

20V Complementary MOSFET

DESCRIPTION

The SMC2562ESG6 is the N+P channel complementary mode power field effect transistors, used trench technology are well suited for high efficiency fast switching applications, this devices are well suited for applications in the small surface mount package.

PART NUMBER INFORMATION

SMC 2562 E SG6 - TR G
 a b c d e f

- a : Company name
- b : Product Serial number
- c : ESD Protection
- d : Package code SG6: SOT-563
- e : Handling code TR: Tape&Reel
- f : Green produce code G: RoHS Compliant

FEATURES

N-Channel

$V_{DS}=20V, I_D=0.98A$

$R_{DS(ON)}=195m\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(ON)}=230m\Omega(Typ.)@V_{GS}=4.5V$

P-Channel

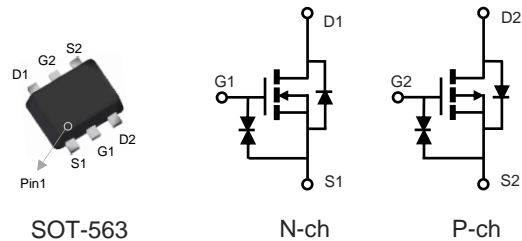
$V_{DS}=-20V, I_D=-0.65A$

$R_{DS(ON)}=440m\Omega(Typ.)@V_{GS}=-10V$
 $R_{DS(ON)}=600m\Omega(Typ.)@V_{GS}=-4.5V$

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

APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Load/Power Switches



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

Symbol	Parameter	Rating		Units	
		N-ch	P-ch		
V_{DSS}	Drain-Source Voltage	20	-20	V	
V_{GSS}	Gate-Source Voltage	± 8	± 8	V	
I_D	Continuous Drain Current	$T_A=25^\circ C$	0.98	0.65	A
		$T_A=70^\circ C$	0.79	0.52	A
I_{DM}	Pulsed Drain Current ^B	3.9	2.6	A	
P_D	Power Dissipation ^A	$T_A=25^\circ C$	0.38	0.38	W
		$T_A=70^\circ C$	0.24	0.24	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 ^{AC}		330	$^\circ C/W$

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

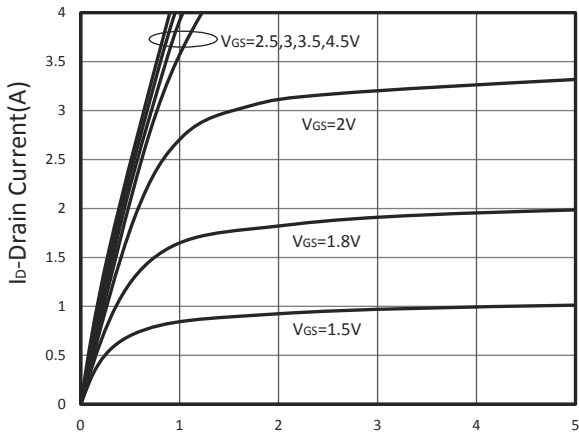
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.3	0.6	1	V
I_{GSS}	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 8V$			± 10	μA
I_{DSS}	Zero Gate 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	$V_{GS}=4.5V, I_D=0.6A$		195	250	m Ω
		$V_{GS}=2.5V, I_D=0.4A$		230	300	
		$V_{GS}=1.8V, I_D=0.3A$		295	400	
		$V_{GS}=1.5V, I_D=0.1A$		365	500	
G_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=0.6A$		1.8		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage ^D	$I_S=0.2A, V_{GS}=0V$			1	V
I_S	Diode Continuous Forward Current				0.49	A
t_{rr}	Reverse Recovery Time	$I_S=0.5A, di/dt=100A/\mu s$		8.8		ns
Q_{rr}	Reverse Recovery Charge			1.3		nC
Dynamic and Switching Parameters ^E						
Q_g	Total Gate Charge	$V_{DS}=10V, V_{GS}=4.5V, I_D=0.6A$		1.05		nC
Q_{gs}	Gate-Source Charge			0.26		
Q_{gd}	Gate-Drain Charge			0.2		
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1MHz$		40		pF
C_{oss}	Output Capacitance			14		
C_{rss}	Reverse Transfer Capacitance			6		
$t_{d(on)}$	Turn-On Time	$V_{DD}=10V, V_{GS}=4.5V$ $R_G=6\Omega, I_D=0.5A$		5.3		nS
t_r				3.7		
$t_{d(off)}$	Turn-Off Time			18		
t_f				8		

