

Single P-Channel MOSFET

DESCRIPTION

SMC4733 is the P-Channel enhancement mode power field effect transistors are using trench DMOS 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. These devices are well suited for high efficiency fast switching applications.

PART NUMBER INFORMATION

SMC 4733 PA - TR G
 a b c d e

- a : Company name.
- b : Product Serial number.
- c : Package code PA:DFN5X6A-8
- d : Handling code TR:Tape&Reel
- e : Green produce code G:RoHS Compliant

FEATURES

$V_{DS} = -30V$, $I_D = -60A$

$R_{DS(ON)} = 6.8m\Omega(Typ.)@V_{GS} = -10V$
 $R_{DS(ON)} = 10m\Omega(Typ.)@V_{GS} = -4.5V$

- ◆ 100% UIS tested
- ◆ 100% Rg tested
- ◆ High power and current handling capability

APPLICATIONS

- ◆ Load Switch
- ◆ POL Applications



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	± 20	V
I_D	Continuous Drain Current *	$T_C = 25^\circ C$	-60
		$T_C = 100^\circ C$	-38
I_{DM}	Pulsed Drain Current ^A	-240	A
I_D	Continuous Drain Current	$T_A = 25^\circ C$	-18
		$T_A = 70^\circ C$	-14.5
P_D	Power Dissipation ^B	$T_A = 25^\circ C$	4.2
		$T_A = 70^\circ C$	2.7
I_{AS}	Avalanche Current ^A	-40	A
E_{AS}	Single Pulse Avalanche energy $L=0.1mH$ ^{AF}	80	mJ
P_D	Power Dissipation ^C	$T_C = 25^\circ C$	46
		$T_C = 100^\circ C$	18.5
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 ^B	$t \leq 10s$	30	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{BD}	Steady-State	60	
$R_{\theta JC}$	Thermal Resistance Junction to Case		2.7	

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

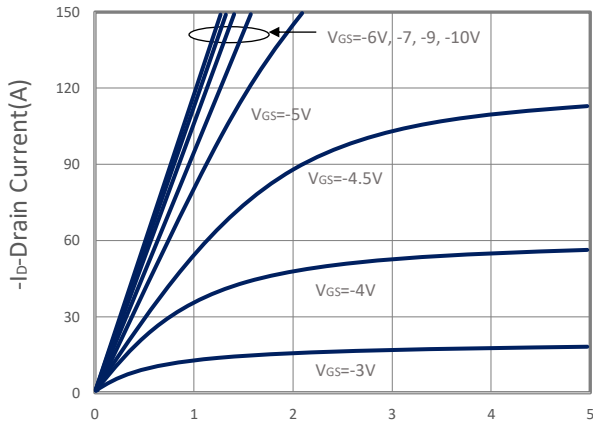
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.6	-2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V, T _J =25°C			-1	μA
		V _{DS} =-24V, V _{GS} =0V, T _J =75°C			-10	
R _{DS(ON)}	Drain-source On-Resistance ^E	V _{GS} =-10V, I _D =-18A V _{GS} =-4.5V, I _D =-12A		6.8 10	8.5 13	mΩ
G _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-10A		14.8		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^E	I _S =-1A, V _{GS} =0V		-0.7	-1	V
I _S	Continuous Source Current [*]				-60	A
t _{rr}	Reverse Recovery Time	I _S =-10A, dI/dt=100A/μs		21		ns
Q _{rr}	Reverse Recovery Charge			15.5		nC
Dynamic and Switching Parameters						
Q _g	Total Gate Charge (10V)	V _{DS} =-15V, V _{GS} =-10V, I _D =-10A		61	85	nC
Q _g	Total Gate Charge (4.5V)			30	42	
Q _{gs}	Gate-Source Charge			10.6	14.3	
Q _{gd}	Gate-Drain Charge			9	12.6	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz		3376		pF
C _{oss}	Output Capacitance			369		
C _{rss}	Reverse Transfer Capacitance			224		
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		8.2		Ω
t _{d(on)}	Turn-On Time ^E	V _{DD} =-15V, V _{GEN} =-10V, R _G =3Ω, I _D =-1A		24	46	nS
t _r				11.6	22	
t _{d(off)}	Turn-Off Time ^E			78.8	150	
t _f				33.8	63	

