

## Single P-Channel MOSFET

### DESCRIPTION

SMC2869ESD 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 2869 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

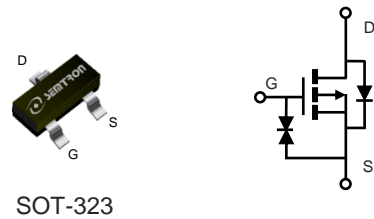
**$V_{DS}=-20V, I_D=0.56A$**

- $R_{DS(ON)}=560m\Omega(Typ.)@V_{GS}=-4.5V$
- $R_{DS(ON)}=740m\Omega(Typ.)@V_{GS}=-2.5V$
- $R_{DS(ON)}=1000m\Omega(Typ.)@V_{GS}=-1.8V$
- $R_{DS(ON)}=1400m\Omega(Typ.)@V_{GS}=-1.5V$

- ◆ High-speed switching, Low On-resistance
- ◆ 1.5V Low gate drive
- ◆ ESD protected

### APPLICATIONS

- ◆ Load switch application for portable
- ◆ DC/DC converter



### 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	$\pm 10$	V	
$I_D$	Continuous Drain Current	$T_A=25^{\circ}C$	-0.56	A
		$T_A=70^{\circ}C$	-0.45	A
$I_{DM}$	Pulsed Drain Current <sup>B</sup>	-1.8	A	
$P_D$	Power Dissipation <sup>A</sup>	$T_A=25^{\circ}C$	0.36	W
		$T_A=70^{\circ}C$	0.23	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 <sup>A</sup>	$t \leq 10s$	-	$^{\circ}C/W$
	Thermal Resistance Junction to Ambient <sup>AC</sup>	Steady-State	350	$^{\circ}C/W$

