

Single P-Channel MOSFET

DESCRIPTION

SMC3401GS 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.

PART NUMBER INFORMATION

SMC 3401G 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

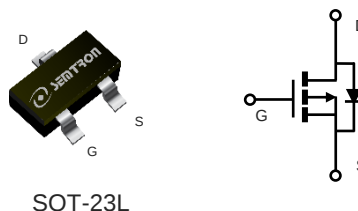
$V_{DS} = -30V$, $I_D = -4.1A$

$R_{DS(ON)} = 50m\Omega (Typ.) @ V_{GS} = -10V$
 $R_{DS(ON)} = 60m\Omega (Typ.) @ V_{GS} = -4.5V$
 $R_{DS(ON)} = 82m\Omega (Typ.) @ V_{GS} = -2.5V$

- ◆ Fast switch
- ◆ 2.5V Low gate drive applications

APPLICATIONS

- ◆ Portable Equipment
- ◆ Power Management
- ◆ Load Switch



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ Unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-Source Voltage	-30	V
V_{GSS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current ^A	$T_A = 25^\circ C$	-4.1
		$T_A = 70^\circ C$	-3.3
I_{DM}	Pulsed Drain Current ^B	-16.4	A
P_D	Power Dissipation ^A	$T_A = 25^\circ C$	1.6
		$T_A = 70^\circ C$	1.0
T_J	Operation Junction Temperature	-55/150	$^\circ C$
T_{STG}	Storage Temperature Range	-55/150	$^\circ C$

THERMAL RESISTANCE

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

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise noted)

