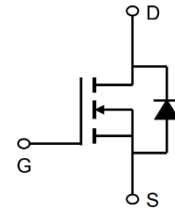


30V N-Channel Enhancement Mode MOSFET

Description

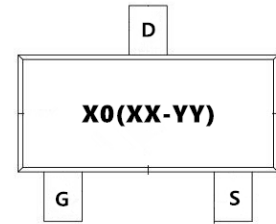
The AP3400MI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

$V_{DS} = 30V$ $I_D = 5.8A$

$R_{DS(ON)} < 25m\Omega$ @ $V_{GS}=10V$



Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP3400MI	SOT-23-3L	X0(XX-YY).	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current	5.8	A
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current	4.9	A
I_{DM}	Pulsed Drain Current ²	20	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation ³	1	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	125	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	85	$^\circ\text{C/W}$

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Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.029	---	V/°C
R _{DS(on)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =5A	---	21	25	mΩ
		V _{GS} =4.5V, I _D =3A	---	23	31	
		V _{GS} =2.5V, I _D =1A	---	30	49	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.5	---	1.2	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-2.82	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =5A	---	25	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.5	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V, V _{GS} =4.5V, I _D =5.8A	---	11.5	---	nC
Q _{gs}	Gate-Source Charge		---	1.6	---	
Q _{gd}	Gate-Drain Charge		---	2.9	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V, R _G =3Ω I _D =5A	---	5	---	ns
T _r	Rise Time		---	47.	---	
T _{d(off)}	Turn-Off Delay Time		---	26	---	
T _f	Fall Time		---	8	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	530	---	pF
C _{oss}	Output Capacitance		---	130	---	
C _{rss}	Reverse Transfer Capacitance		---	36	---	
I _S	Continuous Source Current ^{1,4}	V _G =V _D =0V, Force Current	---	---	5.8	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	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 I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

