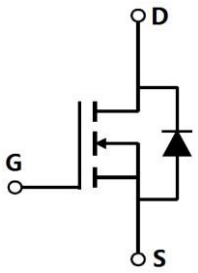
AP4N10MI

100V N-Channel Enhancement Mode MOSFET

Description

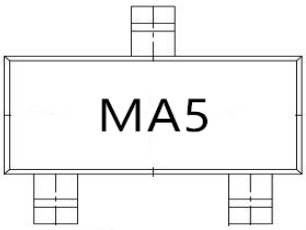
The AP4N10MI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = 100V I_D = 3.8A

$R_{DS(ON)}$ < 240mΩ @ V_{GS}=10V



Applicatio

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP4N10MI	SOT-23-3L	MA5	3000

Absolute Maximum Ratings T_C=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	3.8	A
	Drain Current – Continuous (T_C=100℃)	2	A
I_{DM}	Drain Current – Pulsed[1]	8	A
P_D	Power Dissipation (T_C=25℃)	3.76	W
	Power Dissipation – Derate above 25℃	0.5	W/℃
T_{STG}	Storage Temperature Range	-50 to 150	℃
T_J	Operating Junction Temperature Range	-50 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	70	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	30	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted) Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.09	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=80V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=1A	---	210	240	mΩ
		V_{GS}=4.5V , I_D=0.5A	---	240	280	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.9	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5	---	mV/℃
gfs	Forward Transconductance	V_{DS}=10V , I_D=2A	---	2.3	---	S
Q_g	Total Gate Charge[2,3]	V_{DS}=50V , V_{GS}=10V , I_D=1A	---	9	18	nC
Q_{gs}	Gate-Source Charge[2,3]		---	2.3	4.6	
Q_{gd}	Gate-Drain Charge[2,3]		---	1.1	2.5	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=50V , V_{GS}=10V , R_G=3.3 I_D=1A	---	5.2	10	ns
T_r	Rise Time[2,3]		---	6.8	12	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	14.5	28	
T_f	Fall Time[2,3]		---	2.1	5	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	152	200	pF
C_{oss}	Output Capacitance		---	17	20	
C_{rss}	Reverse Transfer Capacitance		---	10	15	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	2.8	5.6	

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Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	4	A
I_{SM}	Pulsed Source Current		---	---	8	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=1A$, $T_J=25℃$	---	---	1	V
t_{rr}	Reverse Recovery Time[2]	$I_S=1A$, dI/dt=100A/μs	---	---	---	ns
Q_{rr}	Reverse Recovery Charge[2]	$T_J=25℃$	---	---	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.

23. . Essentially independent of operating temperature. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

