250V N-Channel Enhancement Mode MOSFET

Description

The AP4N25MI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = 250V I_D =4A

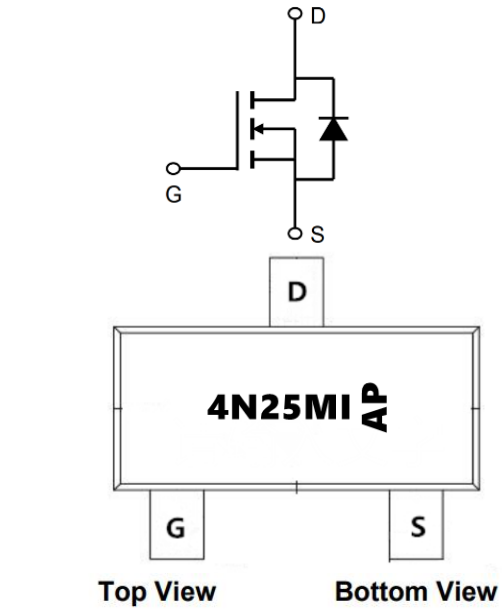
$R_{DS(ON)}$ < 1700mΩ@ V_{GS}=10V （Type：1000mΩ）

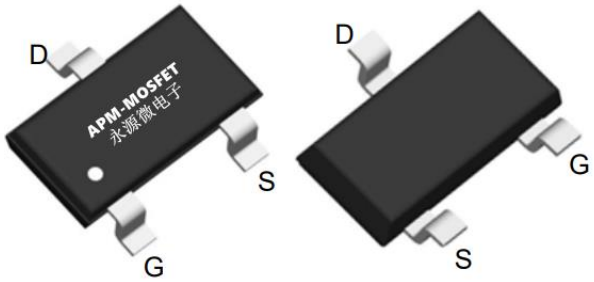
Application

Automative lighting

Load switch

Uninterruptible power supply





Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP4N25MI	SOT23-3L	4N25MI-AP	3000

Absolute Maximum Ratings (TC=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	250	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V	4	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 10V	2.8	A
IDM	Pulsed Drain Current[1]	12	A
P_D@T_C=25℃	Total Power Dissipation	2	W
P_D@T_A=25℃	Total Power Dissipation[3]	1.1	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
RθJA	Maximum Thermal Resistance, Junctionambient	125	℃/W
RθJC	Maximum Thermal Resistance, Junction-case	3.9	℃/W

150V N-Channel Enhancement Mode MOSFET

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	250	285		V
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	1.2	1.8	2.5	V
IGSS	Gate Leakage Current	VDS=0V, VGS=±20V			±100	nA
IDSS	Zero Gate Voltage Drain Current	VDS=150V, VGS=0V			1	μA
RDS(ON)	Drain-Source On-Resistance	VGS=10V, ID= 7A		1000	1700	mΩ
VSD	Diode Forward Voltage	IS=1.8A, VGS=0V		0.8	1.2	V
Qg	Total Gate Charge	VDS=25V, VGS=10V, ID=10A		17.5		nC
Qgs	Gate-Source Charge			4.5		nC
Qgd	Gate-Drain Charge			4.7		nC
Ciss	Input Capacitance	VDS=25V, VGS=0V,f=1MHz		155		pF
Coss	Output Capacitance			35		pF
Crss	Reverse Transfer Capacitance			4.8		pF
td(on)	Turn-On Delay Time	VDS=25V, RL =10.68Ω, VGEN=10V, RG=6Ω		6.8		ns
tr	Turn-On Rise Time			45		ns
td(off)	Turn-Off Delay Time			6.4		ns
tf	Turn-Off Fall Time			22		ns

Note :

1、The data tested by surface mounted on a 1 inch 2 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℃ 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.

