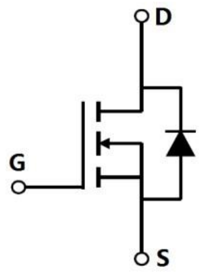
100V N-Channel Enhancement Mode MOSFET

Description

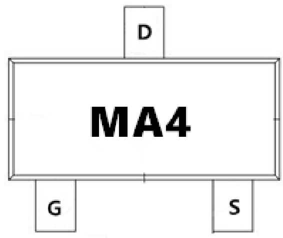


The AP3N10BI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = 100V I_D =2.8 A

$R_{DS(ON)}$ < 320mΩ @ V_{GS}=10V



Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP3N10BI	SOT23L	MA4	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	2.8	A
I_D@T_A=70˚C	Continuous Drain Current, V_{GS} @ 10V[1]	1	A
I_{DM}	Pulsed Drain Current[2]	5	A
P_D@T_A=25˚C	Total Power Dissipation[3]	1	W
T_{STG}	Storage Temperature Range	-55 to 150	˚C
T_J	Operating Junction Temperature Range	-55 to 150	˚C
$R_{θJA}$	Thermal Resistance Junction-ambient [1]	125	˚C/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	80	˚C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.067	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=1A	---	260	310	mΩ
		V_{GS}=4.5V , I_D=0.5A	---	270	320	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.2	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25℃	---	---	1	uA
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25℃	---	---	5	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=1A	---	2.4	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.8	5.6	
Q_g	Total Gate Charge (10V)	V_{DS}=80V , V_{GS}=10V , I_D=1A	---	9.7	13.6	nC
Q_{gs}	Gate-Source Charge		---	1.6	2.2	
Q_{gd}	Gate-Drain Charge		---	1.7	2.4	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=50V , V_{GS}=10V , R_G=3.3 I_D=1A	---	1.6	3.2	ns
T_r	Rise Time		---	19	34	
$T_{d(off)}$	Turn-Off Delay Time		---	13.6	27	
T_f	Fall Time		---	19	38	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	508	711	pF
C_{oss}	Output Capacitance		---	29	41	
C_{rss}	Reverse Transfer Capacitance		---	16.4	23	
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	1.2	A
I_{SM}	Pulsed Source Current[2,4]		---	---	5	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	IF=1A , dI/dt=100A/μs , T_J=25℃	---	14	---	nS
Q_{rr}	Reverse Recovery Charge		---	9.3	---	nC

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.

