

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
20V	10mΩ@4.5V	7A
	13mΩ@2.5V	



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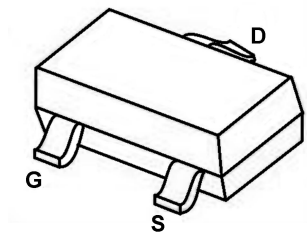
Feature

- High power and current handling capability
- Surface mount package

Application

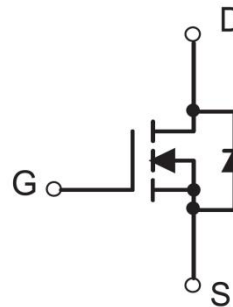
- Battery Switch
- DC/DC Converter

Package

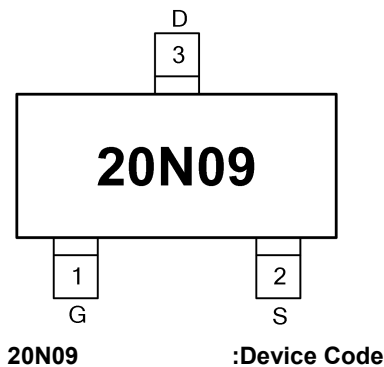


SOT-23-3L

Circuit diagram



Marking



Order Information

Device	Package	Unit/Tape
SP20N09T1	SOT-23-3L	3000

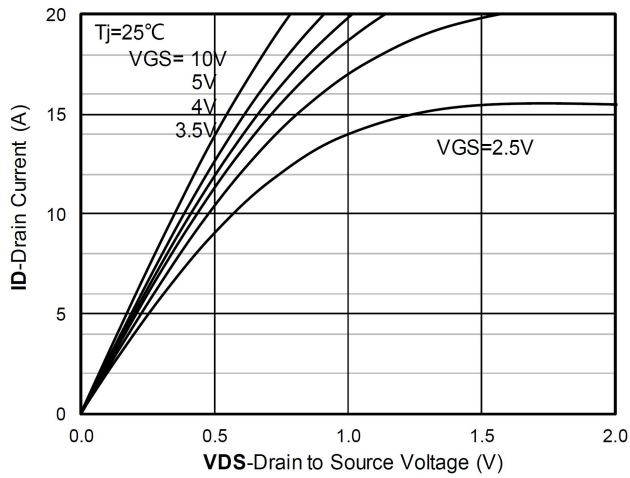
Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	7	A
Pulse Drain Current Tested	I_{DM}	28	A
Power Dissipation	P_D	1.25	W
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	100	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

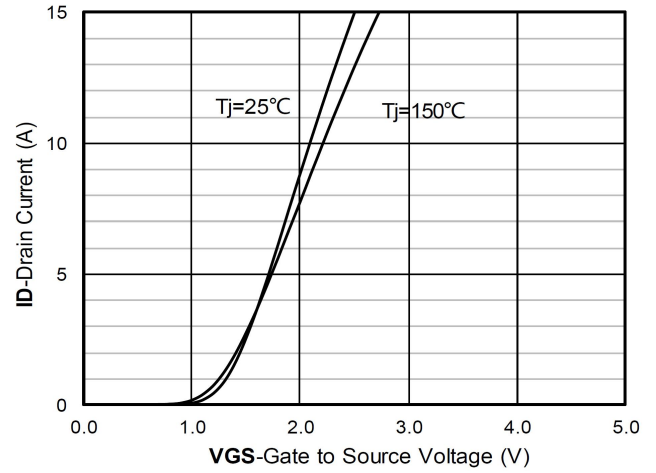
Electrical characteristics (Ta=25°C, unless otherwise noted)

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	0.5	0.7	1.5	V
Static Drain-Source On-Resistance	RDS(ON)	VGS=4.5V, ID=6A	-	10	13	mΩ
		VGS=2.5V, ID=5A	-	13	18	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=10V , VGS=0V , f=1MHz	-	900	-	pF
Output Capacitance	Coss		-	162	-	
Reverse Transfer Capacitance	Crss		-	105	-	
Total Gate Charge	Qg	VDS=10V , VGS=10V , ID=20A	-	15	-	nC
Gate-Source Charge	Qgs		-	1.8	-	
Gate-Drain Charge	Qgd		-	2.8	-	
Switching Characteristics						
Turn-On Delay Time	td(on)	VDD=10V VGS=10V , RG=3Ω, ID=5A	-	4.5	-	nS
Turn-On Rise Time	tr		-	9.2	-	
Turn-Off Delay Time	td(off)		-	18.7	-	
Turn-Off Fall Time	tf		-	3.3	-	
Source-Drain Diode characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V

