

30V N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SMC4420 is the N-Channel logic enhancement mode power field effect transistor is produced using high cell density, advanced trench technology to provide excellent $R_{DS(ON)}$.

This device is suitable for use as a load switch or in PWM and gate charge for most of the synchronous buck converter applications.

100% EAS guaranteed with full function reliability approval.

SMC4420M-TRG ROHS Compliant This is Halogen Free

FEATURE

- ◆ 30V/14A, $R_{DS(ON)} = 10m\Omega(\text{typ.})@V_{GS} = 10V$
- ◆ 30V/12A, $R_{DS(ON)} = 12m\Omega(\text{typ.})@V_{GS} = 4.5V$
- ◆ Super high density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and Maximum DC current capability

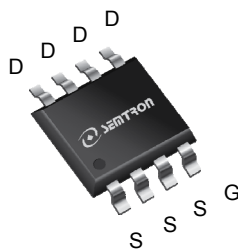
APPLICATIONS

- ◆ Power Management in Note book
- ◆ Portable Equipment
- ◆ High Frequency Point-Load Synchronous Buck Converter for MB/NB/VGA
- ◆ Battery Powered System
- ◆ Load Switch

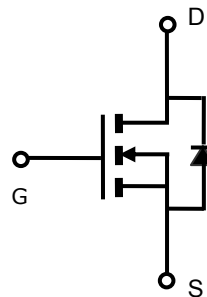


N-Channel Enhancement Mode MOSFET

PIN CONFIGURATION



SOP-8
Top View



PART NUMBER INFORMATION

<p>SMC 4420 M - TR G</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
SMC4420M-TRG	M : SOP-8	TR : Tape&Reel	2.5K/Reel

※ Year Code : 00 ~ 90, 2010 : 00

※ Week Code : 01 ~ 54

※ SOP-8 : 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	30	V	
V_{GSS}	Gate-Source Voltage	± 20	V	
I_D	Continuous Drain Current, $V_{GS}=10V^A$	$T_A=25^\circ\text{C}$	14	A
		$T_A=70^\circ\text{C}$	12	A
I_{DM}	Pulsed Drain Current ^B	40	A	
E_{AS}	Single Pulse Avalanche energy $L=0.1\text{mH}^C$	138	mJ	
P_D	Power Dissipation	$T_A=25^\circ\text{C}$	2.0	W
		$T_A=70^\circ\text{C}$	1.4	W
T_J	Operation Junction Temperature	-55/150	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-55/150	$^\circ\text{C}$	

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	Min	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient			85	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case			38	$^\circ\text{C/W}$

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

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0		2.5	V
I_{GSS}	Gate Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24V, V_{GS} = 0V$			1	μA
		$V_{DS} = 24V, V_{GS} = 0V$ $T_J = 55^\circ\text{C}$			5	
$R_{DS(on)}$	Drain-source On-Resistance ^B	$V_{GS} = -10V, I_D = 14A$ $V_{GS} = -4.5V, I_D = 12A$		10 12	12 14	m Ω
G_{fs}	Forward Transconductance	$V_{DS} = -10V, I_D = -5.8A$		6		S
Source-Drain Diode						
V_{SD}	Diode Forward Voltage	$I_S = 1.7A, V_{GS} = 0V$		0.7	1.2	V
I_S	Continuous Source Current ^{AD}				10	A
Dynamic Parameters						
Q_g	Total Gate Charge	$V_{DS} = 15V, V_{GS} = 4.5V$ $I_D = 10A$		12.5		nC
Q_{gs}	Gate-Source Charge			4.4		
Q_{gd}	Gate-Drain Charge			5		
C_{iss}	Input Capacitance	$V_{DS} = 15V, V_{GS} = 0V$ $f = 1\text{MHz}$		1310		pF
C_{oss}	Output Capacitance			160		
C_{rss}	Reverse Transfer Capacitance			132		
$t_{d(on)}$	Turn-On Time	$V_{DD} = 15V, V_{GS} = 10V,$ $I_D = -10A, R_G = 3.3\Omega$		6.2		nS
t_r				59		
$t_{d(off)}$	Turn-Off Time			28		
t_f				8.4		

Note:

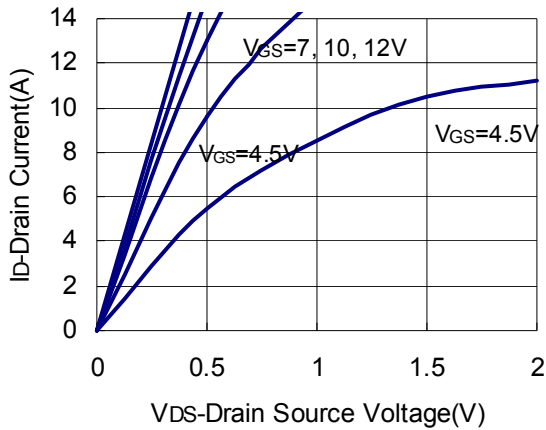
- The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$.
- The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating. The test condition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