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

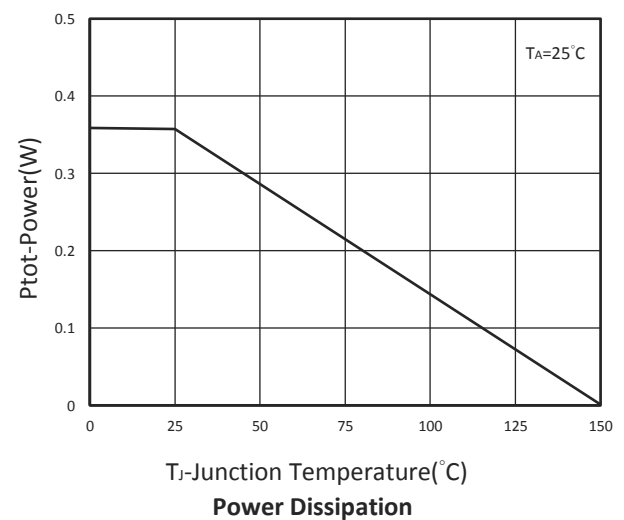
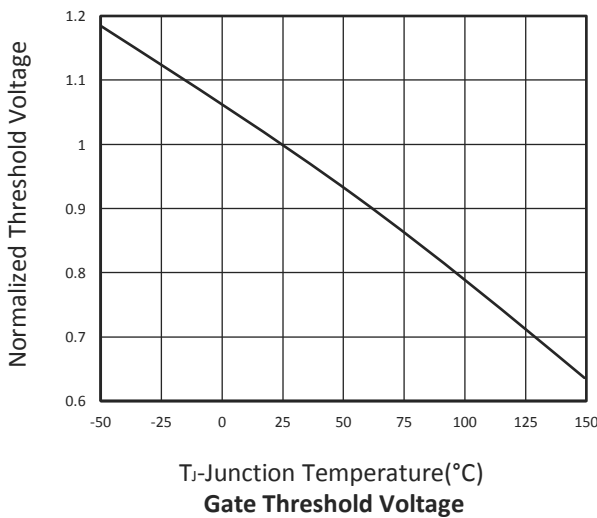
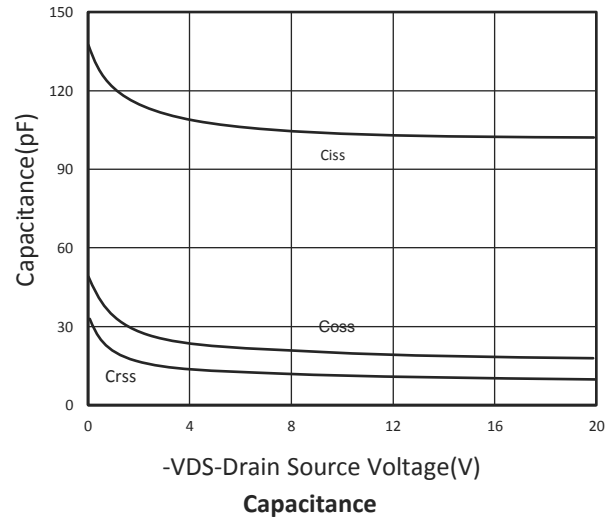
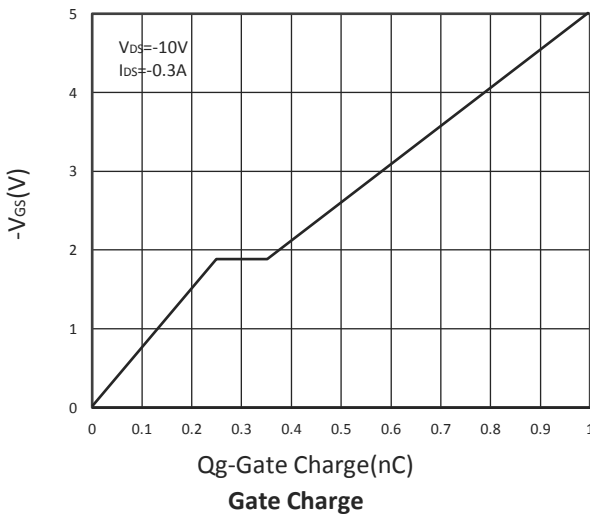
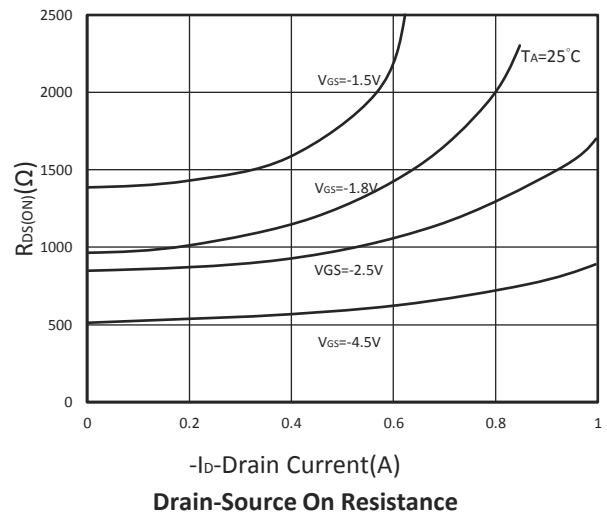
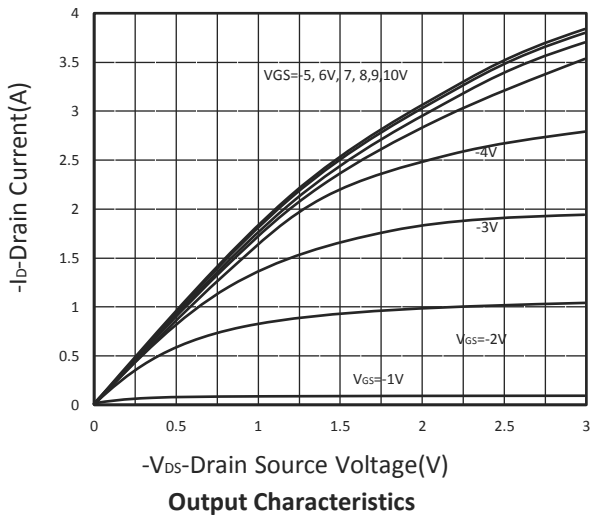
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5	-0.7	-1	V
$I_{GSS}$	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 8V$			$\pm 10$	$\mu A$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V, T_J=25^{\circ}\text{C}$			1	$\mu A$
		$V_{DS}=-12V, V_{GS}=0V, T_J=85^{\circ}\text{C}$			-10	
$R_{DS(ON)}$	Drain-source On-Resistance <sup>D</sup>	$V_{GS}=-4.5V, I_D=-0.56A$		600	750	m $\Omega$
		$V_{GS}=-2.5V, I_D=-0.3A$		800	950	
		$V_{GS}=-1.8V, I_D=-0.2A$		1000	1300	
		$V_{GS}=-1.5V, I_D=-0.1A$		1400	1800	
<b>Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage <sup>D</sup>	$I_S=-0.2A, V_{GS}=0V$			-1	V
$I_S$	Diode Continuous Forward Current				-0.5	A
<b>Dynamic and Switching Parameters <sup>F</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=-10V, V_{GS}=-4.5V$ $I_D=-0.3A$		1		nC
$Q_{gs}$	Gate-Source Charge			0.24		
$Q_{gd}$	Gate-Drain Charge			0.1		
$C_{iss}$	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V, f=1\text{MHz}$		105		pF
$C_{oss}$	Output Capacitance			16		
$C_{rss}$	Reverse Transfer Capacitance			9.4		
$t_{d(on)}$	Turn-On Time	$V_{DD}=-10V, V_{GS}=-4.5V$		6.2		nS
$t_r$				19		
$t_{d(off)}$	Turn-Off Time	$R_G=4.5\Omega, I_D=-0.3A$		77		
$t_f$				231		

