SemTron Microtech Corporation

SMC6242H

Single N-Channel MOSFET

■DESCRIPTION

SMC6242 uses trench technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior, fast switching performance, and withstand high energy pulse in the avalanche and commutation mode.

■FEATURES

V_{DS} = 60V, I_D = 23.5A

$R_{DS(ON)}$=32mΩ(Typ.)@V_{GS}= 10V
$R_{DS(ON)}$=38mΩ(Typ.)@V_{GS}= 4.5V

◆100% EAS and Guaranteed

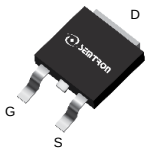
■PART NUMBER INFORMATION

SMC 6242 H - TR G
a b c d e

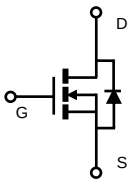
a : Company name.
b : Product Serial number.
c : Package code NA:DFN3.3X3.3A-8
d : Handling code TR:Tape&Reel
e : Green produce code G:*RoHS Compliant*

■APPLICATIONS

◆DC/DC Power System
◆Motor Dirve
◆Load Switch



TO-252



■ABSOLUTE MAXIMUM RATINGS (T_A = 25°C Unless otherwise noted)

Symbol	Parameter		Rating	Units
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C=25°C	23.5	A
		T_C=100°C	14.9	A
I_{DM}	Pulsed Drain Current [A]		94	A
I_D	Continuous Drain Current	T_A=25°C	9	A
		T_A=70°C	7.3	A
P_D	Power Dissipation [B]	T_A=25°C	6.3	W
		T_A=70°C	4	W
I_{AS}	Avalanche Current [A]		20	A
E_{AS}	Single Pulse Avalanche energy L=0.1mH [AF]		20	mJ
P_D	Power Dissipation [C]	T_C=25°C	41.7	W
		T_C=100°C	16.7	W
T_J	Operation Junction Temperature		-55/150	°C
T_{STG}	Storage Temperature Range		-55/150	°C

■THERMAL RESISTANCE

Symbol	Parameter		Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient [B]	t≦10s		20	°C/W
	Thermal Resistance Junction to Ambient [BD]	Steady-State		50	
$R_{\theta JC}$	Thermal Resistance Junction to Case			3	

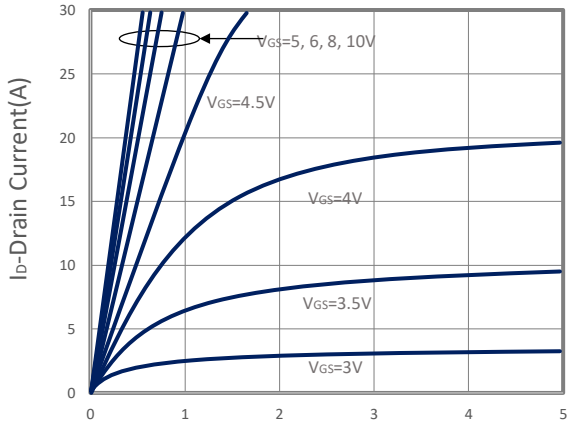
■ELECTRICAL CHARACTERISTICS(T_A = 25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	60			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1	1.5	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}=60V, V_{GS}=0V, T_J=25°C			1	μA
		V_{DS}=48V, V_{GS}=0V, T_J=75°C			10	
$R_{DS(ON)}$	Drain-source On-Resistance [E]	V_{GS}=10V, I_D=9A V_{GS}=4.5V, I_D=6A		32 38	38 48	mΩ
G_{fs}	Forward Transconductance	V_{DS}=5V, I_D=9A		15.2		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [E]	I_S=1A,V_{GS}=0V		0.7	1	V
I_S	Continuous Source Current				11.8	A
t_{rr}	Reverse Recovery Time	I_S=9A, dI/dt=100A/μs		17		ns
Q_{rr}	Reverse Recovery Charge			21		nC
Dynamic and Switching Parameters						
Q_g	Total Gate Charge	V_{DS}=30V, V_{GS}=10V, I_D=9A		18	25.3	nC
Q_g	Total Gate Charge (4.5V)			8.8	11.9	
Q_{gs}	Gate-Source Charge			2.5	3.4	
Q_{gd}	Gate-Drain Charge			4.2	5.7	
C_{iss}	Input Capacitance	V_{DS}=30V, V_{GS}=0V, f=1MHz		1020		pF
C_{oss}	Output Capacitance			78		
C_{rss}	Reverse Transfer Capacitance			45		
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		2.5		Ω
$t_{d(on)}$	Turn-On Time [E]	V_{DD}=30V, V_{GS}=10V R_G=3.3Ω, I_D=1A		4.8	9	nS
t_r				16.6	32	
$t_{d(off)}$	Turn-Off Time [E]			23	44	
T_f				5.4	10	

