

DESCRIPTION

SMC2868ESA used trench technology are well suited for high efficiency fast switching applications, this MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, this devices are well suited for applications in the small surface mount package.

PART NUMBER INFORMATION

SMC 2868 E SA - TR G
 a b c d e f

- a : Company name
- b : Product Serial number
- c : ESD Protection
- d : Package code SA: SOT-723
- e : Handling code TR: Tape&Reel
- f : Green produce code G: RoHS Compliant

FEATURES

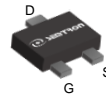
$V_{DS}=20V, I_D=0.6A$

- $R_{DS(ON)}=200m\Omega(Typ.)@V_{GS}=4.5V$
- $R_{DS(ON)}=245m\Omega(Typ.)@V_{GS}=2.5V$
- $R_{DS(ON)}=310m\Omega(Typ.)@V_{GS}=1.8V$
- $R_{DS(ON)}=380m\Omega(Typ.)@V_{GS}=1.5V$
- $R_{DS(ON)}=680m\Omega(Typ.)@V_{GS}=1.2V$

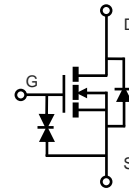
- ◆ High-speed switching, Low On-resistance
- ◆ 1.2V Low gate drive
- ◆ ESD protected

APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Switching application



SOT-723



ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}C$ Unless otherwise noted)

Symbol	Parameter	Rating	Units	
V_{DSS}	Drain-Source Voltage	20	V	
V_{GSS}	Gate-Source Voltage	± 8	V	
I_D	Continuous Drain Current	$T_A=25^{\circ}C$	0.6	A
		$T_A=70^{\circ}C$	0.47	A
I_{DM}	Pulsed Drain Current ^b	1.8	A	
P_D	Power Dissipation ^a	$T_A=25^{\circ}C$	0.15	W
		$T_A=70^{\circ}C$	0.1	W
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 ^A	$t \leq 10s$	-	$^{\circ}C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	833	$^{\circ}C/W$

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

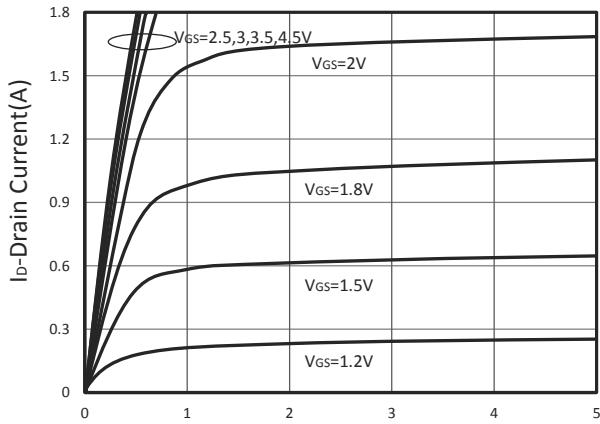
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.3	0.6	1	V
I_{GSS}	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 8V$			± 10	μA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V, T_J=25^\circ C$			1	μA
		$V_{DS}=12V, V_{GS}=0V, T_J=85^\circ C$			10	
$R_{DS(on)}$	Drain-source On-Resistance ^D	$V_{GS}=4.5V, I_D=0.6A$		200	270	m Ω
		$V_{GS}=2.5V, I_D=0.5A$		245	380	
		$V_{GS}=1.8V, I_D=0.3A$		310	500	
		$V_{GS}=1.5V, I_D=0.2A$		380	600	
		$V_{GS}=1.2V, I_D=0.1A$		680	1000	
G_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=0.5A$		1.7		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage ^D	$I_S=0.2A, V_{GS}=0V$			1	V
I_S	Diode Continuous Forward Current				0.3	A
t_{rr}	Reverse Recovery Time	$I_S=0.5A, di/dt=100A/\mu s$		8.8		ns
Q_{rr}	Reverse Recovery Charge			0.8		nC
Dynamic and Switching Parameters ^E						
Q_g	Total Gate Charge	$V_{DS}=10V, V_{GS}=4.5V, I_D=0.5A$		0.97		nC
Q_{gs}	Gate-Source Charge			0.28		
Q_{gd}	Gate-Drain Charge			0.12		
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1MHz$		42		pF
C_{oss}	Output Capacitance			9		
C_{rss}	Reverse Transfer Capacitance			6		
$t_{d(on)}$	Turn-On Time	$V_{DD}=10V, V_{GS}=4.5V$		6	11	nS
t_r				3.8	7	
$t_{d(off)}$	Turn-Off Time	$R_G=6\Omega, I_D=0.5A$		14	23	
t_f				15	29	

