

30V N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SMC4738 is the N-Channel logic enhancement mode power field effect transistor is produced using high cell density and trench DMOS technology.

It has been optimized for low gate charge, low RDS(ON) and fast switching speed.

These devices are well suited for high efficiency fast switching applications.

SMC4738PD-TRG ROHS Compliant This is Halogen Free

FEATURE

- ◆ 30V / 30A
- ◆ $R_{DS(ON)} = 6.5m\Omega(typ.)@V_{GS} = 10V$
- ◆ $R_{DS(ON)} = 9.5m\Omega(typ.)@V_{GS} = 4.5V$
- ◆ Fast switch
- ◆ Low gate charge
- ◆ Improved dv/dt capability
- ◆ High power and current handling capability
- ◆ 100% EAS Guaranteed

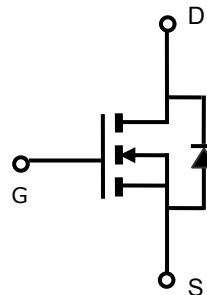
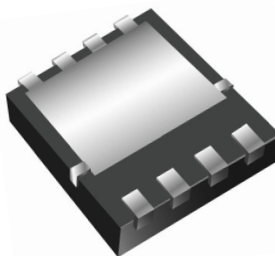
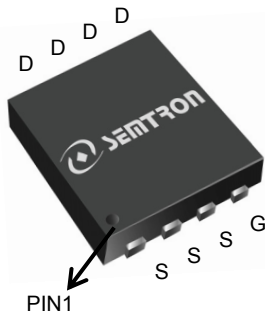
APPLICATIONS

- ◆ High Frequency DC/DC converters
- ◆ POL Applications
- ◆ SMPS 2nd SR



N-Channel Enhancement Mode MOSFET

PIN CONFIGURATION



DFN5X6-8
Top View

PART NUMBER INFORMATION

<p>SMC 4738 PD - TR G</p> <p>a b c d e</p>	<p>a : Company name.</p> <p>b : Product Serial number.</p> <p>c : Package code</p> <p>d : Handling code</p> <p>e : Green produce code</p>
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ORDERING INFORMATION

Part Number	Package Code	Handling Code	Shipping
SMC4738PD-TRG	PD : PDFN5X6-8	TR : Tape&Reel	2.5K/Reel

※ Year Code : 00 ~ 90, 2010 : 00

※ Week Code : 01 ~ 54

※ DFN-56 : Only available in tape and reel packaging.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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	T _C =25°C	55
		T _C =100°C	35
I _{DM}	Pulsed Drain Current ^A	220	A
E _{AS}	Single Pulse Avalanche energy L=0.1mH ^C	45	mJ
I _{AS}	Avalanche Current ^C	30	A
P _D	Power Dissipation	T _C =25°C	54
		T _C =70°C	34
T _J	Operation Junction Temperature	-55/150	°C
T _{STG}	Storage Temperature Range	-55/150	°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 _{θJA}	Thermal Resistance-Junction to Ambient Steady-State			62	°C/W
R _{θJC}	Thermal Resistance Junction to Lead Steady-State			2.3	°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	1.6	2.5	V
I_{GSS}	Gate Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$ $T_J = 25^\circ\text{C}$			1	μA
		$V_{DS} = 24V, V_{GS} = 0V$ $T_J = 125^\circ\text{C}$			10	
$R_{DS(ON)}$	Drain-source On-Resistance ^B	$V_{GS} = 10V, I_D = 16A$ $V_{GS} = 4.5V, I_D = 8A$		6.5 9.5	8 12.5	m Ω
G_{fs}	Forward Transconductance	$V_{DS} = 10V, I_D = 8A$		14		S
Source-Drain Diode						
V_{SD}	Diode Forward Voltage ^B	$I_S = 1A, V_{GS} = 0V$			1.0	V
I_S	Continuous Source Current ^{AD}				55	A
Dynamic Parameters						
$Q_g (4.5V)$	Total Gate Charge	$V_{DS} = 15V, V_{GS} = 4.5V$ $I_D = 20A$		7.5		nC
Q_{gs}	Gate-Source Charge			1.3		
Q_{gd}	Gate-Drain Charge			4.5		
C_{iss}	Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V$ $f = 1\text{MHz}$		750		pF
C_{oss}	Output Capacitance			150		
C_{rss}	Reverse Transfer Capacitance			110		
$t_{d(on)}$	Turn-On Time	$V_{DD} = 15V, V_{GEN} = 10V,$ $R_G = 3.3\Omega,$		4.8		nS
t_r				12.5		
$t_{d(off)}$	Turn-Off Time			27.6		
t_f				8.2		

