

## 20V N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SMC3414 is the N-Channel logic enhancement mode power field effect transistor is produced using high cell density. advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation gate as 1.8V.

This device is suitable for use as a load switch or other general applications.

*SMC3414S-TRG ROHS Compliant This is Halogen Free*

### FEATURE

- ◆ 20V/5.0A,  $R_{DS(ON)} = 30m\Omega (typ.) @ V_{GS} = 4.5V$
- ◆ 20V/4.5A,  $R_{DS(ON)} = 42m\Omega (typ.) @ V_{GS} = 2.5V$
- ◆ 20V/3.8A,  $R_{DS(ON)} = 50m\Omega (typ.) @ V_{GS} = 1.8V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and Maximum DC current capability

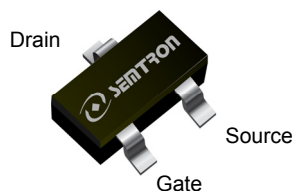
### APPLICATIONS

- ◆ Power Management in Note book
- ◆ Portable Equipment
- ◆ DSC
- ◆ LCD Display inverter
- ◆ Battery Powered System

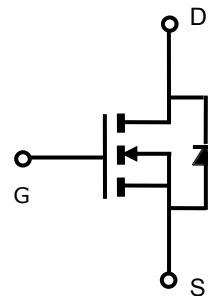


N-Channel Enhancement Mode MOSFET

### PIN CONFIGURATION



SOT-23L  
Top View



### PART NUMBER INFORMATION

<p><b>SMC 3414 S - TR G</b></p> <p>a      b      c      d      e</p>	<p>a : Company name.  b : Product Serial number.  c : Package code  d : Handling code  e : Green produce code</p>
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## ORDERING INFORMATION

Part Number	Package Code	Handling Code	Shipping
SMC3414S-TRG	S : SOT-23L	TR : Tape&Reel	3K/Reel

- ※ Year Code : 0 ~ 9, 2010 : 0
- ※ Week Code : A(1~2) ~ Z(53~54)
- ※ SOT-23L : Only available in tape and reel packaging.

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

Symbol	Parameter	Typical	Unit
$V_{DSS}$	Drain-Source Voltage	20	V
$V_{GSS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Continuous Drain Current ( $T_C=25^\circ\text{C}$ ) <sup>A</sup>	5.0	A
	Continuous Drain Current ( $T_C=70^\circ\text{C}$ ) <sup>A</sup>		
$I_{DM}$	Pulsed Drain Current <sup>B</sup>	20	A
$P_D$	Power Dissipation	$T_A=25^\circ\text{C}$	1.4
		$T_A=70^\circ\text{C}$	0.9
$T_J$	Operation Junction Temperature	-55 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.  
 Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## THERMAL DATA

Symbol	Parameter	Typ	Max	Unit	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient <sup>A</sup>	Steady-State	-	120	$^\circ\text{C}/\text{W}$
$R_{\theta JL}$	Thermal Resistance Junction to Lead <sup>A</sup>	Steady-State	-	80	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5		1.0	V
$I_{GSS}$	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	nA
$I_{DSS}$	Zero Gate Voltage, Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V$ $T_J=25^\circ\text{C}$			1	$\mu A$
		$V_{DS}=20V, V_{GS}=0V$ $T_J=55^\circ\text{C}$			5	
$R_{DS(ON)}$	Drain-source On-Resistance <sup>B</sup>	$V_{GS}=4.5V, I_D=5.0A$		30	38	m $\Omega$
		$V_{GS}=2.5V, I_D=4.5A$		42	48	
		$V_{GS}=1.8V, I_D=3.8A$		50	65	
$G_{fs}$	Forward Transconductance	$V_{DS}=15V, I_D=5.0A$		30		S
<b>Source-Drain Diode</b>						
$V_{SD}$	Diode Forward Voltage	$I_S=1.7A, V_{GS}=0V$		0.9	1.2	V
$I_S$	Continuous Source Current <sup>AD</sup>				6	A
<b>Dynamic Parameters</b>						
$Q_g (4.5V)$	Total Gate Charge	$V_{DS}=10V$ $V_{GS}=4.5V$ $I_D=5.0A$		11	13	nC
$Q_{gs}$	Gate-Source Charge			1.45		
$Q_{gd}$	Gate-Drain Charge			2.3		
$C_{iss}$	Input Capacitance	$V_{DS}=10V$ $V_{GS}=0V$ $f=1\text{MHz}$		578		pF
$C_{oss}$	Output Capacitance			116		
$C_{rss}$	Reverse Transfer Capacitance			96		
$t_{d(on)}$	Turn-On Time	$V_{DD}=10V$ $I_D=1.0A$		14.5	25	nS
$t_r$				42	62	
$t_{d(off)}$	Turn-Off Time	$V_{GEN}=4.5V$ $R_G=6\Omega$		46	67	
$t_f$				34	43	

