

## Common-Drain Dual N-Channel MOSFET

### DESCRIPTION

SMC4270 is the Dual N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced trench technology to provide excellent  $R_{DS(ON)}$ . These devices are well suited for high efficiency fast switching applications, low in-line power loss are needed in small outline surface mount package.

### PART NUMBER INFORMATION

**SMC 4270 S6 - TR G**  
a      b      c      d      e

- a : Company name.
- b : Product Serial number.
- c : Package code            S6:SOT-23-6L
- d : Handling code            TR:Tape&Reel
- e : Green produce code    G:RoHS Compliant

### FEATURES

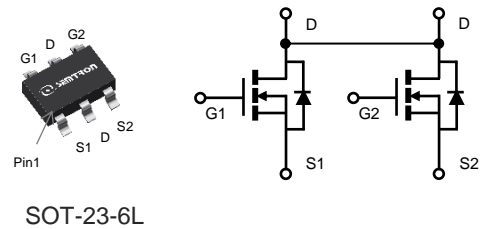
**$V_{DS} = 20V, I_D = 6.7A$**

- $R_{DS(ON)} = 16m\Omega(Typ.)@V_{GS} = 4.5V$
- $R_{DS(ON)} = 17m\Omega(Typ.)@V_{GS} = 4.0V$
- $R_{DS(ON)} = 18m\Omega(Typ.)@V_{GS} = 3.2V$
- $R_{DS(ON)} = 20m\Omega(Typ.)@V_{GS} = 2.5V$
- $R_{DS(ON)} = 24m\Omega(Typ.)@V_{GS} = 1.8V$

- ◆ Fast switch
- ◆ High power and current handling capability
- ◆ Exceptional on-resistance

### APPLICATIONS

- ◆ Power Management in Notebook Computer
- ◆ Portable Equipment and Battery Powered.



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

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-Source Voltage	20	V
$V_{GSS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Continuous Drain Current ( $V_{GS}=4.5V$ )	$T_A=25^\circ C$	6.7
		$T_A=70^\circ C$	5.4
$I_{DM}$	Pulsed Drain Current <sup>A</sup>	26.8	A
$P_D$	Power Dissipation <sup>B</sup>	$T_A=25^\circ C$	1.3
		$T_A=70^\circ C$	0.8
$T_J$	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 <sup>B</sup>	$t \leq 10s$	90	$^\circ C/W$
	Thermal Resistance Junction to Ambient <sup>BC</sup>	Steady-State	130	

