

-12V P-Channel Enhancement Mode MOSFET

Description

The AP2311MI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

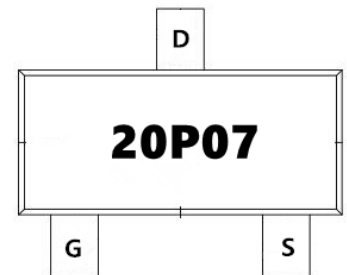
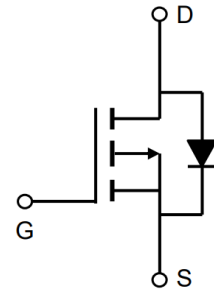
$V_{DS} = -12V$ $I_D = -7.0A$

$R_{DS(ON)} < 24m\Omega$ @ $V_{GS}=4.5V$ (Type: 19m Ω)

Application

electronic cigarette

Load switch



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2311MI	SOT23-3L	20P07	3000

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-Source Voltage	-12	V
V_{GSS}	Gate-Source Voltage	± 12	V
$I_D @ T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	-7.0	A
$I_D @ T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	-3.6	A
IDM	Pulsed Drain Current ^{note1}	-22	A
$P_D @ T_C=25^\circ C$	Power Dissipation	1.6	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	125	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ C$



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Electrical Characteristics (T_J=25°C, unless otherwise noted)

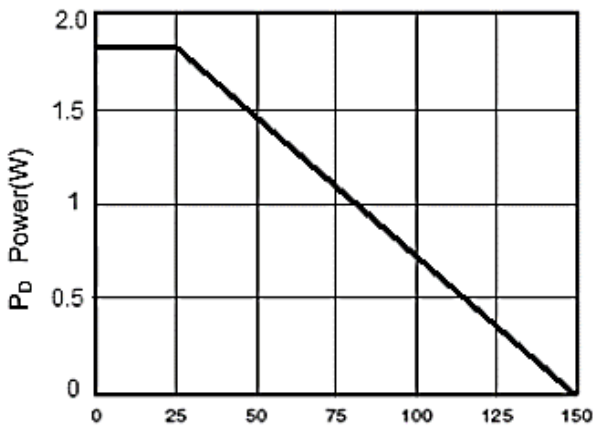
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-12	-18	-	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} = -12V, V _{GS} = 0V,	-	-	-1	μA
IGSS	Gate to Body Leakage Current	V _{DS} = 0V, V _{GS} = ±12V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-0.5	-0.65	-1.0	V
RDS(on)	Static Drain-Source on-Resistance note2	V _{GS} =-4.5V, I _D =-5.2A	-	19	24	mΩ
RDS(on)	Static Drain-Source on-Resistance note2	V _{GS} =-2.5V, I _D =-4.2A	-	28	35	mΩ
C _{iss}	Input Capacitance	V _{DS} =-6V, V _{GS} =0V f=1.0MHz	-	1100	-	pF
C _{oss}	Output Capacitance		-	390	-	pF
C _{rss}	Reverse Transfer Capacitance		-	300	-	pF
Q _g	Total Gate Charge	V _{DS} =-4V, I _D =-4.1A, V _{GS} = -4.5V	-	11.5	-	nC
Q _{gs}	Gate-Source Charge		-	1.5	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	3.2	-	nC
td(on)	Turn-on Delay Time	V _{DD} = -4V, I _D = -3.3A, R _G = 1.0Ω, V _{GEN} = -4.5V, R _L = 1.2Ω	-	25	-	ns
t _r	Turn-on Rise Time		-	45	-	ns
td(off)	Turn-off Delay Time		-	72	-	ns
t _f	Turn-off Fall Time		-	60	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	-6.0	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-16	A
VSD	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S = -4.1A	-	-	-1.2	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S = -4.1A, di/dt=100A/μs	-	20	-	ns
Q _{rr}	Reverse Recovery Charge		-	9	-	nC

Note :

