SemTron Microtech Corporation

SMC4738

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

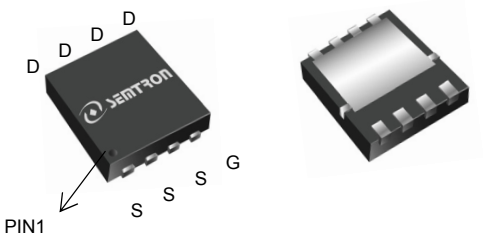
- ***30V / 45A***
- ***$R_{DS(ON)}$ = 6.5mΩ(typ.)@V_{GS} = 10V***
- ***$R_{DS(ON)}$ = 9.5mΩ(typ.)@V_{GS} = 4.5V***

- Fast switch
- Low gate charge
- Improved dv/dt capability
- High power and current handlingcapability
- 100% EAS Guaranteed

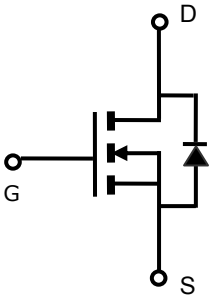
APPLICATIONS

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

PIN CONFIGURATION



DFN5X6A-8
Top View



PART NUMBER INFORMATION

SMC 4738 PD - TR G a b c d e	**a : Company name.** **b : Product Serial number.** **c : Package code** **d : Handling code** **e : Green produce code**

■ORDERING INFORMATION

Part Number	Package Code	Handling Code	Shipping
SMC4738PD-TRG	PD : DFN5X6A-8	TR : Tape&Reel	2.5K/Reel

※ Year Code : 0 ~ 9, 2010 : 0
※ Week Code : A(1~2) ~ Z(53~54)
※ 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 [A]	T_C=25°C	45	A
		T_C=100°C	28	
I_{DM}	Pulsed Drain Current [A]	T_C=25°C	60	A
E_{AS}	Single Pulse Avalanche energy L=0.1mH [B]		45	mJ
I_{AS}	Avalanche Current [B]		30	A
P_D	Power Dissipation [F]	T_C=25°C T_C=100°C	32 15	W
P_D	Power Dissipation [A] Surface−mounted	T_C=25°C T_C=100°C	2.2 1.5	W
T_J	Operation Junction Temperature		-55/150	°C
T_{STG}	Storage Temperature Range		-55/150	°C
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient [C]	Steady-State	45	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Lead [C]	Steady-State	3.0	°C/W

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
A. Surface−mounted on FR-4 board using 1 sq−in pad, 1 oz Cu.
B. The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=30A,R_G=25Ω,Starting TJ=25°C.
C. UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature Tj=25°C).
F. The power dissipation PD is based on TJ(MAX)=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper.

■ELECTRICAL CHARACTERISTICS(T_A = 25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage [D]	V_{GS} =0V,I_D =250μA	30			V
$V_{GS(th)}$	Gate Threshold Voltage [D]	V_{DS} =V_{GS},I_D =250μA	1.0	1.6	2.5	V
I_{GSS}	Gate Leakage Current	V_{DS} =0V,V_{GS}=±20V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =30V,V_{GS} =0V T_J =25°C			1	μA
		V_{DS} =24V,V_{GS} =0V T_J =125°C			10	
$R_{DS(ON)}$	Drain-source On-Resistance [D]	V_{GS} =10V,I_D=16A V_{GS} =4.5V, I_D=8A		7.0 9.5	8.5 12.5	mΩ
G_{fs}	Forward Transconductance [D]	V_{DS} =10V,I_D =8A		14		S
Source-Drain Doide						
V_{SD}	Diode Forward Voltage[B]	I_S=1A,V_{GS}=0V		0.7	1.0	V
I_S	Continuous Source Current				20	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 =1MHz		750		pF
C_{oss}	Output Capacitance			150		
C_{rss}	Reverse Transfer Capacitance			110		
R_G	Gate Resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		2.6		Ω
$t_{d(on)}$	Turn-On Time [E]	V_{DD}=15V, V_{GEN}=10V, R_G=3.3Ω,		4.8		nS
t_r				12.5		
$t_{d(off)}$	Turn-Off Time [E]			27.6		
t_f				8.2		

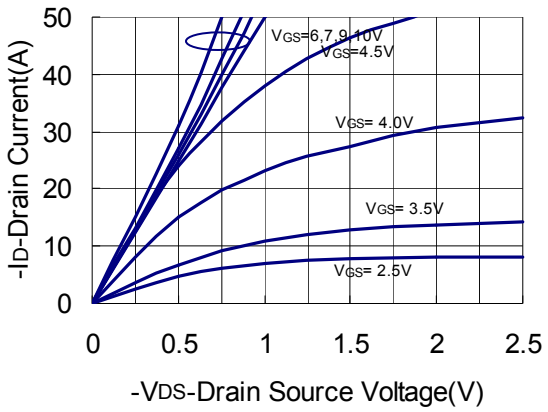
Note:

D. The data tested by pulsed , pulse width ≦ 300uS , duty cycle ≦ 2%

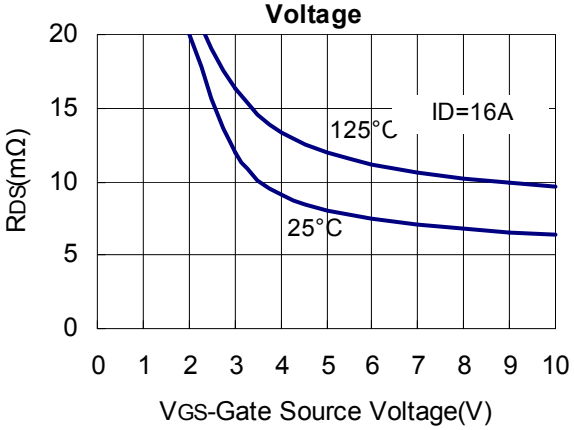
E. Pulsed width limited by maximum junction temperature.

TYPICAL CHARACTERISTICS

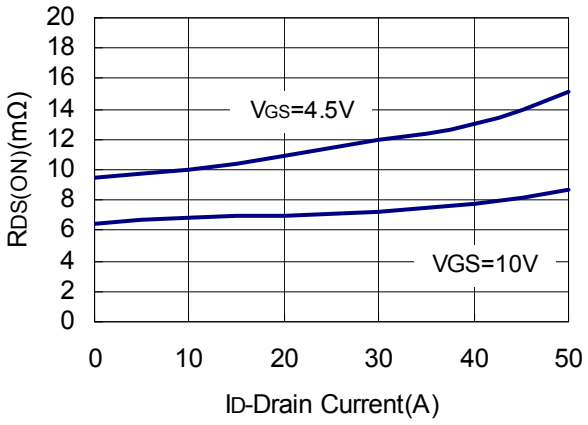
Output Characteristics



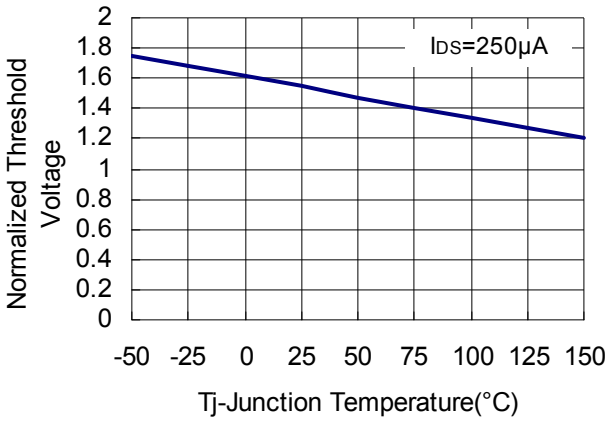
On Resistance VS Gate Source Voltage



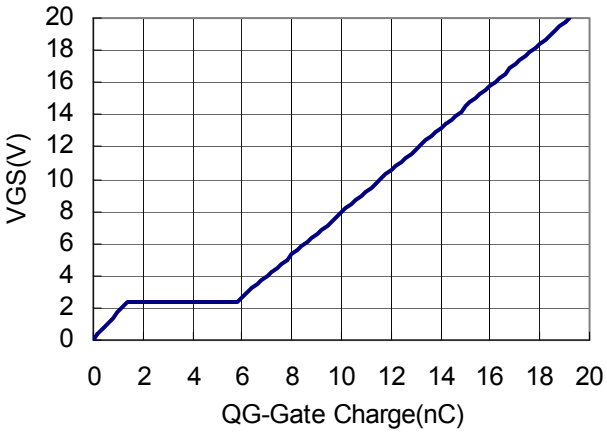
Drain Source On Resistance



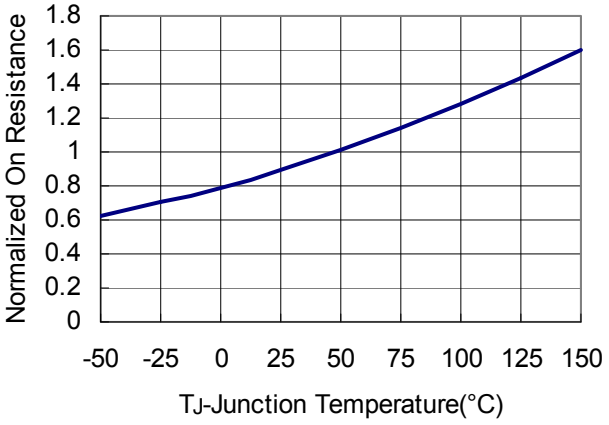