Note:

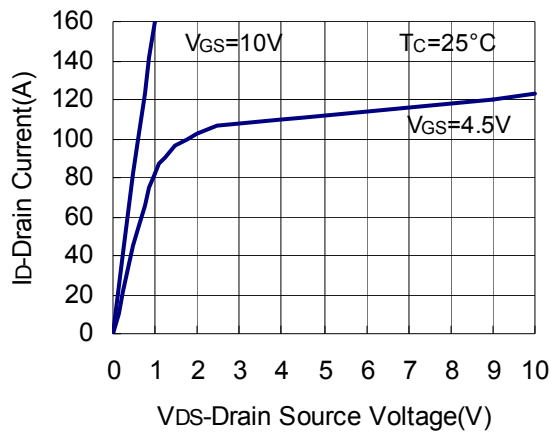
- A. Repetitive Rating : Pulsed width limited by maximum junction temperature.
- B. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- C. The EAS data shows Max. rating . The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.1\text{mH}, I_{AS} = 30A, R_G = 25\Omega,$ Starting $T_J = 25^\circ\text{C}$.
- D. 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

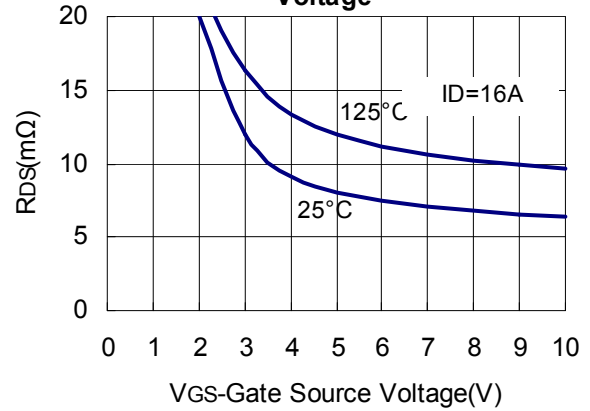
We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this datasheet.