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Typical Characteristics

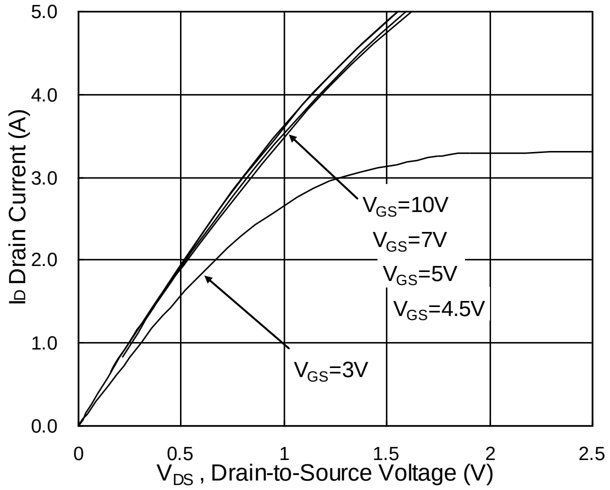


Fig.1 Typical Output Characteristics

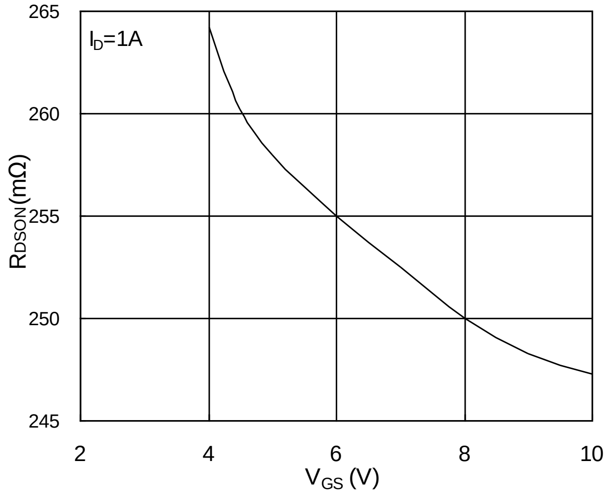


Fig.2 On-Resistance vs. Gate-Source

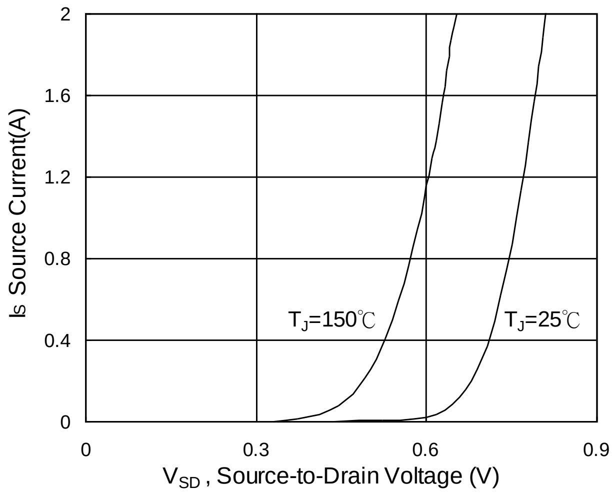


Fig.3 Forward Characteristics of Reverse

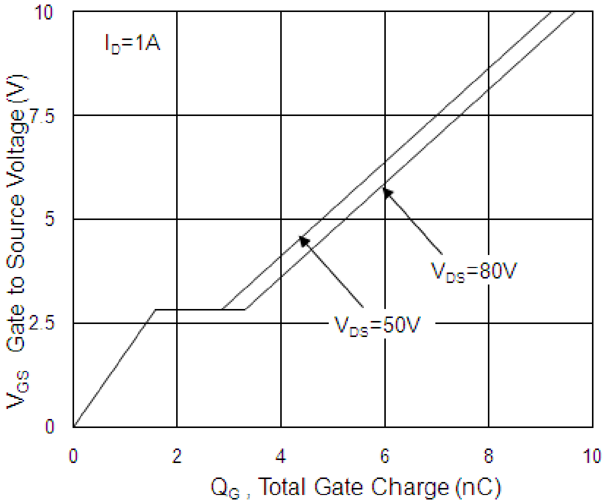


