

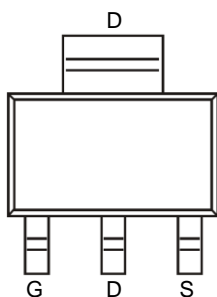
## -60V/-4A P-Channel MOSFET

### Features

- High density cell design for ultra low R<sub>ds(on)</sub>
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

### Application

- PWM applications
- Power management
- Load switch

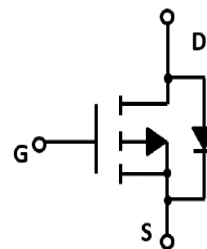


### Product Summary

V <sub>DS</sub>	R <sub>DS(ON)</sub> MAX	I <sub>D</sub> MAX
-60V	140mΩ@10V	-4A
	170mΩ@4.5V	



SOT-223 top view



Schematic diagram

Absolute Maximum Ratings (T <sub>A</sub> =25°C unless otherwise noted)				
Symbol	Parameter	Rating	Unit	
<b>Common Ratings (T<sub>C</sub>=25°C Unless Otherwise Noted)</b>				
V <sub>DS</sub>	Drain-Source Breakdown Voltage	-60	V	
V <sub>GS</sub>	Gate-Source Voltage	±20	V	
T <sub>J</sub>	Maximum Junction Temperature	150	°C	
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C	
I <sub>S</sub>	Diode Continuous Forward Current	T <sub>c</sub> =25°C	-4	A
<b>Mounted on Large Heat Sink</b>				
I <sub>DM</sub>	Pulse Drain Current Tested	T <sub>c</sub> =25°C	-13	A
I <sub>D</sub>	Continuous Drain Current@GS=10V	T <sub>c</sub> =25°C	-4	A
P <sub>D</sub>	Maximum Power Dissipation	T <sub>c</sub> =25°C	2	W
R <sub>θJA</sub>	Thermal Resistance Junction-to-Ambient		62	°C/W

<b>Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)</b>						
<b>Symbol</b>	<b>Parameter</b>	<b>Condition</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>
<b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
BV <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	VGS=0V, ID=-250μA	-60	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	VDS=-60V, VGS=0V	--	--	-1	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	VGS=±20V, VDS=0V	--	--	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	VDS=VGS, ID=-250μA	-1.0	-1.8	-2.5	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	VGS=-10V, ID=-4A	--	100	140	mΩ
		VGS=-4.5V, ID=-4A	--	130	170	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>ISS</sub>	Input Capacitance	VDS=-15V, VGS=0V, f=1MHz	--	715	--	pF
C <sub>OSS</sub>	Output Capacitance		--	51	--	pF
C <sub>RSS</sub>	Reverse Transfer Capacitance		--	34	--	pF
<b>Switching Characteristics</b>						
Q <sub>g</sub>	Total Gate Charge	VDS=-20V, ID=-2A, VGS=-4.5V	--	6	--	nC
Q <sub>gs</sub>	Gate Source Charge		--	3	--	nC
Q <sub>gd</sub>	Gate Drain Charge		--	2	--	nC
t <sub>d(on)</sub>	Turn-on Delay Time	VDD=-12V, ID=-1A, VGS=-10V, RG=3.3Ω	--	10	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	17	--	nS
t <sub>d(off)</sub>	Turn-Off Delay Time		--	22	--	nS
t <sub>f</sub>	Turn-Off Fall Time		--	21	--	nS
<b>Source- Drain Diode Characteristics</b>						
V <sub>SD</sub>	Forward on voltage	T <sub>J</sub> =25°C, I <sub>S</sub> =-3A,	--	--	-1.2	V