TYPICAL CHARACTERISTICS

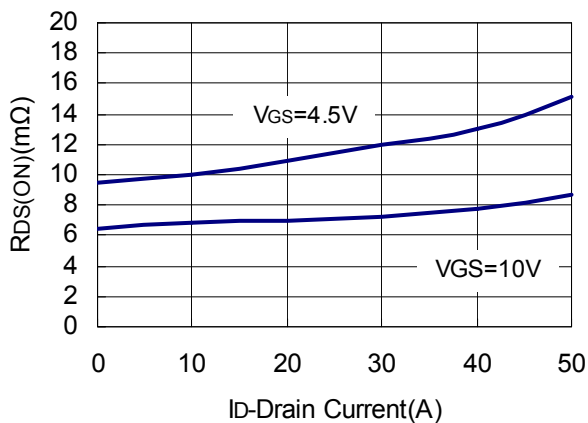
Output Characteristics



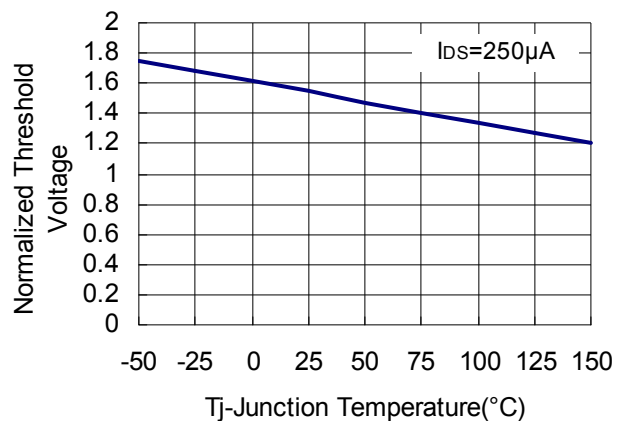
On Resistance VS Gate Source Voltage



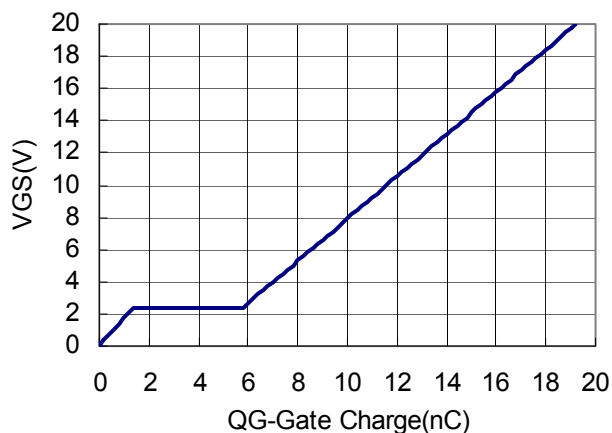
Drain Source On Resistance



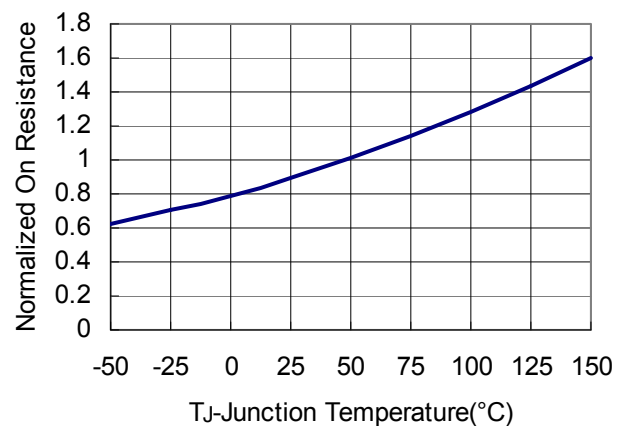
Gate Threshold Voltage



Gate Charge

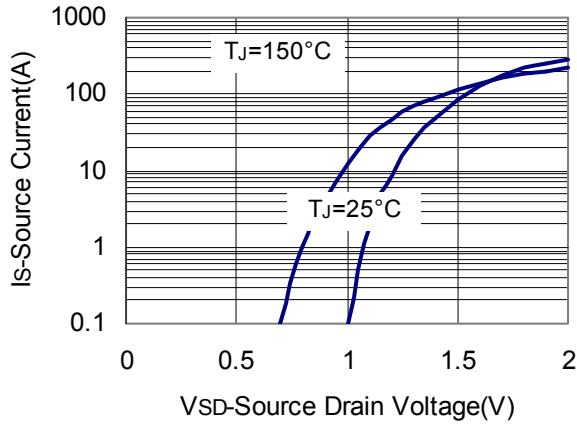


Normalized RDS(On) V.S. TJ

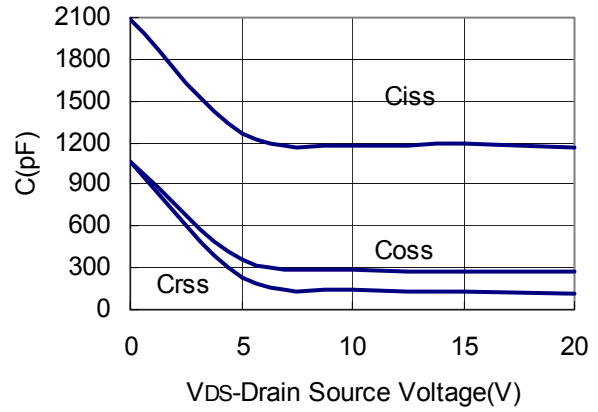


TYPICAL CHARACTERISTICS

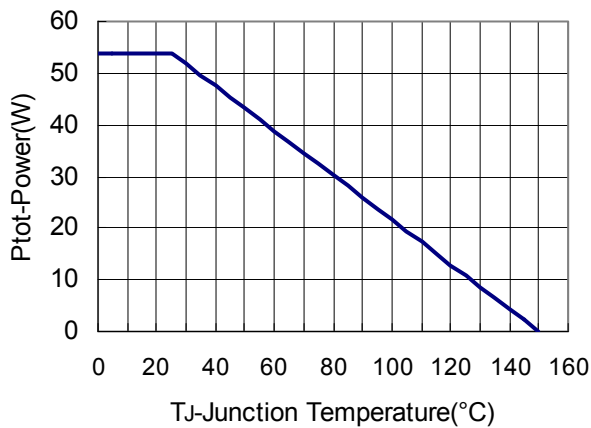
Source Drain Diode Forward



