SemTron Microtech Corporation

SMC2562ESG6

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

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

P-Channel

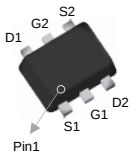
V_{DS}=-20V, I_D=-0.65A

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

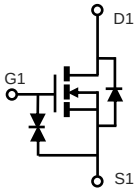
◆High-speed switching, Low On-resistance
◆1.5V Low gate drive
◆ESD protected

■APPLICATIONS

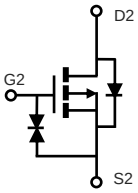
◆Hend-Held Instruments
◆Load/Power Switches



SOT-563



N-ch



P-ch

■ABSOLUTE MAXIMUM RATINGS (T_A=25°C Unless otherwise noted)

Symbol	Parameter		Rating N-ch	Rating P-ch	Units
V_{DSS}	Drain-Source Voltage		20	-20	V
V_{GSS}	Gate-Source Voltage		±8	±8	V
I_D	Continuous Drain Current	T_A=25°C	0.98	0.65	A
		T_A=70°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°C	0.38	0.38	W
		T_A=70°C	0.24	0.24	W
T_J	Operation Junction Temperature		-55/150		°C
T_{STG}	Storage Temperature Range		-55/150		°C

■THERMAL RESISTANCE

Symbol	Parameter		Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient [AC]	Steady-State		330	°C/W

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■N-ch ELECTRICAL CHARACTERISTICS(T_A=25°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 [D]	V_{GS}=4.5V, I_D=0.6A		195	250	mΩ
		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/μs		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=6Ω, 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 in^2 pad size.
B. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}$=150°C (initial temperature T_J=25°C).
C. Using ≤ 10s junction-to-ambient thermal resistance is base on $T_{J(MAX)}$=150°C.
D. Pulse test width ≤300μs and duty cycle ≤ 2%.
E. Guaranteed by design, not subject to production testing.

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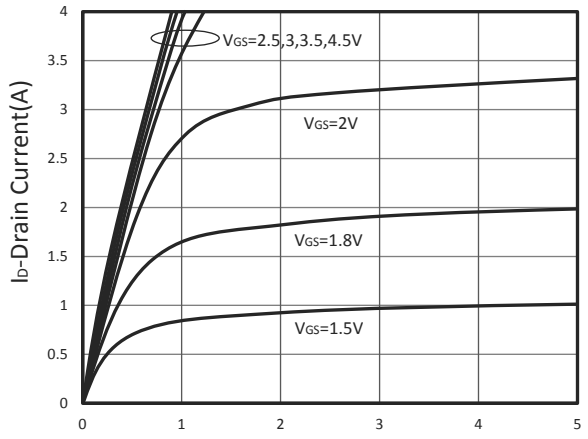
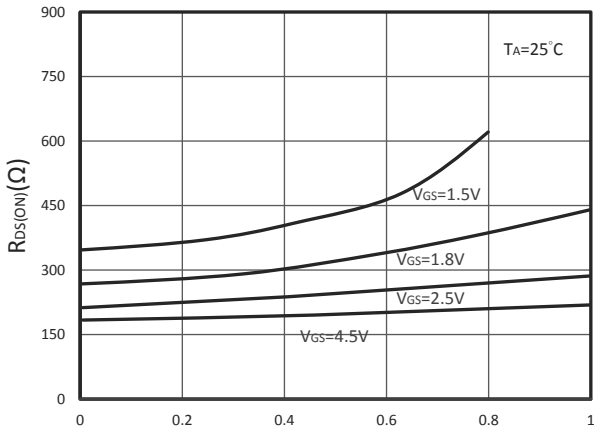
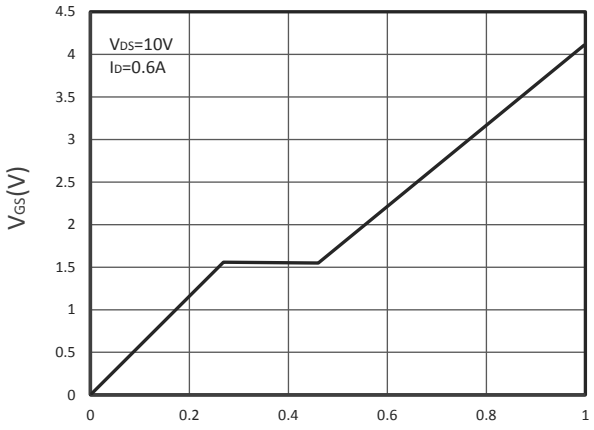
■N-ch TYPICAL CHARACTERISTICS