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

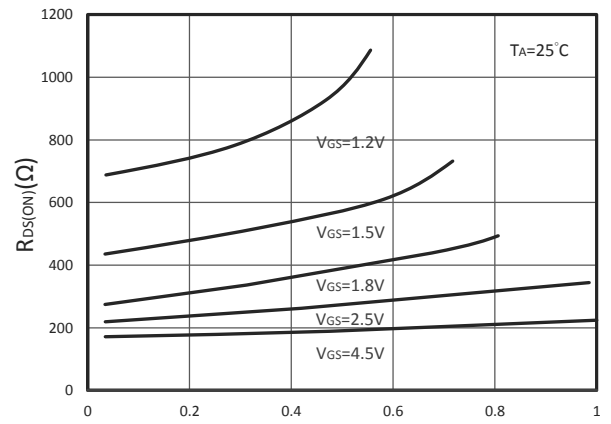
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}=150^\circ C$ (initial temperature $T_J=25^\circ C$).
- C. Using $\leq 10s$ junction-to-ambient thermal resistance is base on $T_{J(MAX)}=150^\circ C$.
- D. Pulse test width $\leq 300\mu s$ and duty cycle $\leq 2\%$.
- E. Guaranteed by design, not subject to production testing.

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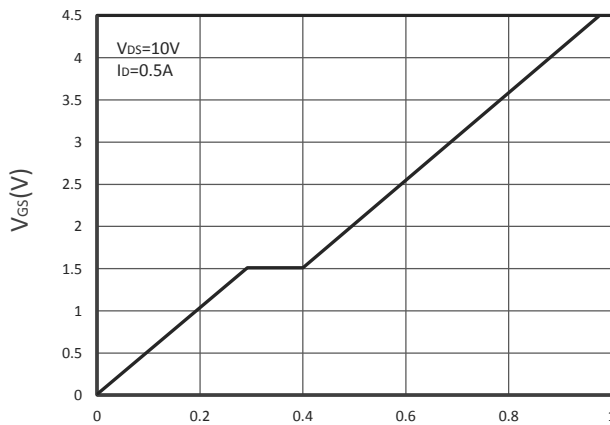
TYPICAL CHARACTERISTICS