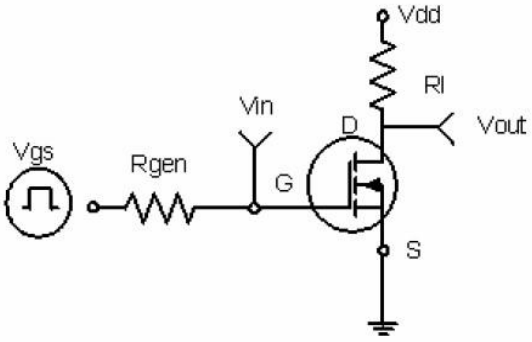


Figure 1:Switching Test Circuit

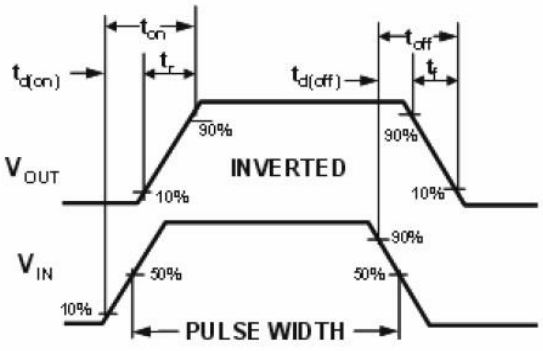


Figure 2:Switching Waveforms

100V N-Channel Enhancement Mode MOSFET

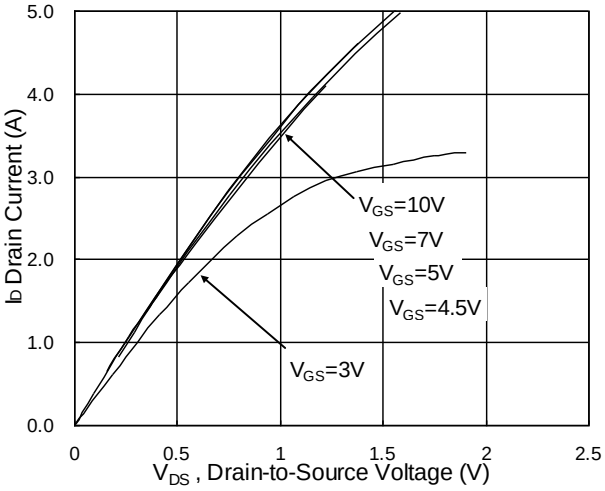


Fig.1 Typical Output Characteristics

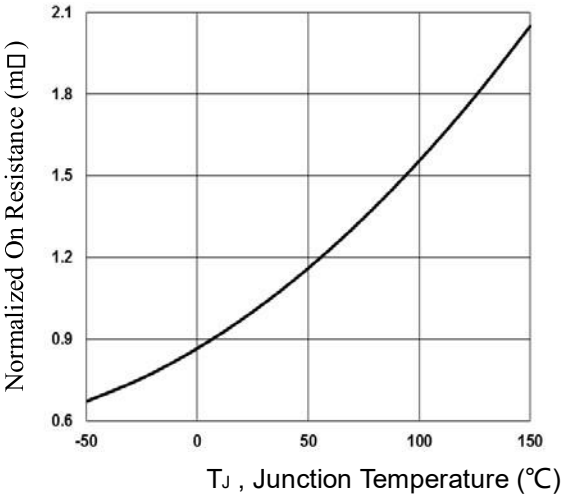


Fig.2 Normalized RDSON vs. T_J

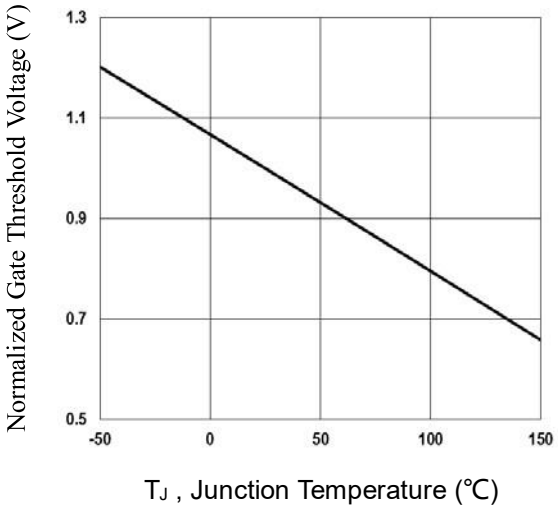


Fig.3 Normalized V_{th} vs. T_J

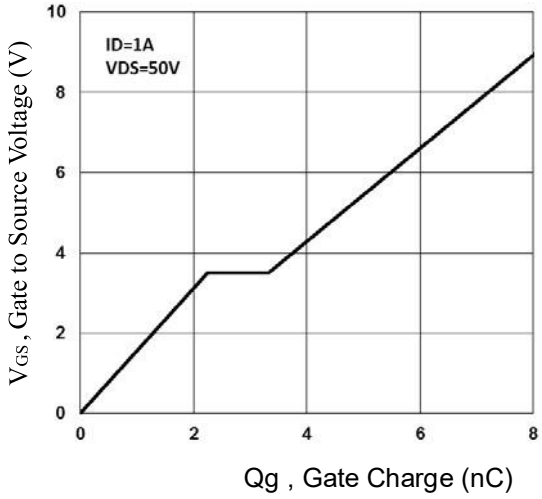


Fig.4 Gate Charge Waveform