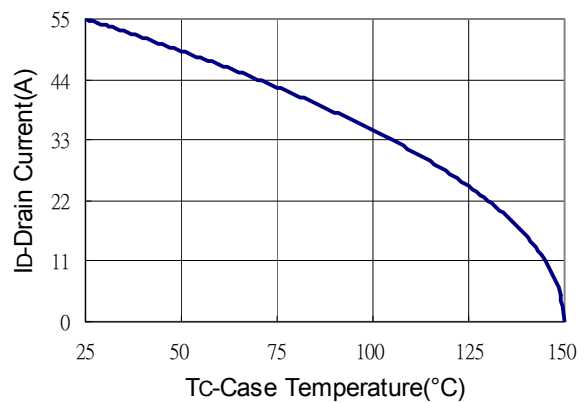
Capacitance



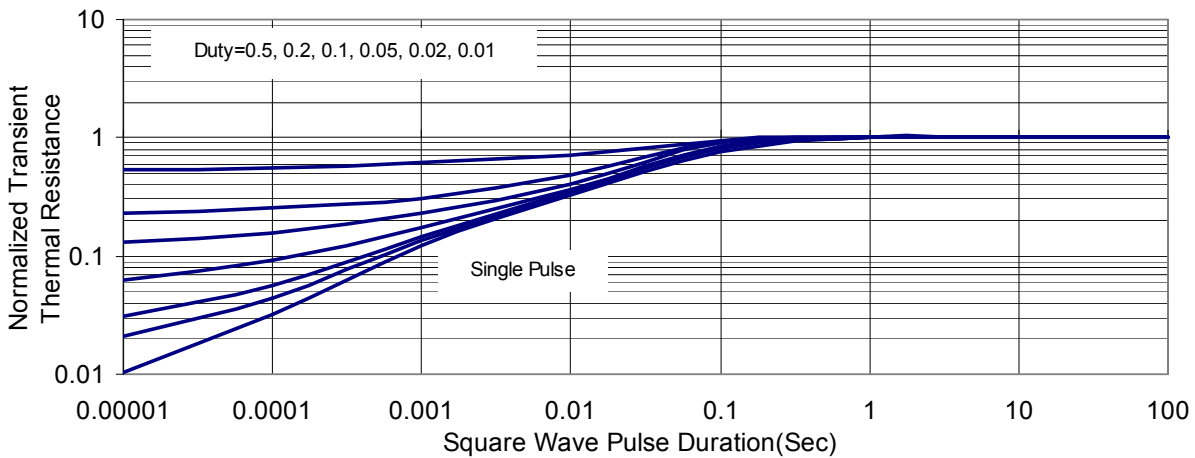
Power Dissipation



Drain Current



Thermal Transient Impedance



PDFN5X6-8 PACKAGE DIMENSIONS

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
D2	4.824	4.976	0.190	0.196
E1	3.375	3.575	0.133	0.141
E2	5.674	5.826	0.223	0.229
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
k	1.190	1.390	0.047	0.055
L	0.559	0.325	0.011	0.013
L1	0.424	0.725	0.027	0.029
H	0.574	0.325	0.011	0.013
θ	10°	12°	10°	12°

