

Single N-Channel MOSFET

DESCRIPTION

SMC2868ESD 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** **SD** - **TR** **G**
 a b c d e f

a : Company name
 b : Product Serial number
 c : ESD Protection
 d : Package code SD: SOT-323
 e : Handling code TR: Tape&Reel
 f : Green produce code G: RoHS Compliant

FEATURES

$V_{DS}=20V$, $I_D=0.9A$

$R_{DS(ON)}=200m\Omega(Typ.)@V_{GS}=4.5V$

$R_{DS(ON)}=245m\Omega(Typ.)@V_{GS}=2.5V$

$R_{DS(ON)}=310m\Omega(Typ.)@V_{GS}=1.8V$

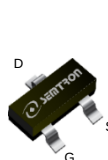
$R_{DS(ON)}=380m\Omega(Typ.)@V_{GS}=1.5V$

$R_{DS(ON)}=680m\Omega(Typ.)@V_{GS}=1.2V$

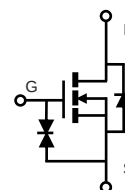
- ◆ High-speed switching, Low On-resistance
- ◆ 1.2V Low gate drive
- ◆ ESD protected

APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Switching application



SOT-323



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	$T_A=25^{\circ}C$	0.9
		$T_A=70^{\circ}C$	0.73
I_{DM}	Pulsed Drain Current ^a	1.8	A
P_D	Power Dissipation ^a	$T_A=25^{\circ}C$	0.36
		$T_A=70^{\circ}C$	0.23
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	350	$^{\circ}C/W$

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

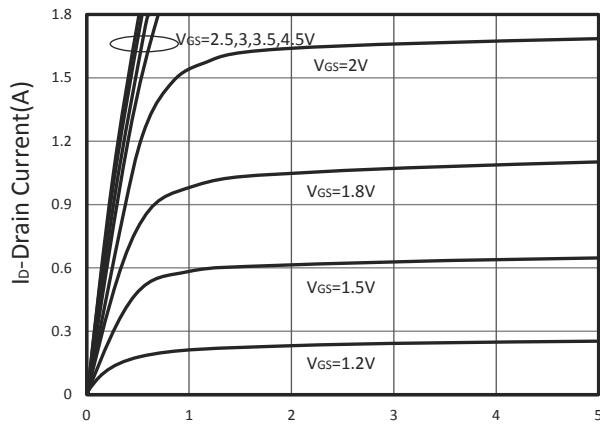
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.3	0.6	1	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±8V			±10	μA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V, T _J =25°C			1	μA
		V _{DS} =12V, V _{GS} =0V, T _J =85°C			10	
R _{DS(ON)}	Drain-source On-Resistance °	V _{GS} =4.5V, I _D =0.9A		200	270	mΩ
		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 °	I _S =0.2A, V _{GS} =0V			1	V
I _S	Diode Continuous Forward Current				0.46	A
t _{rr}	Reverse Recovery Time	I _S =0.5A, dI/dt=100A/μs		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 R _G =6Ω, I _D =0.5A		6	11	nS
t _r				3.8	7	
t _{d(off)}	Turn-Off Time			14	23	
t _f				15	29	

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

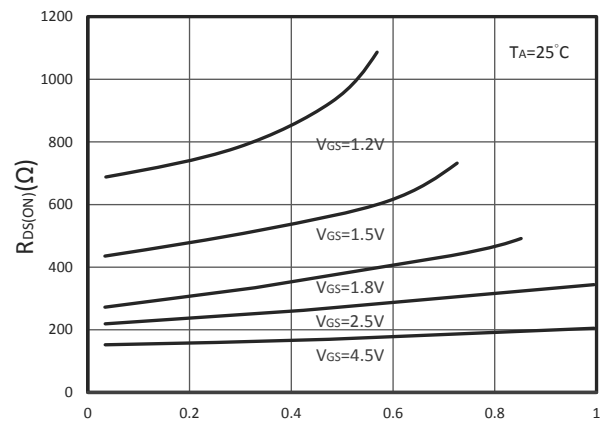
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}=150^{\circ}\text{C}$ (initial temperature $T_J=25^{\circ}\text{C}$).
- C. Using $\leq 10s$ junction-to-ambient thermal resistance is base on $T_{J(MAX)}=150^{\circ}\text{C}$.
- 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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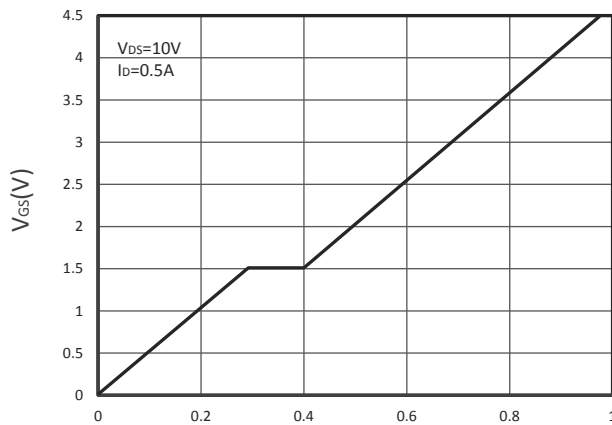
TYPICAL CHARACTERISTICS