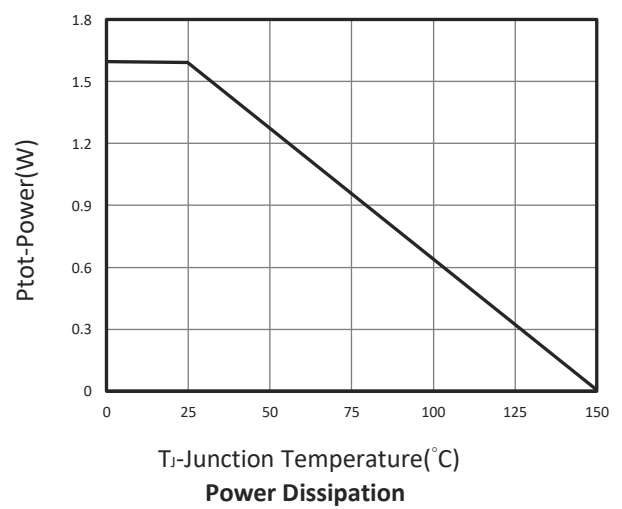
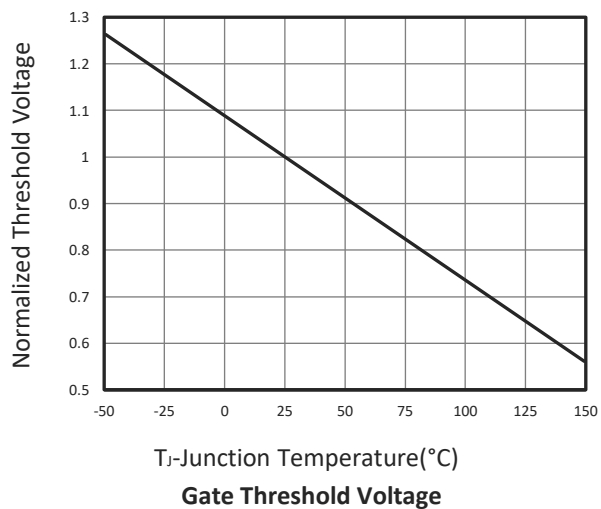
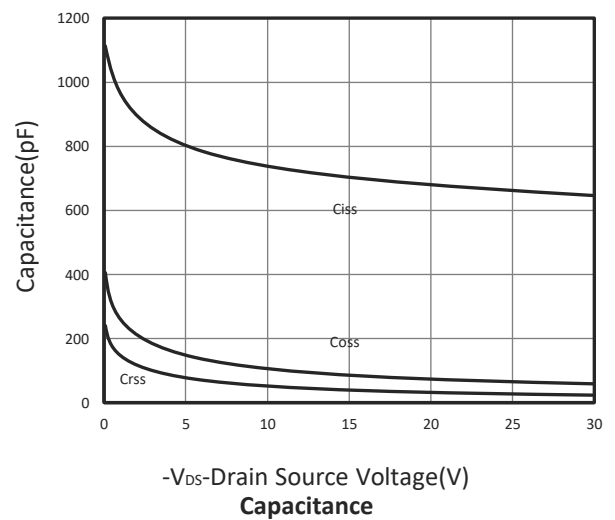
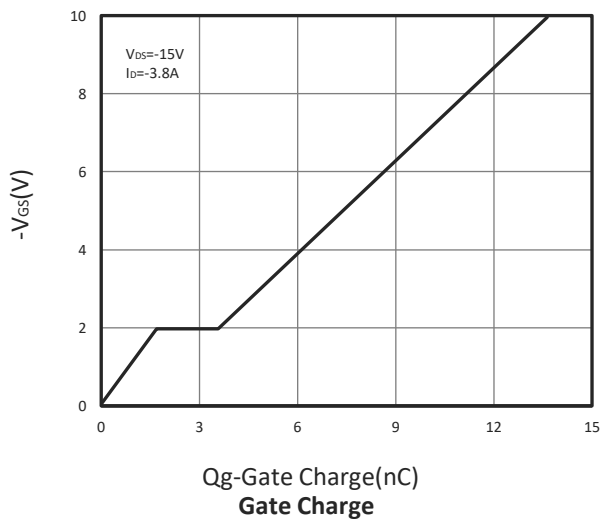
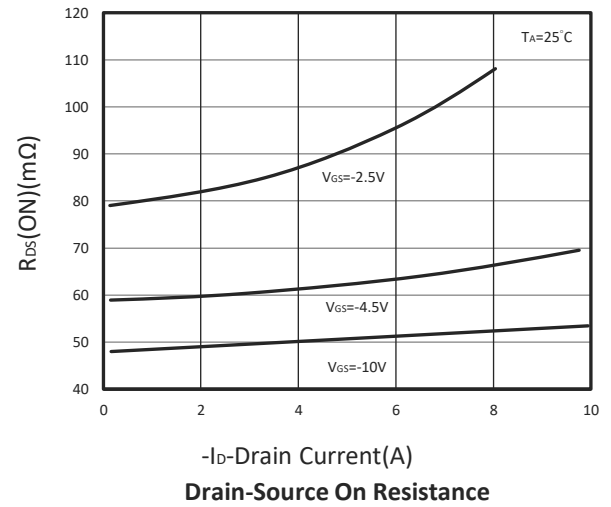
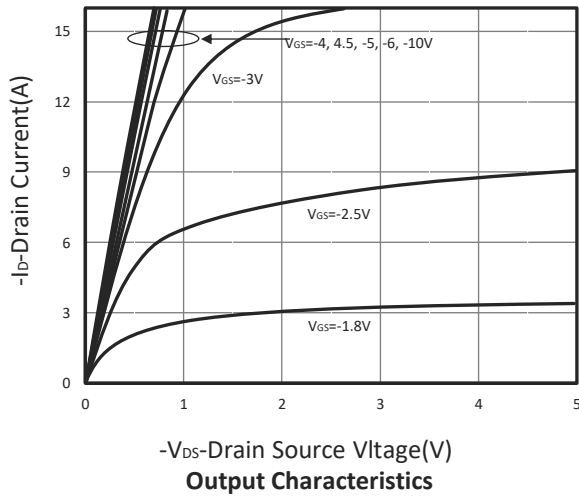
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-0.5	-0.7	-1	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±12V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-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 °	V _{GS} =-10V, I _D =-4.1A V _{GS} =-4.5V, I _D =-3.2A V _{GS} =-2.5V, I _D =-2.5A		50 60 82	58 70 95	mΩ
G _{fs}	Forward Transconductance	V _{DS} =-5V,I _D =-3.8A		14		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage °	I _S =-1A,V _{GS} =0V			-1	V
I _S	Diode Continuous Forward Current				-2.1.	A
t _{rr}	Reverse Recovery Time	I _S =-3.8A, dI/dt=100A/μs		13		ns
Q _{rr}	Reverse Recovery Charge			8		nC
Dynamic and Switching Parameters ^E						
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-10V I _D =-3.8A		12.5	17.5	nC
Q _g	Total Gate Charge (4.5V)			6.1	7.3	
Q _{gs}	Gate-Source Charge			1.55	1.9	
Q _{gd}	Gate-Drain Charge			2	2.8	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz		720		pF
C _{oss}	Output Capacitance			71		
C _{rss}	Reverse Transfer Capacitance			42		
t _{d(on)}	Turn-On Time	V _{DD} =-15V, V _{GEN} =-10V R _G =6Ω, I _D =-1A		6	11	nS
t _r				9.5	18	
t _{d(off)}	Turn-Off Time			22	42	
t _f				10.2	19	