The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date

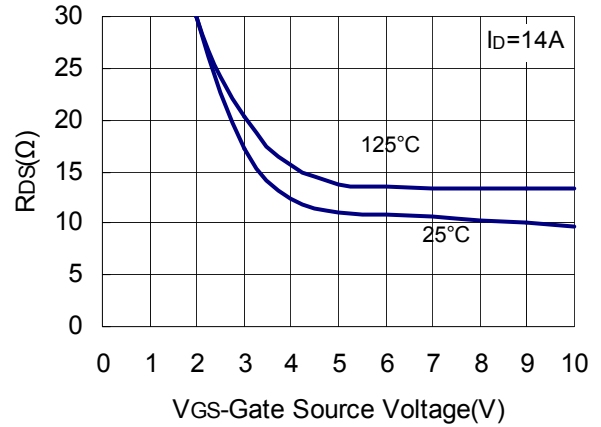
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TYPICAL CHARACTERISTICS

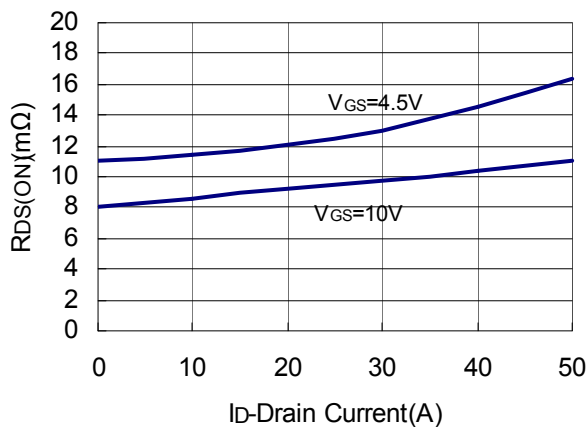
Output Characteristics



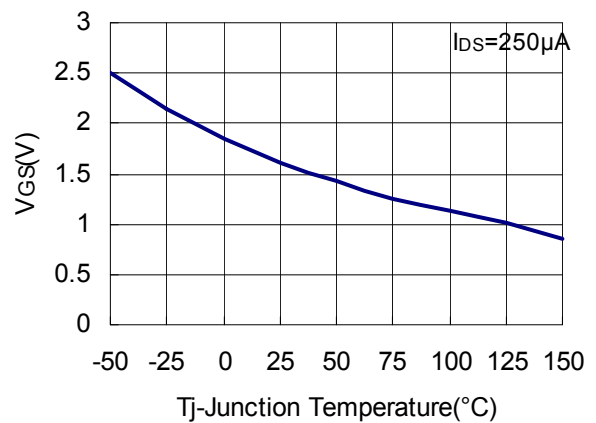
On Resistance VS Gate Source Voltage



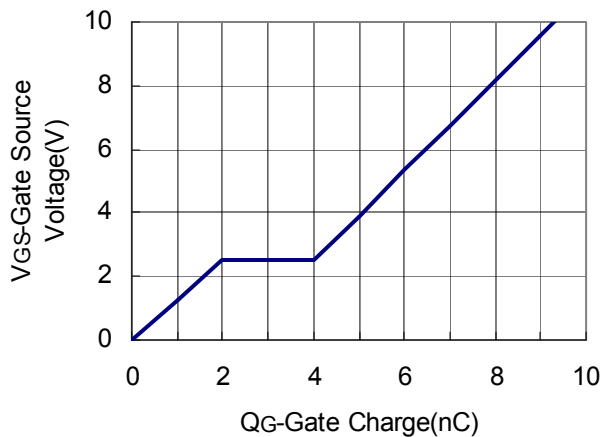
Drain Source On Resistance



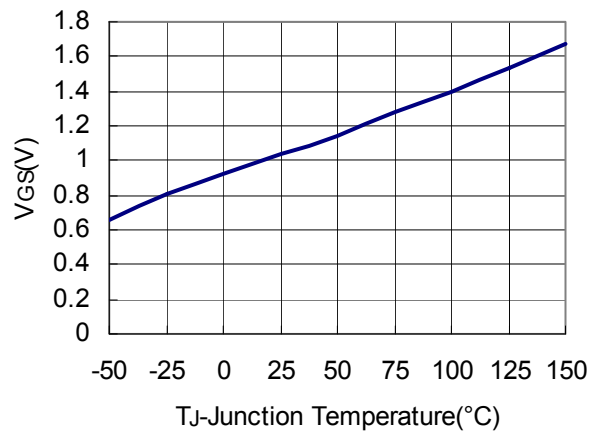
Gate Threshold Voltage



Gate Charge

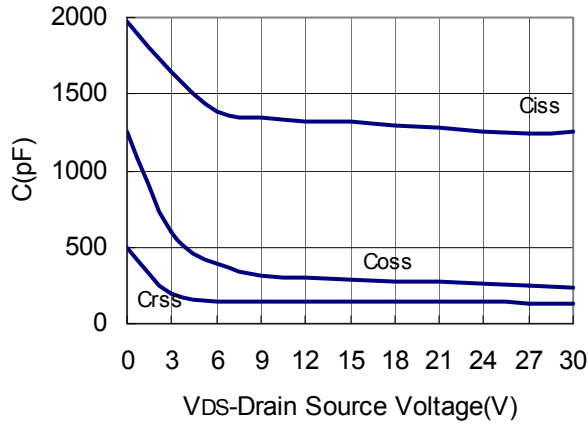