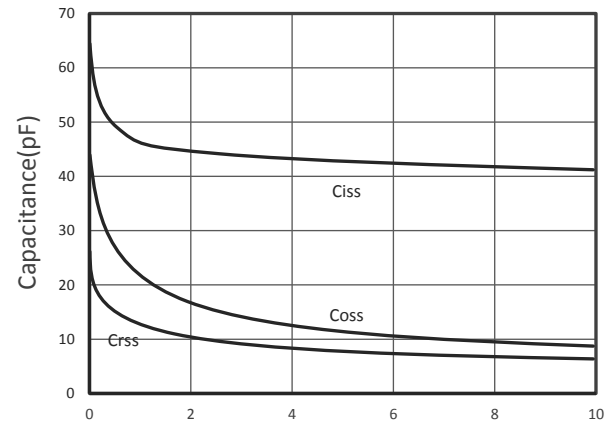
Output Characteristics



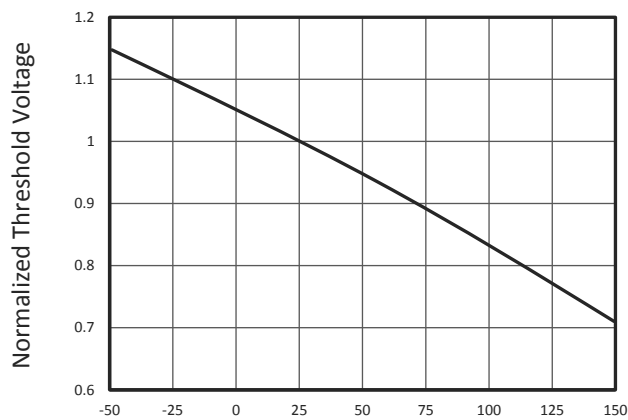
Drain-Source On Resistance



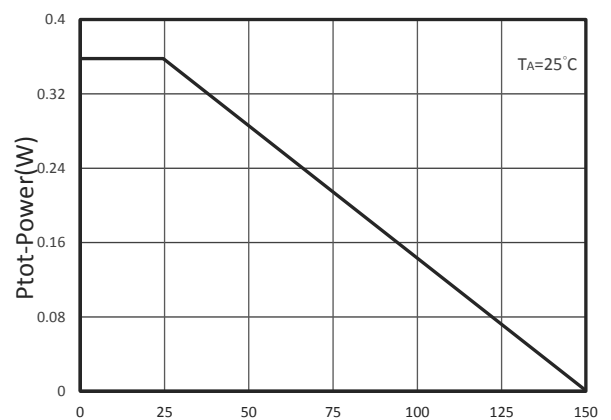
Gate Charge



Capacitance

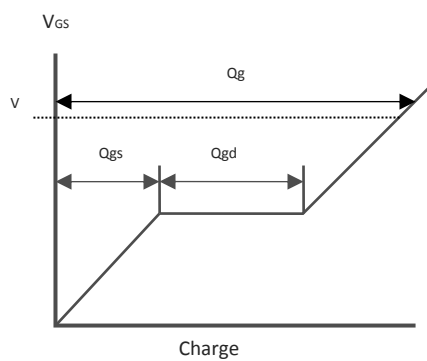
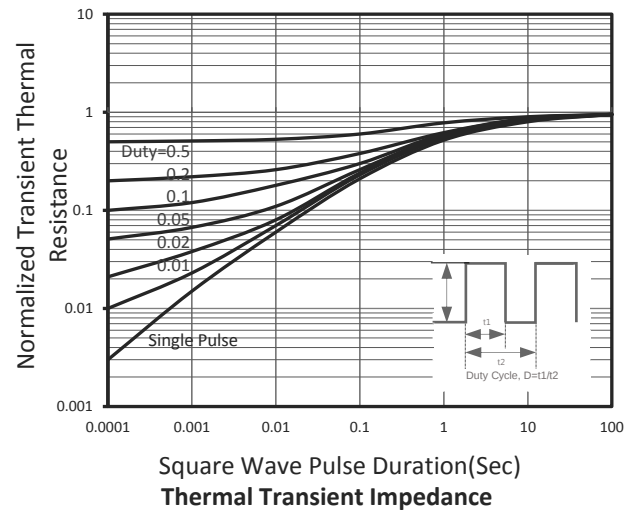
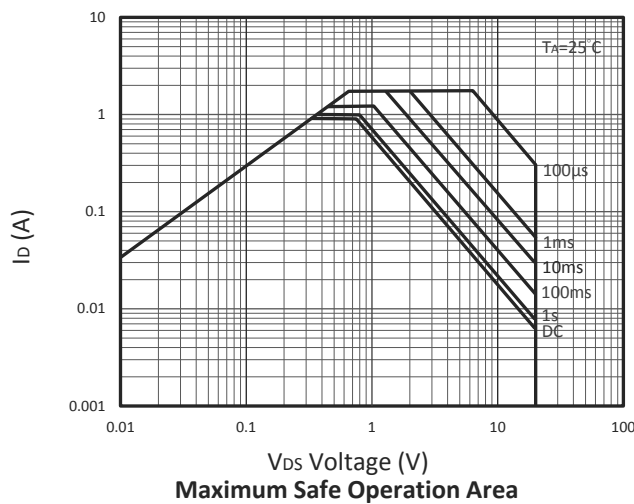
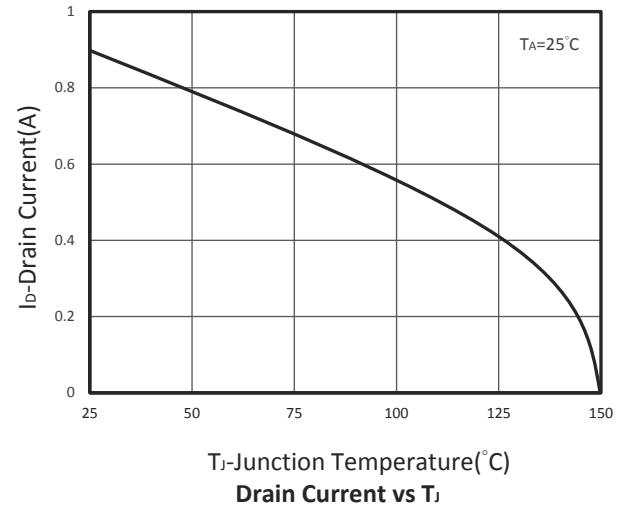
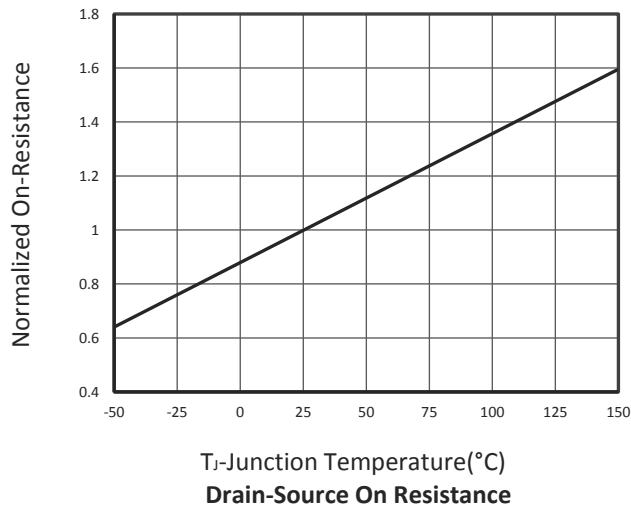


Gate Threshold Voltage

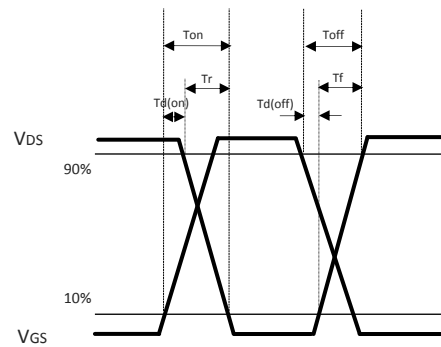


Power Dissipation