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

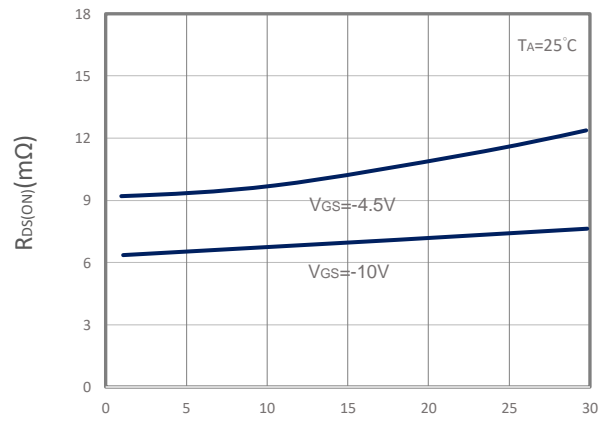
- A. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150°C.
- B. Measure the value in a still air environment at T_A=25°C, using an installation mounted on a 1 in2 FR-4 board, maximum junction temperature T_{J(MAX)}=150°C.
- C. Using junction-to-case thermal resistance, dissipation limit in the case of additional heat.
- D. T_{J(MAX)}=150°C, using junction-to-case thermal resistance (R_{θJC}) is more useful in additional heat sinking is used.
- E. The pulse test width is ≤300μs and the duty cycle ≤ 2%.
- F. The EAS data shows Maximum, tested and pulse width limited by maximum.
- *. The maximum rating current is limited by wire bonding.

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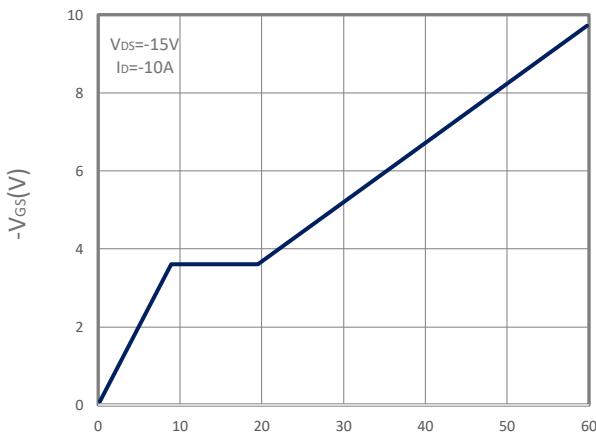
TYPICAL CHARACTERISTICS