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

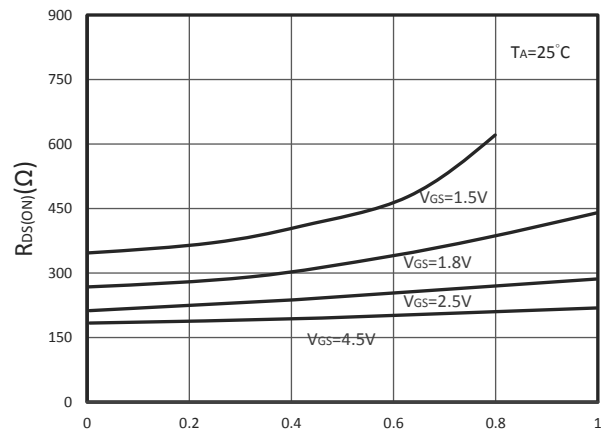
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}=150^\circ C$ (initial temperature $T_J=25^\circ C$).
- C. Using $\leq 10s$ junction-to-ambient thermal resistance is base on $T_{J(MAX)}=150^\circ C$.
- D. Pulse test width $\leq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

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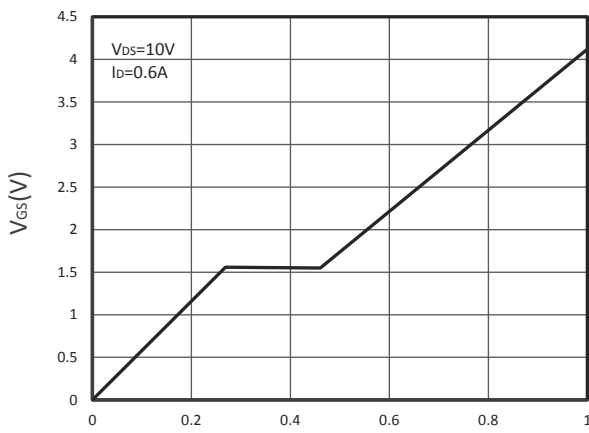
N-ch TYPICAL CHARACTERISTICS