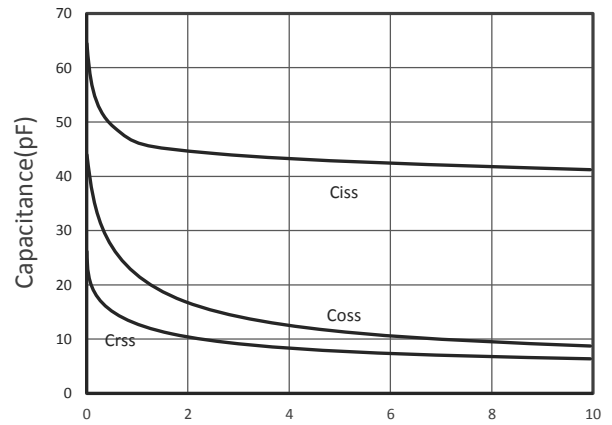
Output Characteristics



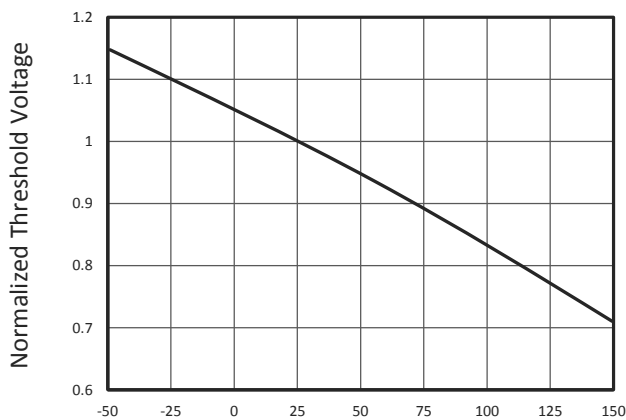
Drain-Source On Resistance



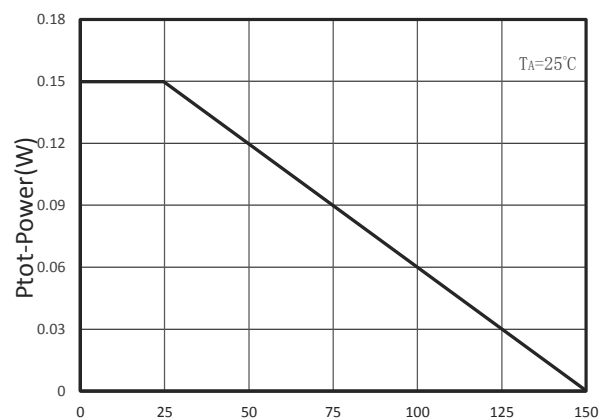
Gate Charge



Capacitance

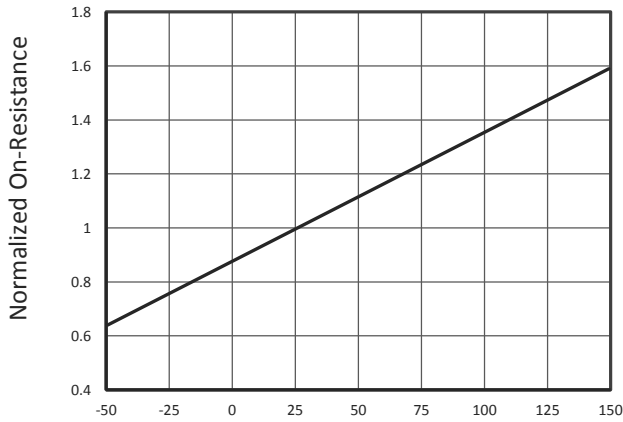


Gate Threshold Voltage

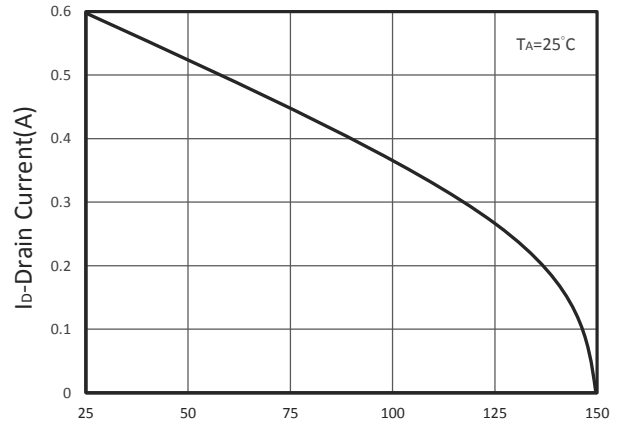


Power Dissipation

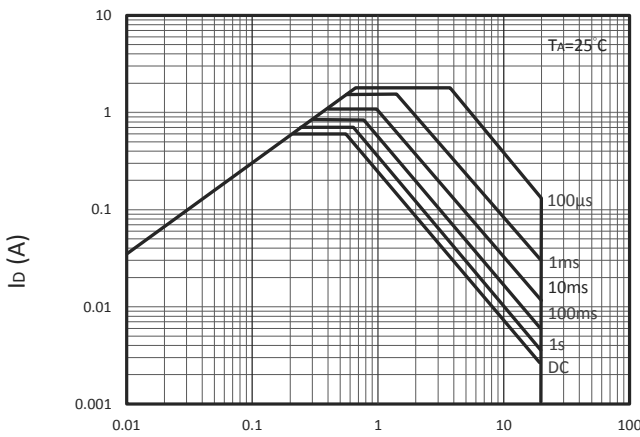
TYPICAL CHARACTERISTICS



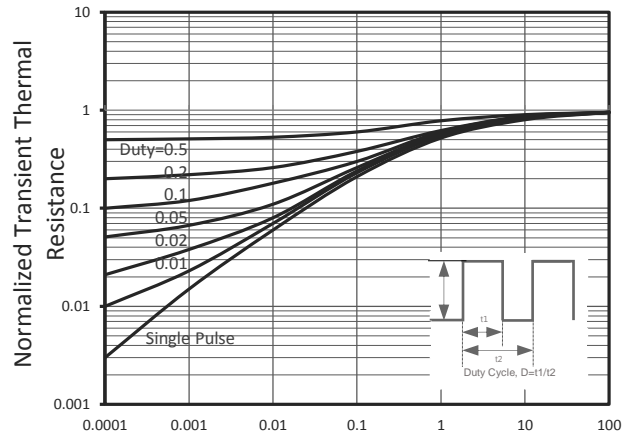
T_J-Junction Temperature(°C)
Drain-Source On Resistance



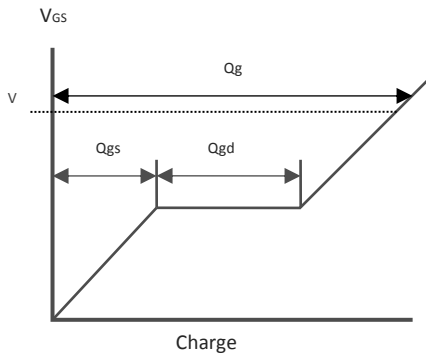
T_J-Junction Temperature(°C)
Drain Current vs T_J



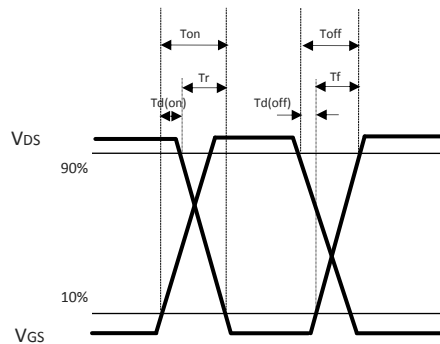