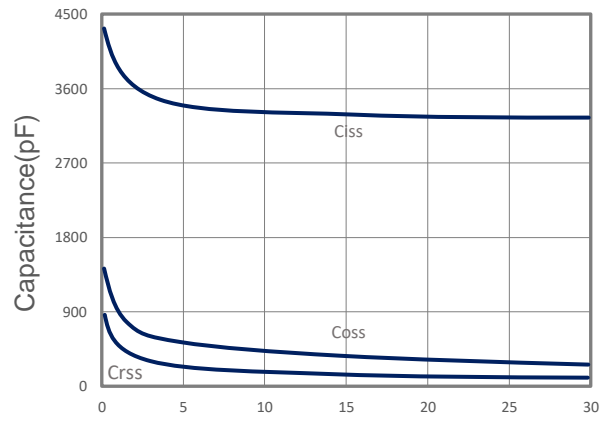
Output Characteristics



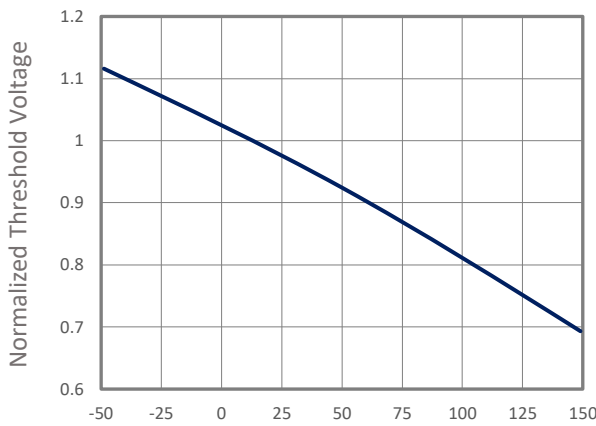
Drain-Source On Resistance



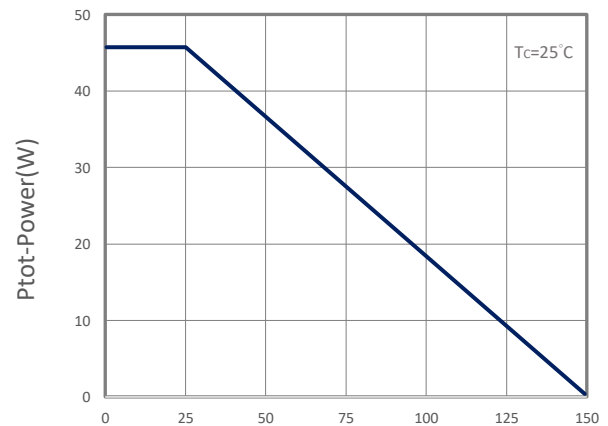
Gate Charge



Capacitance

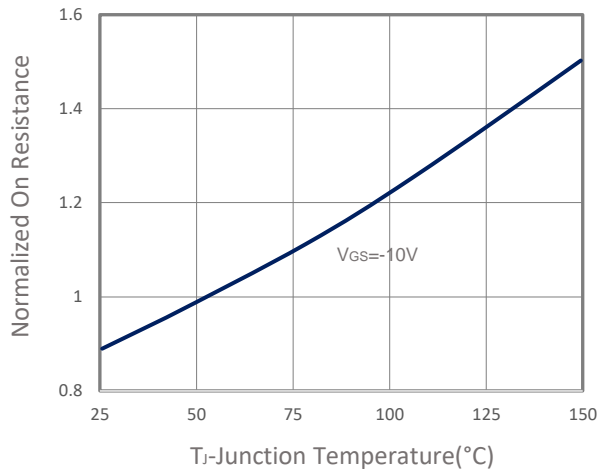


Gate Threshold Voltage

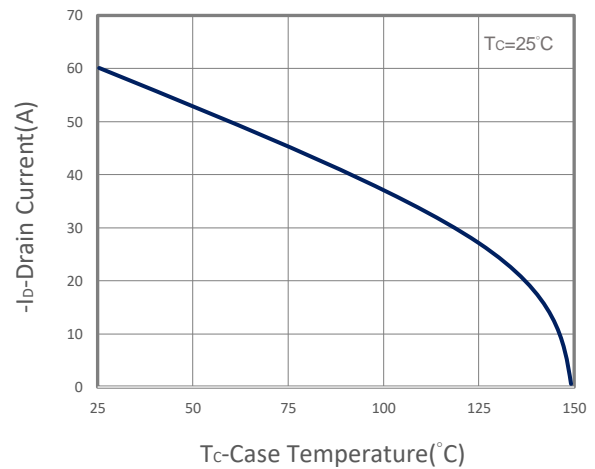


Power Dissipation

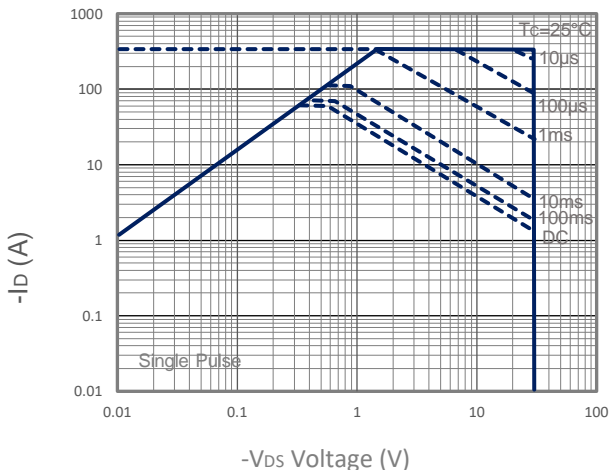
TYPICAL CHARACTERISTICS



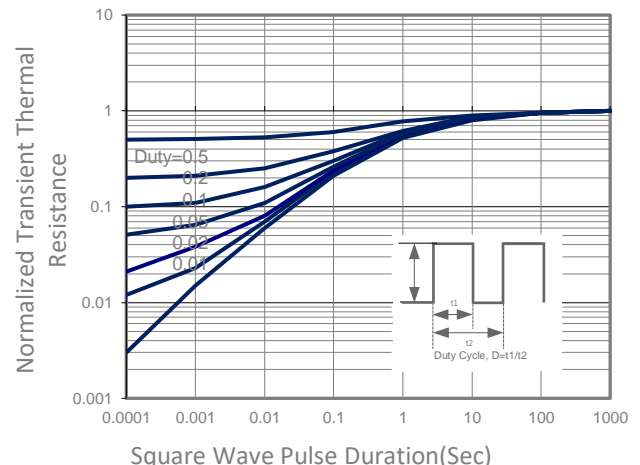
$R_{DS(ON)}$ vs Junction Temperature



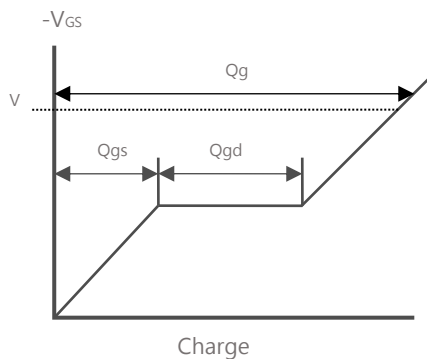
Drain Current vs T_c



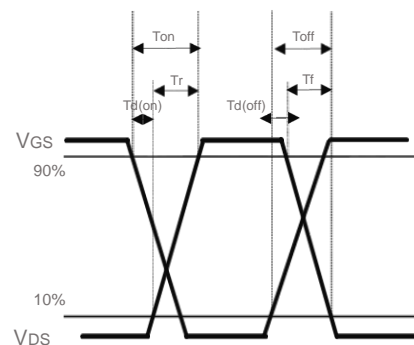
