

### DESCRIPTION

SMC2868ESD6 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 SD6 - TR G**  
 a b c d e f

- a : Company name
- b : Product Serial number
- c : ESD Protection
- d : Package code SD6: SOT-363
- e : Handling code TR: Tape&Reel
- f : Green produce code G: RoHS Compliant

### FEATURES

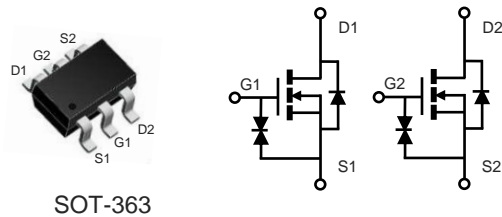
**$V_{DS}=20V, I_D=0.8A$**

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

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

### APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Switching application



### 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	$\pm 8$	V
$I_D$	Continuous Drain Current	$T_A=25^{\circ}C$	0.8
		$T_A=70^{\circ}C$	0.64
$I_{DM}$	Pulsed Drain Current <sup>B</sup>	1.8	A
$P_D$	Power Dissipation <sup>A</sup>	$T_A=25^{\circ}C$	0.28
		$T_A=70^{\circ}C$	0.18
$T_J$	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	450	$^{\circ}C/W$

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

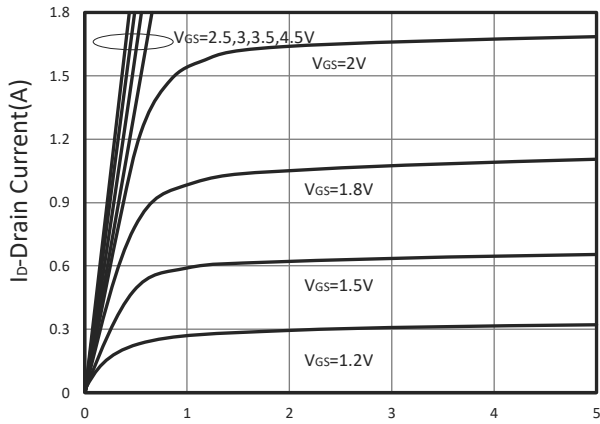
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250 $\mu$ A	20			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 $\mu$ A	0.3	0.6	1	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = $\pm$ 8V			$\pm$ 10	$\mu$ A
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, T <sub>J</sub> =25 $^{\circ}$ C			1	$\mu$ A
		V <sub>DS</sub> =12V, V <sub>GS</sub> =0V, T <sub>J</sub> =85 $^{\circ}$ C			10	
R <sub>DS(ON)</sub>	Drain-source On-Resistance <sup>D</sup>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.8A		200	270	$\Omega$
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.5A		245	380	
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =0.3A		310	500	
		V <sub>GS</sub> =1.5V, I <sub>D</sub> =0.2A		380	600	
		V <sub>GS</sub> =1.2V, I <sub>D</sub> =0.1A		680	1000	
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =0.5A		1.7		S
<b>Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage <sup>D</sup>	I <sub>S</sub> =0.2A, V <sub>GS</sub> =0V			1	V
I <sub>S</sub>	Diode Continuous Forward Current				0.4	A
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =0.5A, dI/dt=100A/ $\mu$ s		8.8		ns
Q <sub>rr</sub>	Reverse Recovery Charge			0.8		nC
<b>Dynamic and Switching Parameters <sup>E</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V I <sub>D</sub> =0.5A		0.97		nC
Q <sub>gs</sub>	Gate-Source Charge			0.28		
Q <sub>gd</sub>	Gate-Drain Charge			0.12		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz		42		pF
C <sub>oss</sub>	Output Capacitance			9		
C <sub>rss</sub>	Reverse Transfer Capacitance			6		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =10V, V <sub>GS</sub> =4.5V R <sub>G</sub> =6 $\Omega$ , I <sub>D</sub> =0.5A		6	11	nS
t <sub>r</sub>				3.8	7	
t <sub>d(off)</sub>	Turn-Off Time			14	23	
t <sub>f</sub>				15	29	