Typical Characteristics

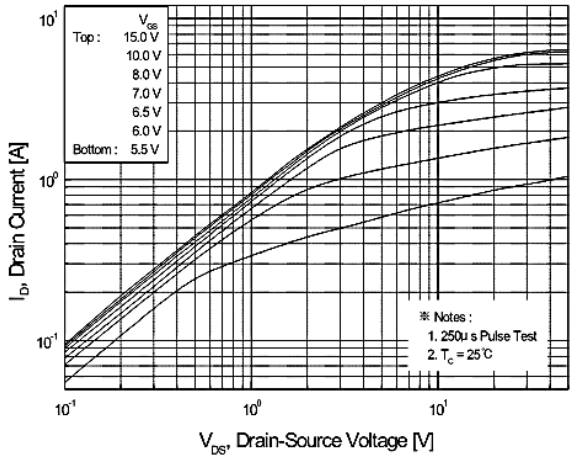


Figure 1. On-Region Characteristics

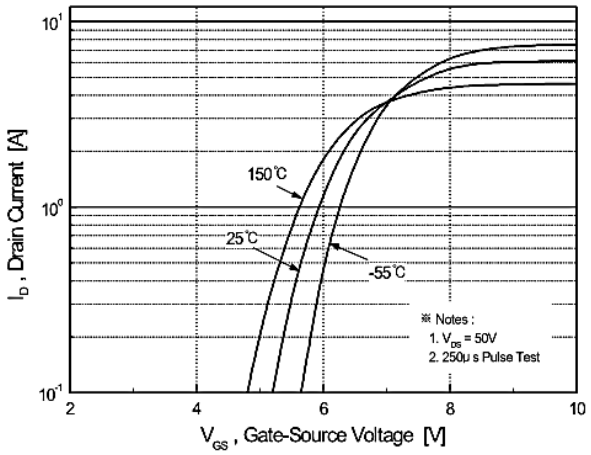


Figure 2. Transfer Characteristics

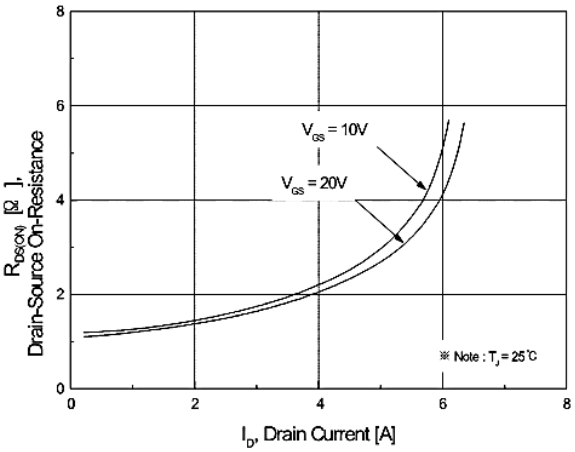


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

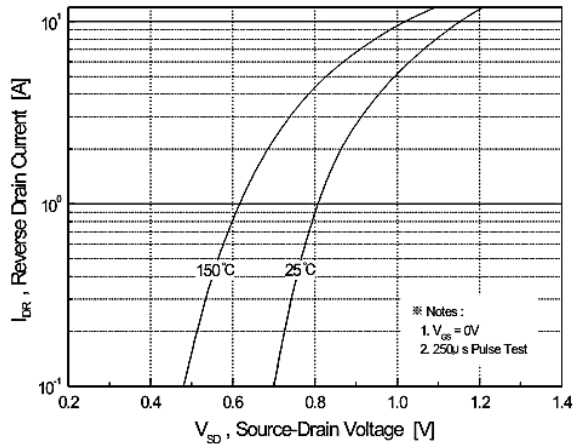


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

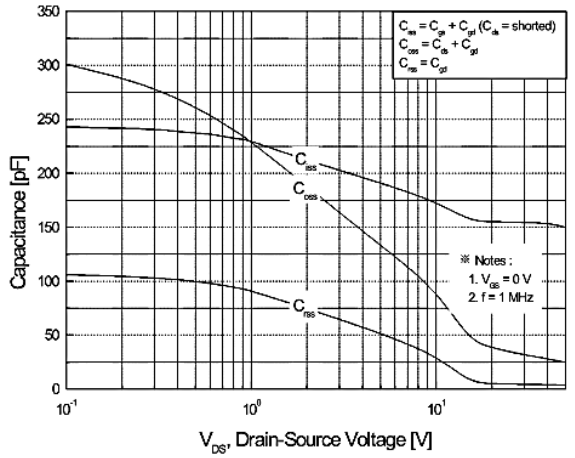