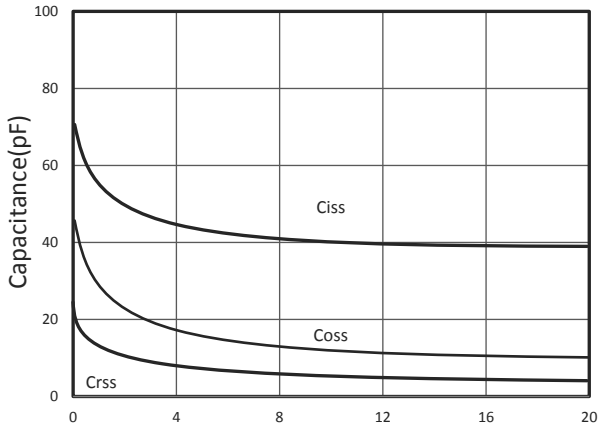
Output Characteristics



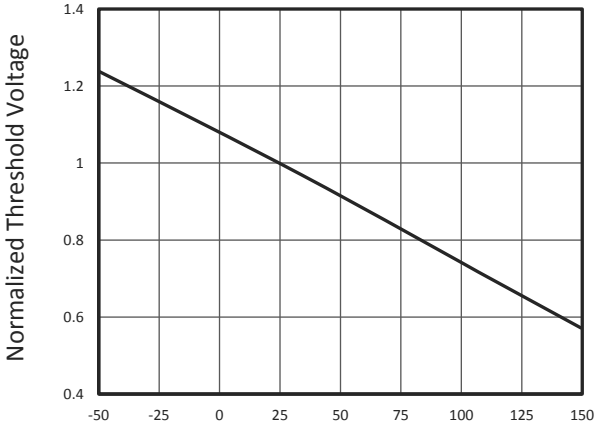
Drain-Source On Resistance



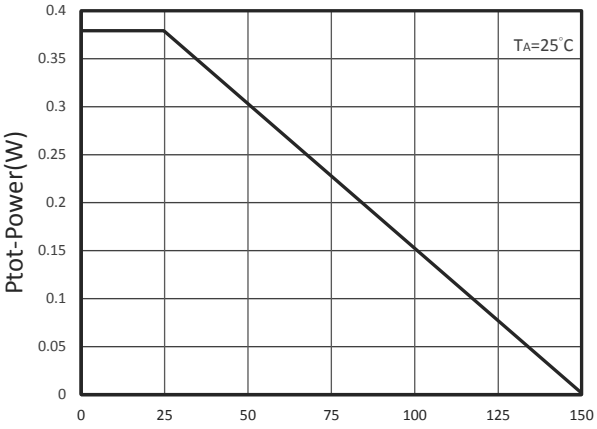
Gate Charge



Capacitance



Gate Threshold Voltage



Power Dissipation

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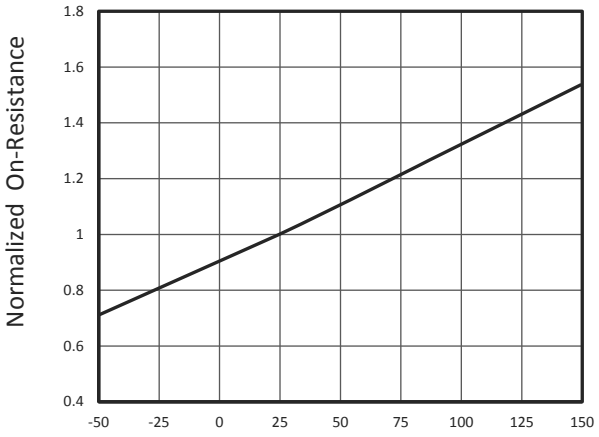
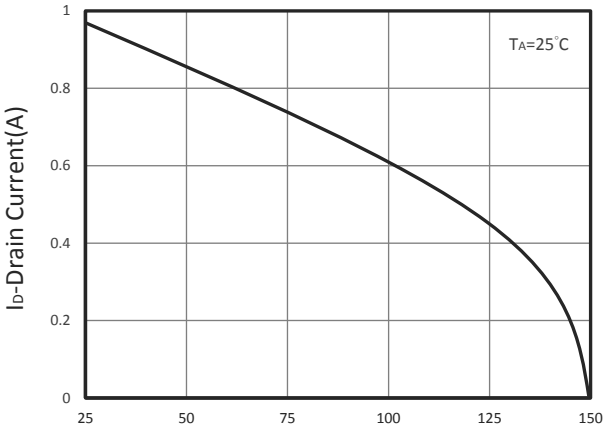
■N-ch TYPICAL CHARACTERISTICS