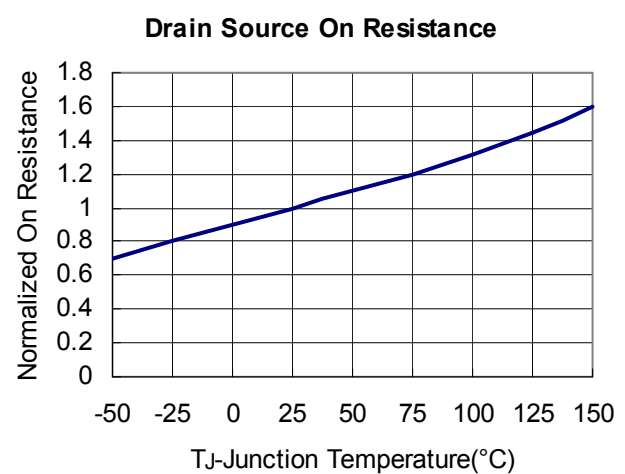
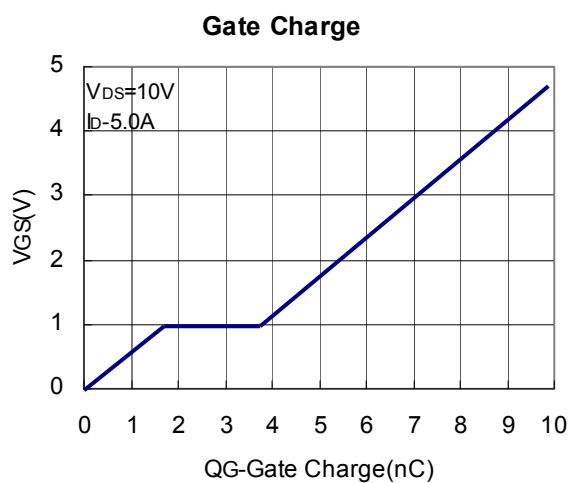
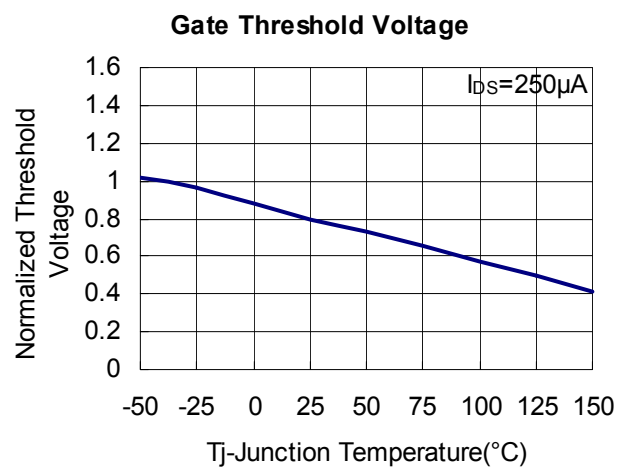
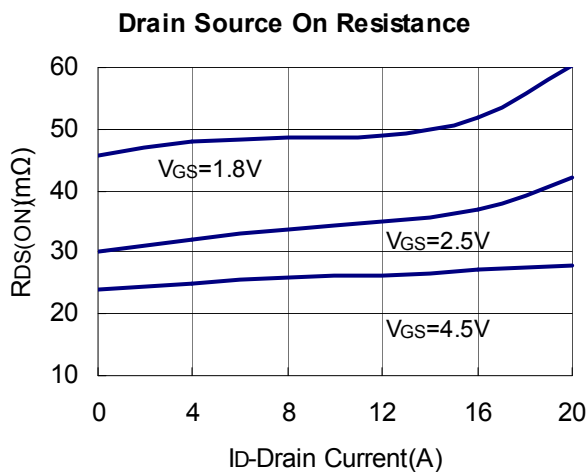
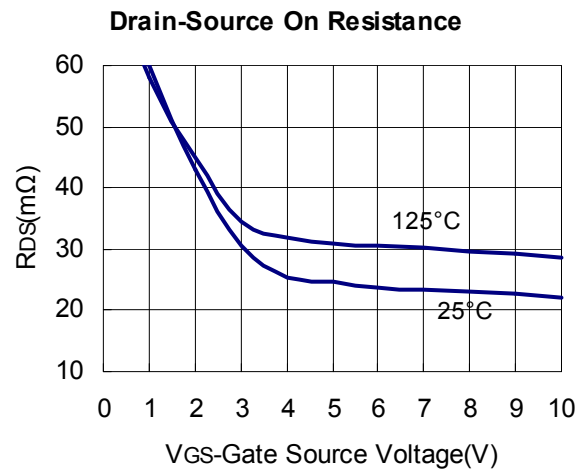
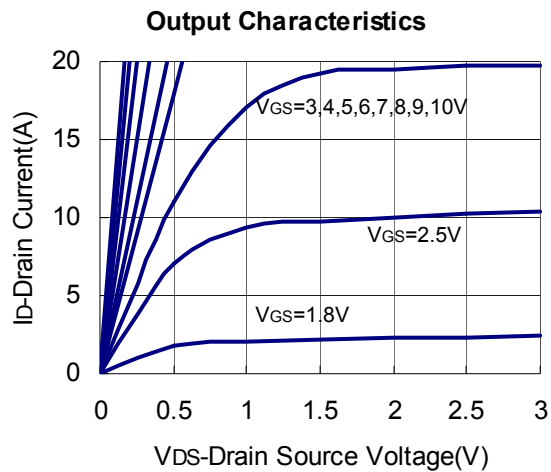
Note:

- The value of  $R_{\theta JA}$  is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ .
- The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
- The EAS data shows Max. rating. The test condition is  $V_{DD}=20V, V_{GS}=10V, L=0.1\text{mH}$ .
- The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

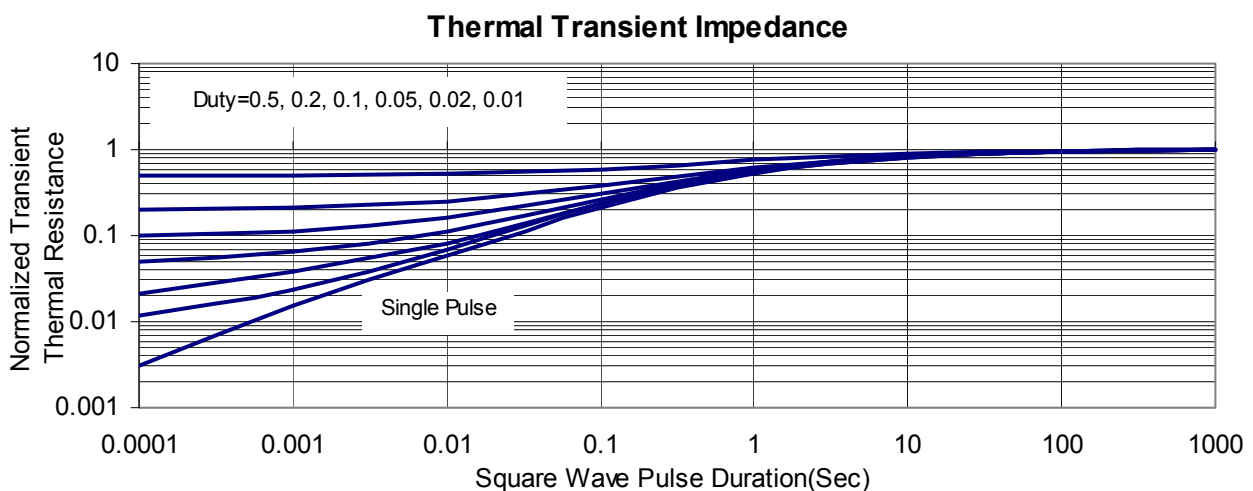
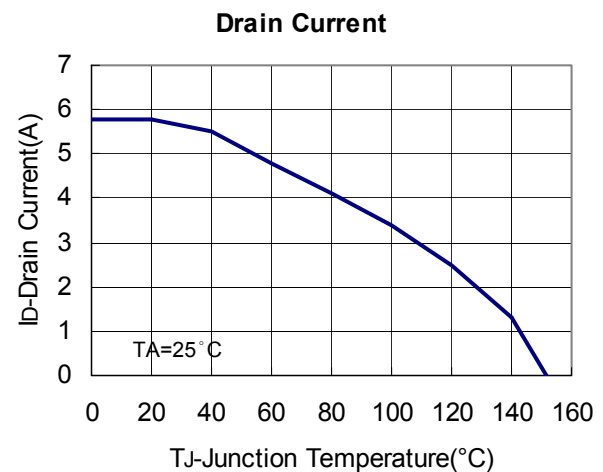
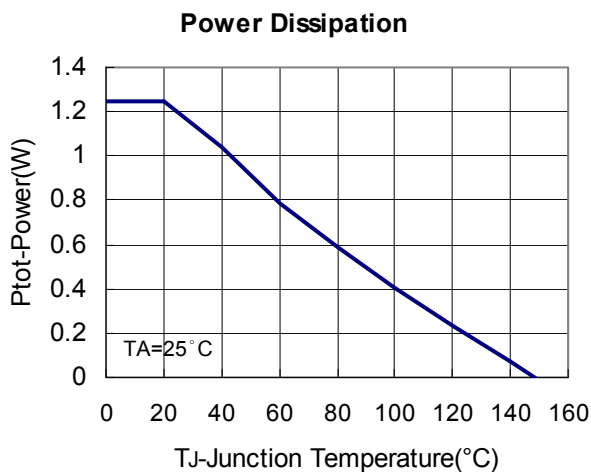
