

-20V P-Channel Enhancement Mode MOSFET

Description

The AP2307MI 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

$V_{DS} = -20V$ $I_D = -10.0A$

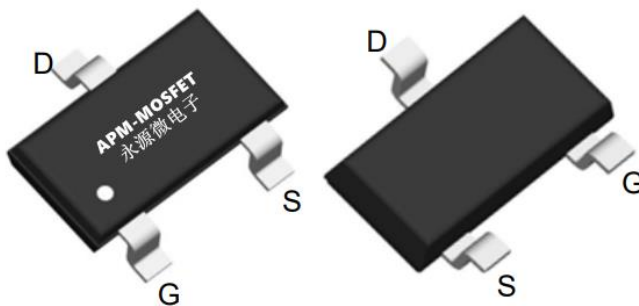
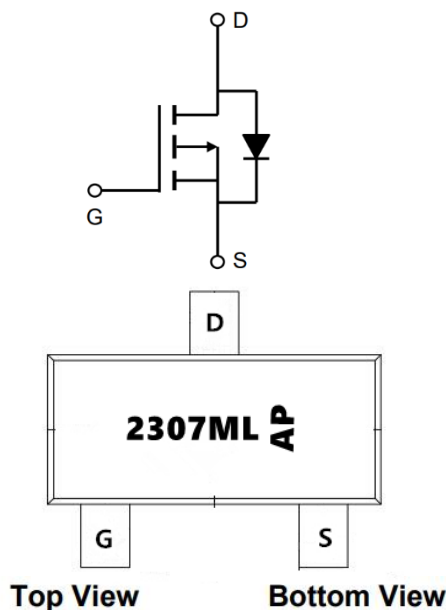
$R_{DS(ON)} < 18m\Omega$ @ $V_{GS} = -4.5V$ (Type:14m Ω)

Application

Quick charge

electronic cigarette

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2307MI-L	SOT23-3L	2307ML-AP	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-10	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-6.8	A
IDM	Pulsed Drain Current ²	-23.8	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ³	1	W
TSTG	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	125	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	80	$^\circ C/W$

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Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20	-22	-	V
IDSS	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V,$	-	-	-1	μA
IGSS	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	± 100	nA
VGS(th)	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5	-0.7	-1.2	V
RDS(on)	Static Drain-Source on-Resistance note2	$V_{GS}=-4.5V, I_D=-7A$	-	14	18	m Ω
		$V_{GS}=-2.5V, I_D=-5A$	-	18	24	
Ciss	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V,$ $f=1.0MHz$	-	2000	-	pF
Coss	Output Capacitance		-	242	-	pF
Crss	Reverse Transfer Capacitance		-	231	-	pF
Qg	Total Gate Charge	$V_{DS}=-10V, I_D=-3A,$ $V_{GS}=-4.5V$	-	15.3	-	nC
Qgs	Gate-Source Charge		-	2.2	-	nC
Qgd	Gate-Drain("Miller") Charge		-	4.4	-	nC
td(on)	Turn-on Delay Time	$V_{DD}=-10V, I_D=-7A,$ $V_{GS}=-4.5V,$ $R_{GEN}=2.5\Omega$	-	10	-	ns
tr	Turn-on Rise Time		-	31	-	ns
td(off)	Turn-off Delay Time		-	28	-	ns
tf	Turn-off Fall Time		-	8	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	-7	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-28	A
VSD	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=-7A$	-	-0.8	-1.2	V

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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

