

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-20V	13.5mΩ@-4.5V	-11A
	16mΩ@-2.5V	



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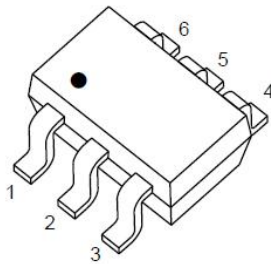
Feature

- High power and current handling capability
- Surface mount package

Application

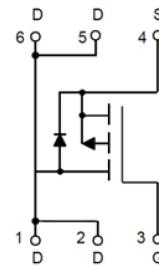
- Battery Switch
- DC/DC Converter

Package

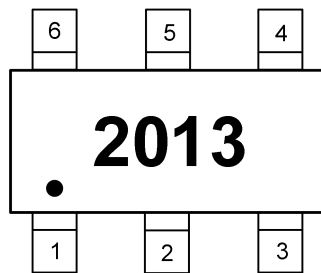


SOT-23-6L

Circuit diagram



Marking



2013 :Device Code

Order Information

Device	Package	Unit/Tape
SP2013TS	SOT-23-6L	3000

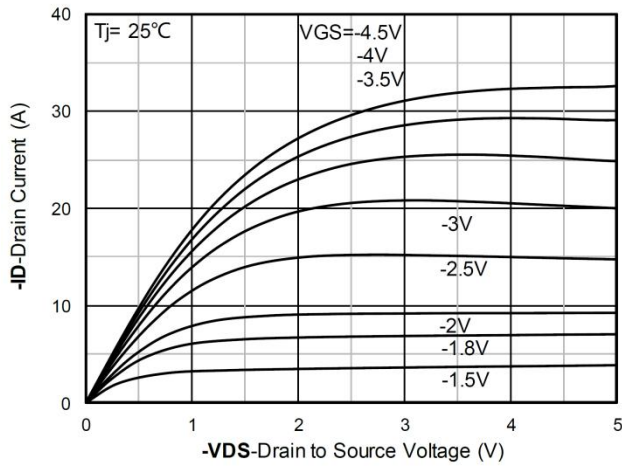
Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	-11	A
Pulse Drain Current Tested	I_{DM}	-44	A
Power Dissipation	P_D	1.3	W
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	96	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

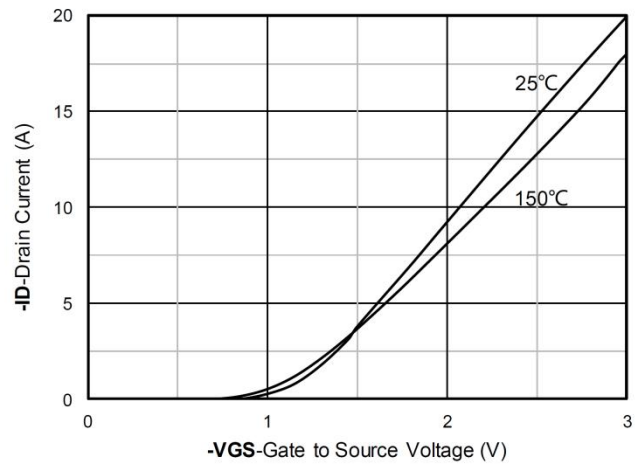
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=-250μA	-20	-	-	V
Drain-Source Leakage Current	IDSS	VDS=-16V , VGS=0V	-	-	-1	uA
Gate-Source Leakage Current	IGSS	VGS=±12V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VDS=VGS , ID=-250μA	-0.4	-0.7	-1.0	V
Static Drain-Source On-Resistance	RDS(ON)	VGS=-4.5V , ID=-5A	-	13.5	17	mΩ
		VGS=-2.5V , ID=-4A	-	16	22	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=-10V , VGS=0V , f=1MHz	-	1800	-	pF
Output Capacitance	Coss		-	215	-	
Reverse Transfer Capacitance	Crss		-	176	-	
Total Gate Charge	Qg	VDS=-10V , VGS=-4.5V , ID=-7A	-	16	-	nC
Gate-Source Charge	Qgs		-	4.3	-	
Gate-Drain Charge	Qgd		-	3.6	-	
Switching Characteristics						
Turn-On Delay Time	td(on)	VDD=-6V VGS=-4.5V , RG=3Ω, ID=-7A	-	8	-	nS
Turn-On Rise Time	tr		-	34	-	
Turn-Off Delay Time	td(off)		-	65	-	
Turn-Off Fall Time	tf		-	70	-	
Source-Drain Diode characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=-1A , TJ=25℃	-	-	-1.2	V