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

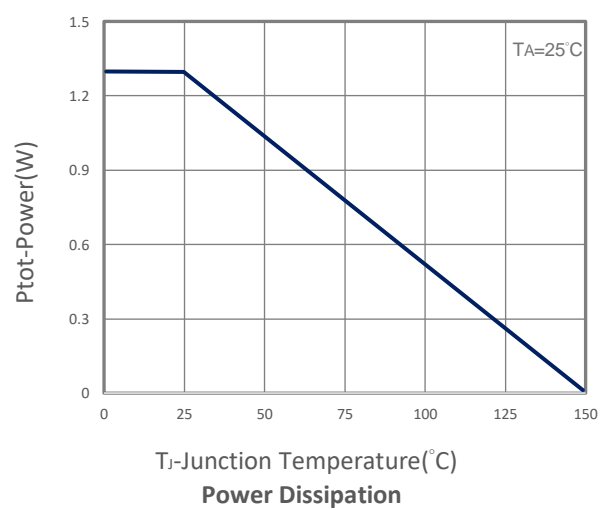
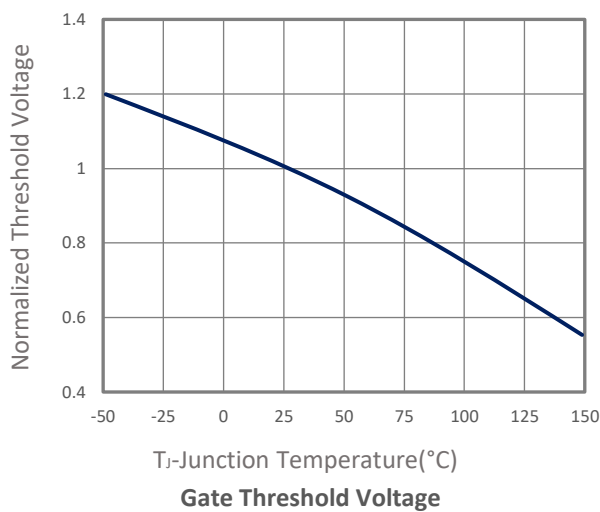
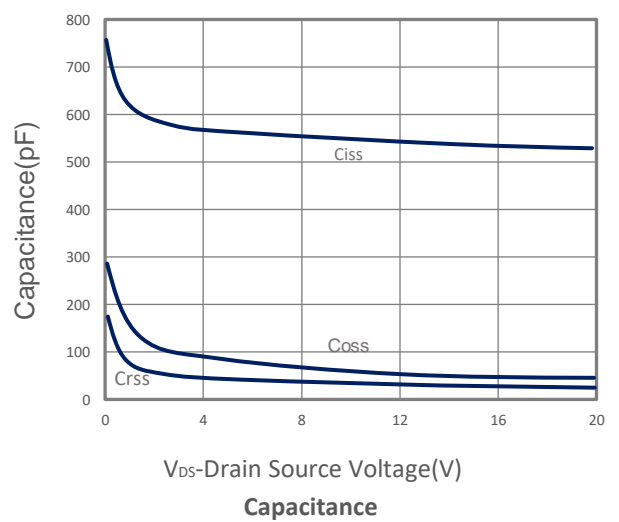
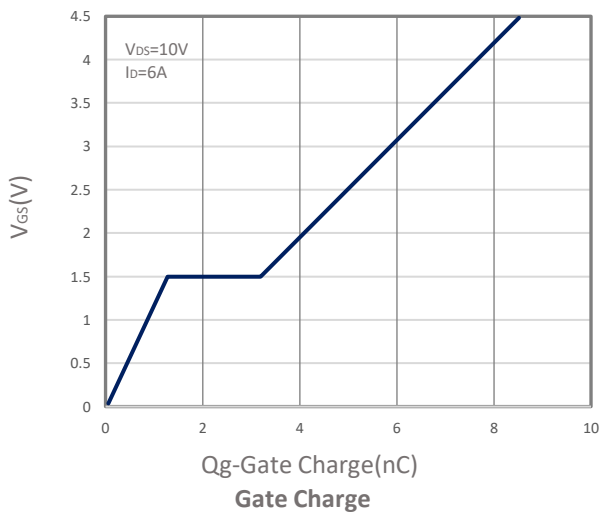
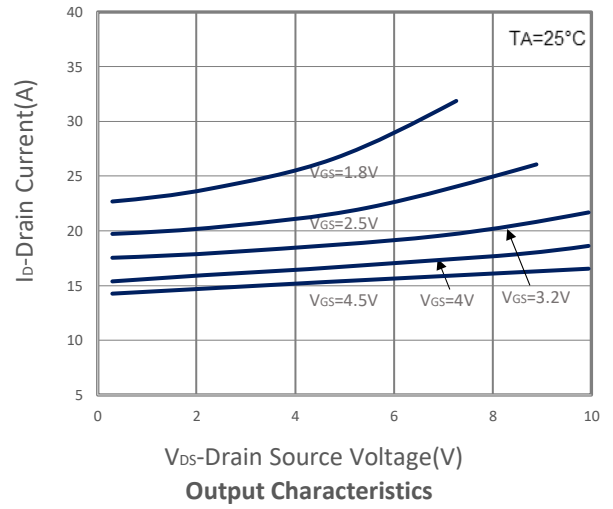
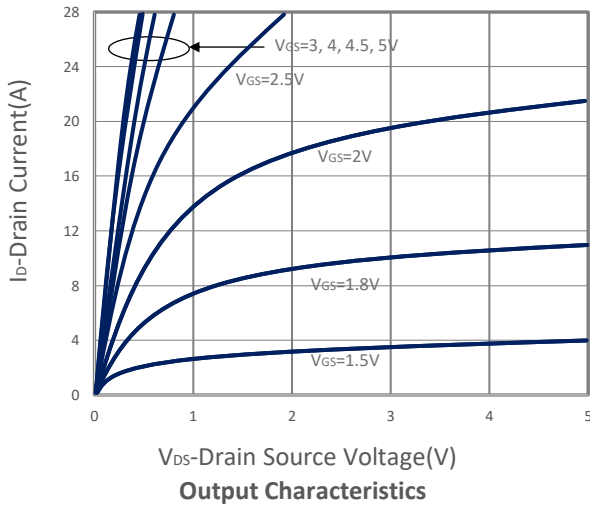
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250 $\mu$ A	20			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 $\mu$ A	0.4	0.6	1.0	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = $\pm$ 12V			$\pm$ 100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, T <sub>J</sub> =25 $^\circ$ C			1	$\mu$ A
		V <sub>DS</sub> =16V, V <sub>GS</sub> =0V, T <sub>J</sub> =75 $^\circ$ C			10	
R <sub>DS(ON)</sub>	Drain-source On-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A		16	19	m $\Omega$
		V <sub>GS</sub> =4.0V, I <sub>D</sub> =5A		17	20	
		V <sub>GS</sub> =3.2V, I <sub>D</sub> =4A		18	21	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =3A		20	24	
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =2A		24	29	
<b>Source-Drain Diode</b>						
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.7	1	V
I <sub>S</sub>	Continuous Source Current				3.5	A
<b>Dynamic Parameters</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A		8.5	11.9	nC
Q <sub>gs</sub>	Gate-Source Charge			1.4	2	
Q <sub>gd</sub>	Gate-Drain Charge			2.2	3.1	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz		550		pF
C <sub>oss</sub>	Output Capacitance			65		
C <sub>rss</sub>	Reverse Transfer Capacitance			41		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =10V, V <sub>GEN</sub> =4.5V R <sub>G</sub> =3 $\Omega$ , I <sub>D</sub> =1A		4.8	9.1	nS
t <sub>r</sub>				13.5	25.7	
t <sub>d(off)</sub>	Turn-Off Time			28	53.2	
t <sub>f</sub>				8.8	16.7	