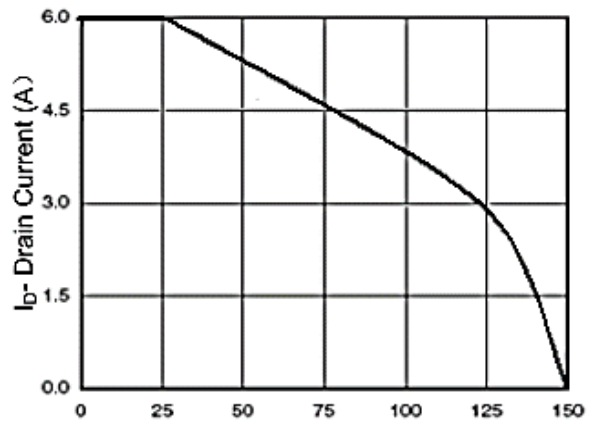
- 1、 The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width ≅ 300us , duty cycle ≅ 2%
- 3、 The power dissipation is limited by 150°C junction temperature
- 4、 The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

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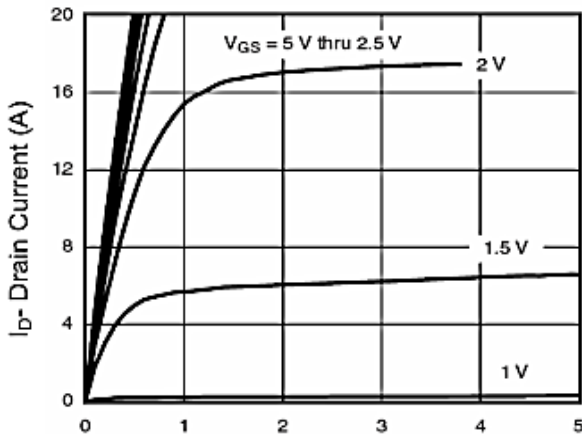
Typical Characteristics



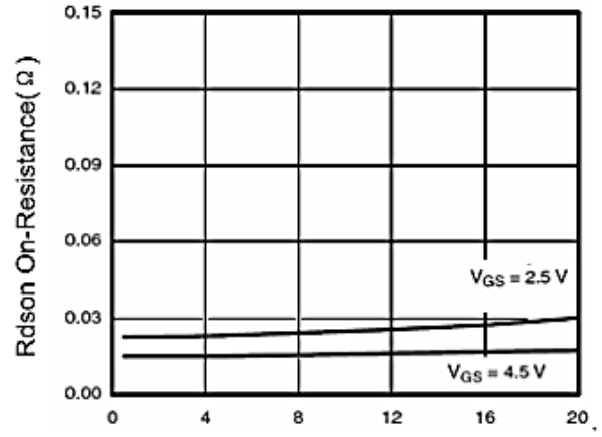
T_J-Junction Temperature(°C)
Figure 1 Power Dissipation



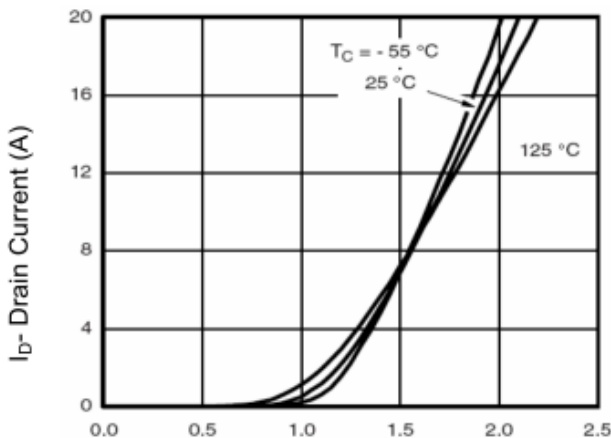
T_J-Junction Temperature(°C)
Figure 2 Drain Current



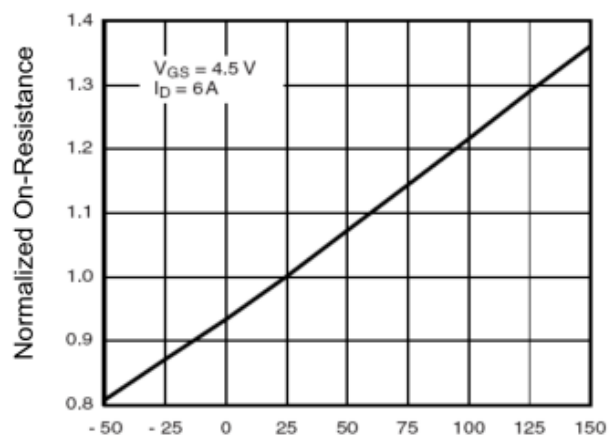
V_{ds} Drain-Source Voltage (V)
Figure 3 Output Characteristics