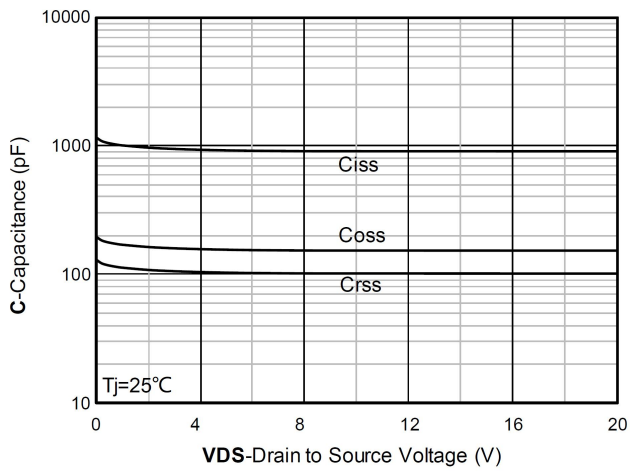
Typical Characteristics



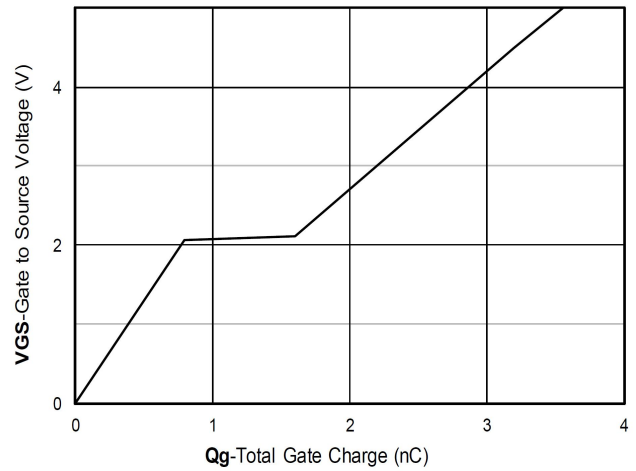
Output Characteristics



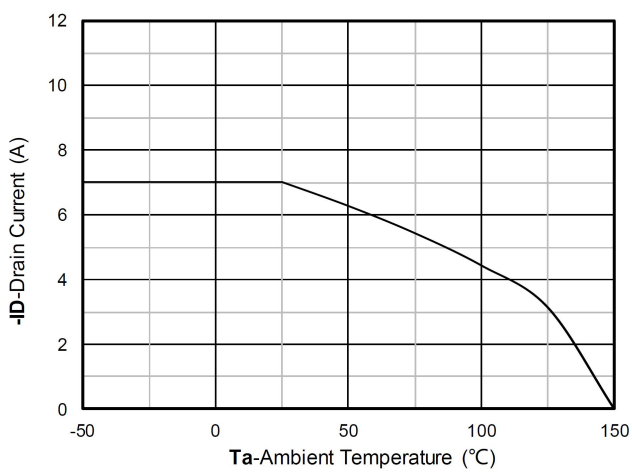
Transfer Characteristics



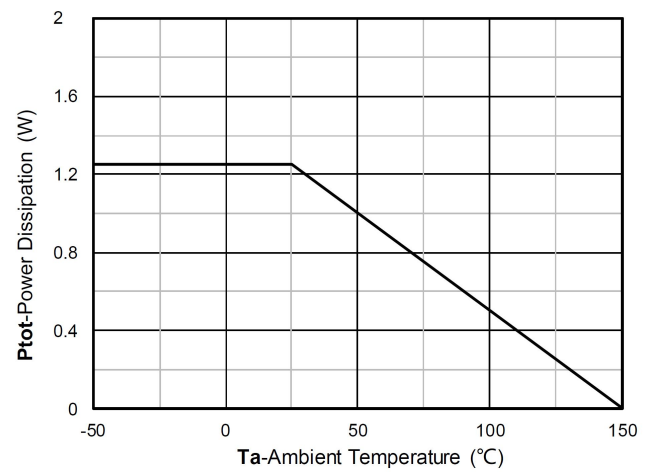
Capacitance Characteristics



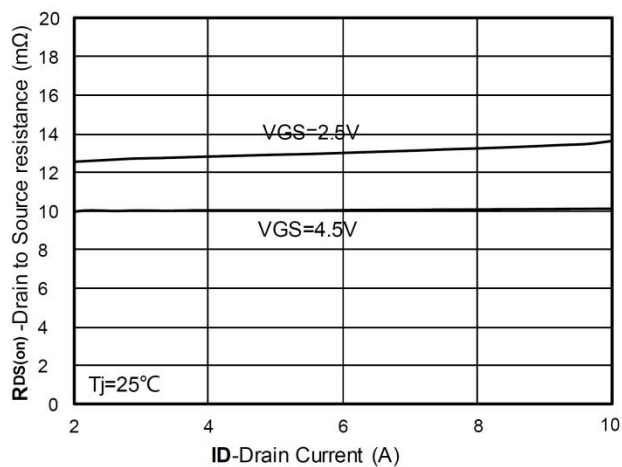