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

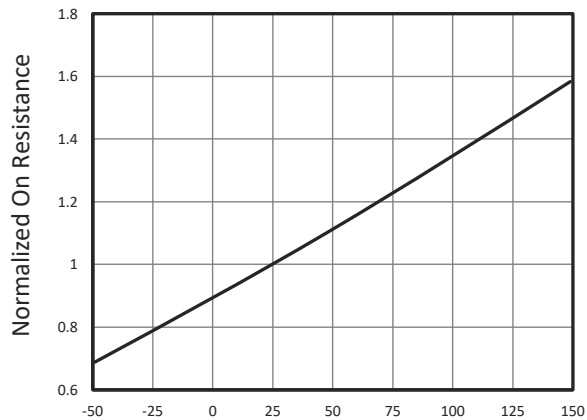
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}=150^\circ\text{C}$.
- C. Using $\leq 10s$ junction-to-ambient thermal resistance is base on $T_{J(MAX)}=150^\circ\text{C}$.
- D. Pulse test width $\leq 300\mu s$ and duty cycle $\leq 2\%$.
- E. Guaranteed by design, not subject to production testing.

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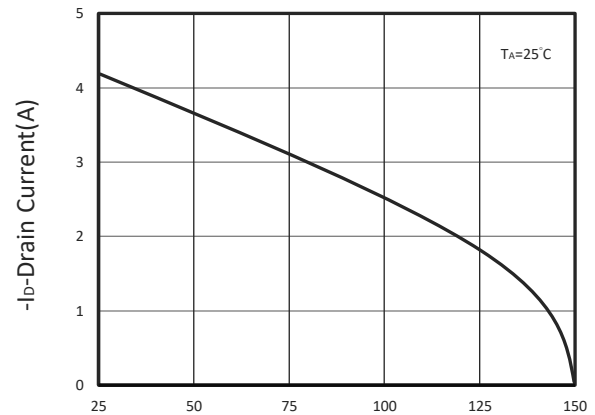
TYPICAL CHARACTERIS