Figure 5. Capacitance Characteristics

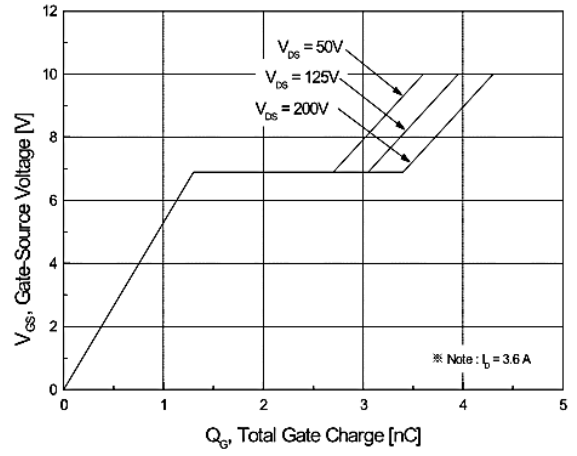


Figure 6. Gate Charge Characteristics

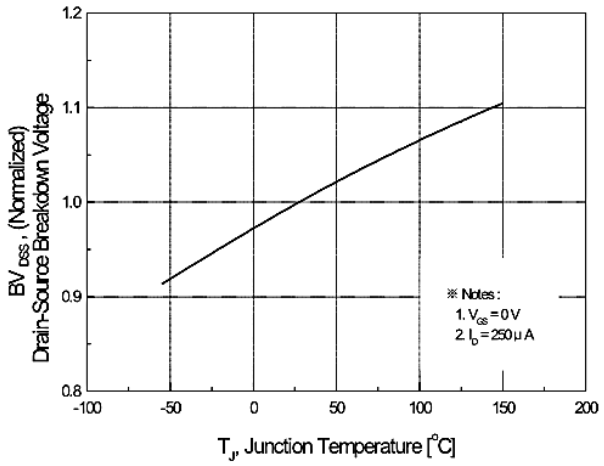


Figure 7. Breakdown Voltage Variation vs. Temperature

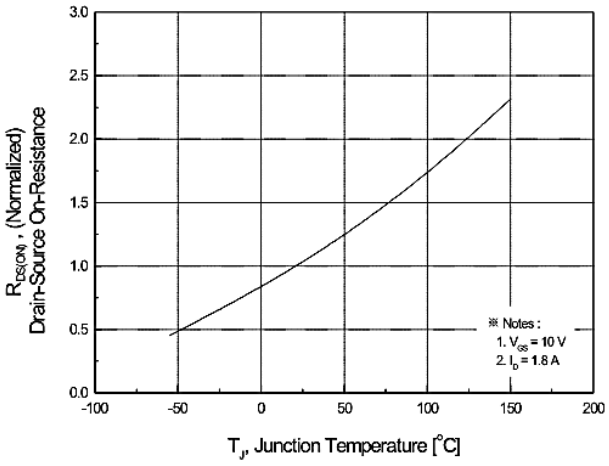


Figure 8. On-Resistance Variation vs. Temperature

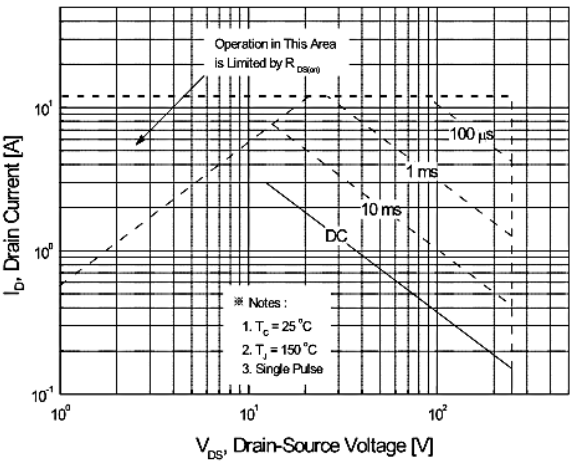


Figure 9. Maximum Safe Operating Area

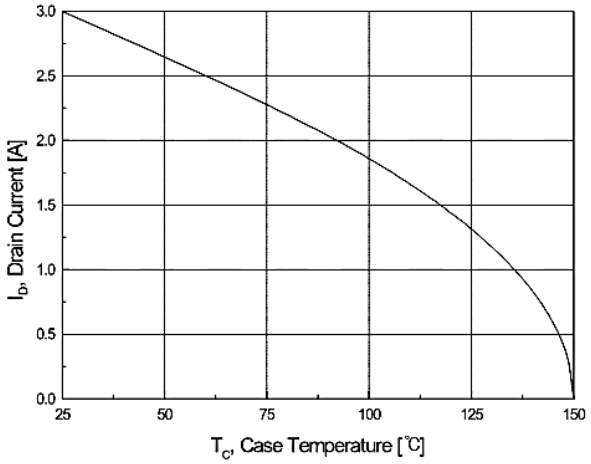


