TM2300AI

N-Channel Enhancement Mosfet

General Description

• Low $R_{DS(ON)}$
• RoHS and Halogen-Free Compliant

Applications

• Load switch
• PWM

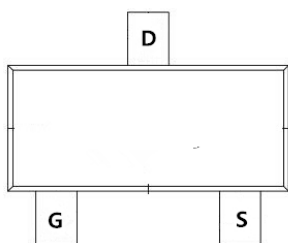### General Features

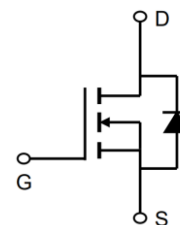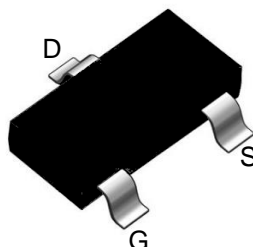V_{DS} = 20V I_D =6.0A

$R_{DS(ON)}$=19mΩ (typ.) @ V_{GS}=4.5V

100% UIS Tested
100% R_g Tested

Green Product

I:SOT-23

Marking 2300 OR 06N02

Absolute Maximum Ratings (T_C=25℃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℃	Continuous Drain Current, V_{GS} @ 4.5V[1]	6.0	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 4.5V[1]	4.0	A
I_{DM}	Pulsed Drain Current[2]	15.0	A
P_D@T_A=25℃	Total Power Dissipation[3]	1	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient [1]	---	125	℃/W
R	Thermal Resistance Junction Case[1]		80	℃/W

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Electrical Characteristics (T$_J$=25 $^\circ$C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=250uA	20	---	---	V
R$_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V$_{GS}$=4.5V , I$_D$=3A	---	19	30	mΩ
		V$_{GS}$=2.5V , I$_D$=2A	---	26	37	
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	0.4	---	1.2	V
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=16V , V$_{GS}$=0V , T$_J$=25°C	---	---	1	uA
		V$_{DS}$=16V , V$_{GS}$=0V , T$_J$=55°C	---		5	
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±12V , V$_{DS}$=0V	---	---	±100	nA
gfs	Forward Transconductance	V$_{DS}$=5V , I$_D$=3A	---	10.5	---	S
Q$_g$	Total Gate Charge (4.5V)	V$_{DS}$=15V , V$_{GS}$=4.5V , I$_D$=3A	---	4.6	---	nC
Q$_{gs}$	Gate-Source Charge		---	0.7	---	
Q$_{gd}$	Gate-Drain Charge		---	1.5	---	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=10V , V$_{GS}$=4.5V , R$_G$=3.3Ω I$_D$=3A	---	1.6	---	ns
T$_r$	Rise Time		---	42	---	
T$_{d(off)}$	Turn-Off Delay Time		---	14	---	
T$_f$	Fall Time		---	7	---	
C$_{iss}$	Input Capacitance	V$_{DS}$=15V , V$_{GS}$=0V , f=1MHz	---	310	---	pF
C$_{oss}$	Output Capacitance		---	49	---	
C$_{rss}$	Reverse Transfer Capacitance		---	35	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current[1,4]	V$_G$=V$_D$=0V , Force Current	---	---	6.0	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 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°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.