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

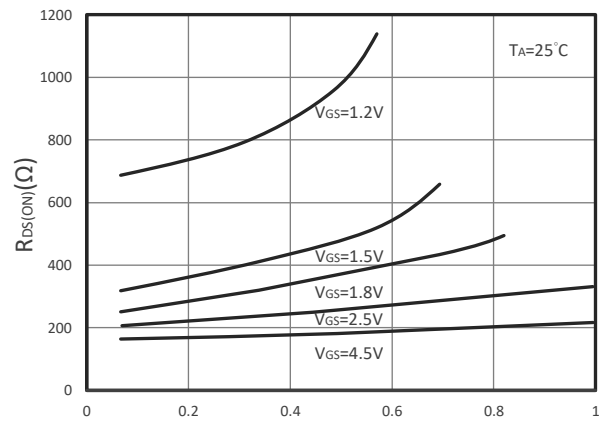
- A. Surface mounted on FR4 board using the minimum recommended pad size.
- B. Pulsed width limited by maximum junction temperature, T<sub>J(MAX)</sub>=150 $^{\circ}$ C.
- C. Using  $\leq$  10s junction-to-ambient thermal resistance is base on T<sub>J(MAX)</sub>=150 $^{\circ}$ C.
- D. Pulse test width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

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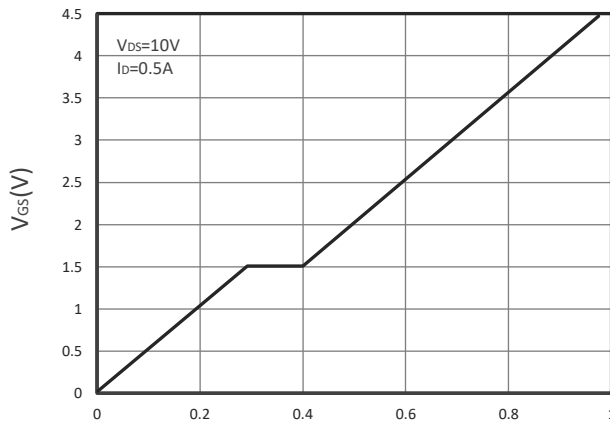
## TYPICAL CHARACTERISTICS