Drain Source On Resistance

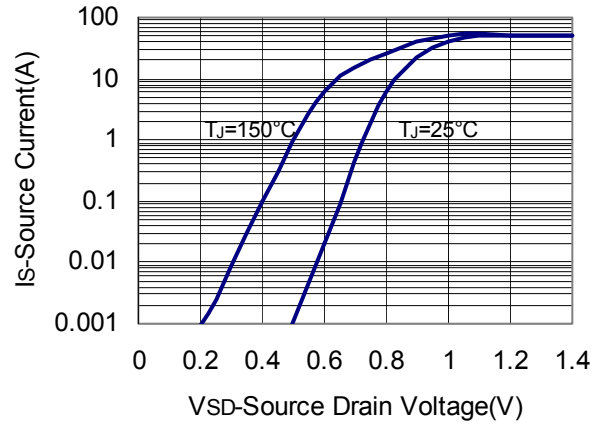


TYPICAL CHARACTERISTICS

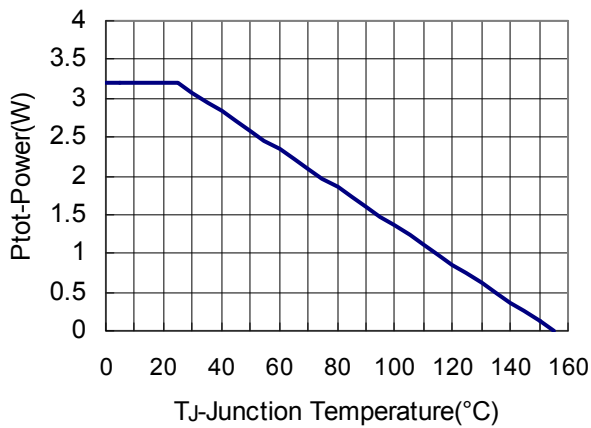
Capacitance



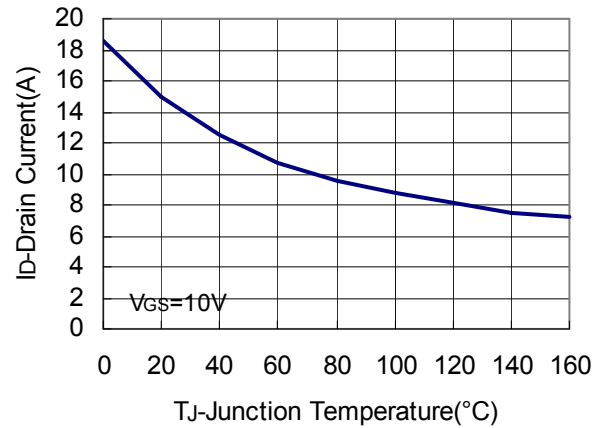
Source Drain Diode Forward



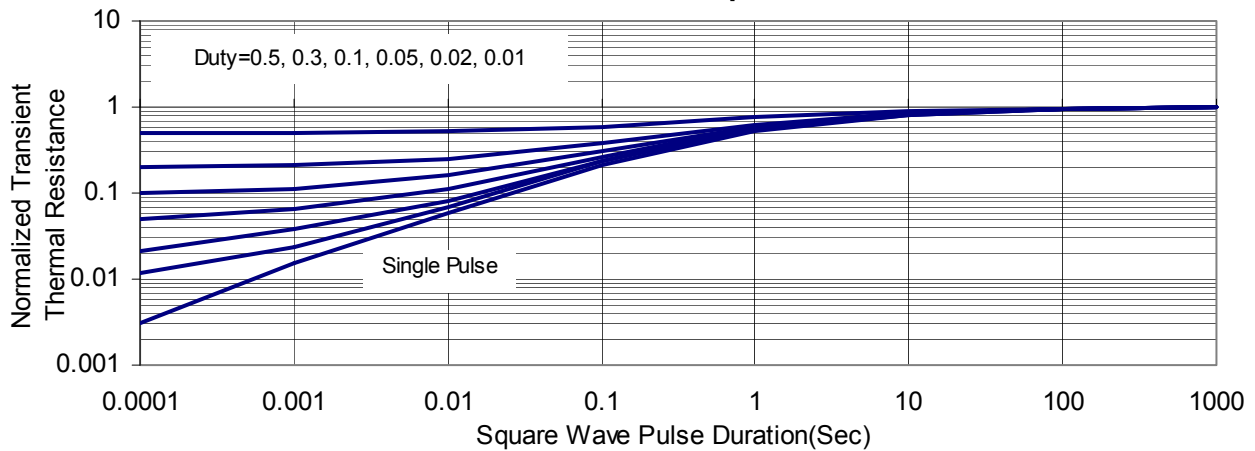
Power Dissipation



Drain Current



Thermal Transient Impedance



■ SOP-8 PACKAGE DIMENSIONS

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.040	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

SOP-8 PACKAGE OUTLINE DIMENSIONS