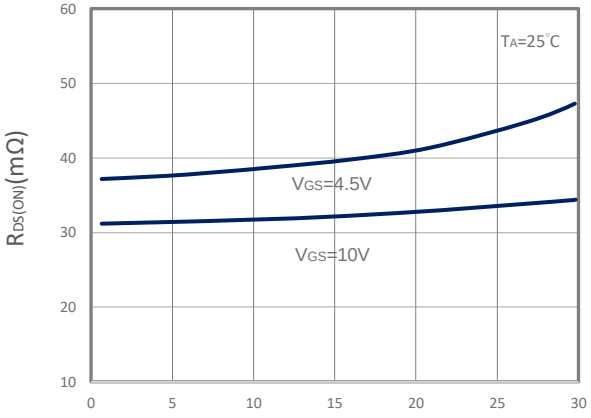
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

A. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}$=150°C.
B. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature $T_{J(MAX)}$=150°C (initial temperature T_A=25°C).
C. $T_{J(MAX)}$=150°C,using junction-to-ambient thermal resistance, t ≦10sec.
D. $T_{J(MAX)}$=150°C,using junction-to-case thermal resistance ($R_{\theta JC}$) is more useful in additional heat sinking is used.
E. The data tested by pulsed , pulse width ≦ 300μS , duty cycle ≦ 2%.
F. The E_{AS} data shows Max, tested and pulse width limited by $T_{J(MAX)}$=150°C (initial temperature T_J=25°C).

