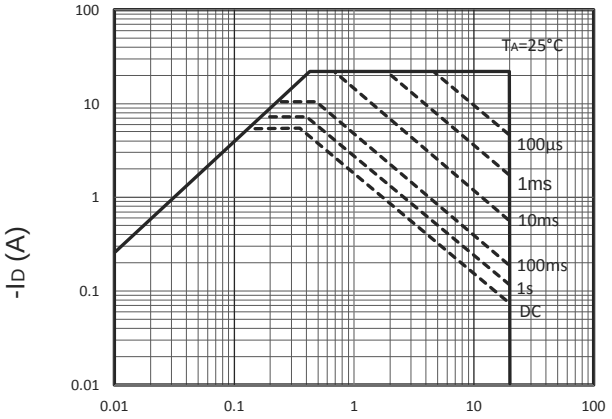
T_J-Junction Temperature(°C)

$R_{DS(ON)}$ vs Junction Temperature



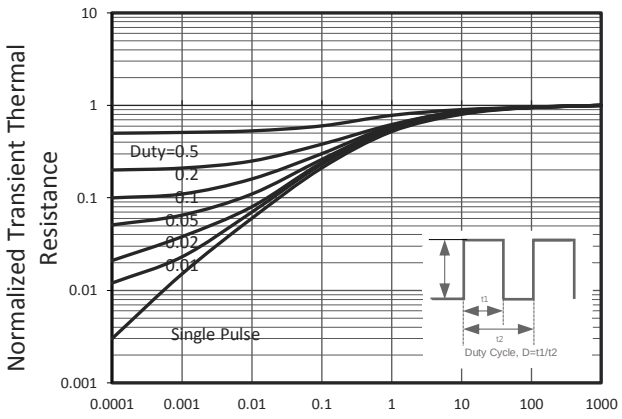
T_J-Junction Temperature(°C)

Drain Current vs T_J



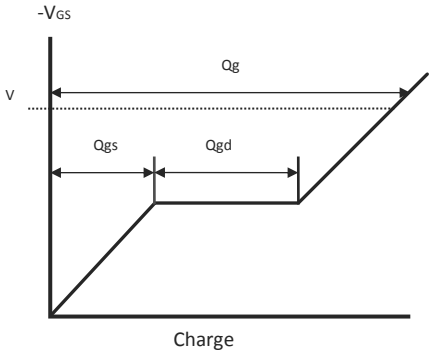
-V_{DS} Voltage (V)

Maximum Safe Operation Area

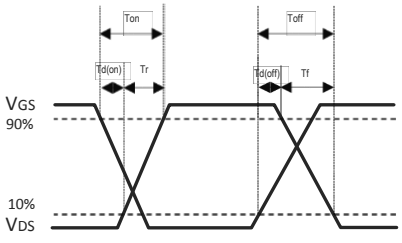


Square Wave Pulse Duration(Sec)

Thermal Transient Impedance

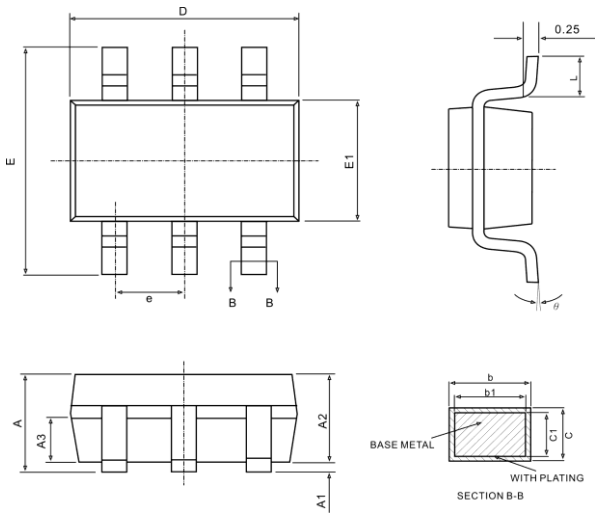


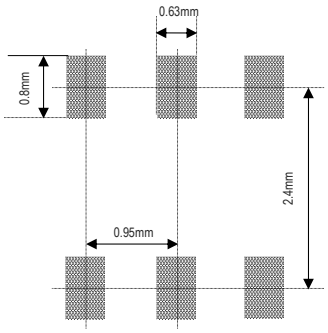
Gate Chrge Waveform



Switching Time Waveform

■SOT-23-6L PACKAGE DIMENSIONS





Recommended Land Pattern

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	-	1.300	-	0.051
A1	0.040	0.100	0.002	0.004
A2	1.000	1.200	0.039	0.047
A3	0.550	0.750	0.022	0.030
b	0.340	0.430	0.013	0.017
b1	0.330	0.380	0.013	0.015
c	0.150	0.210	0.006	0.008
c1	0.140	0.160	0.006	0.006
D	2.720	3.120	0.107	0.123
E	2.600	3.000	0.102	0.118
E1	1.400	1.800	0.055	0.071
e	0.950 BSC		0.066 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°