Gate Threshold Voltage



Gate Charge

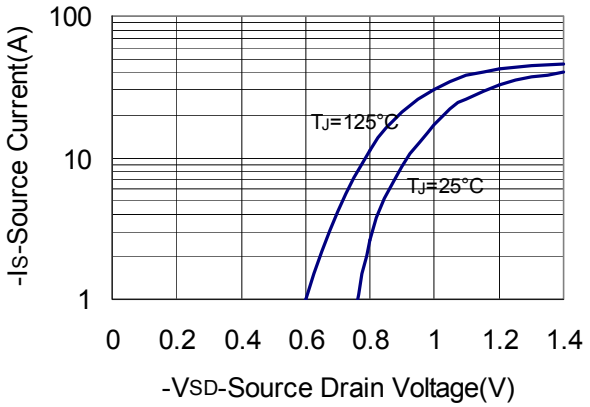


Normalized RDS(On) V.S. TJ

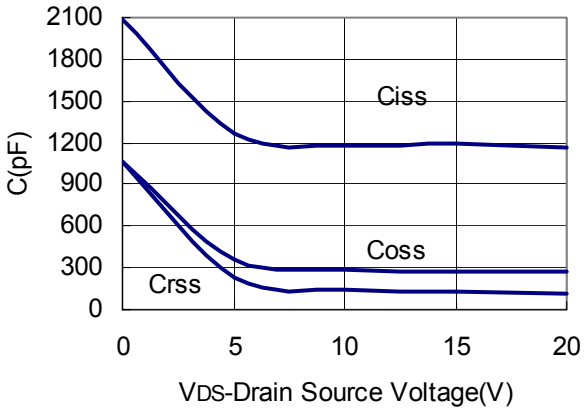


TYPICAL CHARACTERISTICS

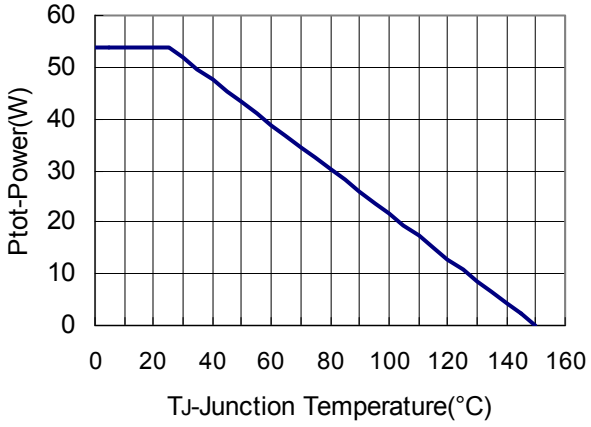
Source Drain Diode Forward



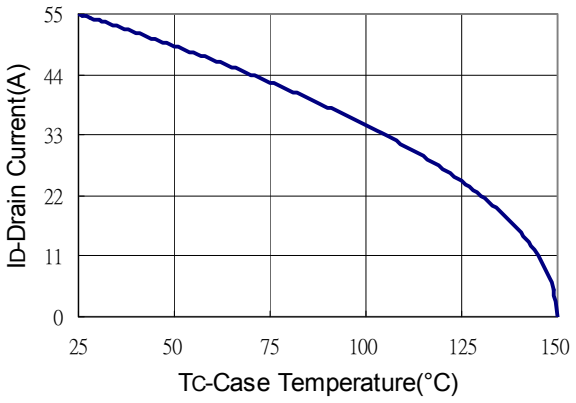
Capacitance



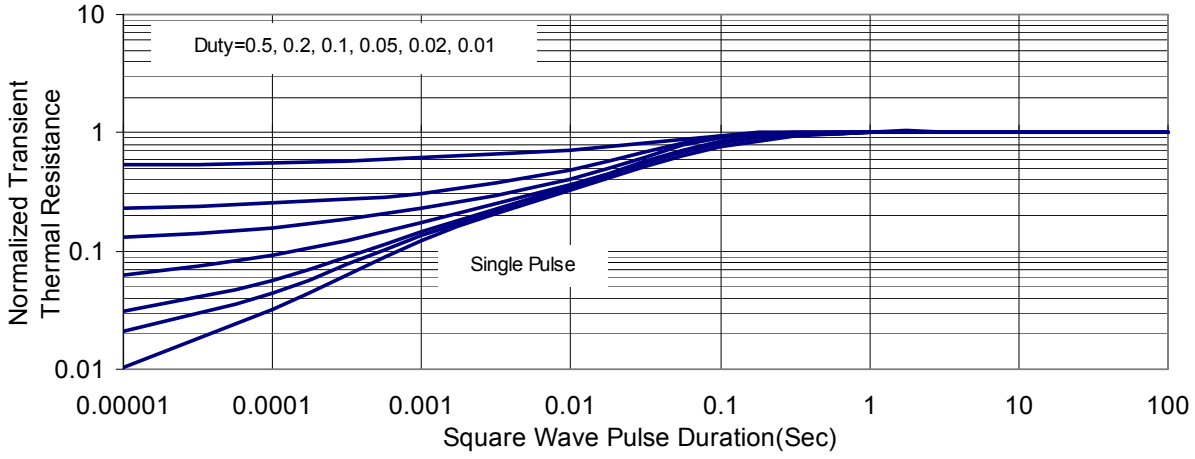
Power Dissipation



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°