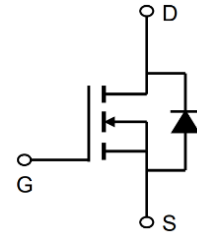


20V N-Channel Enhancement Mode MOSFET

Description

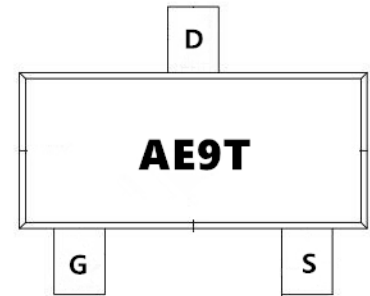
The AP2312MI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

$V_{DS} = 20V$ $I_D = 6.8A$

$R_{DS(ON)} < 18m\Omega @ V_{GS}=4.5V$



Application

- Lithium battery protection
- Wireless impact
- Mobile phone fast charging



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2312MI	SOT-23-3L	AE9T	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_A=25^\circ\text{C}$	Continuous Drain Current	6.8	A
$I_D @ T_A=70^\circ\text{C}$	Continuous Drain Current	6.0	A
I_{DM}	Pulsed Drain Current ²	30	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation ³	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	83	$^\circ\text{C/W}$



20V N-Channel Enhancement Mode MOSFET

Electrical Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20	22		V
VGS(th)	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	0.50	0.65	1.0	V
RDS(ON)	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =7.6A		12	18	mΩ
RDS(ON)	Static Drain-Source On-Resistance	V _{GS} =2.5V, I _D =3.5A		15.5	20	
RDS(ON)	Static Drain-Source On-Resistance	V _{GS} =1.8V, I _D =2.5A		20.5	35	
IDSS	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V			1	μA
IGSS	Gate-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V			±100	nA
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHZ		888		pF
C _{oss}	Output Capacitance			133		
C _{rss}	Reverse Transfer Capacitance			117		
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =6.8A		11.05		nC
Q _{gs}	Gate-Source Charge			1.73		
Q _{gd}	Gate-Drain Charge			3.1		
tD(on)	Turn-on Delay Time	V _{GS} =4.5V, V _{DS} =10V, I _D =6.8A R _{GEN} =3Ω		7		ns
t _r	Turn-on Rise Time			46		
tD(off)	Turn-off Delay Time			30		
t _f	Turn-off fall Time			52		
V _{SD}	Diode Forward Voltage	I _S =7.6A, V _{GS} =0V			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 ≅ 300us , duty cycle ≅ 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