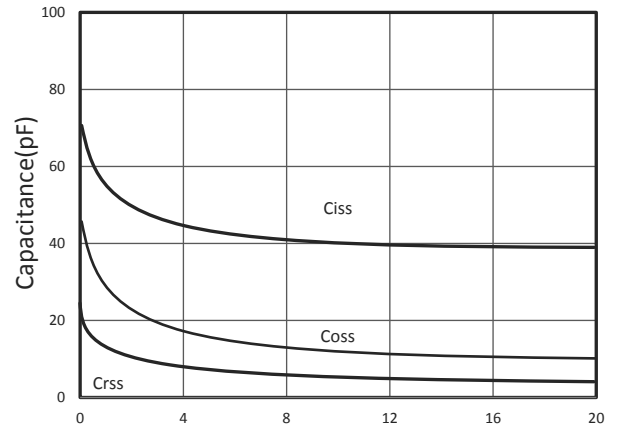
Output Characteristics



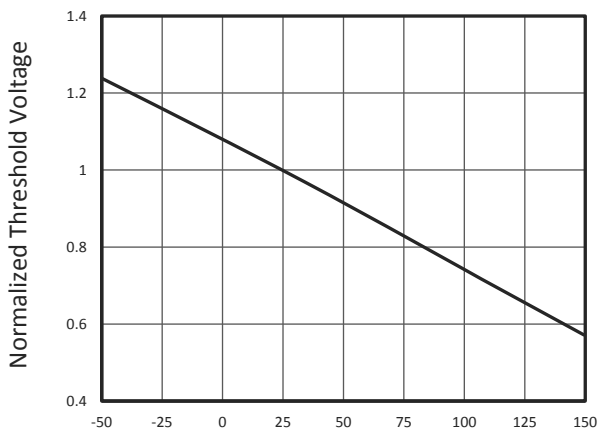
Drain-Source On Resistance



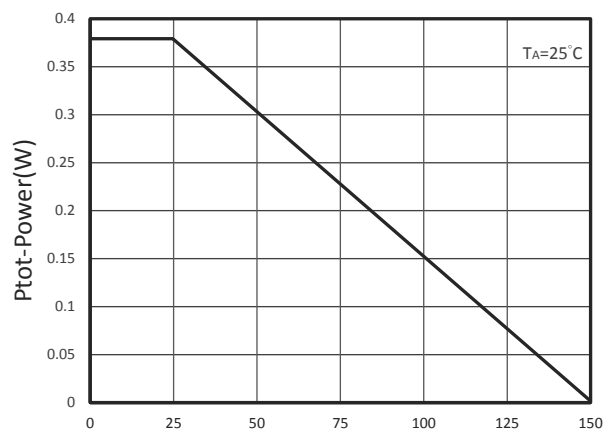
Gate Charge



Capacitance

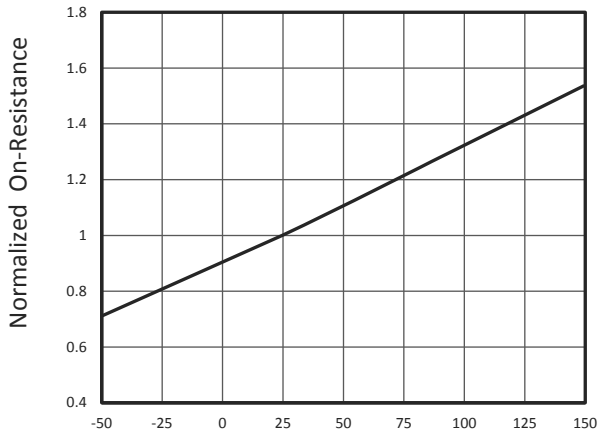


Gate Threshold Voltage

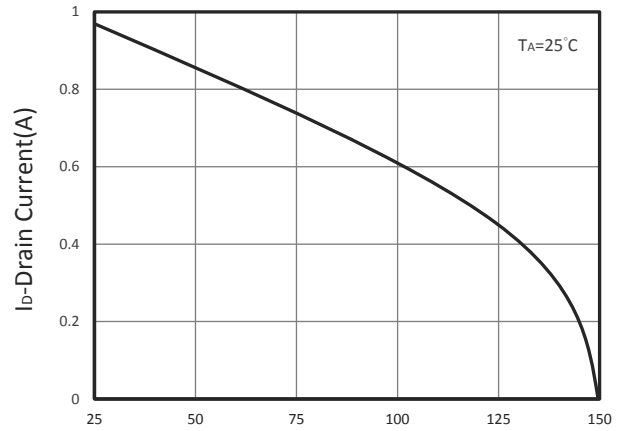


Power Dissipation

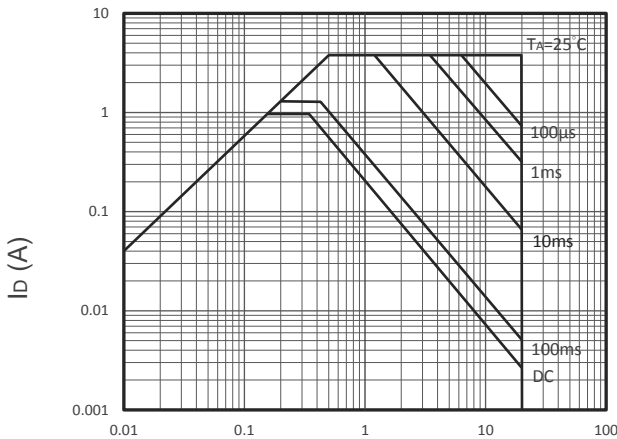
N-ch TYPICAL CHARACTERISTICS



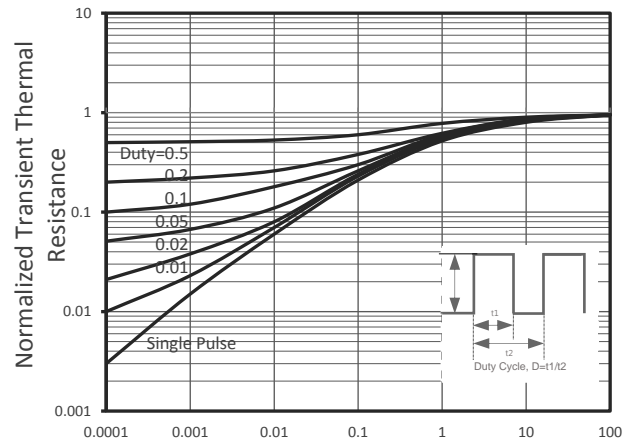
T_J-Junction Temperature(°C)
Drain-Source On Resistance