V_{ds} Voltage (V)
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)
Thermal Transient Impedance

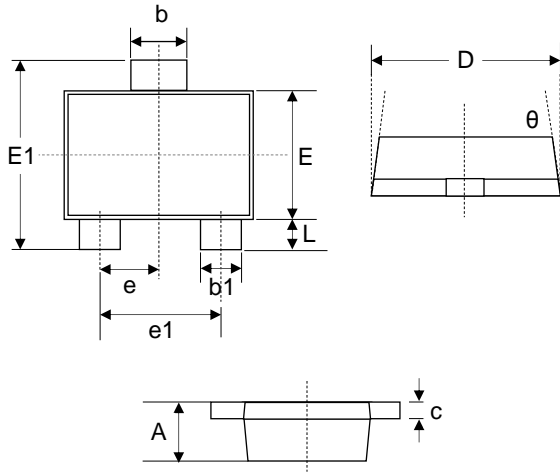


Gate Chrg Waveform

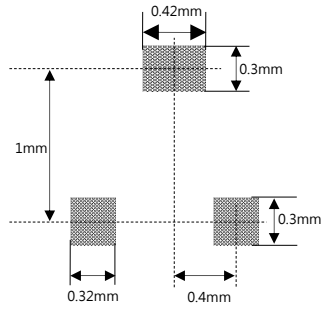


Switching Time Waveform

■ SOT-723 PACKAGE DIMENSIONS



Recommended Land Pattern



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.430	0.500	0.017	0.020
b	0.270	0.370	0.011	0.015
b1	0.170	0.270	0.007	0.011
c	0.001	0.015	0.003	0.006
D	1.150	1.250	0.045	0.049
E	0.750	0.850	0.030	0.033
E1	1.150	1.250	0.045	0.049
e	0.400 BSC.		0.016 BSC.	
e1	0.800 BSC.		0.032 BSC.	
L	0.200 BSC.		0.008 BSC.	
θ	7°		7°	