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

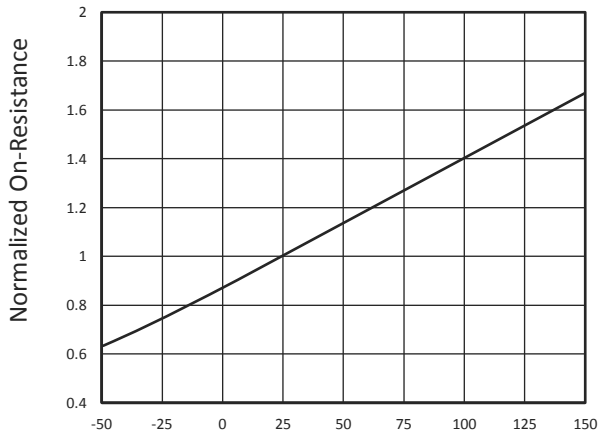
- A. Surface mounted on FR4 board using 1 in<sup>2</sup> pad size.
- B. Pulsed width limited by maximum junction temperature,  $T_{J(MAX)}=150^{\circ}\text{C}$  (initial temperature  $T_J=25^{\circ}\text{C}$ ).
- C. Using  $\leq 10\text{s}$  junction-to-ambient thermal resistance is base on  $T_{J(MAX)}=150^{\circ}\text{C}$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

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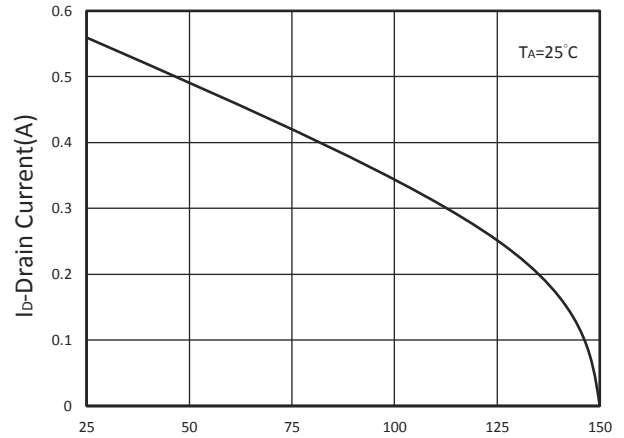
## TYPICAL CHARACTERISTICS