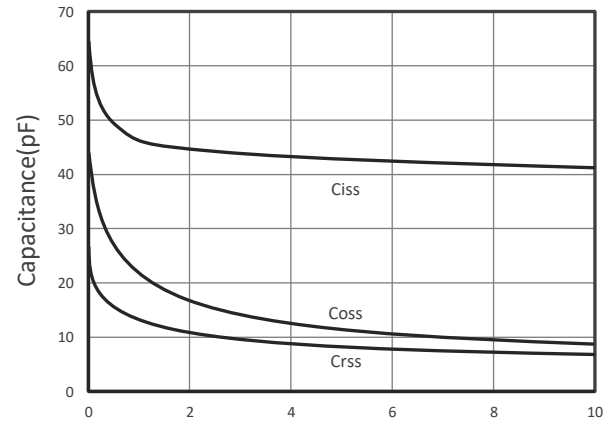
Output Characteristics



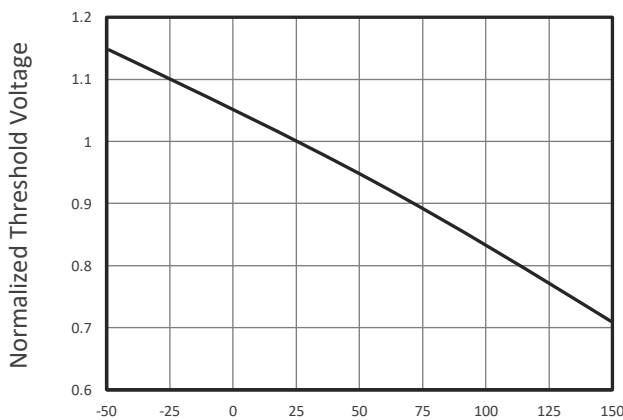
Drain-Source On Resistance



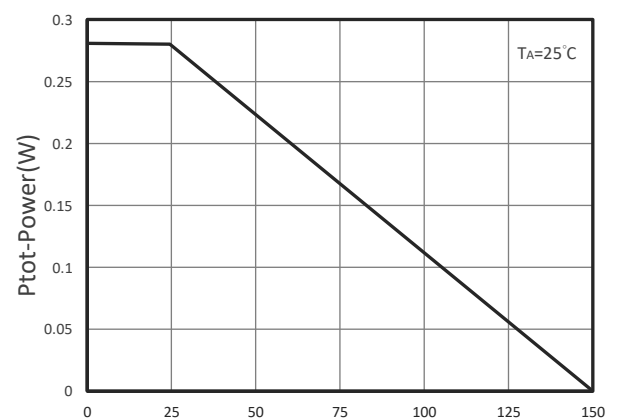
Gate Charge



Capacitance

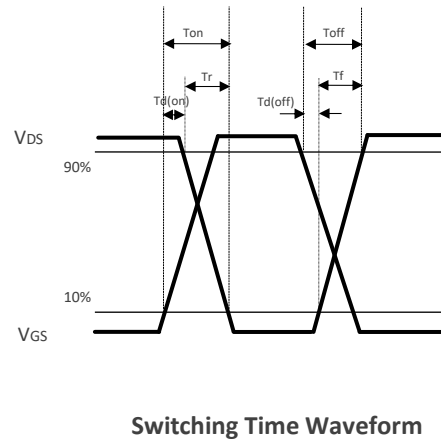
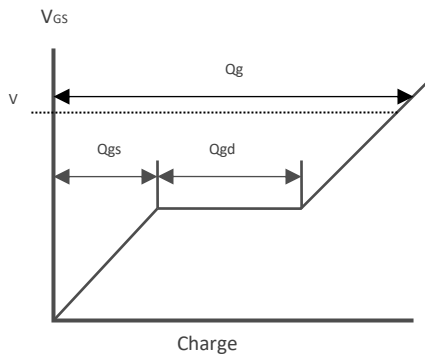
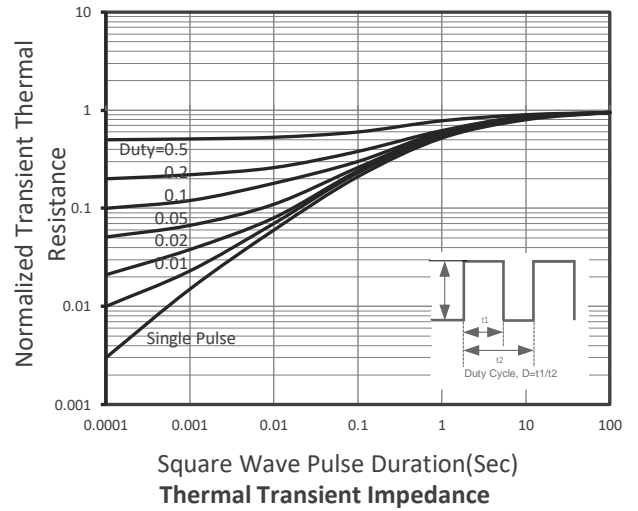
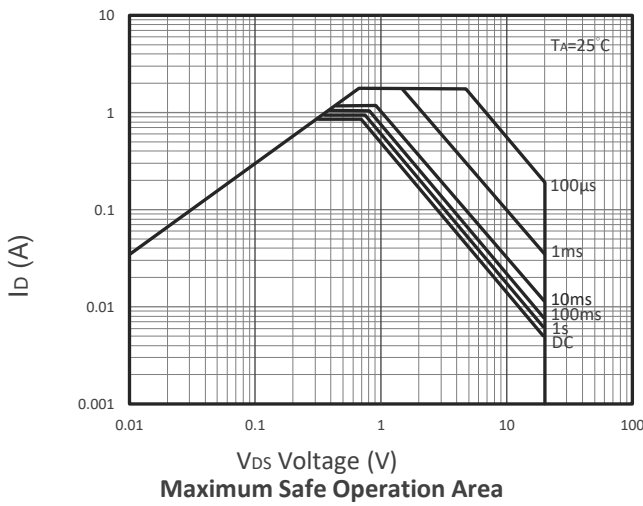
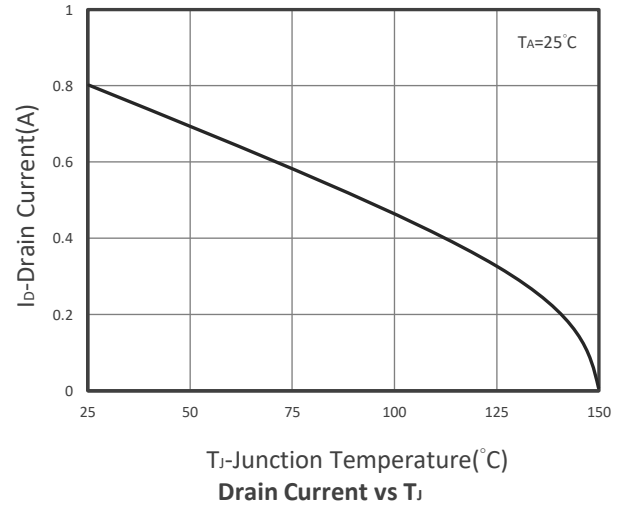
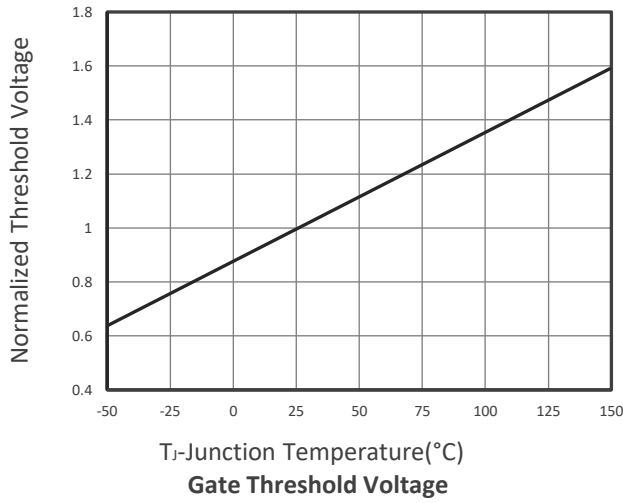