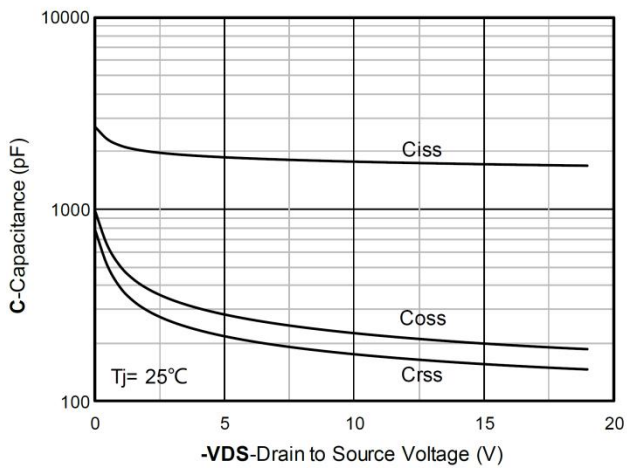
Typical Characteristics



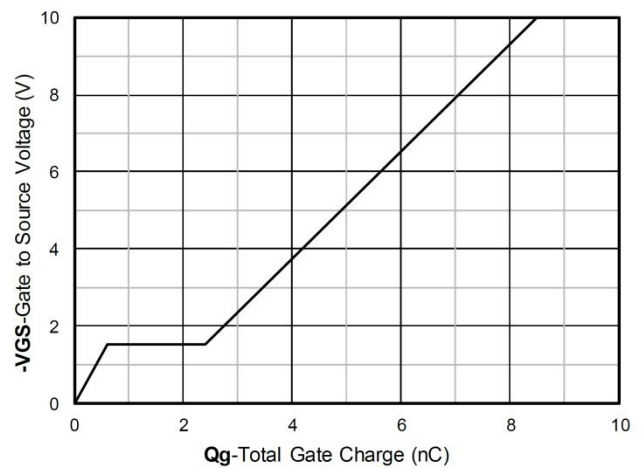
Output Characteristics



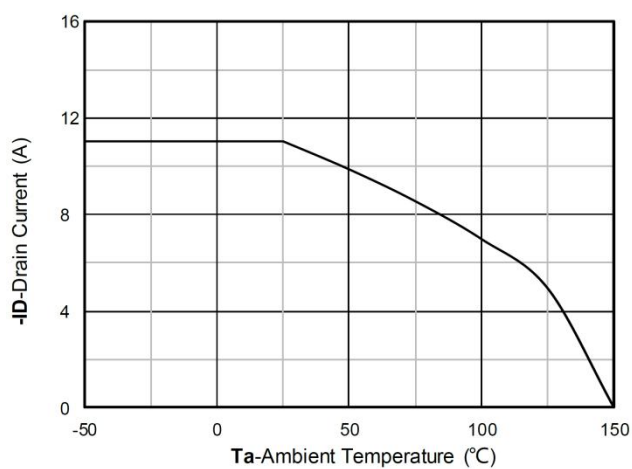
Transfer Characteristics



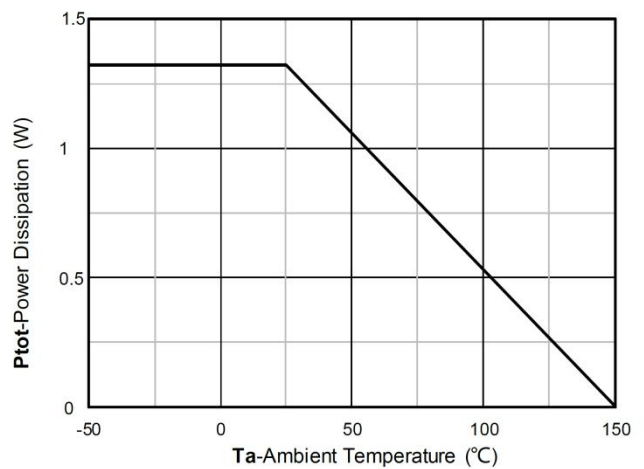
Capacitance Characteristics



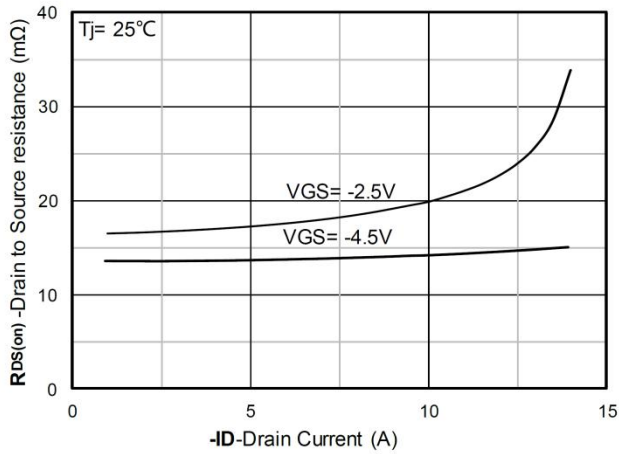