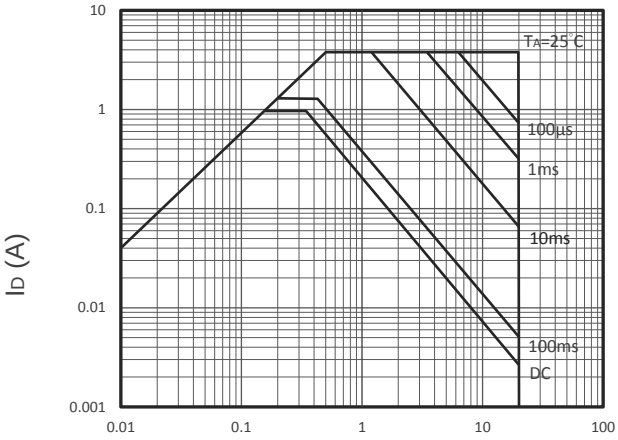
TJ-Junction Temperature(°C)

Drain-Source On Resistance



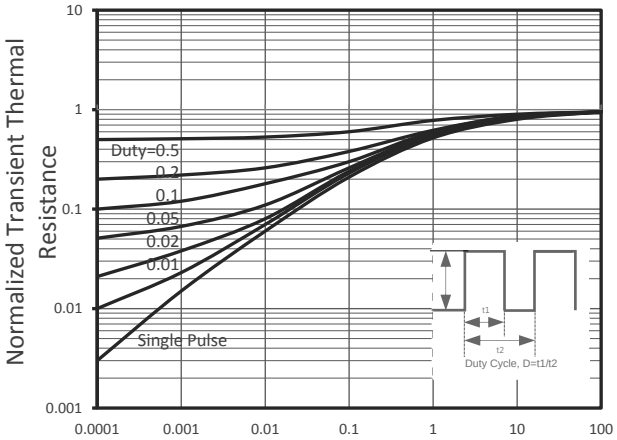
TJ-Junction Temperature(°C)

Drain Current vs TJ



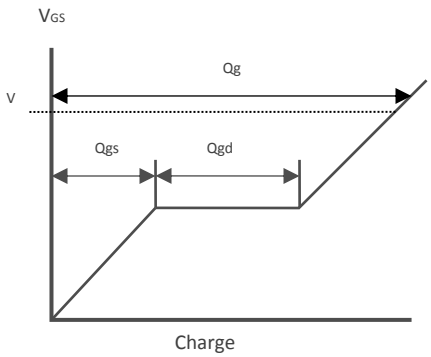
VDS Voltage (V)

Maximum Safe Operation Area

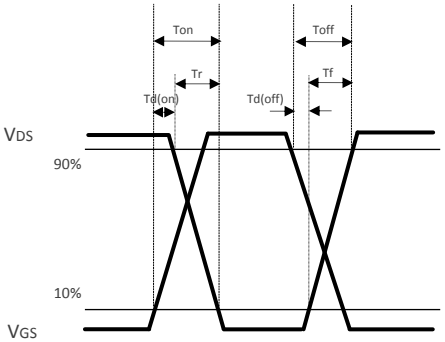


Square Wave Pulse Duration(Sec)