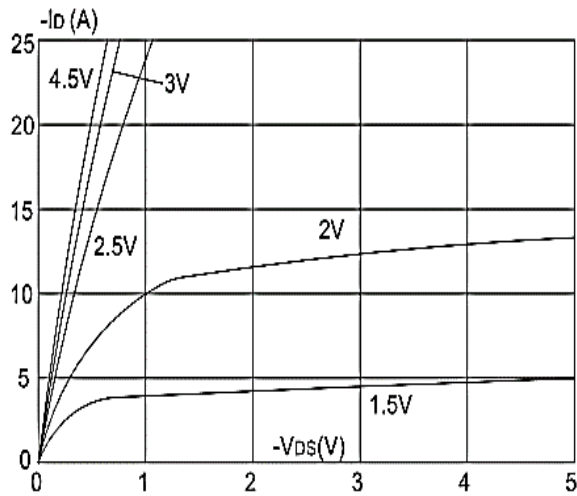


Figure1: Output Characteristics

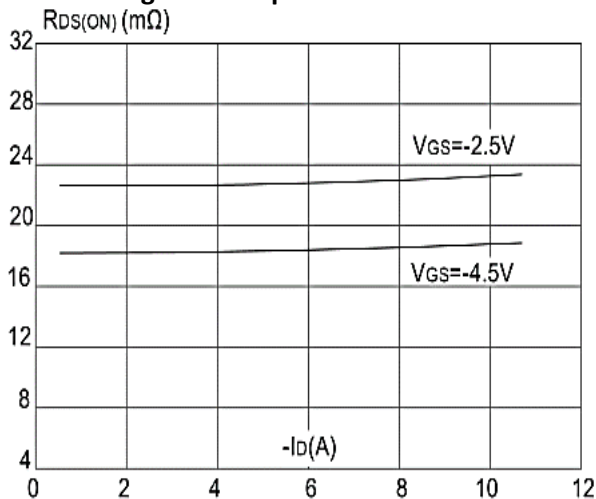


Figure 3: On-resistance vs. Drain Current

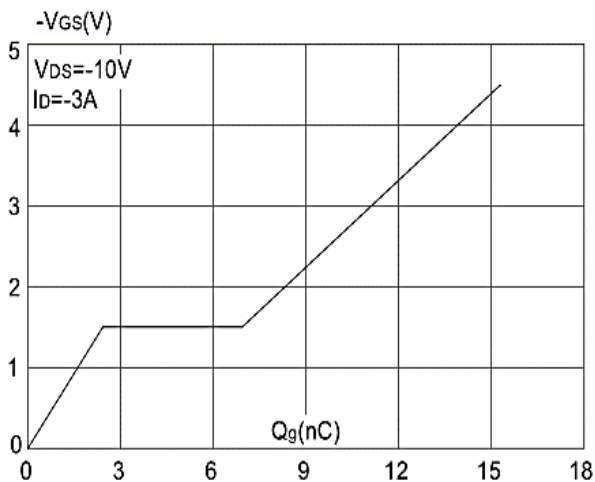


Figure 5: Gate Charge Characteristics

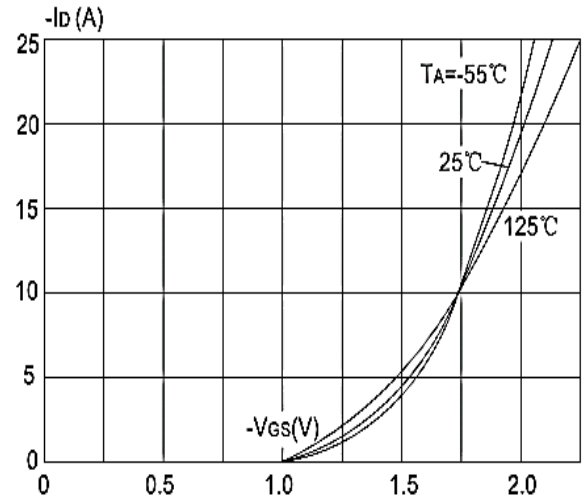