Gate Charge



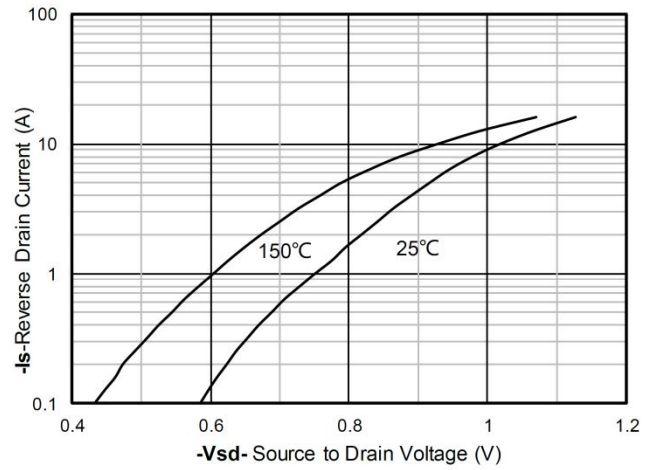
Current dissipation



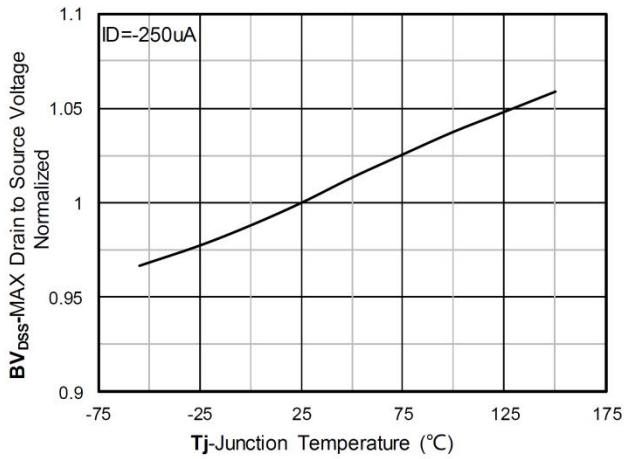
Power dissipation



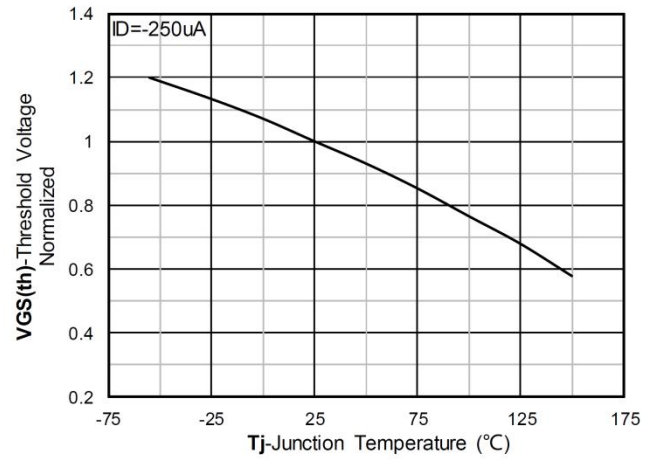
$R_{DS(on)}$ VS Drain Current



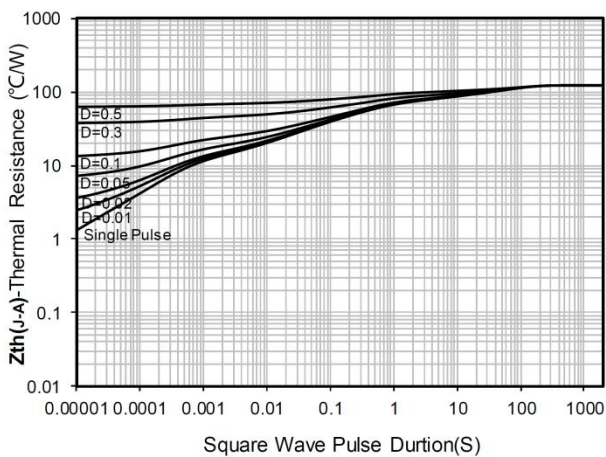
Forward characteristics of reverse diode