Fig.4 Gate-Charge Characteristics

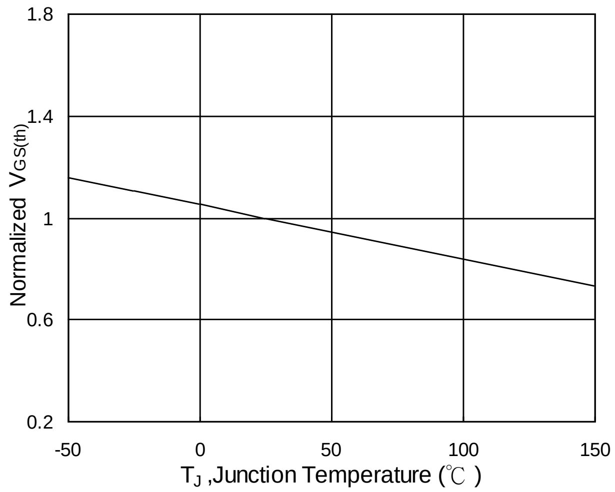


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

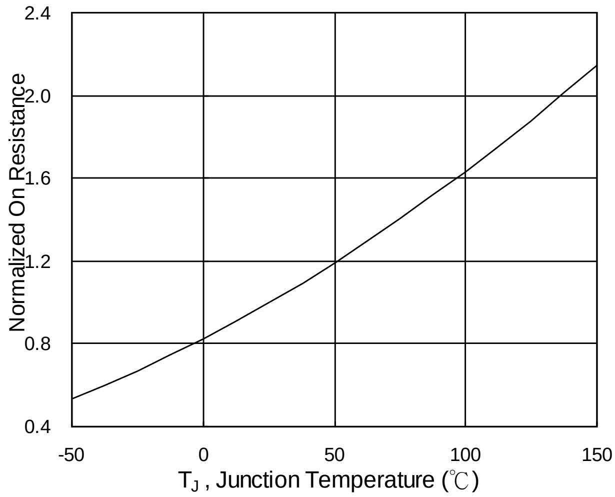


Fig.6 Normalized R_{DSON} vs. T_J

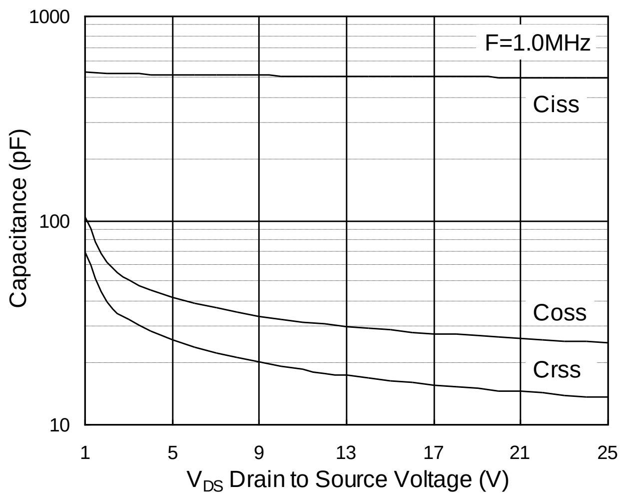


Fig.7 Capacitance

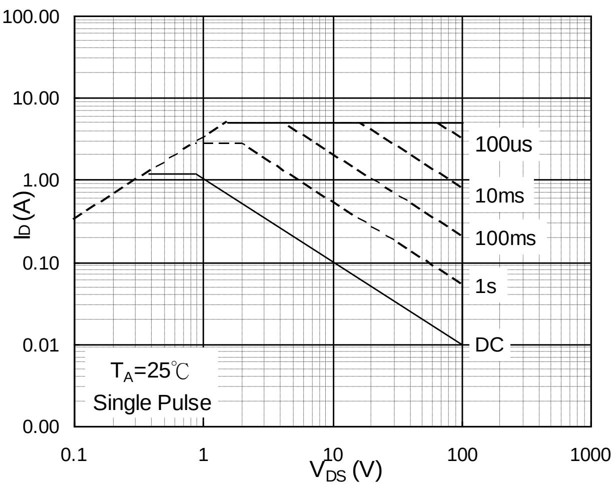


Fig.8 Safe Operating Area

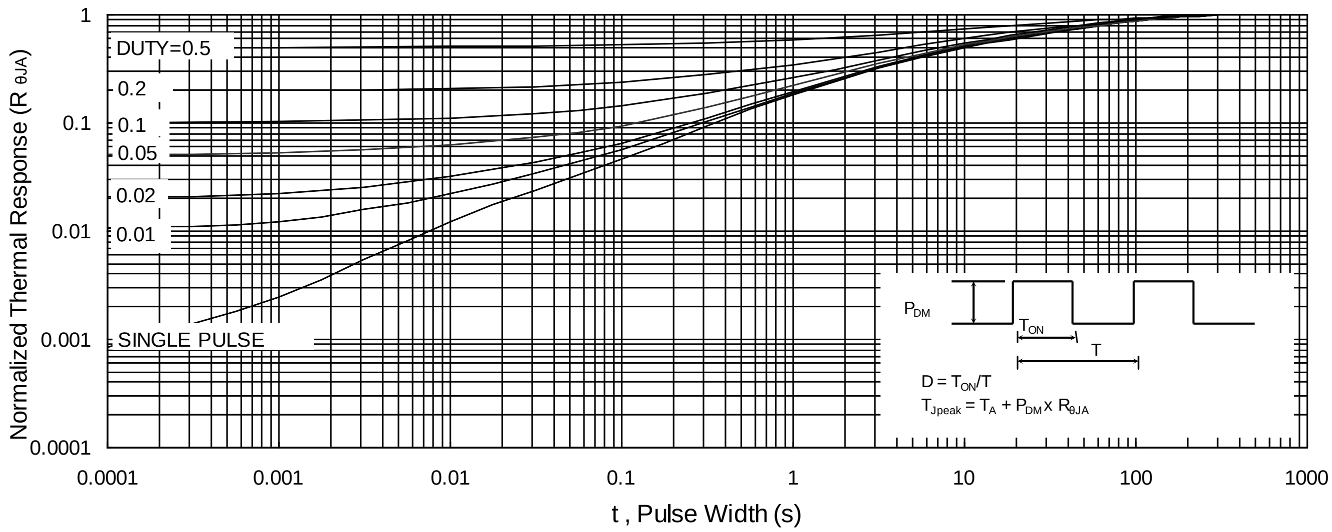