Maximum Safe Operation Area



Thermal Transient Impedance

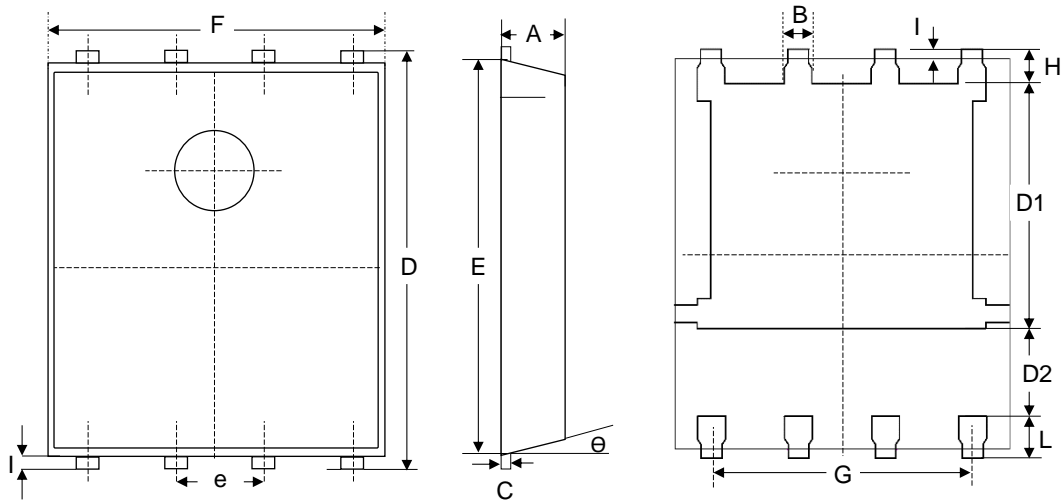


Gate Charge Waveform



Switching Time Waveform

DFN5X6A-8 PACKAGE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.000	1.200	0.039	0.047
B	0.300	0.500	0.012	0.020
C	0.154	0.354	0.006	0.014
D	5.950	6.350	0.234	0.250
D1	3.520	3.920	0.139	0.154
D2	1.150	1.45	0.045	0.057
E	5.660	6.060	0.223	0.239
e	1.270BSC.		0.050BSC.	
F	5.000	5.400	0.197	0.213
G	3.800	4.250	0.150	0.167
H	0.400	0.600	0.016	0.024
I	0.145	0.145	0.006	0.006
L	0.300	0.700	0.012	0.028