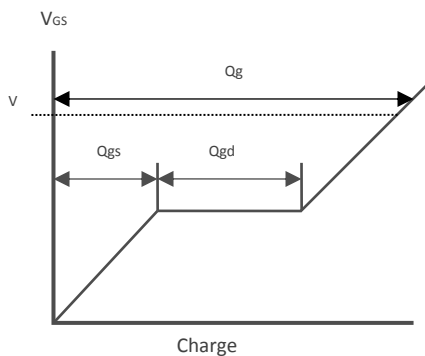
T_J-Junction Temperature(°C)
Drain Current vs T_J



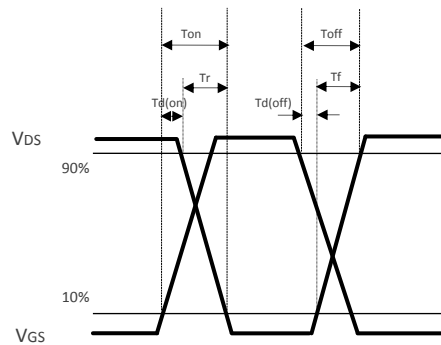
V_{DS} Voltage (V)
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)
Thermal Transient Impedance



Gate Charge Waveform



Switching Time Waveform

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

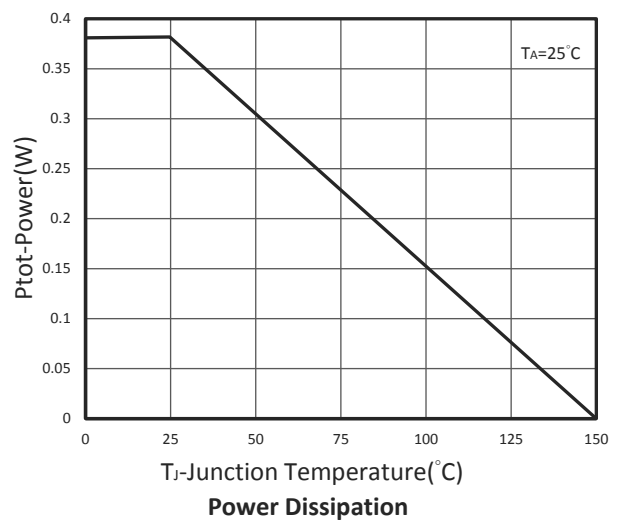
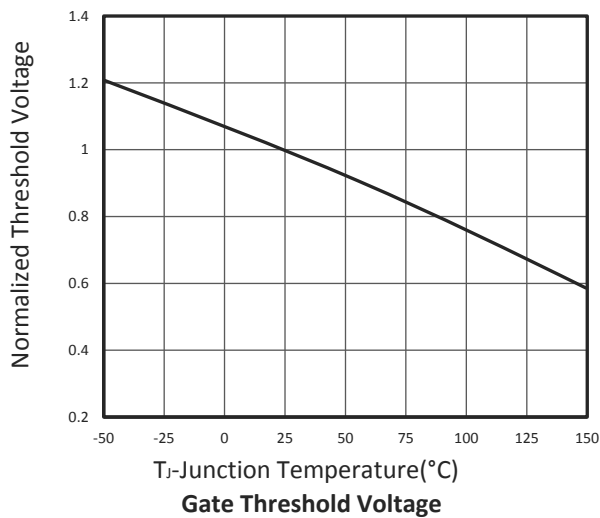
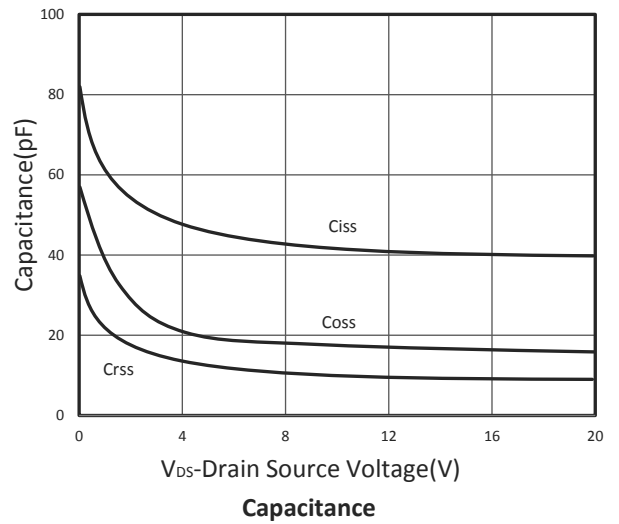
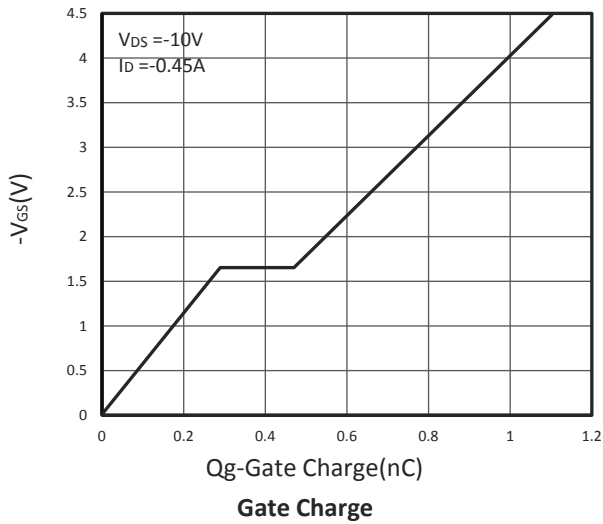
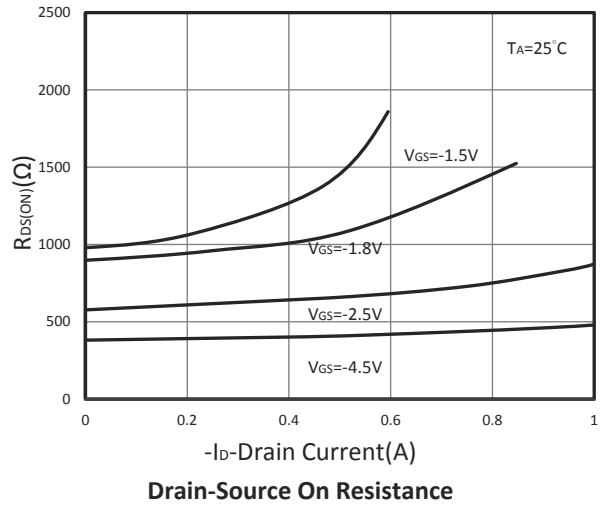
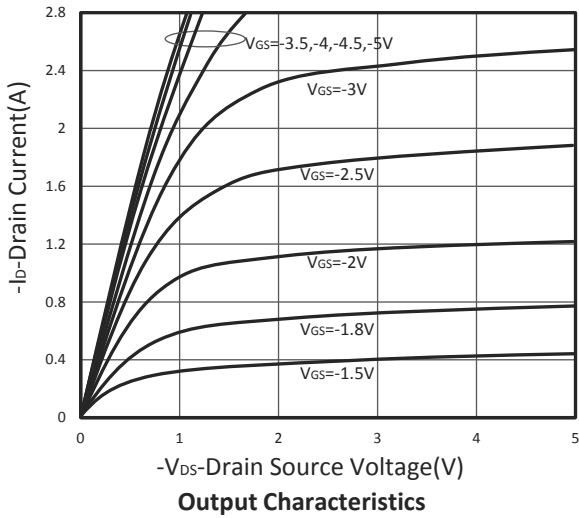
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.3	-0.6	-1	V
I_{GSS}	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 8V$			± 10	μA
I_{DSS}	Zero 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	$V_{GS}=-4.5V, I_D=-0.45A$		440	580	m Ω
		$V_{GS}=-2.5V, I_D=-0.3A$		600	800	