Fig.9 Normalized Maximum Transient Thermal Impedance

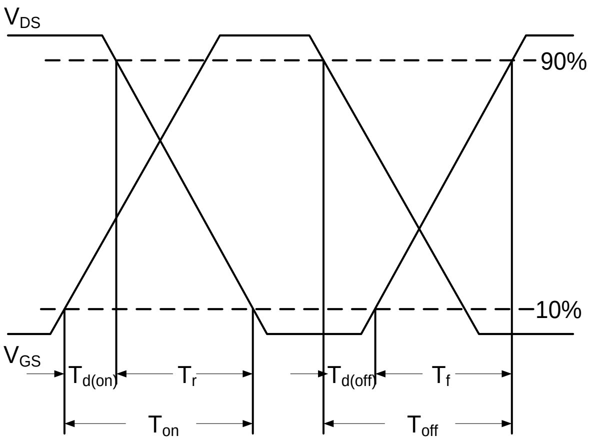


Fig.10 Switching Time Waveform

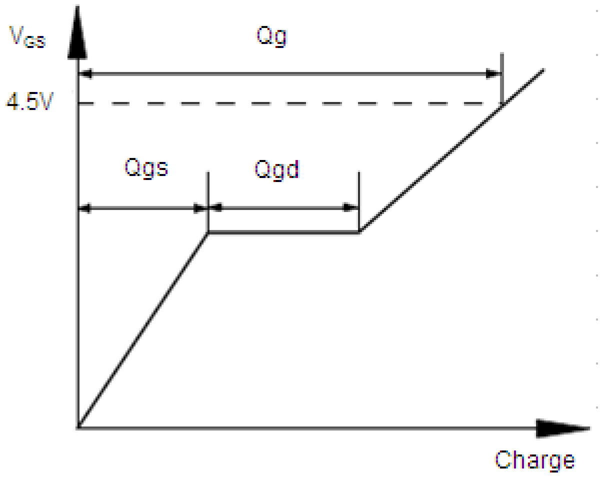
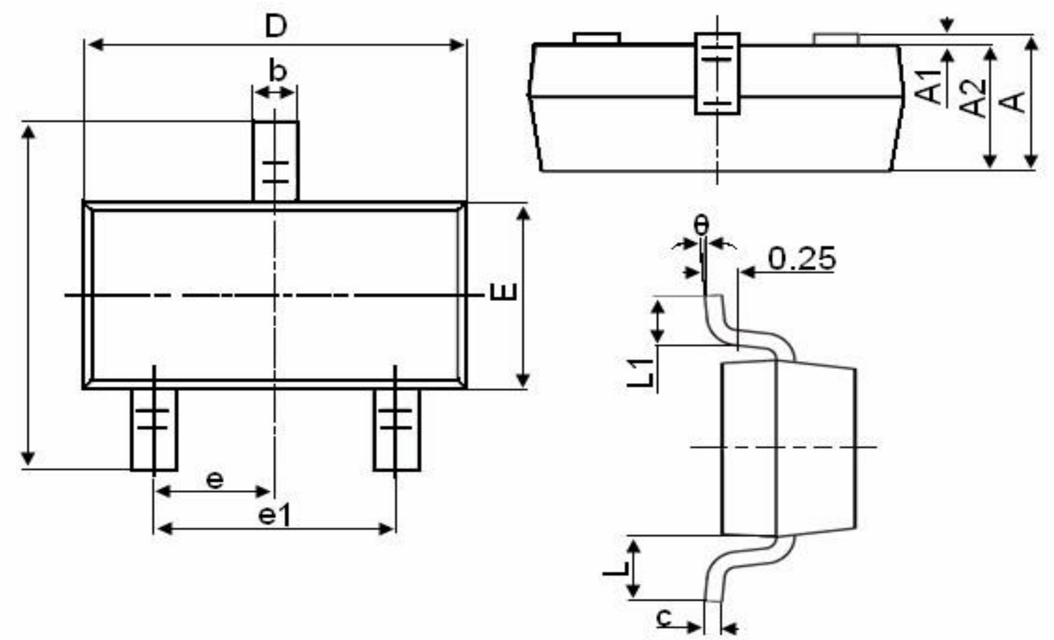


Fig.11 Gate Charge Waveform

SOT23L Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

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