

## Single N-Channel MOSFET

### DESCRIPTION

SMC3400 is the N-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, low in-line power loss are needed in small outline surface mount package.

### PART NUMBER INFORMATION

**SMC 3400 SN - TR G**  
 a      b      c      d      e

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

### FEATURES

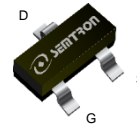
**$V_{DS} = 30V, I_D = 5.5A$**

$R_{DS(ON)}=23m\Omega(Typ.)@V_{GS}=10V$   
 $R_{DS(ON)}=25m\Omega(Typ.)@V_{GS}=4.5V$   
 $R_{DS(ON)}=30m\Omega(Typ.)@V_{GS}=2.5V$

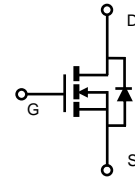
- ◆ Fast switch
- ◆ Improved dv/dt capability
- ◆ High power and current handling capability

### APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Load Switch



SOT-23



### 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	$\pm 12$	V
$I_D$	Continuous Drain Current	$T_A=25^\circ C$	5.5
		$T_A=70^\circ C$	4.4
$I_{DM}$	Pulsed Drain Current <sup>A</sup>	22	A
$P_D$	Power Dissipation <sup>C</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>	$t \leq 10s$	95	$^\circ C/W$
	Thermal Resistance Junction to Ambient <sup>BD</sup>	Steady-State	130	

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

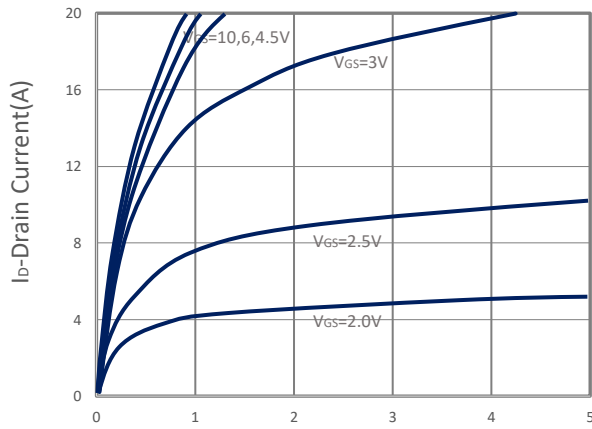
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250 $\mu$ A	30			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 $\mu$ A	0.4	0.7	1	V
I <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> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25 $^\circ$ C			1	$\mu$ A
		V <sub>DS</sub> =24V, 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> =10V, I <sub>D</sub> =5.5A		23	27	m $\Omega$
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4.2A		25	30	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =3.2A		30	38	
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =5A		28		S
<b>Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.75	1	V
I <sub>S</sub>	Continuous Source Current				2.8	A
<b>Dynamic and Switching Parameters</b>						
Q <sub>g</sub> (10V)	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =5A		15.4	21.5	nC
Q <sub>g</sub> (4.5V)	Total Gate Charge			7.5	10.5	
Q <sub>gs</sub>	Gate-Source Charge			2	2.8	
Q <sub>gd</sub>	Gate-Drain Charge			2.3	3.2	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz		670		pF
C <sub>oss</sub>	Output Capacitance			54		
C <sub>rss</sub>	Reverse Transfer Capacitance			42		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =15V, V <sub>GEN</sub> =10V, R <sub>G</sub> =3 $\Omega$ , I <sub>D</sub> =1A		4.7	9	nS
t <sub>r</sub>				14	27	
t <sub>d(off)</sub>	Turn-Off Time			30	57	
t <sub>f</sub>				8.8	17	