		$V_{GS}=-1.8V, I_D=-0.2A$		820	1100	
		$V_{GS}=-1.5V, I_D=-0.1A$		1000	1350	
G_{fs}	Forward Transconductance	$V_{DS}=-5V, I_D=-0.45A$		1		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage ^D	$I_S=-0.2A, V_{GS}=0V$			-1	V
I_S	Diode Continuous Forward Current				-0.33	A
t_{rr}	Reverse Recovery Time	$I_S=-0.5A, dI/dt=100A/\mu s$		13		ns
Q_{rr}	Reverse Recovery Charge			9.5		nC
Dynamic and Switching Parameters ^E						
Q_g	Total Gate Charge	$V_{DS}=-10V, V_{GS}=-4.5V$ $I_D=-0.45A$		1.1		nC
Q_{gs}	Gate-Source Charge			0.28		
Q_{gd}	Gate-Drain Charge			0.18		
C_{iss}	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V, f=1MHz$		43		pF
C_{oss}	Output Capacitance			18		
C_{rss}	Reverse Transfer Capacitance			9.5		
$t_{d(on)}$	Turn-On Time	$V_{DD}=-10V, V_{GS}=-4.5V$ $R_G=6\Omega, I_D=-0.5A$		7.2		nS
t_r				4.75		
$t_{d(off)}$	Turn-Off Time			32		
t_f				20		