Thermal Transient Impedance



Gate Chrge Waveform



Switching Time Waveform

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P-ch ELECTRICAL CHARACTERISTICS(T_A=25°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 [D]	V_{GS}=-4.5V, I_D=-0.45A V_{GS}=-2.5V, I_D=-0.3A V_{GS}=-1.8V, I_D=-0.2A V_{GS}=-1.5V, I_D=-0.1A		440 600 820 1000	580 800 1100 1350	mΩ
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/μs		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=6Ω, I_D=-0.5A		7.2		nS
t_r				4.75		
$t_{d(off)}$	Turn-Off Time			32		
t_f				20		

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

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C. Using ≤ 10s junction-to-ambient thermal resistance is base on $T_{J(MAX)}$=150°C.
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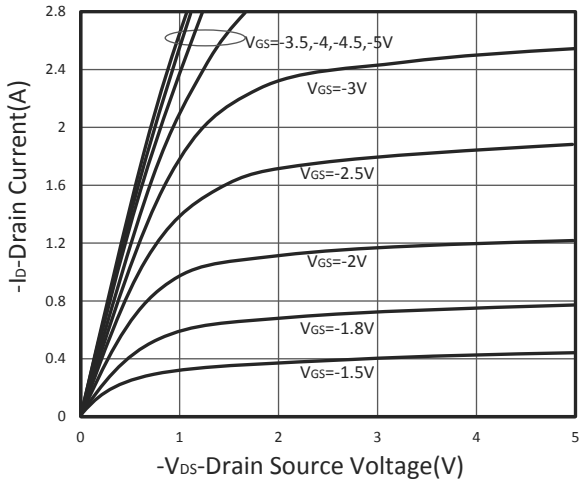
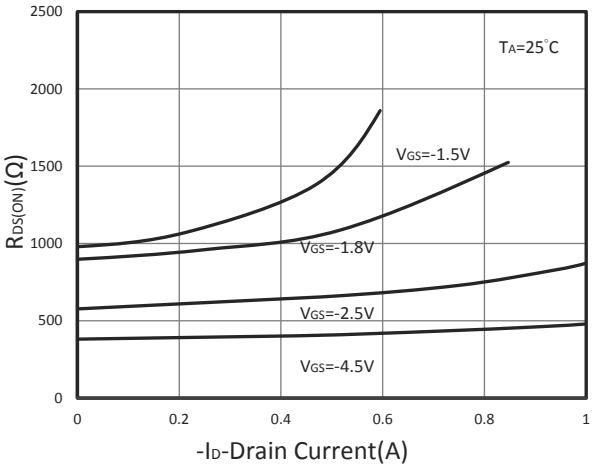
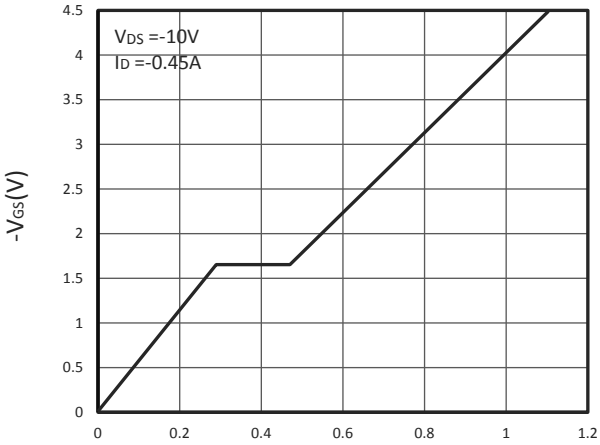