Gate Charge



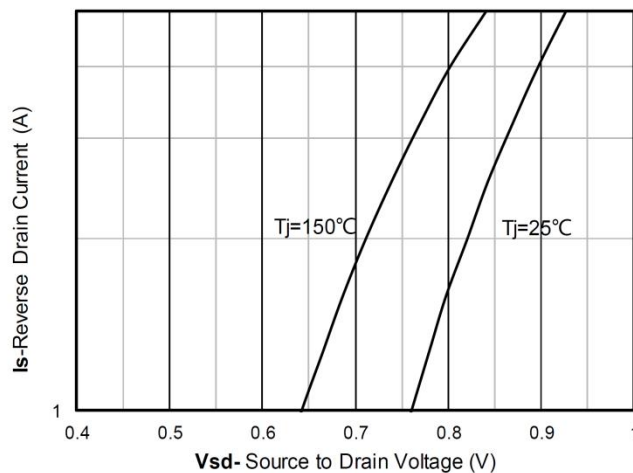
Current dissipation



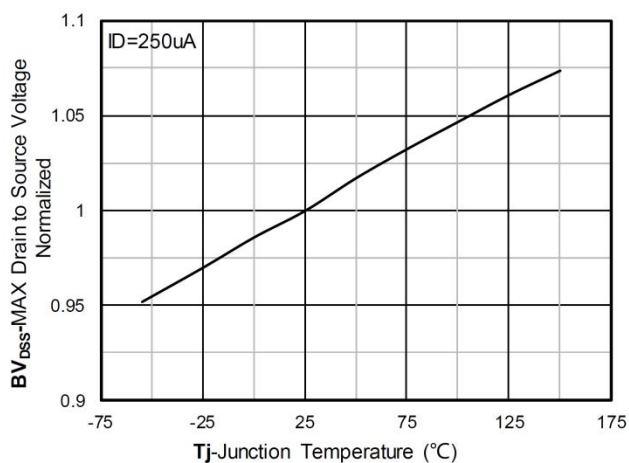
Power dissipation



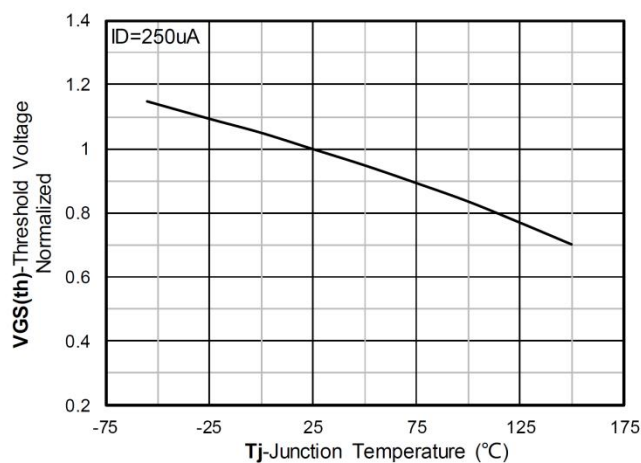
$R_{DS(on)}$ VS Drain Current



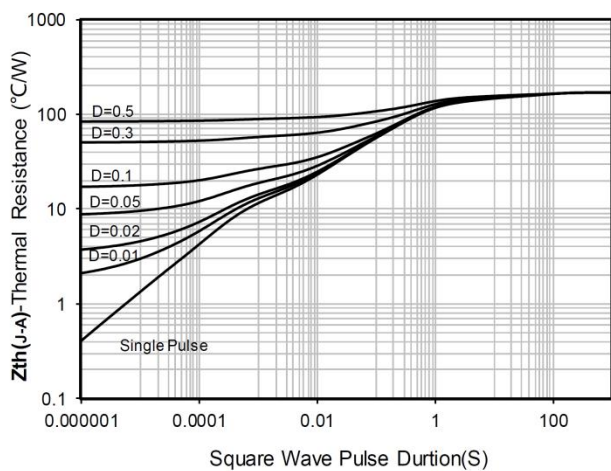
Forward characteristics of reverse diode