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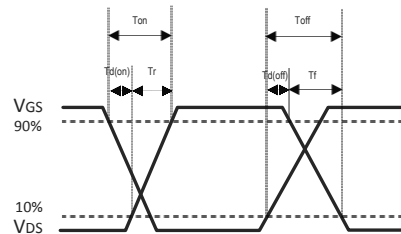
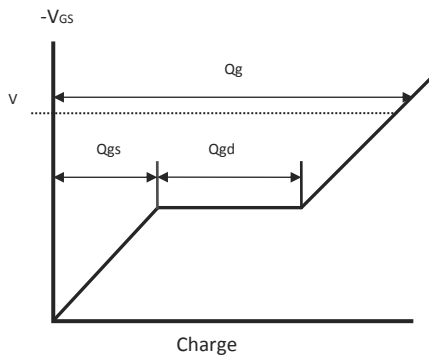
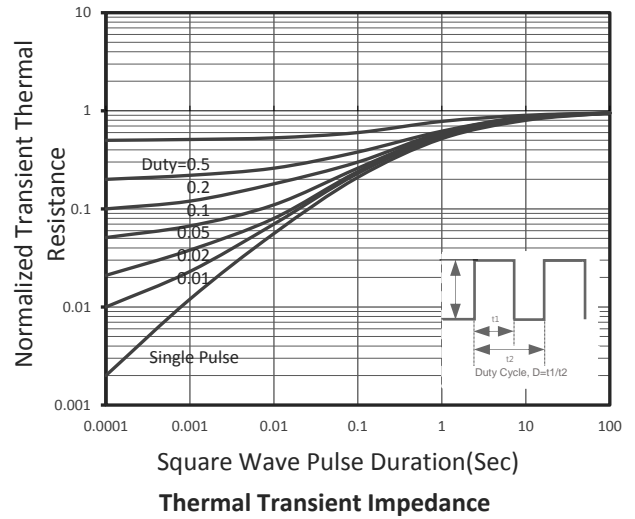
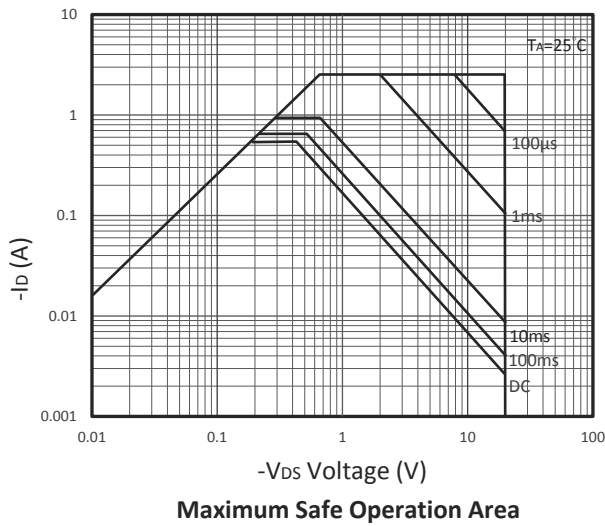
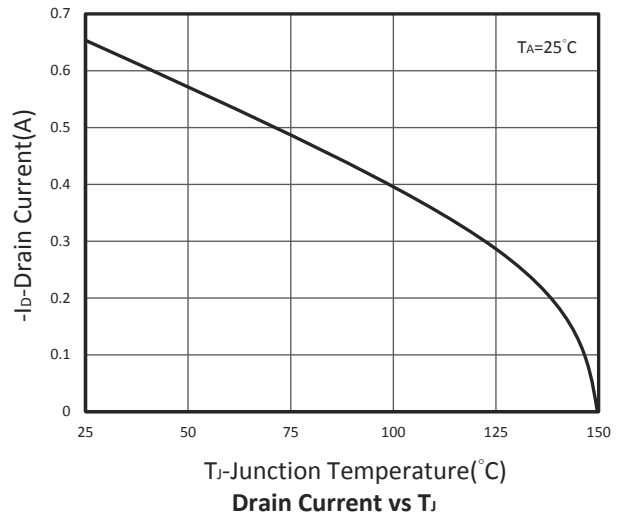
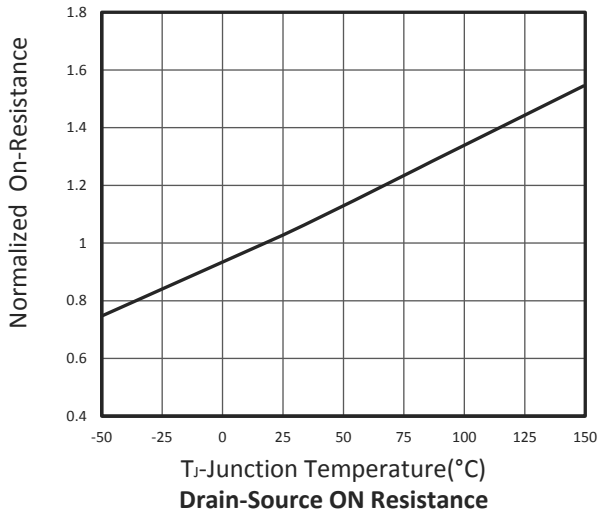
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P-ch TYPICAL CHARACTERISTICS