TYPICAL CHARACTERISTICS

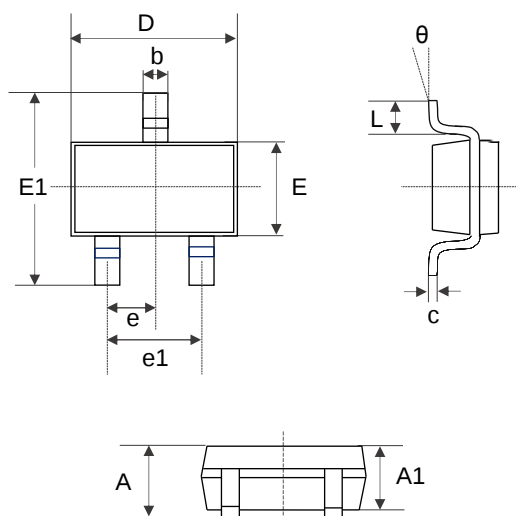


Gate Chrg Waveform

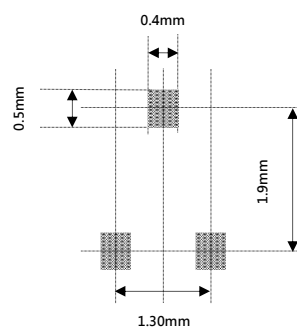


Switching Time Waveform

■ SOT-323 PACKAGE DIMENSIONS



Recommended Land Pattern



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.800	1.000	0.031	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.250	0.003	0.010
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.1500	2.450	0.085	0.096
e	0.650 BSC.		0.026 BSC.	
e1	1.200	1.400	0.047.	0.055
L	0.15	0.45	0.06	0.018
θ	0°	8°	0°	8°