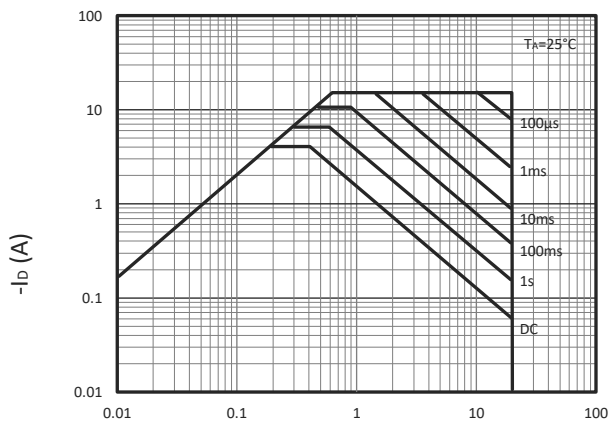
TYPICAL CHARACTERISTICS



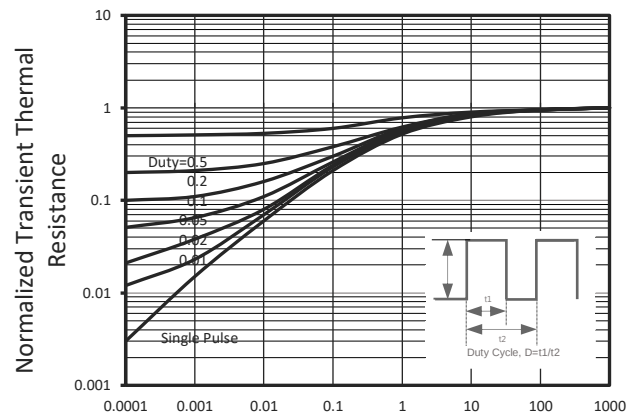
$R_{DS(ON)}$ vs Junction Temperature



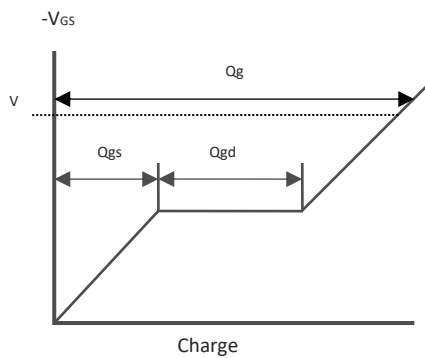
Drain Current vs T_J



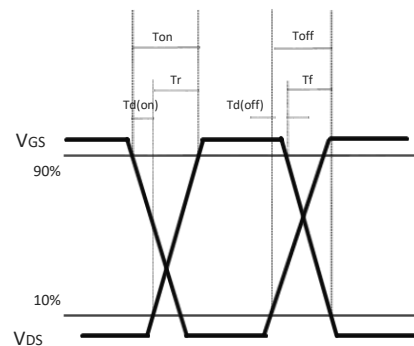
Maximum Safe Operation Area



Thermal Transient Impedance

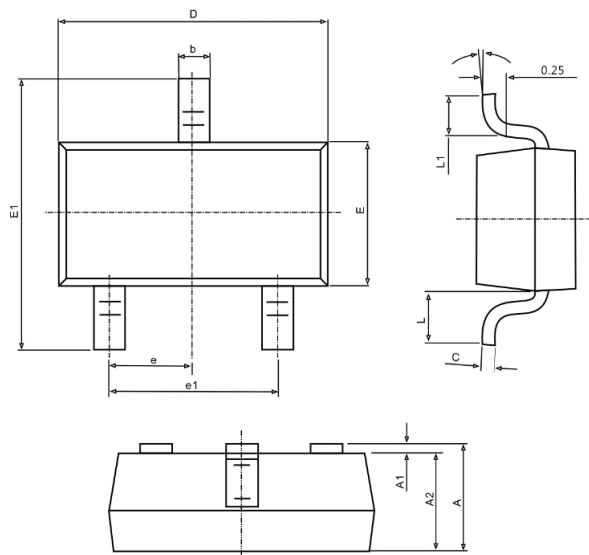


Gate Chrg Waveform

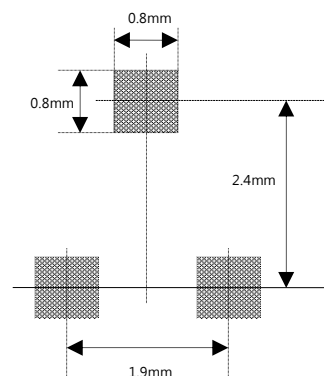


Switching Time Waveform

■ 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°