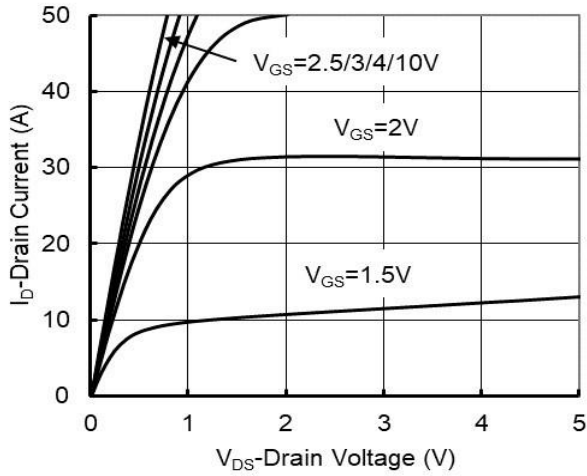


Figure1. Output Characteristics

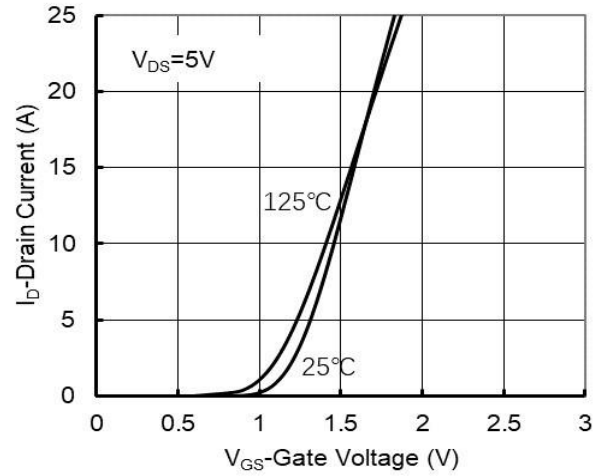


Figure2. Transfer Characteristics

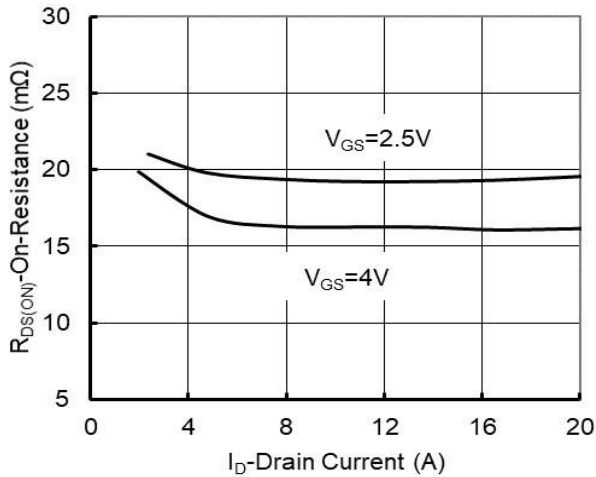


Figure 3: On-Resistance vs. Drain Current

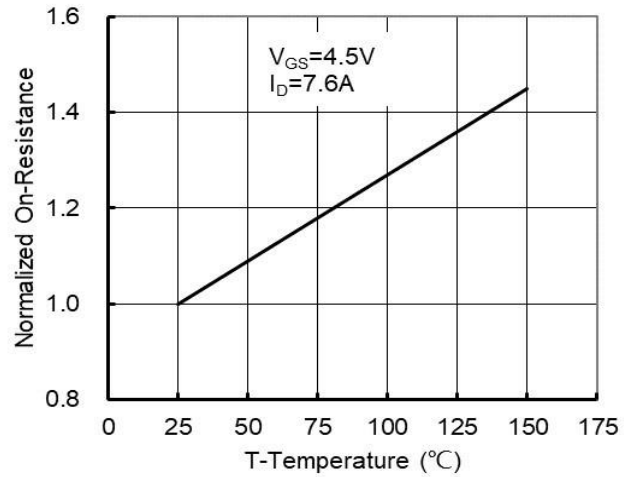


Figure 4: On-Resistance vs. Junction Temperature and Gate Voltage

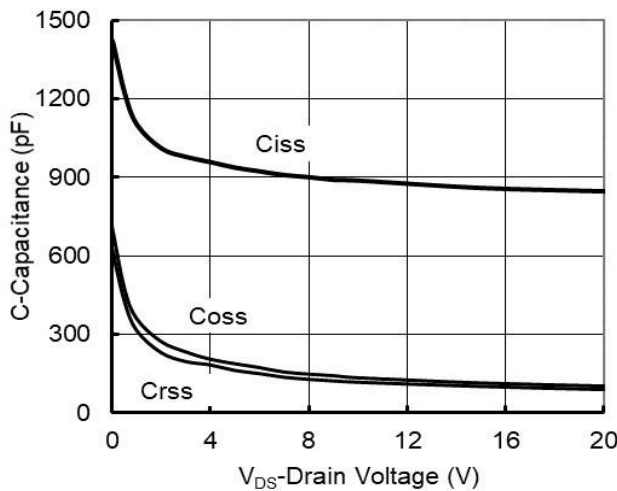