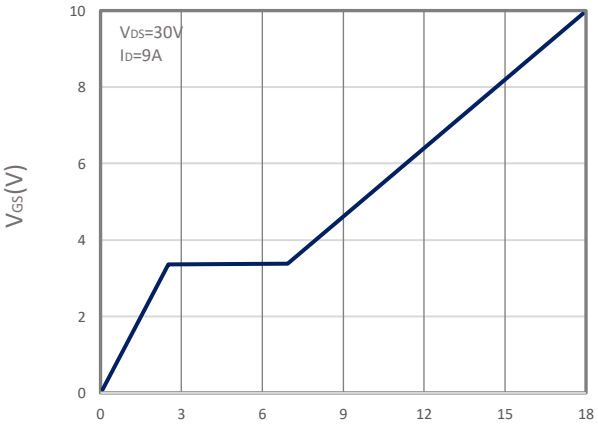
TYPICAL CHARACTERISTICS



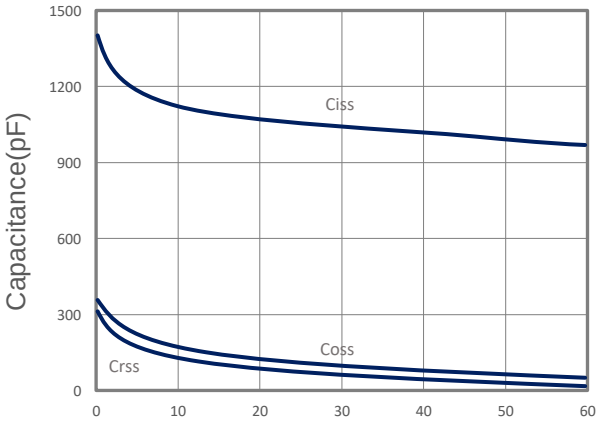
Output Characteristics



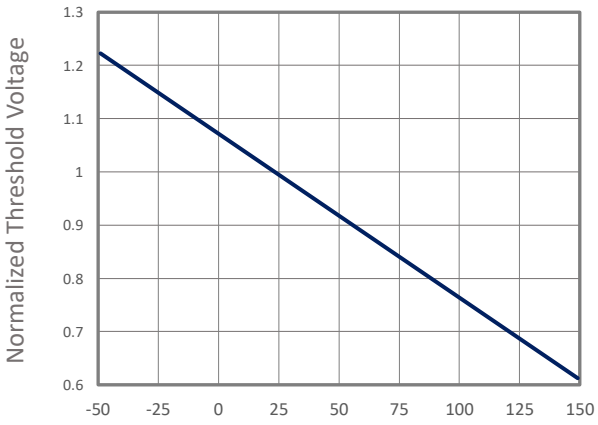
Drain-Source On Resistance



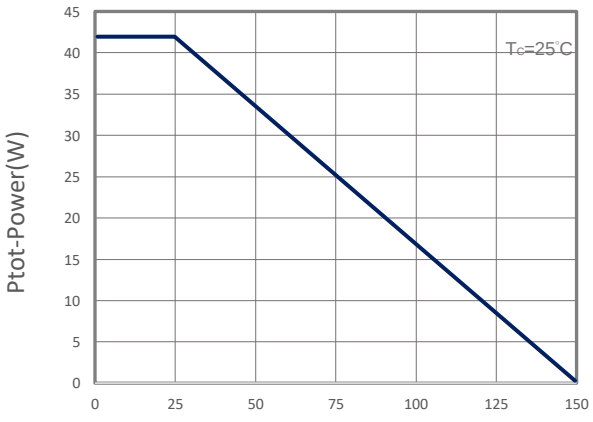
Gate Charge



Capacitance

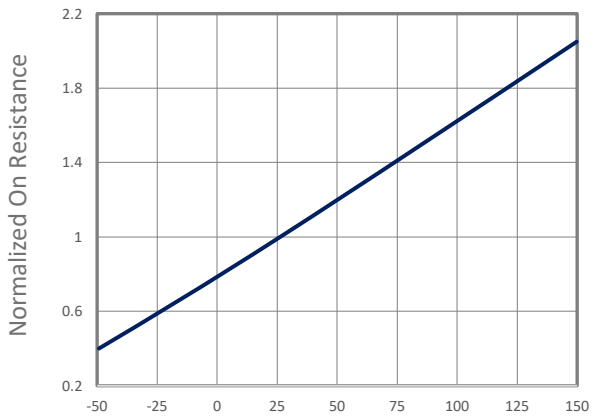


Gate Threshold Voltage

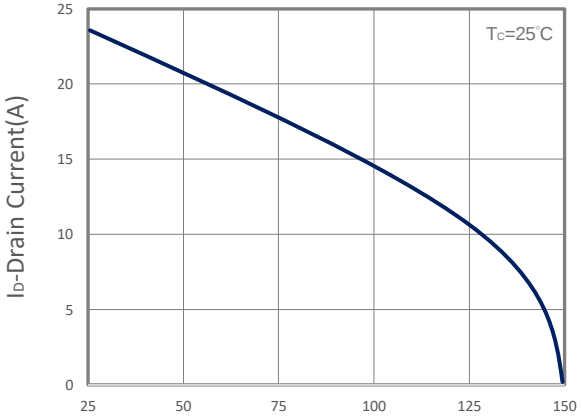


Power Dissipation

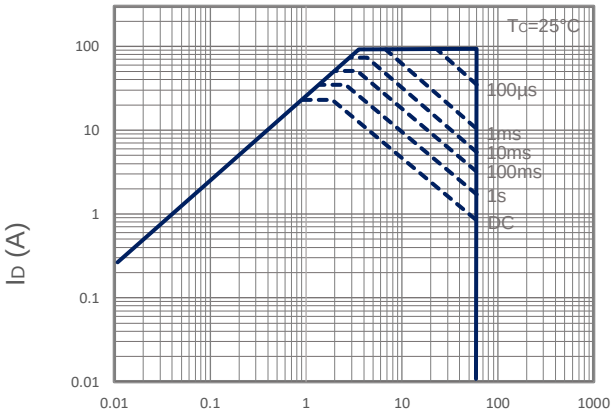
TYPICAL CHARACTERISTICS



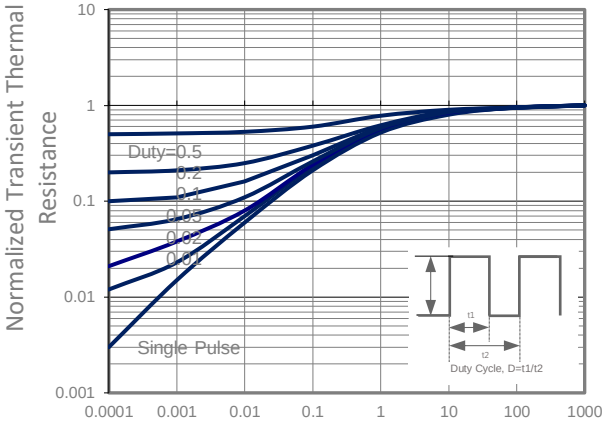
RDS(ON) vs Junction Temperature



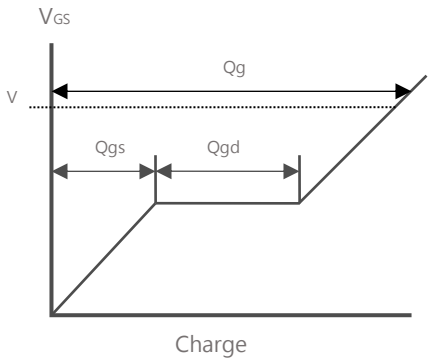
Drain Current vs TJ



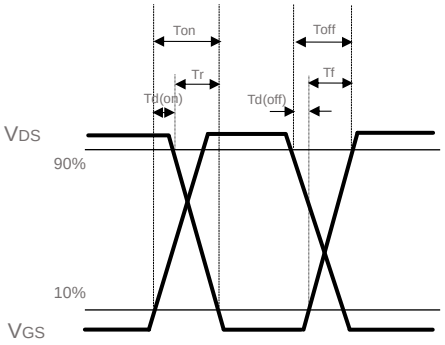
Maximum Safe Operation Area