## Typical Operating Characteristics

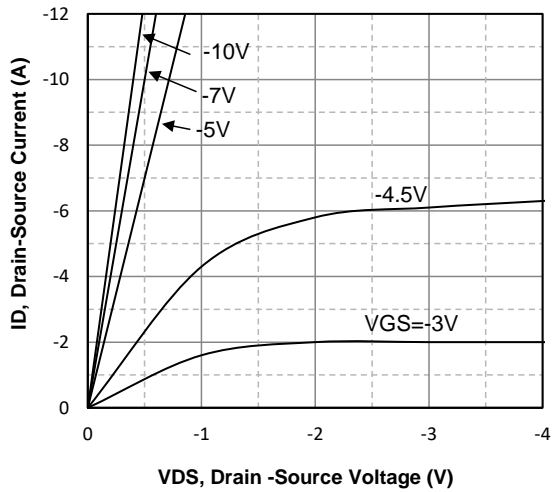


Fig1. Typical Output Characteristics

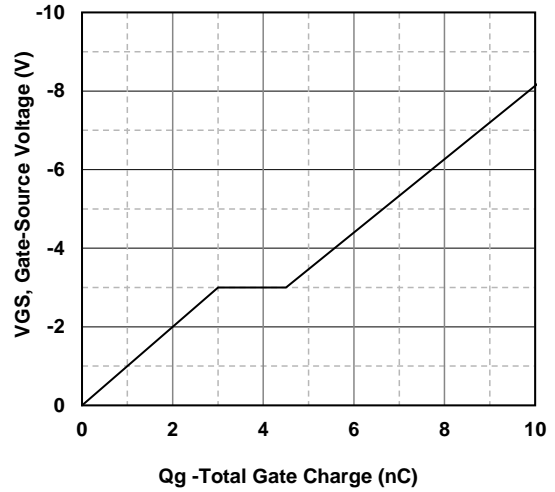


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

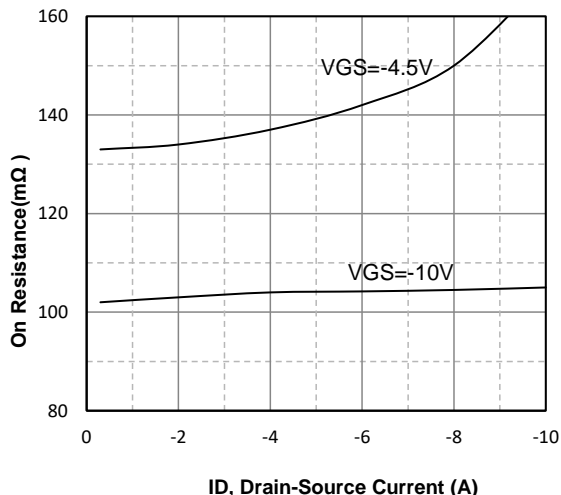


Fig3. Drain-Source on Resistance

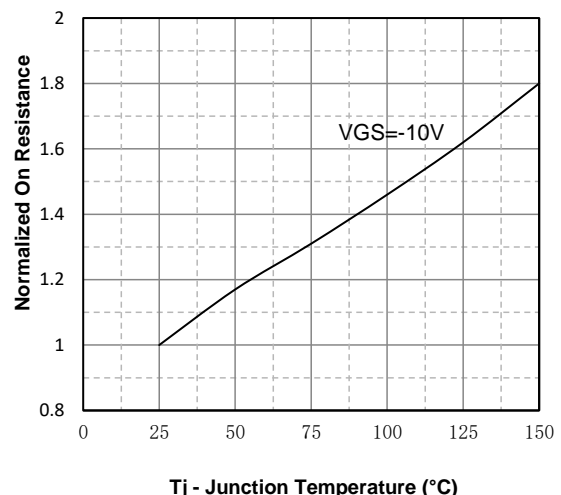


Fig4. Normalized On-Resistance Vs. Temperature

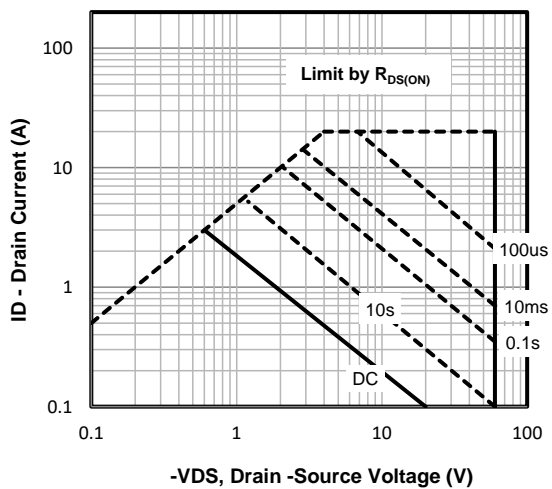


Fig5. Maximum Safe Operating Area

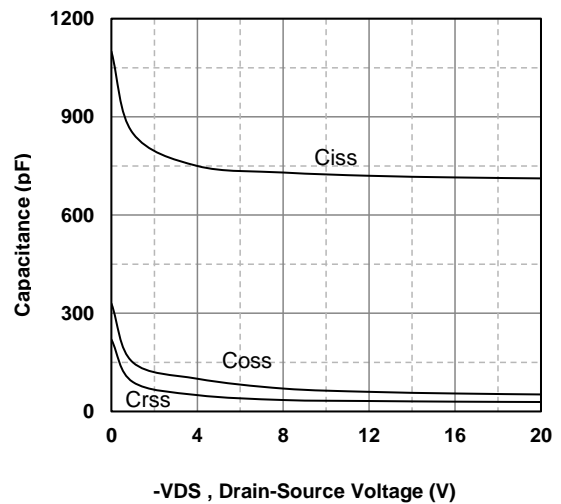
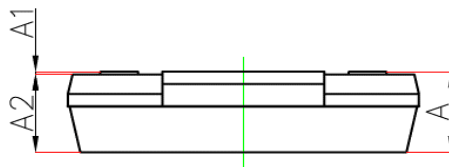
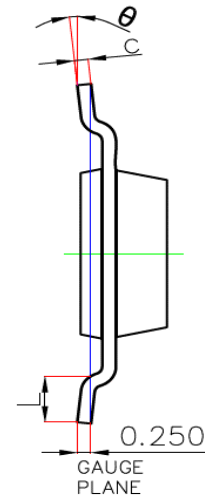
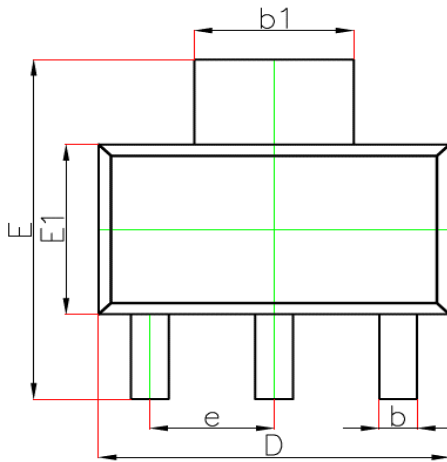


Fig6. Typical Capacitance Vs. Drain-Source Voltage

## SOT-223 Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
$b_1$	0.150	0.250	0.006	0.010
$b_2$	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500TYP		0.020TYP	
e1	0.900	1.100	0.035	0.043
L	0.400REF		0.016REF	
L1	0.260	0.460	0.010	0.018
$\theta$	0°	8°	0°	8°

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