Figure5. Capacitance Characteristics

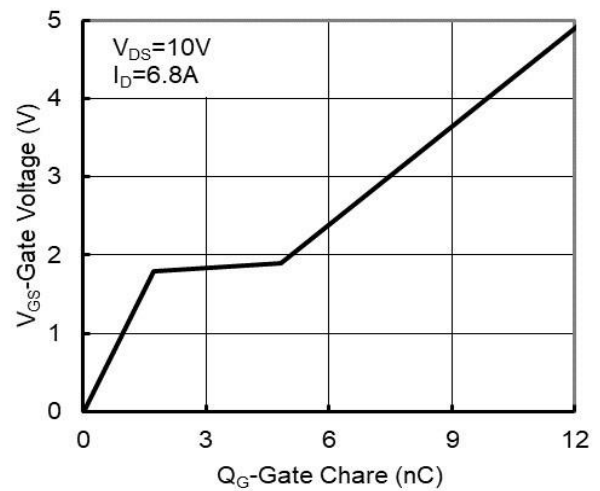


Figure6. Gate Charge

20V N-Channel Enhancement Mode MOSFET

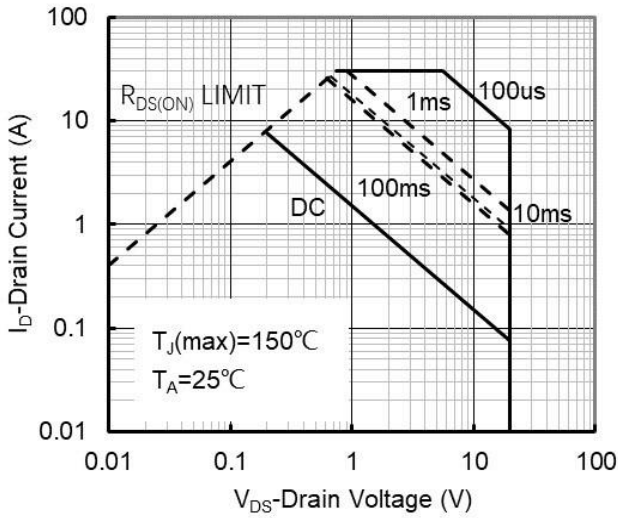


Figure7. Safe Operation Area

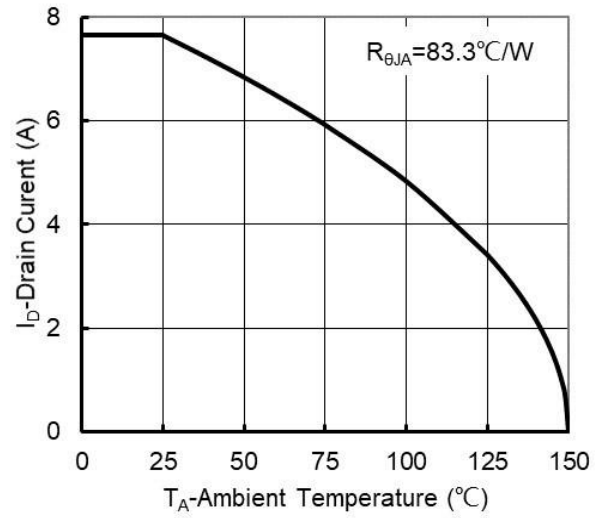


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

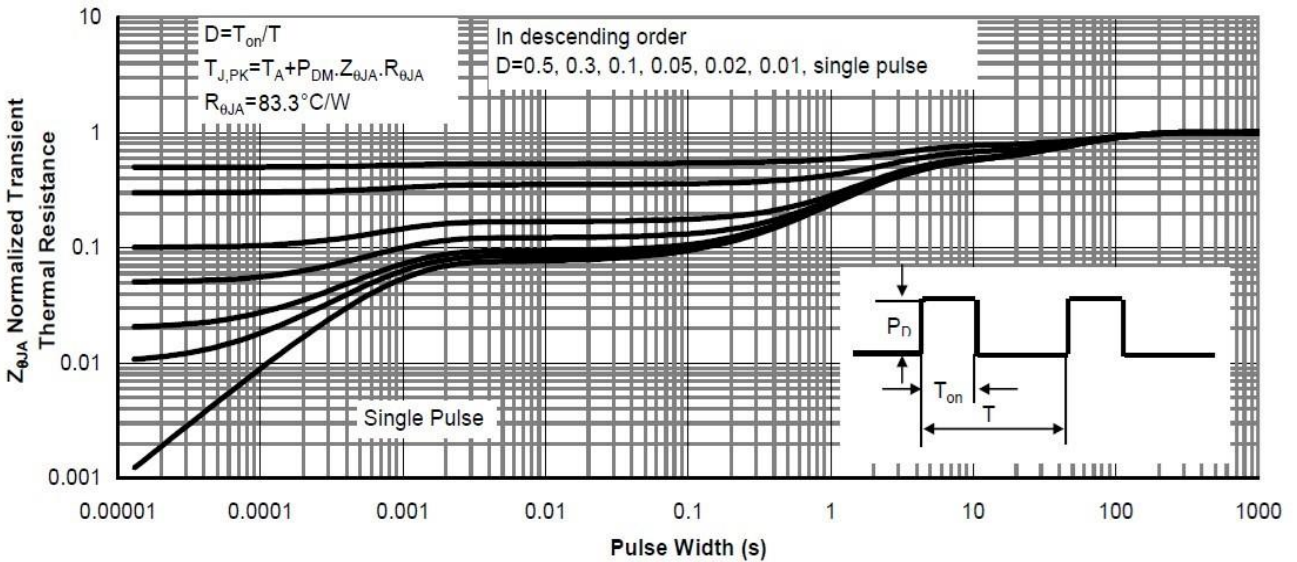
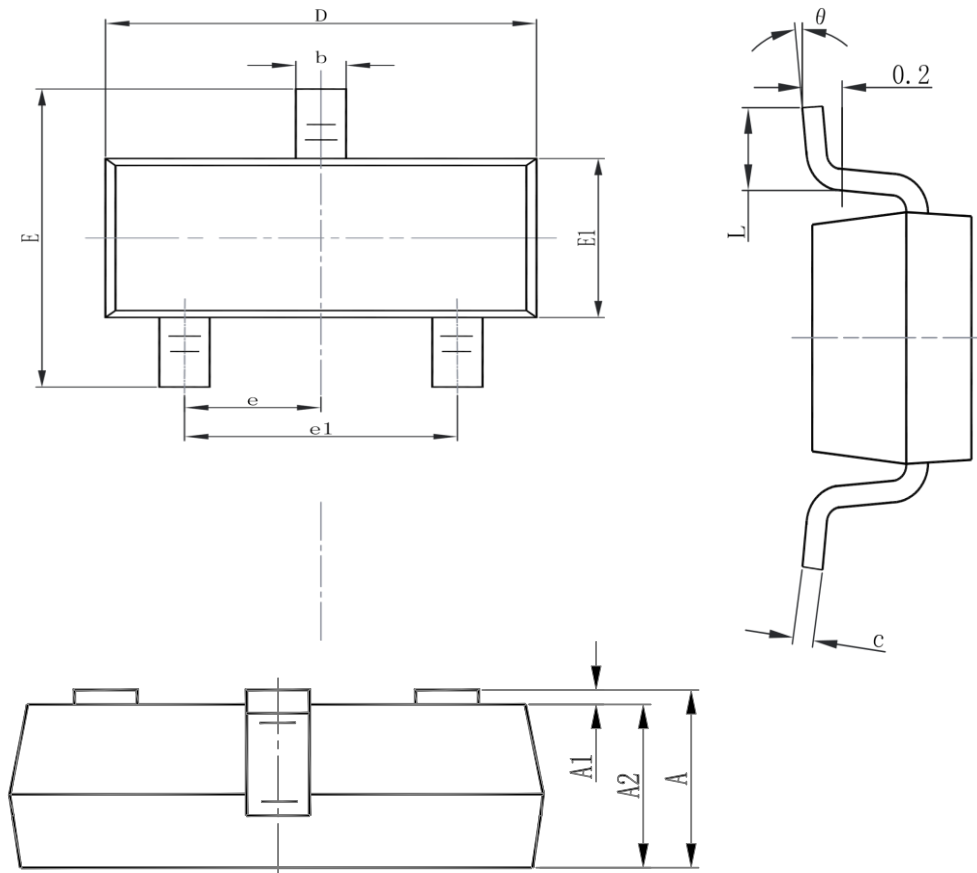


Figure9. Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-SOT-23-3L-Single



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°

**20V N-Channel Enhancement Mode MOSFET
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Edition	Date	Change
Rve3.8	2018/1/31	Initial release
Rve3.9	2020/8/01	Reduce RDS(on)

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