Thermal Transient Impedance

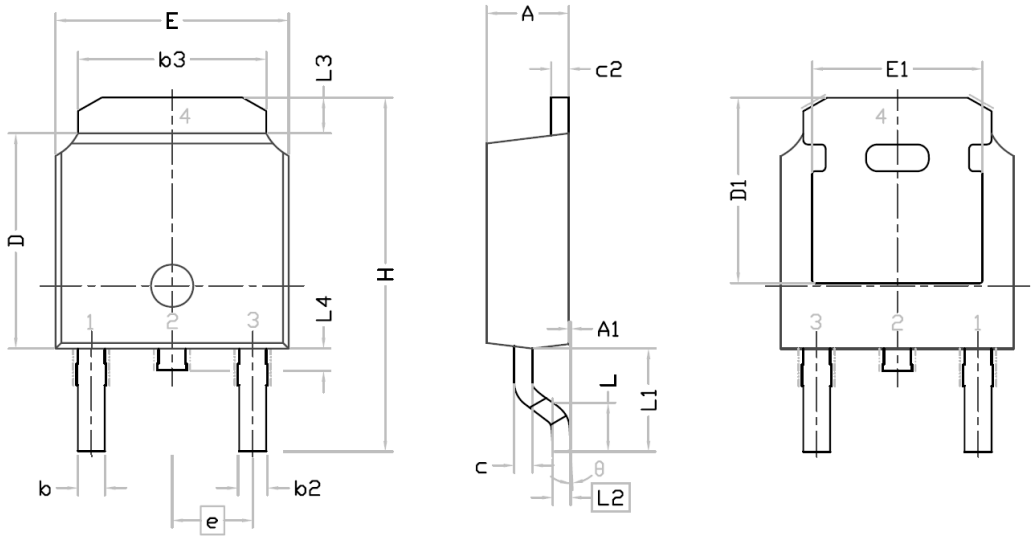


Gate Chrge Waveform



Switching Time Waveform

■TO-252 PACKAGE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.380	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.640	0.880	0.025	0.035
b2	0.770	1.140	0.030	0.045
b3	5.210	5.460	0.205	0.215
c	0.460	0.600	0.018	0.024
c2	0.460	0.580	0.018	0.023
D	6.000	6.223	0.236	0.245
D1	5.210	-	0.205	-
E	6.400	6.731	0.252	0.265
E1	4.400	-	0.173	-
e	2.286 BSC.		0.090 BSC.	
H	9.400	10.40	0.370	0.409
L	1.400	1.770	0.055	0.070
L1	2.743 REF.		0.108 REF.	
L2	0.508 BSC.		0.020 BSC.	
L3	0.890	1.270	0.035	0.050
L4	0.640	1.010	0.025	0.040
θ	0°	10°	0°	10°

Recommended Land Pattern