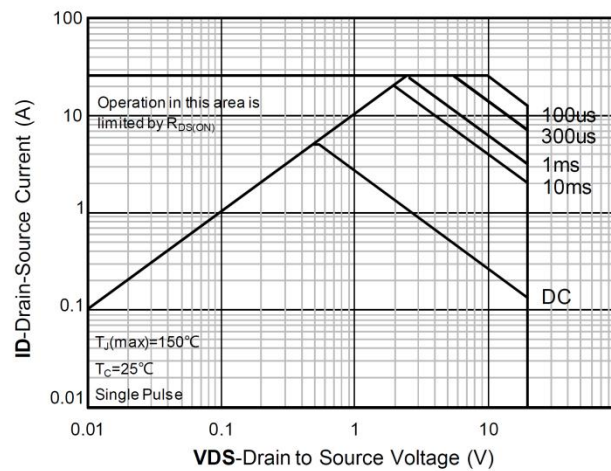
Normalized breakdown voltage



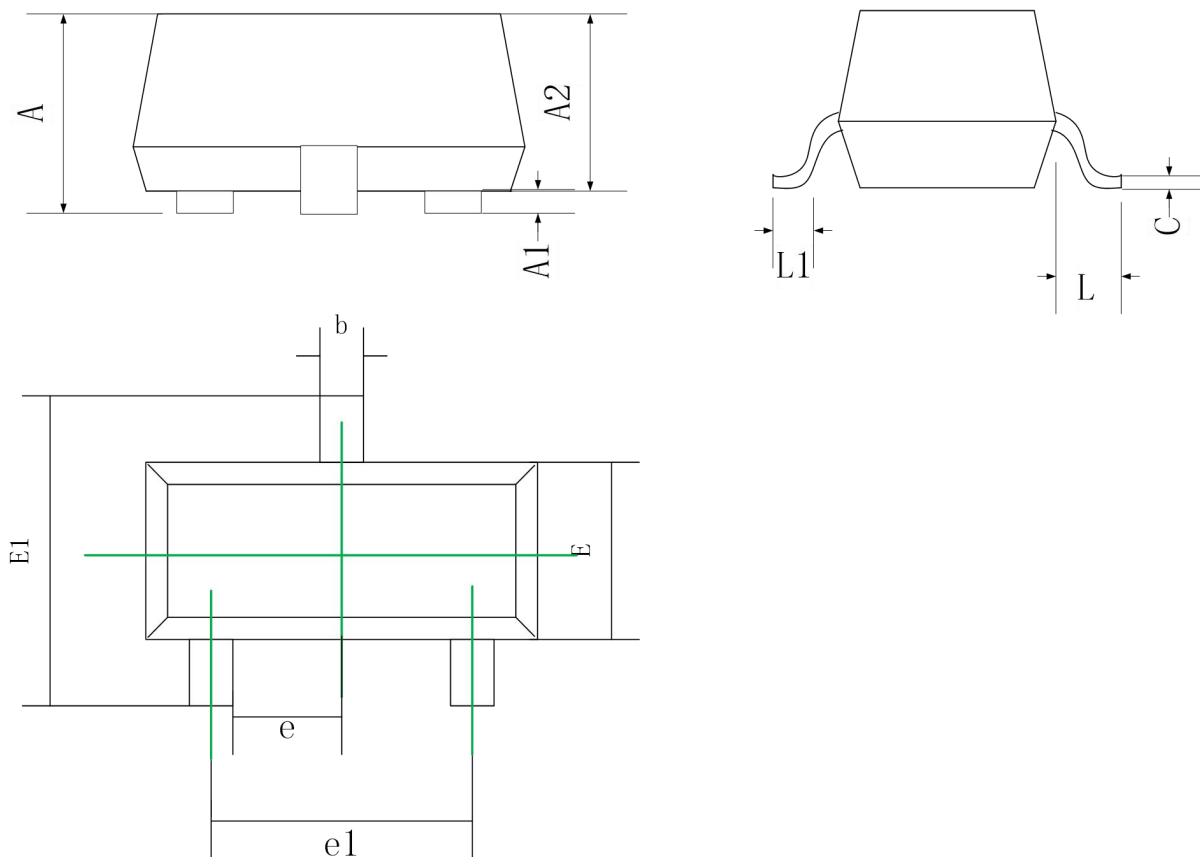
Normalized Threshold voltage



Maximum Transient Thermal Impedance



Safe Operation Area

SOT-23-3L Package Information


Symbol	Dimensions in millimeters	
	Min.	Max.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950 Typ.	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

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