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

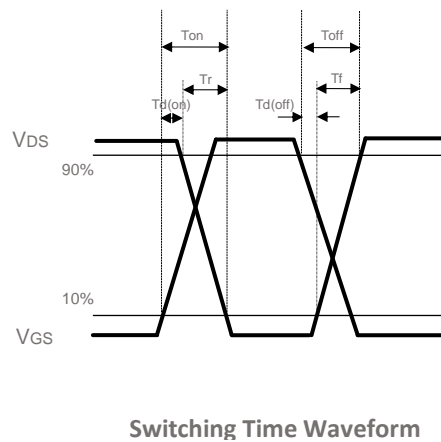
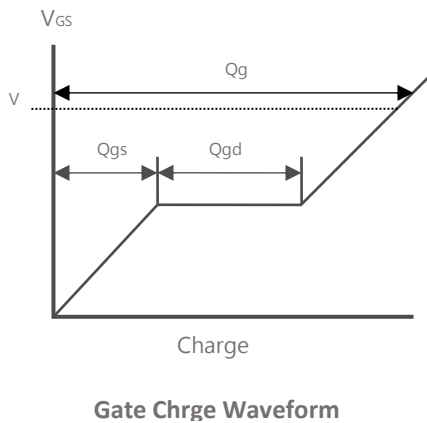
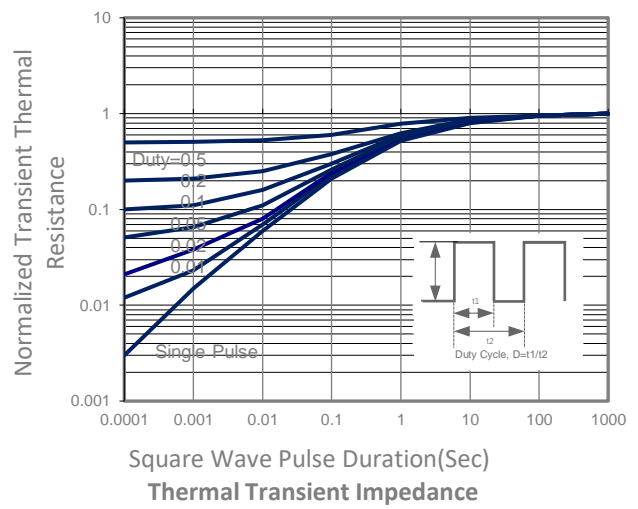
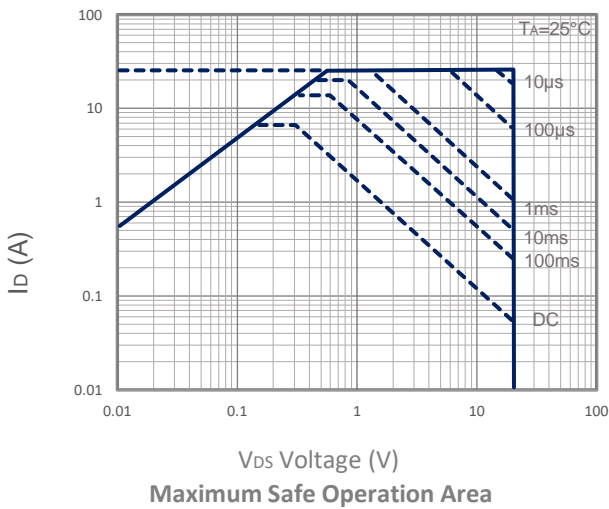
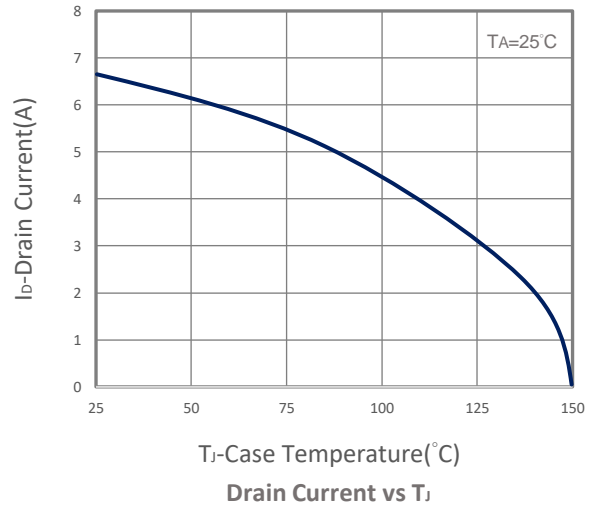
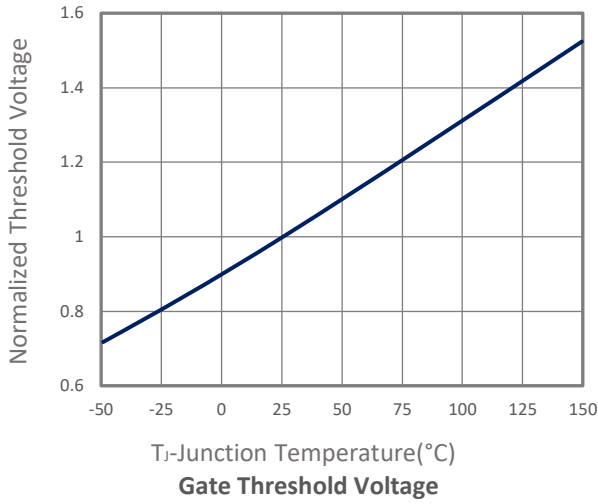
- Pulsed width limited by maximum junction temperature, T<sub>J(MAX)</sub>=150 $^\circ$ C.
- The value of R <sub>$\theta$ JA</sub> is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature T<sub>J(MAX)</sub>=150 $^\circ$ C (initial temperature T<sub>A</sub>=25 $^\circ$ C).
- T<sub>J(MAX)</sub>=150 $^\circ$ C, using junction-to-case thermal resistance (R <sub>$\theta$ JC</sub>) is more useful in additional heat sinking is used.