I_D- Drain Current (A)
Figure 4 Drain-Source On-Resistance

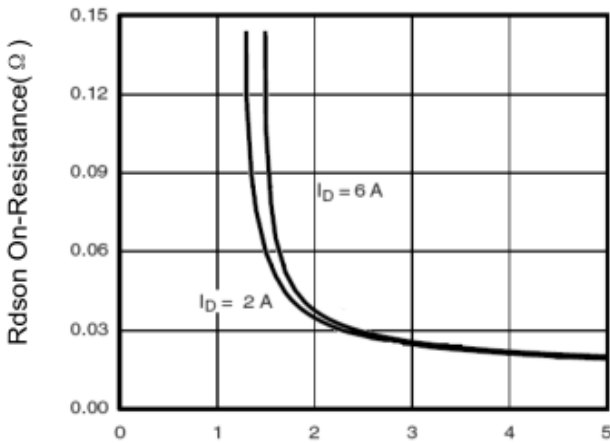


V_{gs} Gate-Source Voltage (V)
Figure 5 Transfer Characteristics

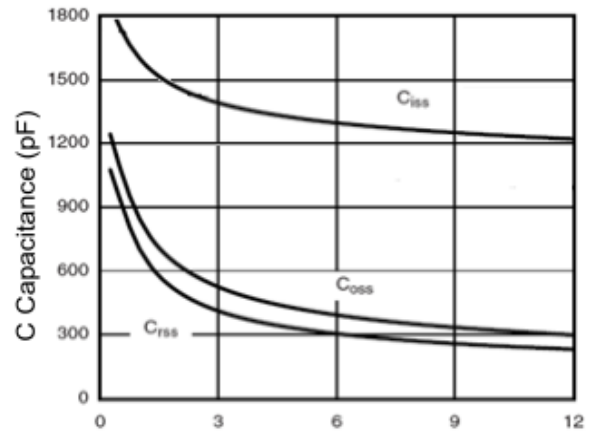


T_J-Junction Temperature(°C)
Figure 6 Drain-Source On-Resistance

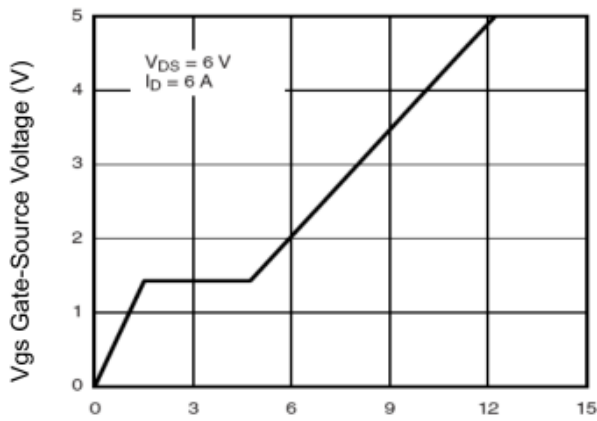
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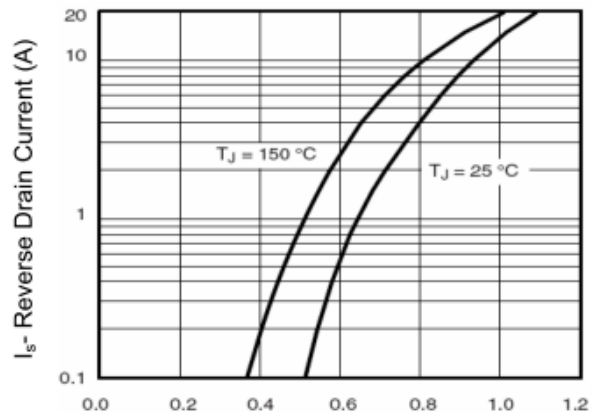
Vgs Gate-Source Voltage (V)
Figure 7 Rdson vs Vgs