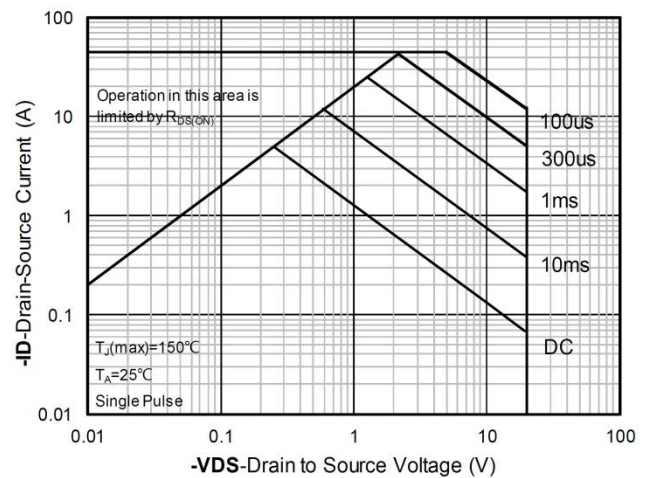
Normalized breakdown voltage



Normalized Threshold voltage

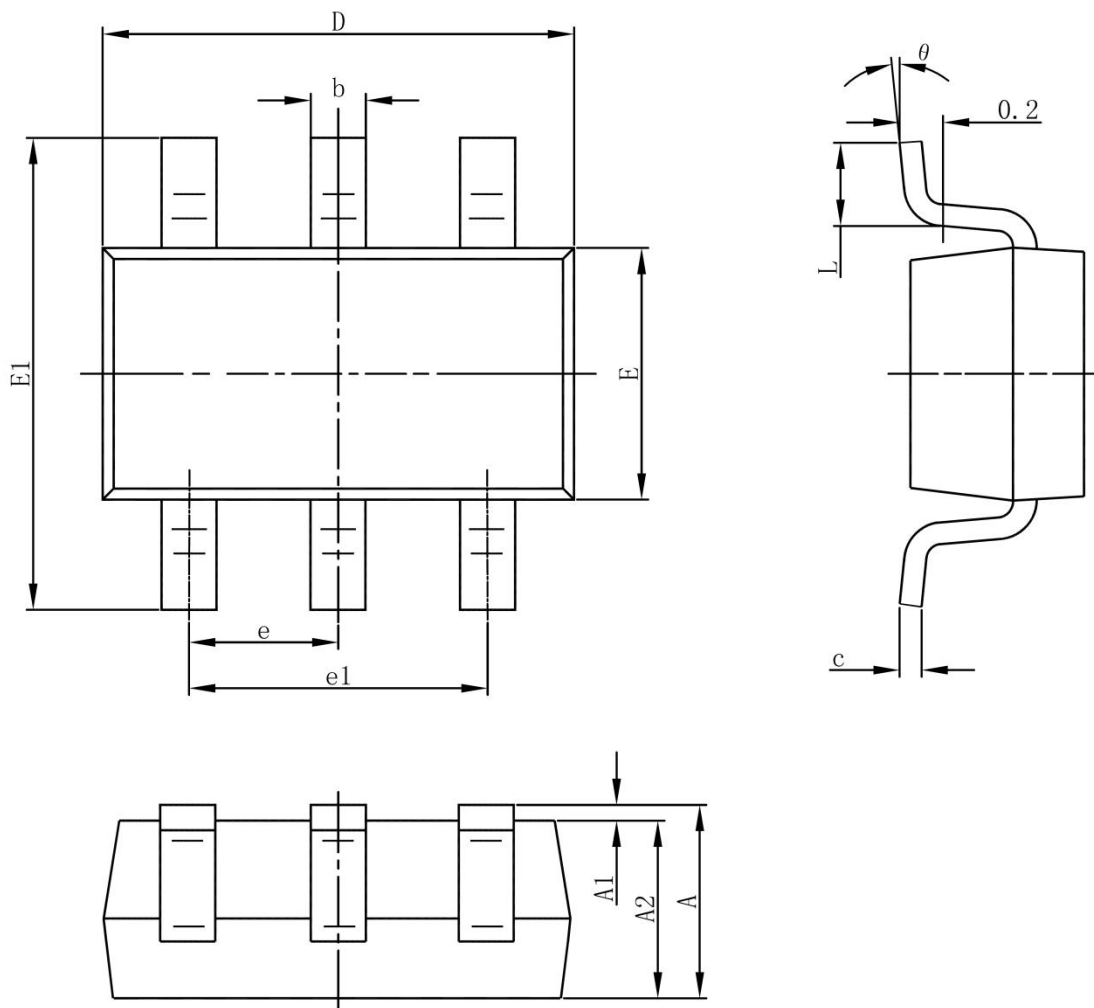


Maximum Transient Thermal Impedance



Safe Operation Area

SOT-23-6L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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