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

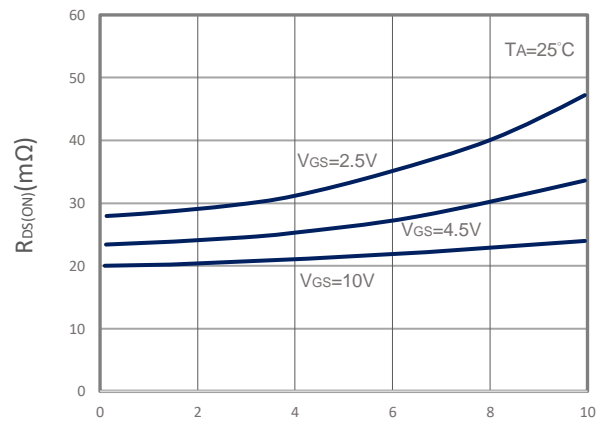
- Pulsed width limited by maximum junction temperature T<sub>J(MAX)</sub>=150 $^\circ$ C, initial temperature T<sub>J</sub>=25 $^\circ$ C.
- Measure the value in a still air environment at T<sub>A</sub>=25 $^\circ$ C using an installation mounted on a 1 in2 FR-4 board.
- Current Rating based  $\leq$ 10 sec thermal resistance rating.
- The R $\theta$ <sub>JA</sub> is the sum of the thermal resistance.

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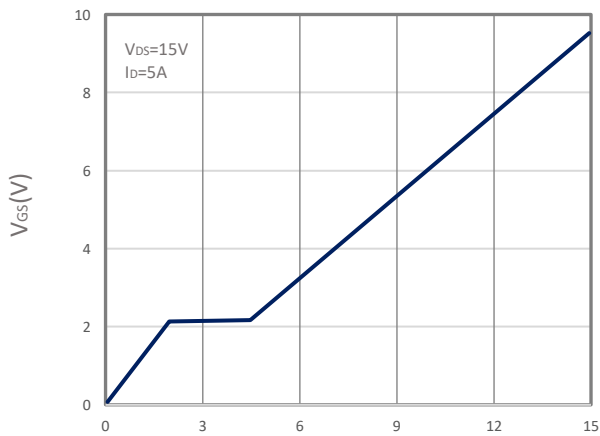
## TYPICAL CHARACTERISTICS



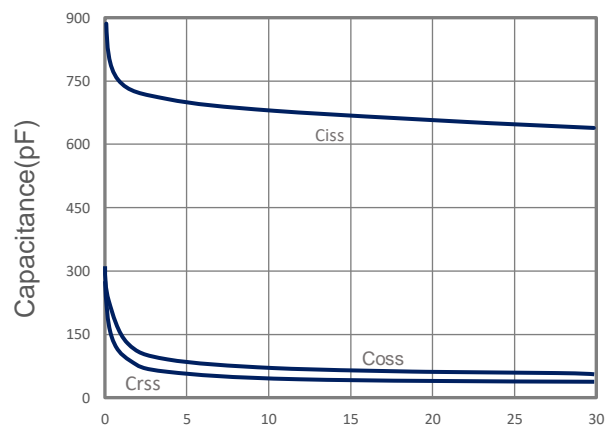
V<sub>DS</sub>-Drain Source Voltage (V)  
**Output Characteristics**



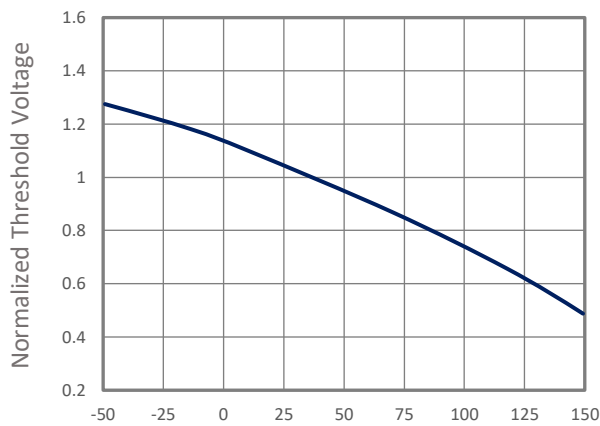
I<sub>D</sub>-Drain Current (A)  
**Drain-Source On Resistance**



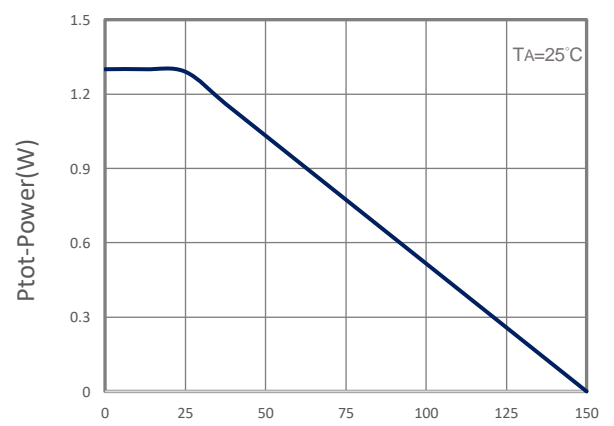
Q<sub>G</sub>-Gate Charge (nC)  
**Gate Charge**