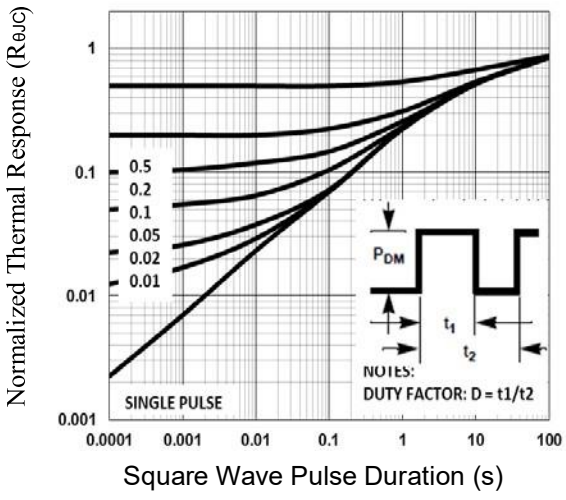


Fig.5 Normalized Transient Impedance

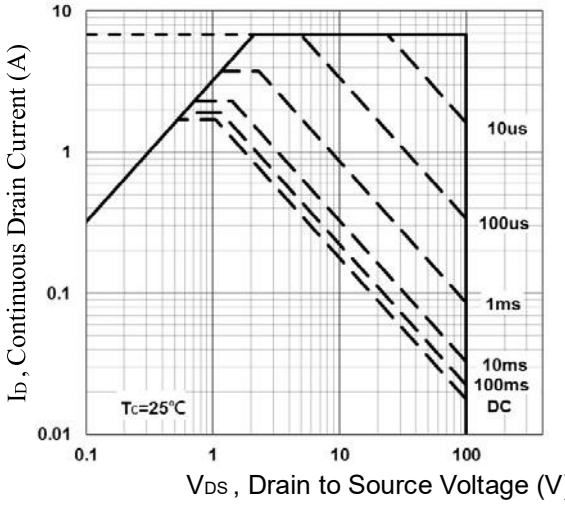
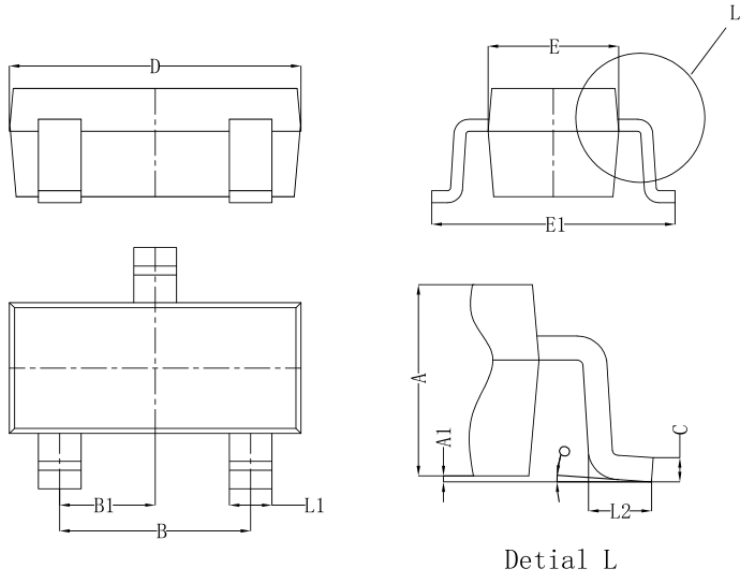


Fig.6 Maximum Safe Operation Area

SOT23-3L Package outline



Detial L

Symbol	Dim in mm		
	Min	Nor	Max
A	1.050	1.100	1.150
A1	0.000	0.050	0.100
L1	0.300	0.400	0.500
C	0.100	0.150	0.200
D	2.820	2.920	3.020
E	1.500	1.600	1.700
E1	2.650	2.800	2.950
B	1.800	1.900	2.000
B1	0.950 TYP		
L2	0.300	0.450	0.600
o	0°	4°	8°

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