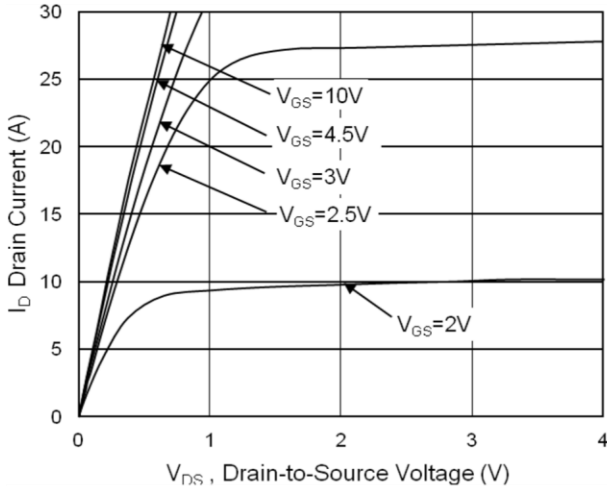


Fig.1 Typical Output Characteristics

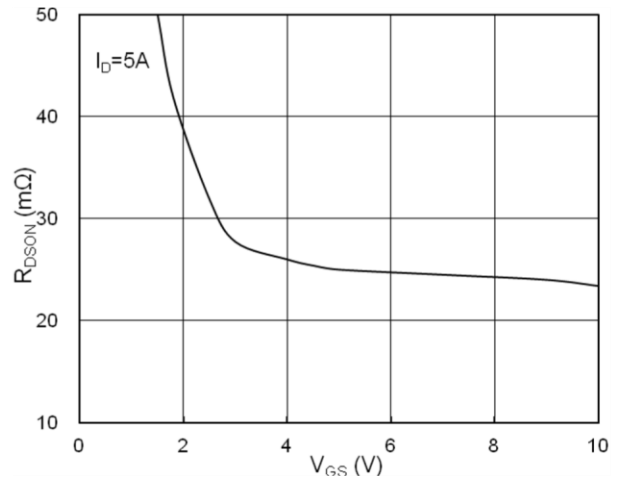


Fig.2 On-Resistance vs. Gate-Source

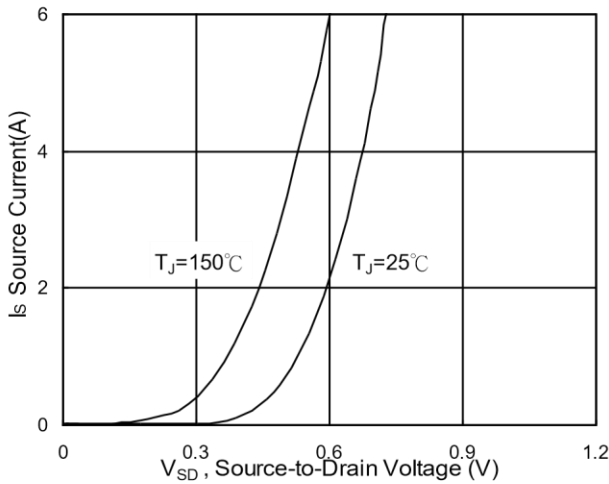


Fig.3 Forward Characteristics Of Reverse

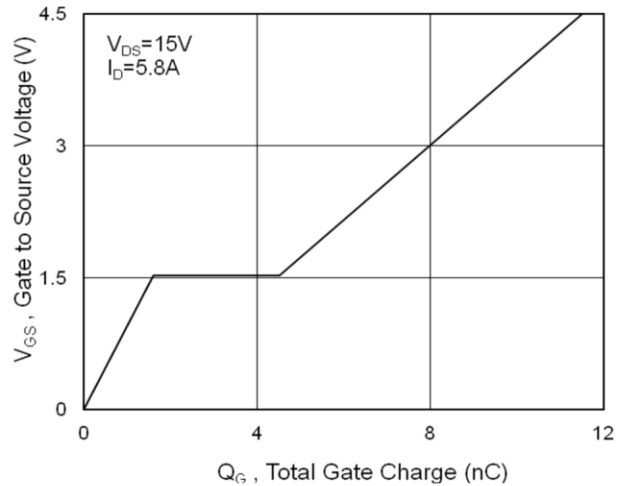


Fig.4 Gate-Charge Characteristics

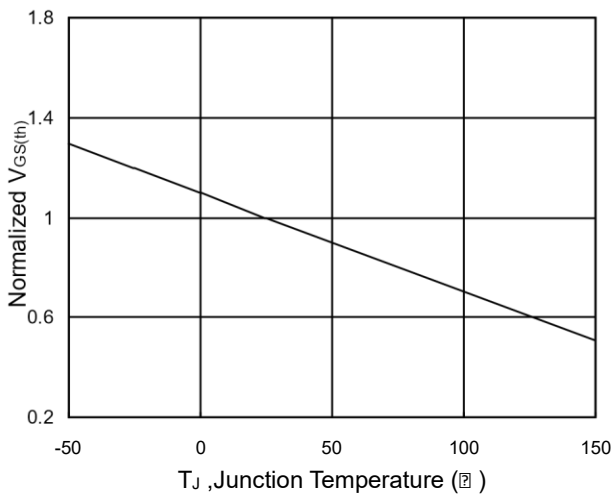


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