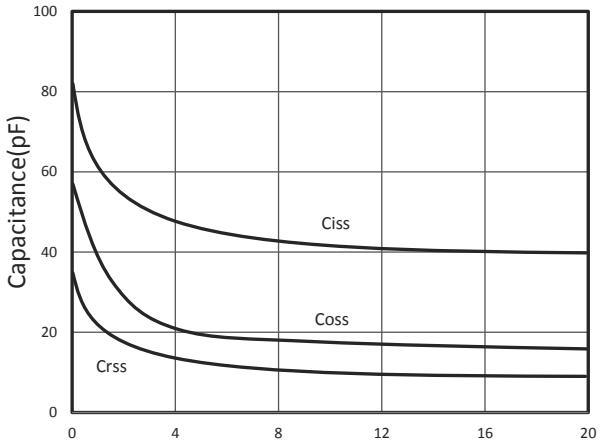
Output Characteristics



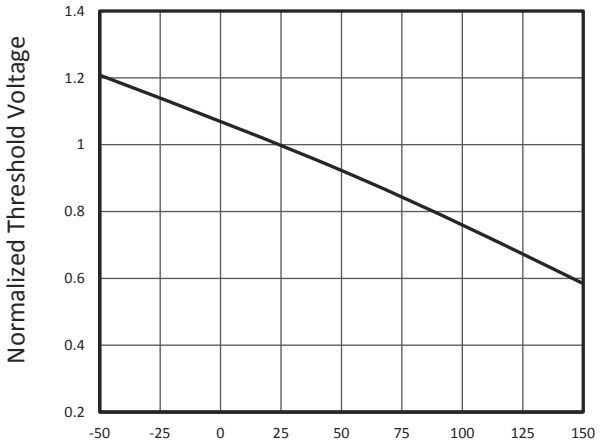
Drain-Source On Resistance



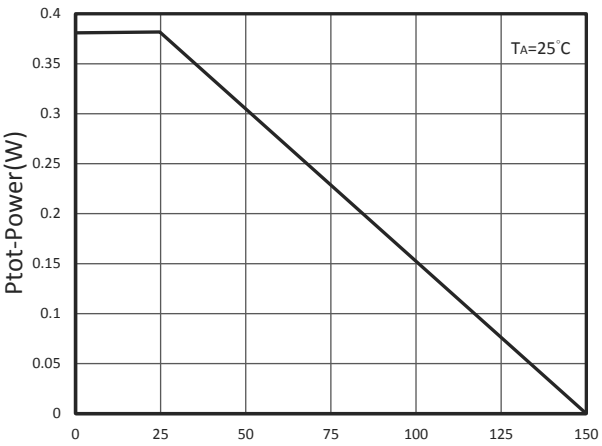
Gate Charge



Capacitance



Gate Threshold Voltage



Power Dissipation

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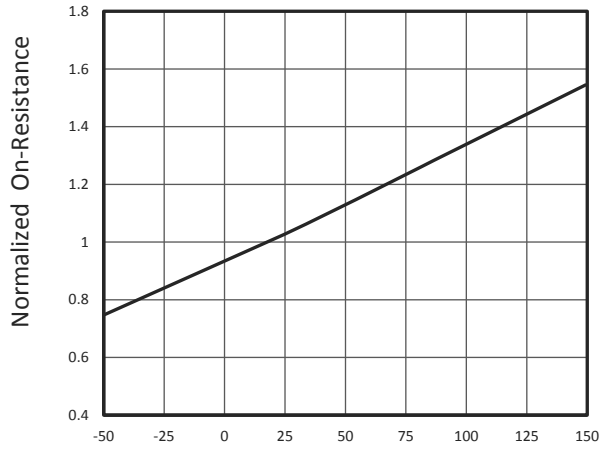
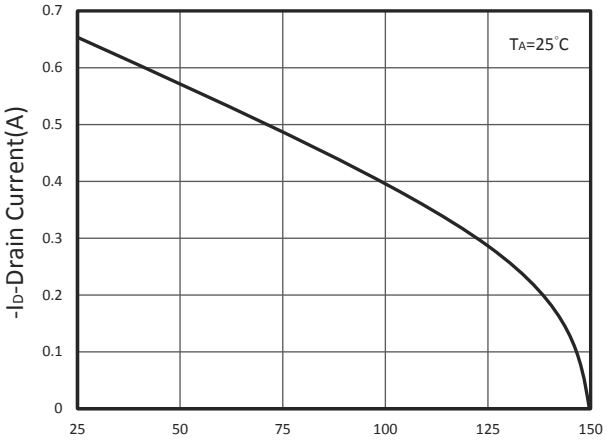
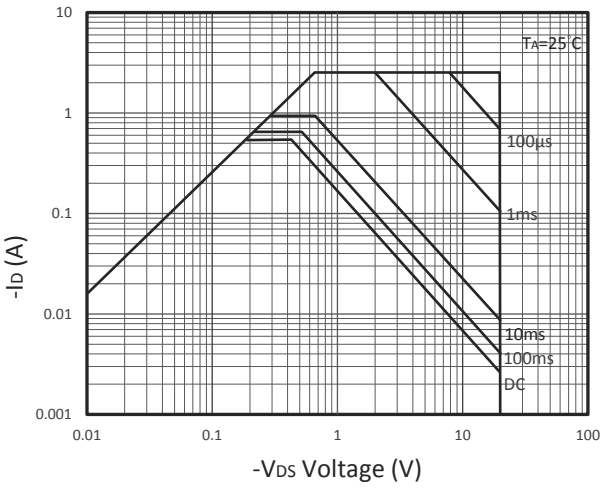
P-ch TYPICAL CHARACTERISTICS