V<sub>DS</sub>-Drain Source Voltage (V)  
**Capacitance**

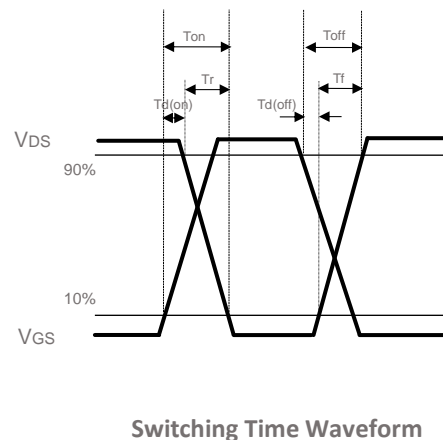
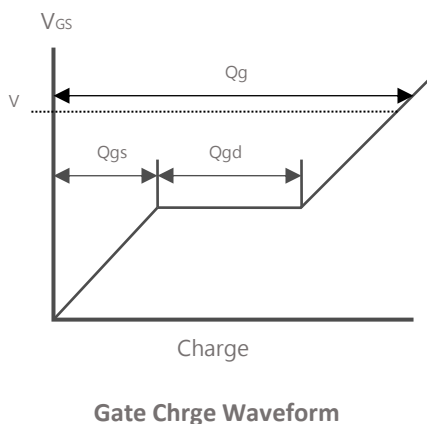
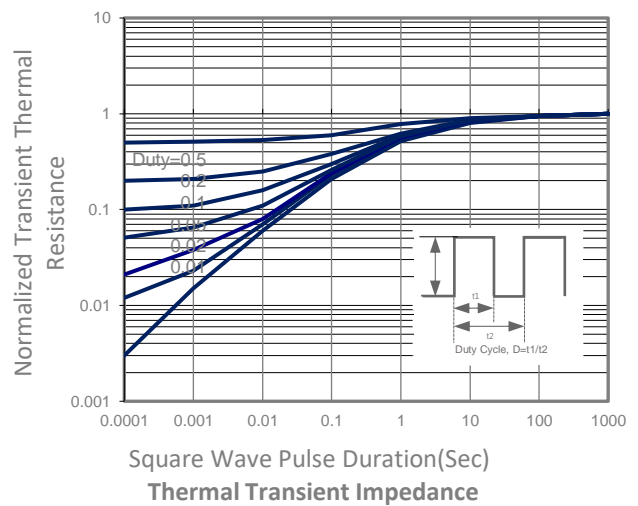
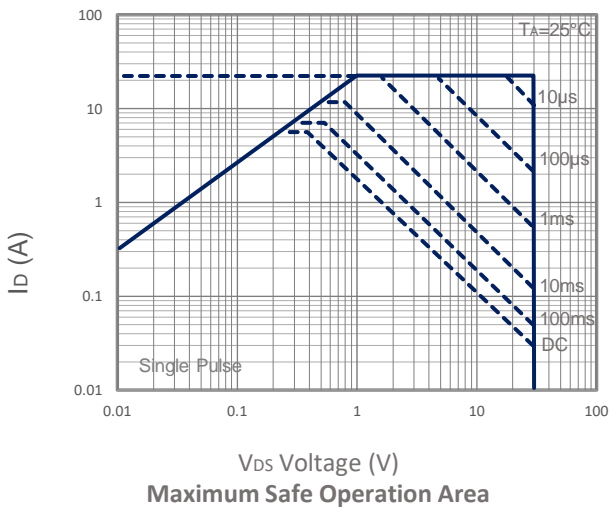
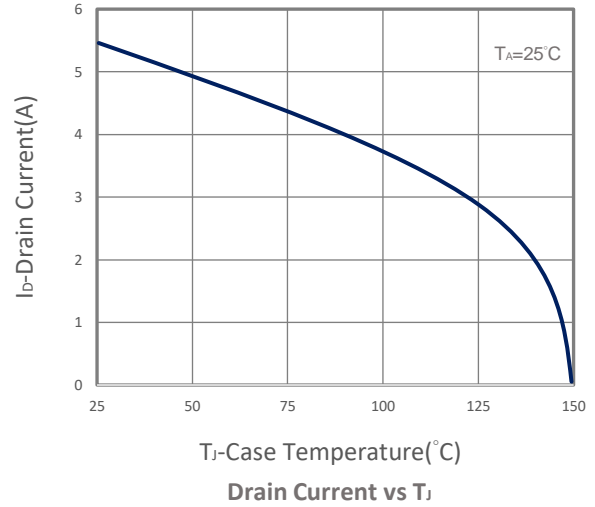
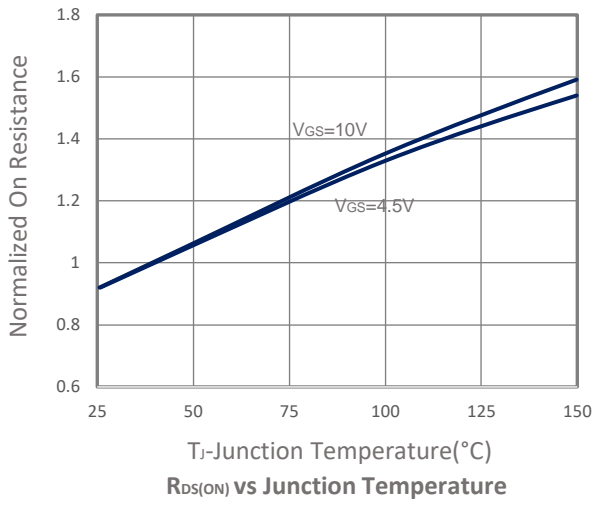