Gate Threshold Voltage

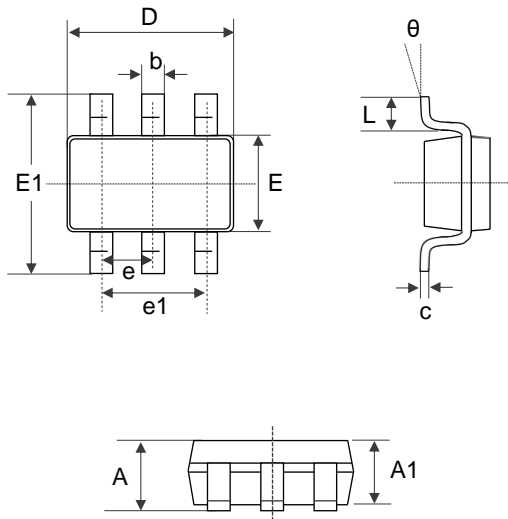


Power Dissipation

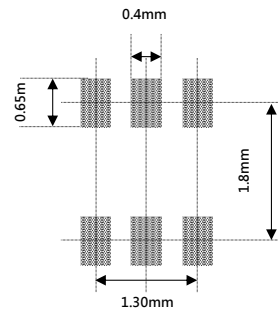
## TYPICAL CHARACTERISTICS



## ■ SOT-363 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	0.150	0.350	0.006	0.014
c	0.100	0.250	0.004	0.010
D	1.800	2.200	0.071	0.087
E	1.150	1.350	0.045	0.053
E1	2.000	2.400	0.079	0.094
e	0.650 BSC.		0.026 BSC.	
e1	1.200.	1.400	0.047	0.055
L	0.100	0.350	0.004	0.014
θ	0°	8°	0°	8°