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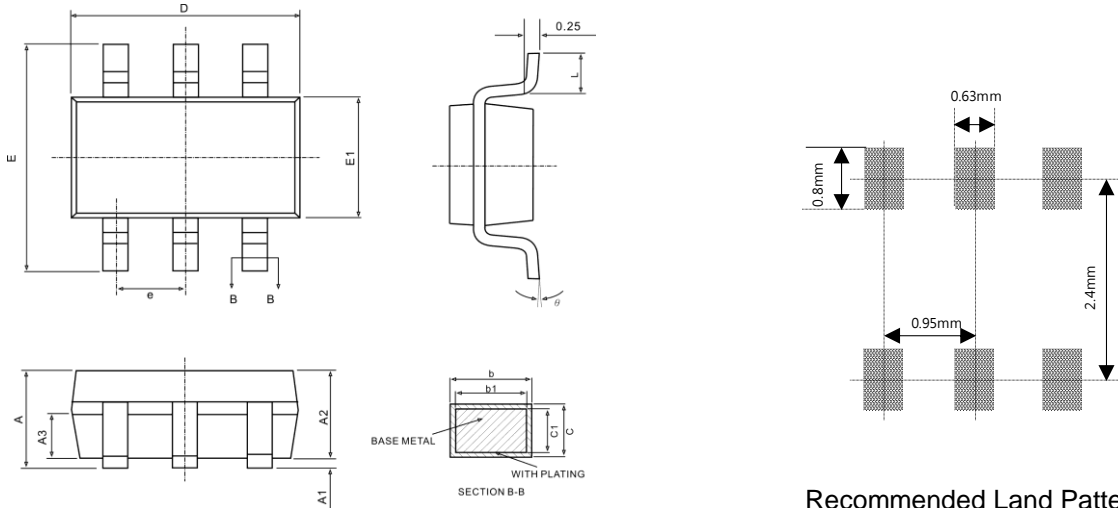
## TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS



## ■ 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°