Figure 10. Maximum Drain Current vs. Case Temperature

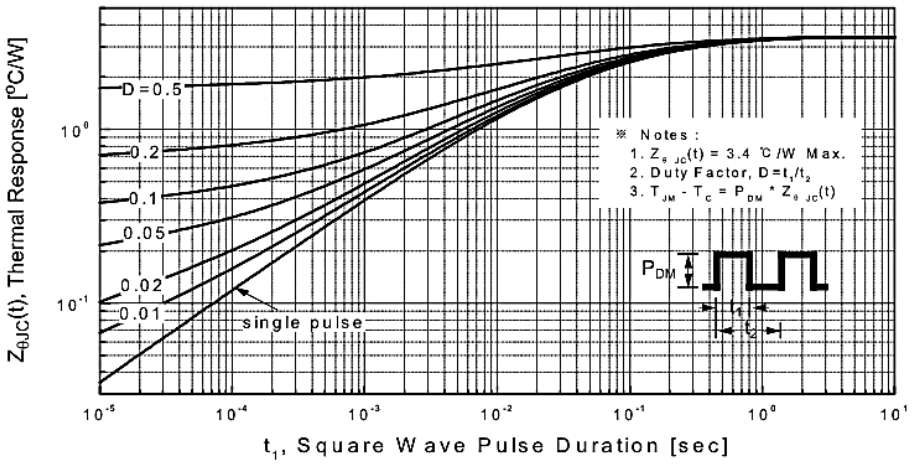
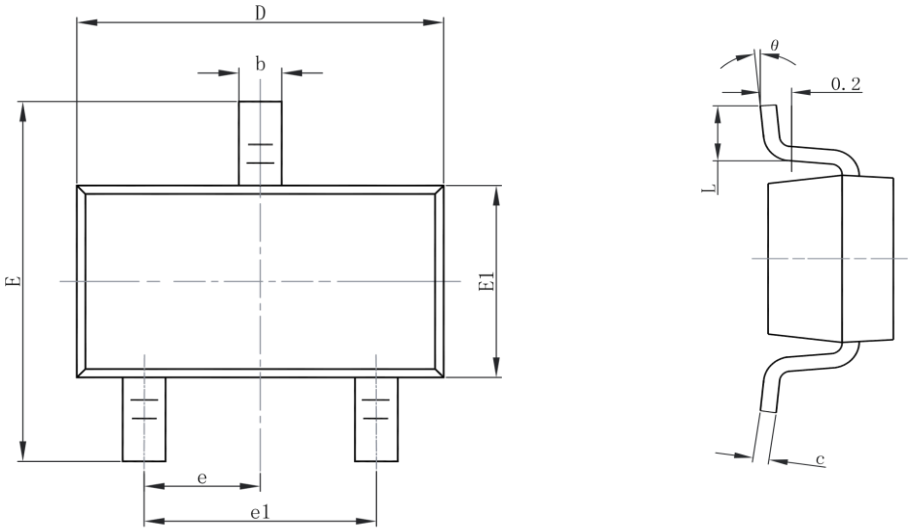


Figure 11. Transient Thermal Response Curve

Package Mechanical Data-SOT23-3L



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°

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250V N-Channel Enhancement Mode MOSFET

Edition	Date	Change
Rve1.0	2023/1/29	Initial release