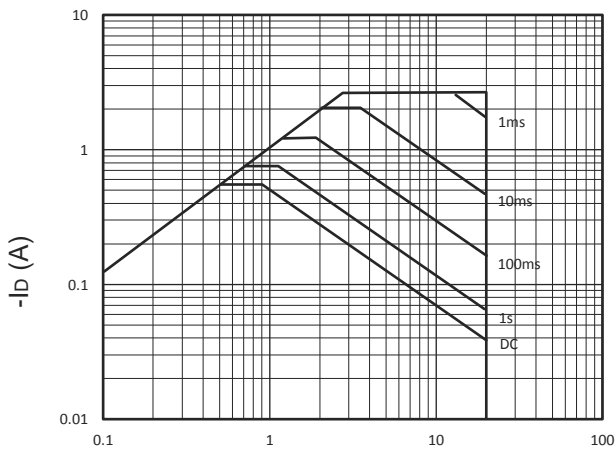
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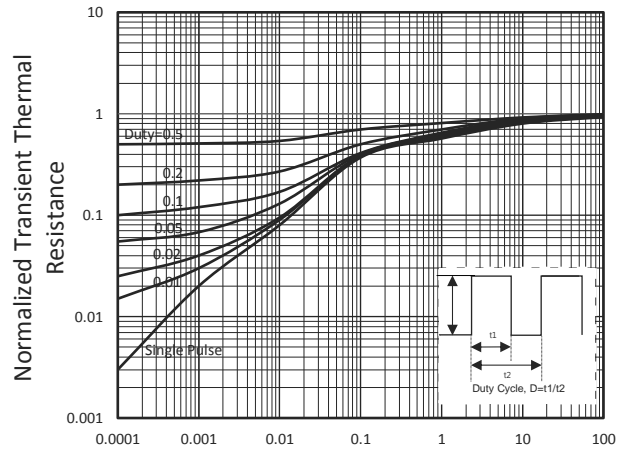
$T_j$ -Junction Temperature( $^{\circ}$ C)  
Drain-Source On Resistance



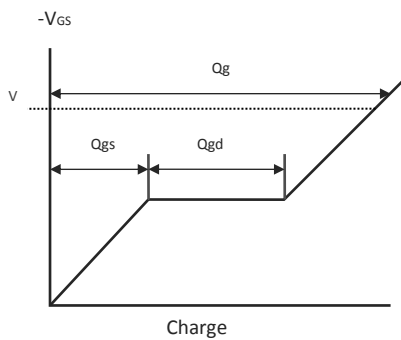
$T_j$ -Junction Temperature( $^{\circ}$ C)  
Drain Current vs  $T_j$



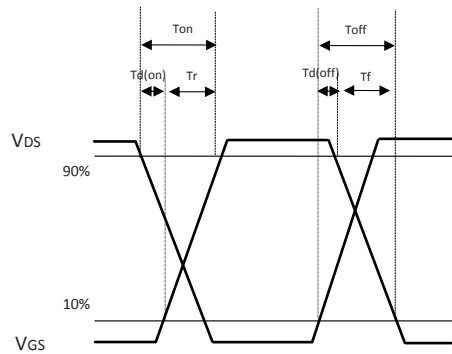
Maximum Safe Operation Area  
 $V_{ds}$  Voltage (V)



Square Wave Pulse Duration(Sec)  
Thermal Transient Impedance

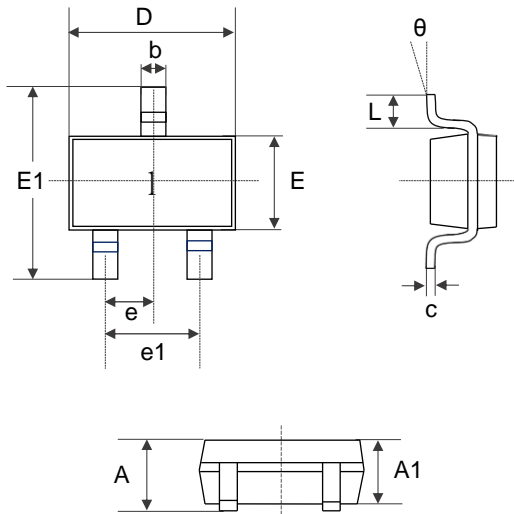


Gate Charge Waveform

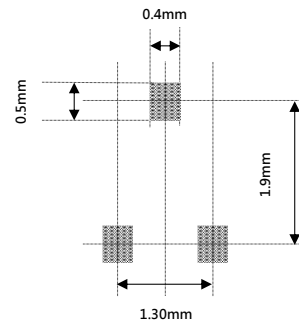


Switching Time Waveform

## ■ 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°