T<sub>J</sub>-Junction Temperature (°C)  
**Gate Threshold Voltage**

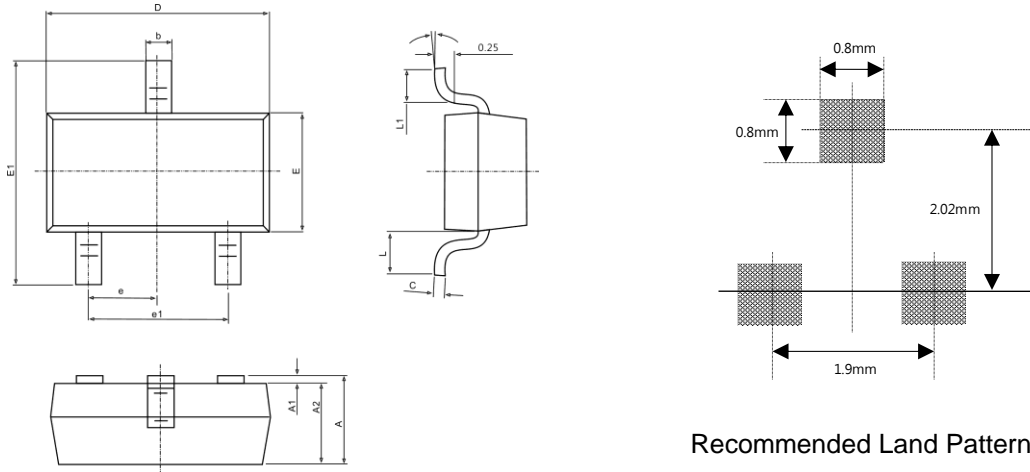


T<sub>J</sub>-Junction Temperature (°C)  
**Power Dissipation**

## TYPICAL CHARACTERISTICS



## ■ SOT-23 PACKAGE DIMENSIONS



Recommended Land Pattern

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	-	1.050	-	0.041
A1	0.000	0.100	0.000	0.004
A2	0.900	1.100	0.035	0.043
b	0.390	0.450	0.015	0.018
c	0.050	0.150	0.002	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.300	2.500	0.091	0.098
e	0.950 TYP.		0.037 TYP.	
e1	1.900 REF.		0.075 REF.	
L	0.550 REF.		0.022 REF.	
L1	0.200	-	0.008	-
θ	0°	10°	0°	10°