Vds Drain-Source Voltage (V)
Figure 8 Capacitance vs Vds



Qg Gate Charge (nC)
Figure 9 Gate Charge



Vsd Source-Drain Voltage (V)
Figure 10 Source-Drain Diode Forward

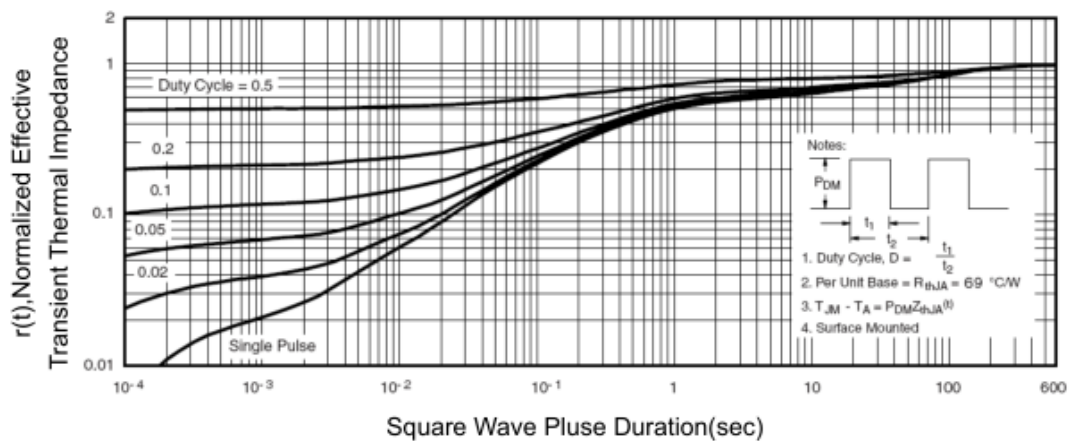
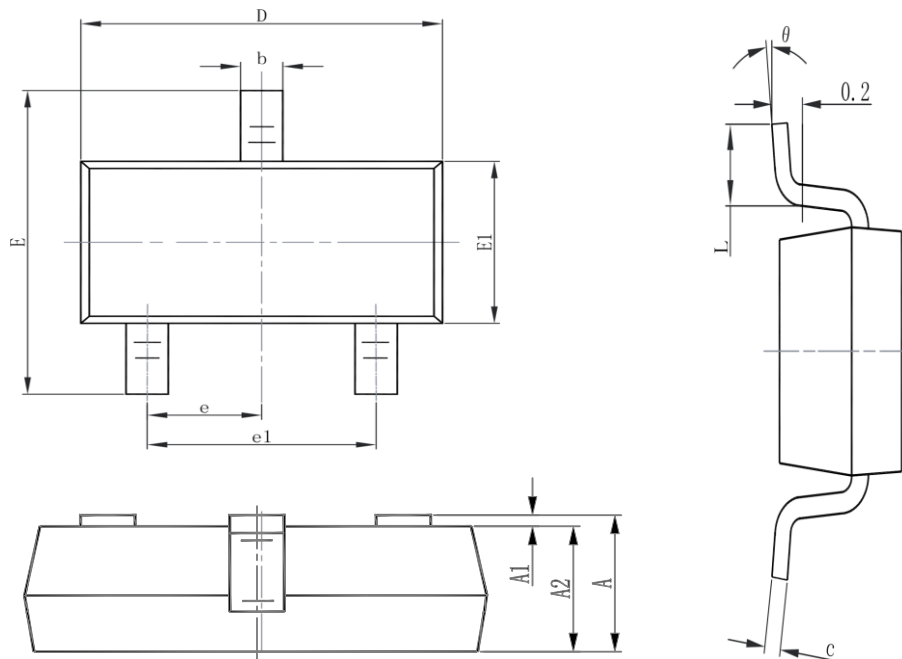


Figure 12 Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-SOT23-3



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
E1	1.500	1.700	0.059	0.067
E	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°

-12V P-Channel Enhancement Mode MOSFET Attention

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Edition	Date	Change
Rve1.0	2020/9/8	Initial release

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