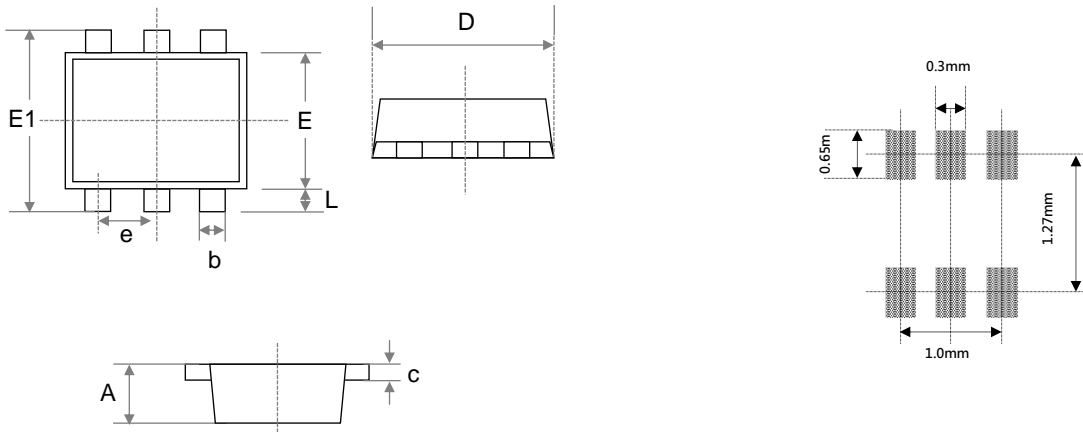


P-ch TYPICAL CHARACTERISTICS



■ SOT-563 PACKAGE DIMENSIONS

Recommended Land Pattern



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.500	0.600	0.020	0.024
b	0.150	0.300	0.006	0.012
c	0.100	0.180	0.004	0.007
D	1.500	1.700	0.059	0.067
E	1.100	1.250	0.043	0.049
E1	1.550	1.700	0.061	0.067
e	0.500 BSC.		0.020 BSC.	
L	0.100	0.300	0.004	0.012