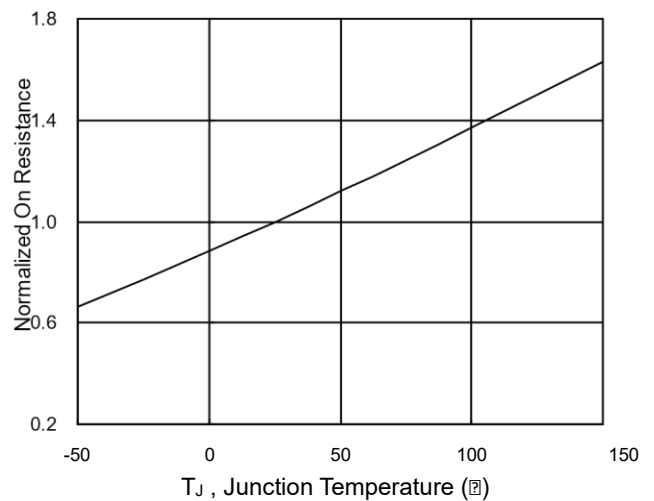


Fig.6 Normalized R_{DSON} vs. T_J

30V N-Channel Enhancement Mode MOSFET

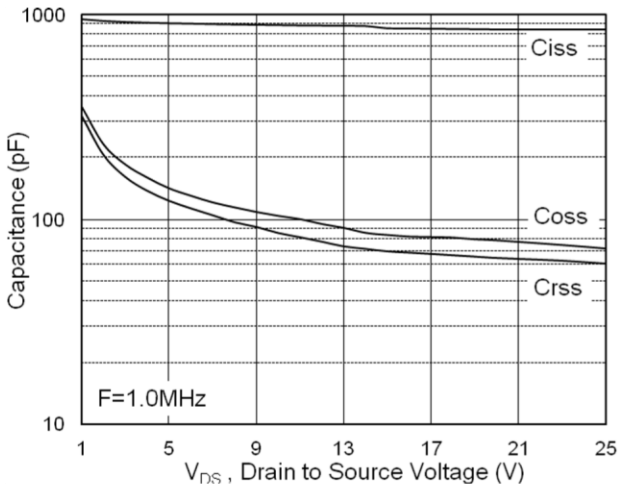


Fig.7 Capacitance

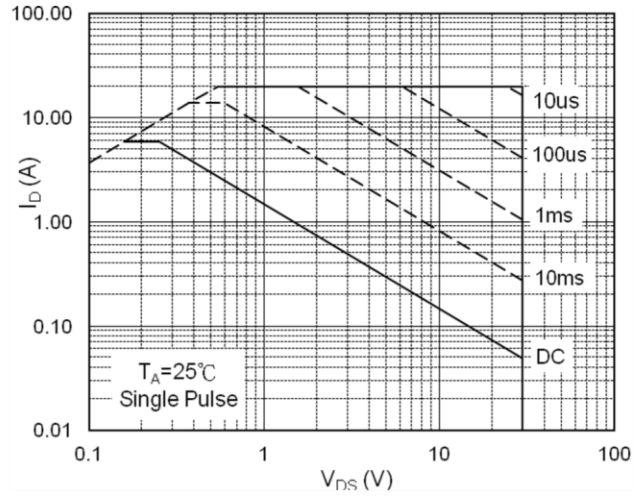


Fig.8 Safe Operating Area

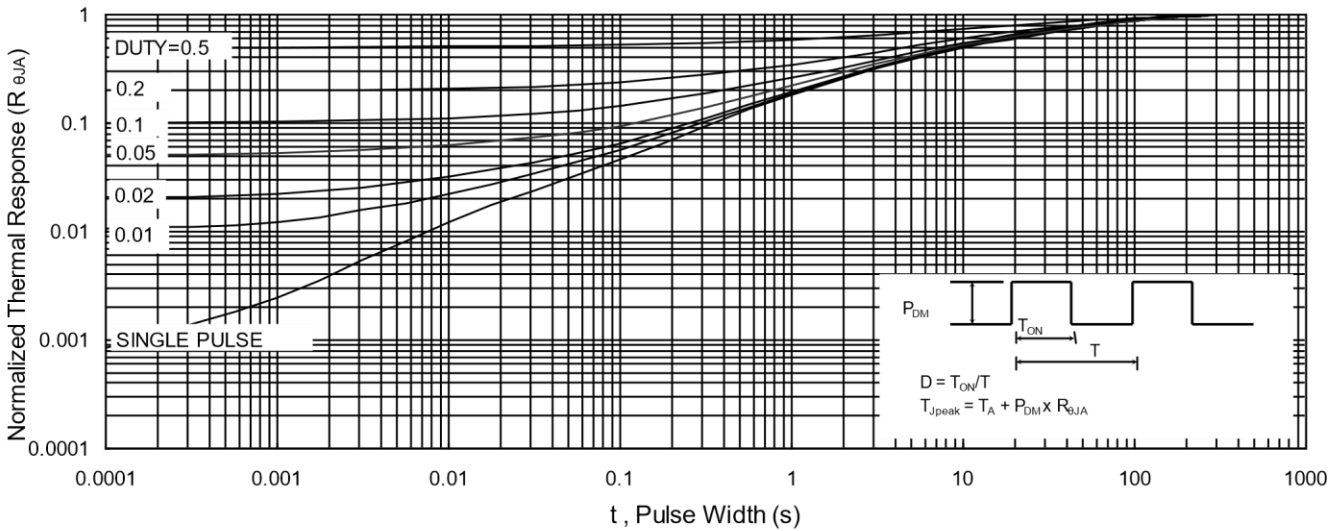


Fig.9 Normalized Maximum Transient Thermal Impedance

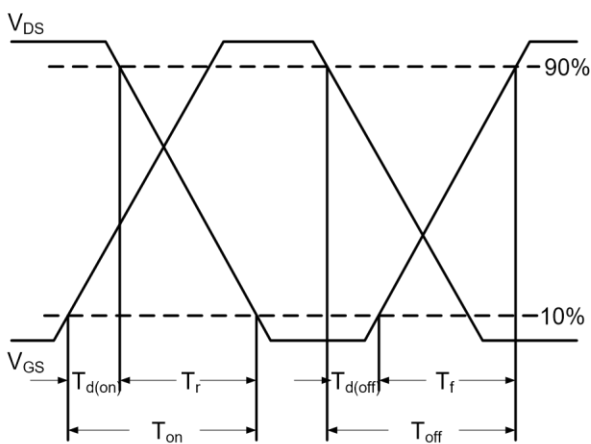


Fig.10 Switching Time Waveform