Figure 2: Typical Transfer Characteristics

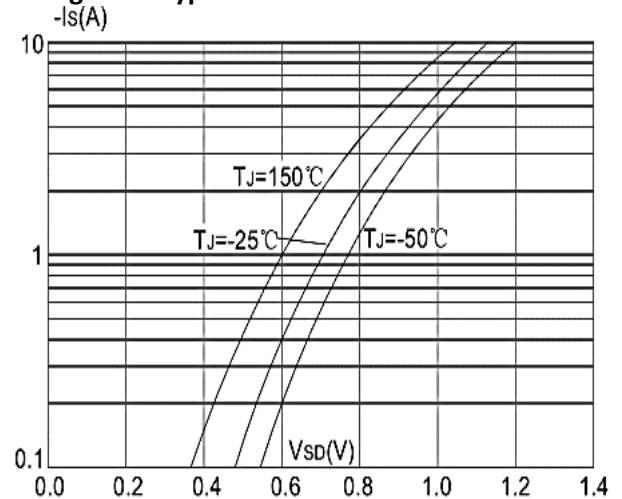


Figure 4: Body Diode Characteristics

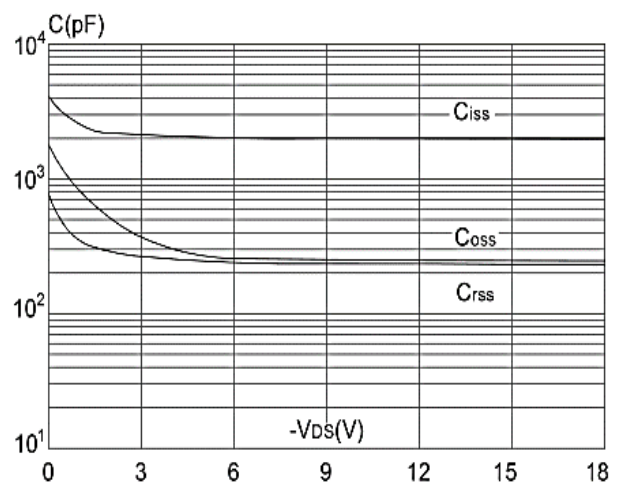


Figure 6: Capacitance Characteristics

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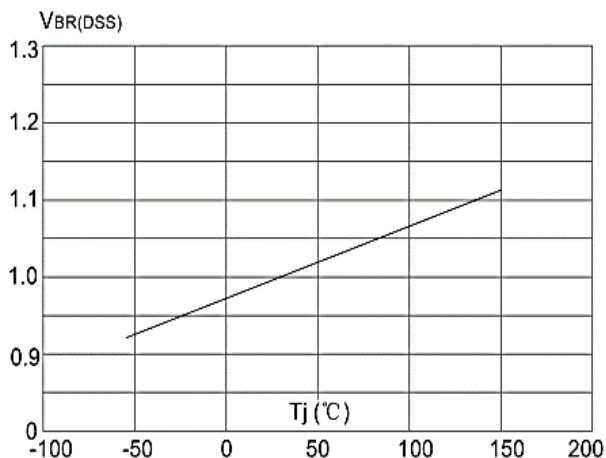