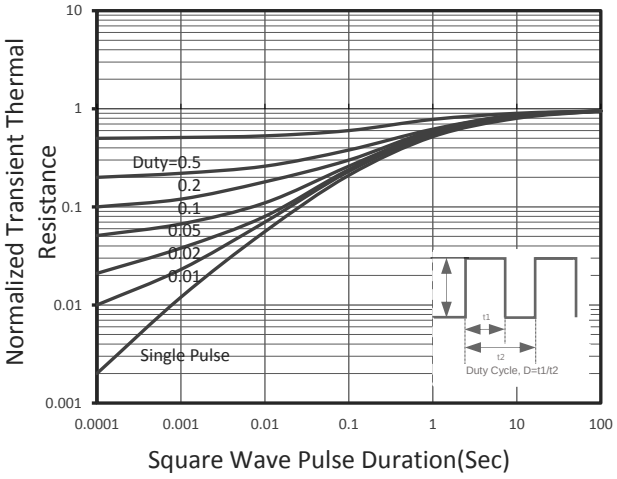
Drain-Source ON Resistance



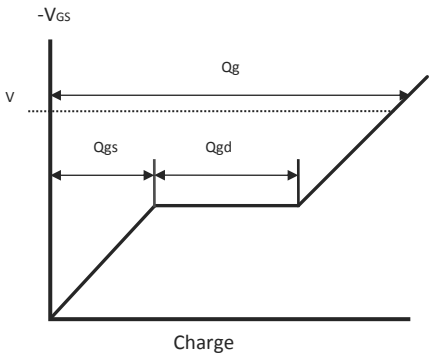
Drain Current vs TJ



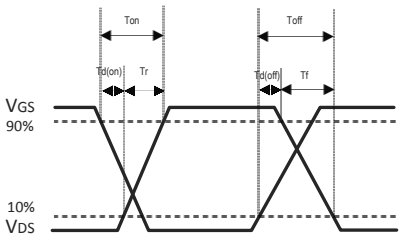
Maximum Safe Operation Area



Thermal Transient Impedance



Gate Chrge Waveform



Switching Time Waveform

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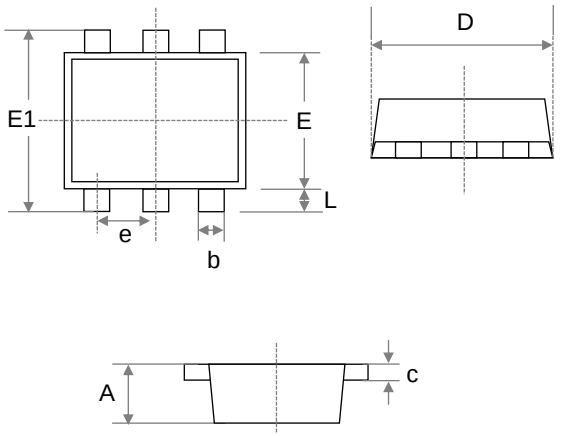
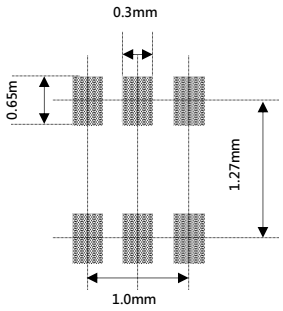
SOT-563 PACKAGE DIMENSIONS



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

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