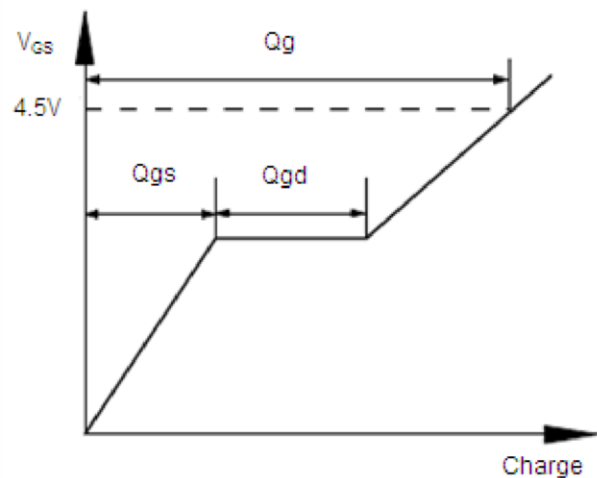
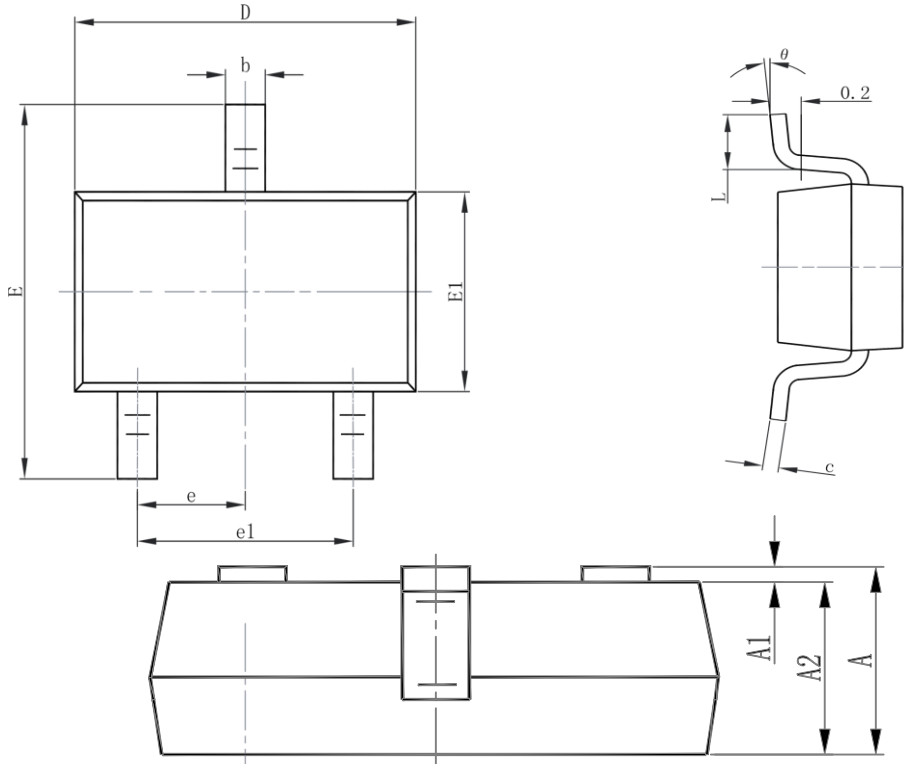


Fig.11 Gate Charge Waveform

Package Mechanical Data-SOT23-3



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
theta	0°	8°	0°	8°

**30V N-Channel Enhancement Mode MOSFET
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Edition	Date	Change
Rve3.8	2017/5/1	Initial release
Rve3.9	2020/5/20	Reduce RDS(on)

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