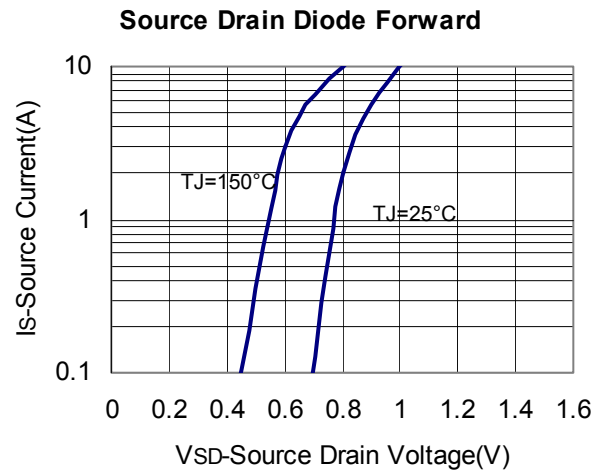
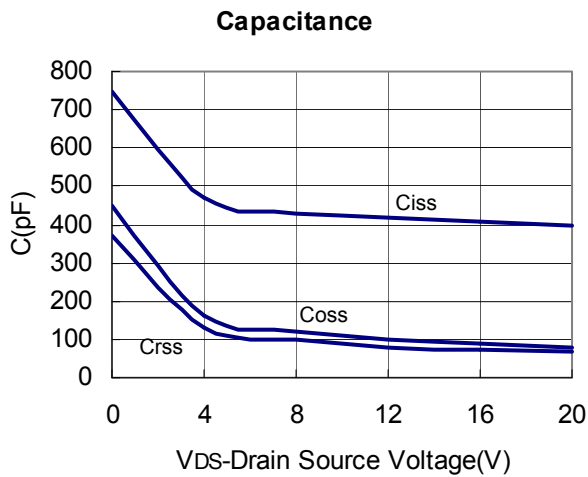
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## TYPICAL CHARACTERISTICS (25°C Unless Note)



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## SOT-23L PACKAGE DIMENSIONS

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	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
$\theta$	0°	8°	0°	8°

SOT-23L PACKAGE OUTLINE DIMENSIONS