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

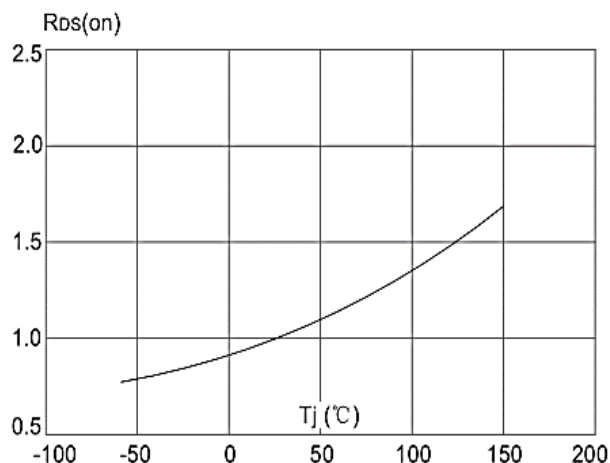


Figure 8: Normalized on Resistance vs. Junction Temperature

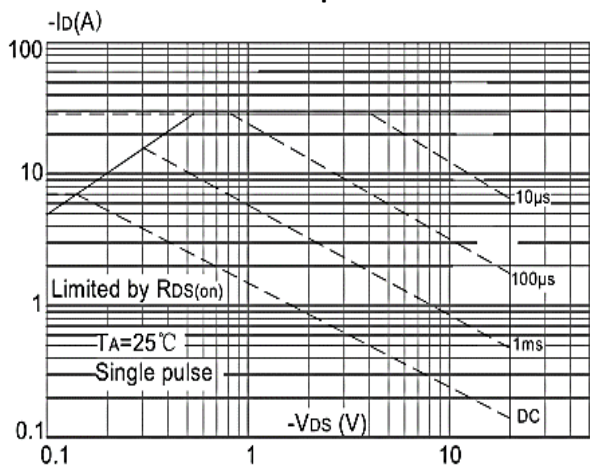


Figure 9: Maximum Safe Operating Area vs. Case Temperature

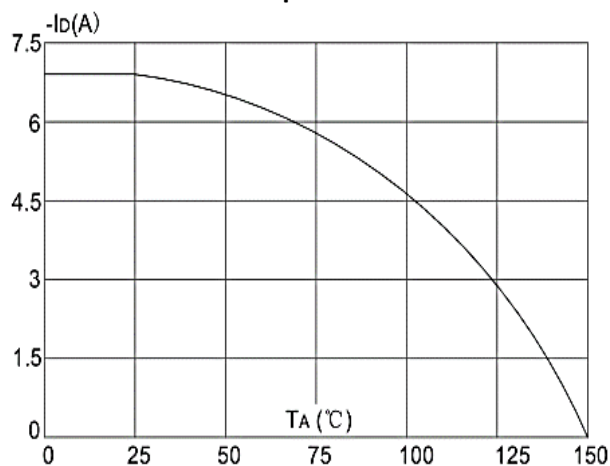


Figure 10: Maximum Continuous Drain Current

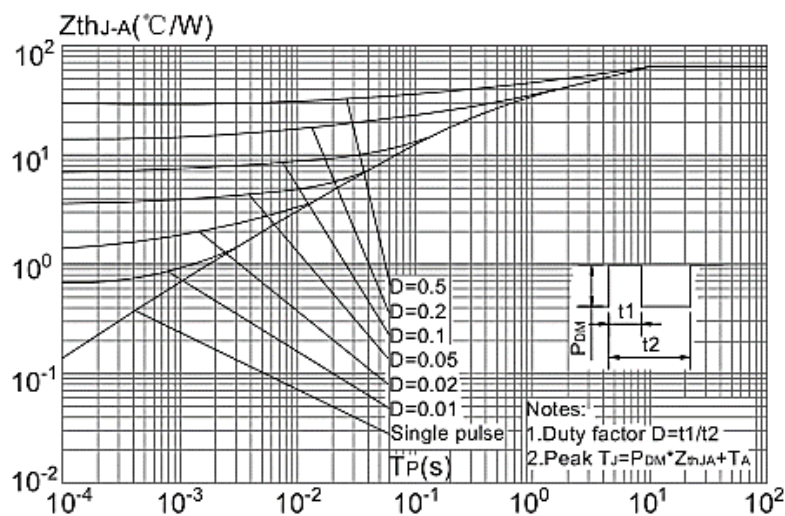
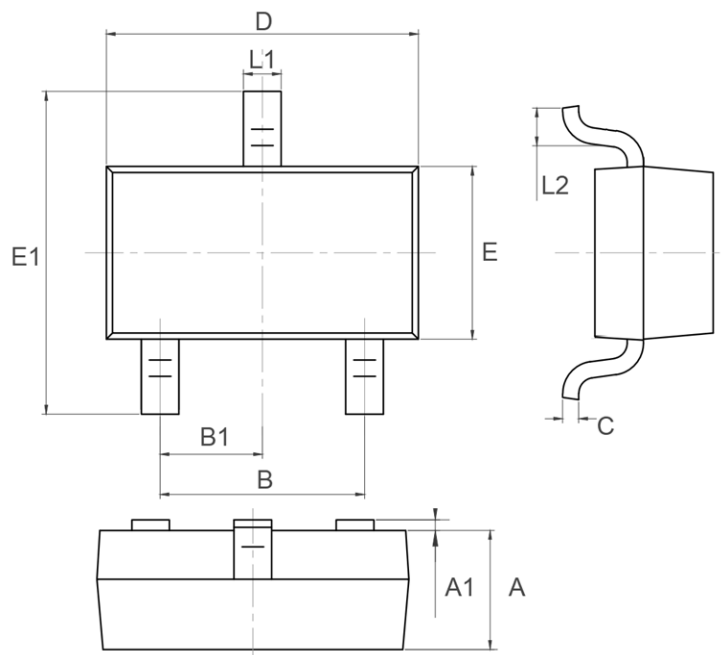


Figure.11: Maximum Effective

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Transient Thermal Impedance, Junction-to-Case

Package Mechanical Data-SOT23-3L-Single



Symbol	Dim in mm		
	Min	Typ	Max
A	1	1.1	1.2
A1	0	0.05	0.1
B	1.8	1.9	2
B1	0.95TYP		
C	0.1	0.15	0.2
D	2.82	2.92	3.02
E	1.5	1.6	1.7
E1	2.65	2.8	2.95
L1	0.3	0.4	0.5
L2	0.3	0.45	0.6

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Edition	Date	Change
REV1.0	2018/12/31	Initial release
REV1.1	2024/3/18	Reduce RDS

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