TM2300AI

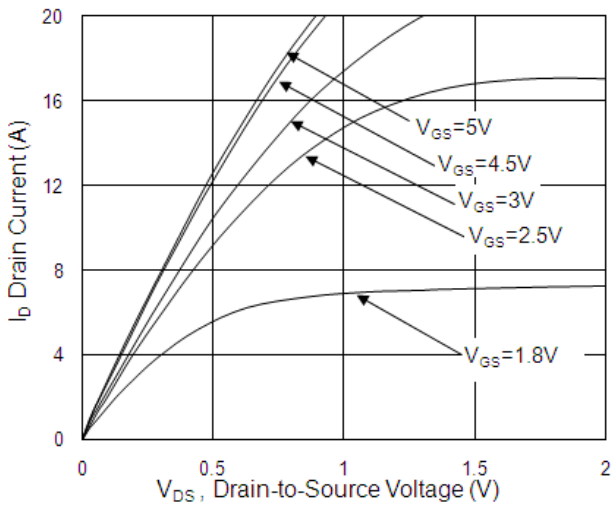## N-Channel Enhancement Mosfet

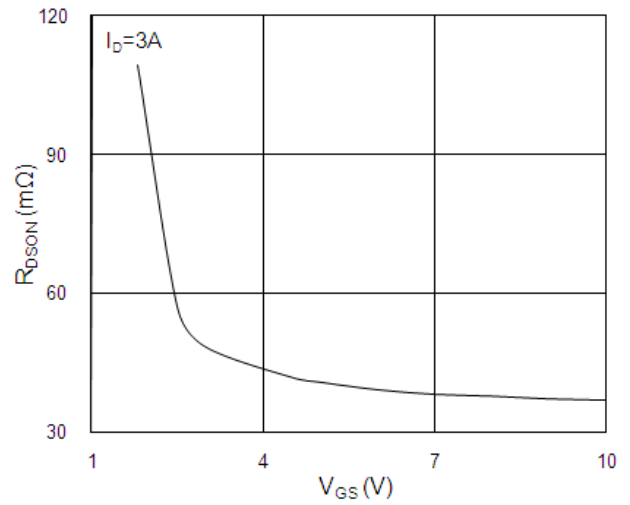## Typical Characteristics

Fig.1 Typical Output Characteristics

Fig.2 On-Resistance vs. Gate-Source Voltage
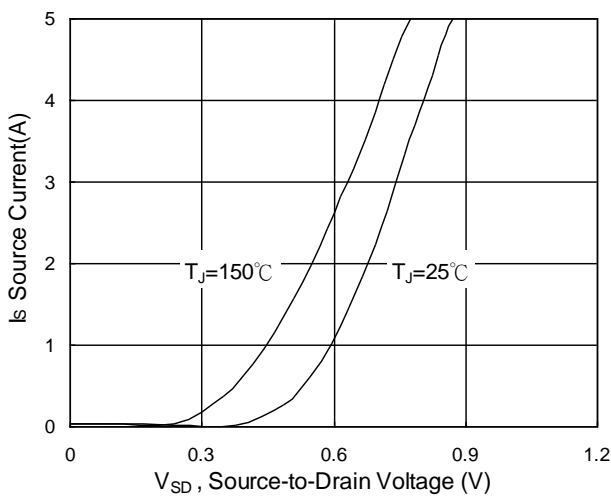

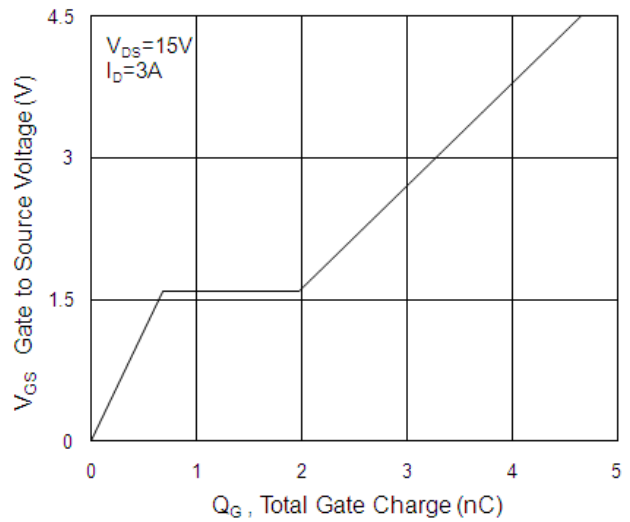**Fig.3 Forward Characteristics of Reverse**
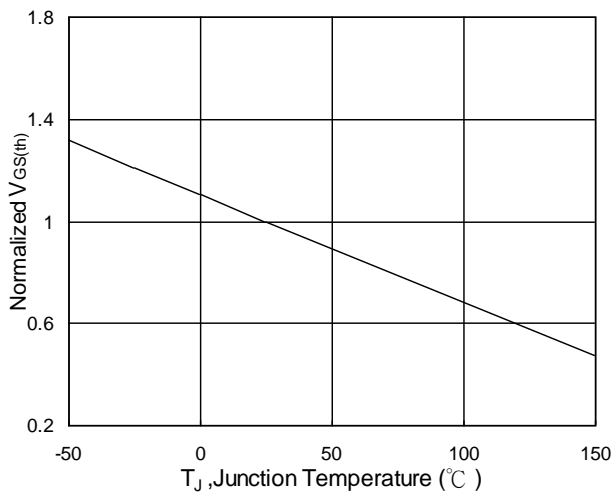

Fig.4 Gate-Charge Characteristics

Fig.5 Normalized $V_{GS(th)}$ vs. T_J
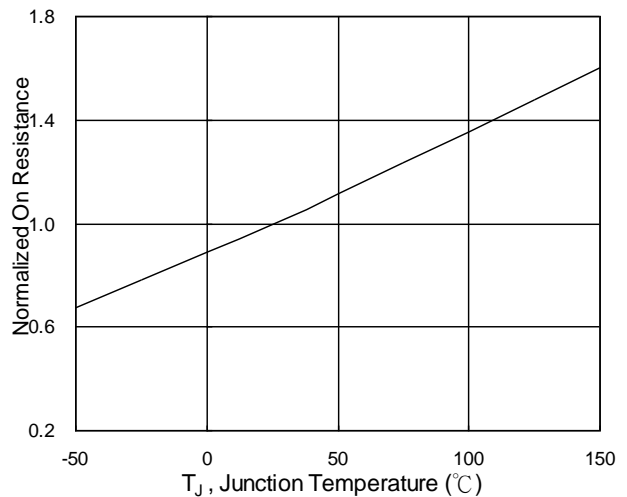
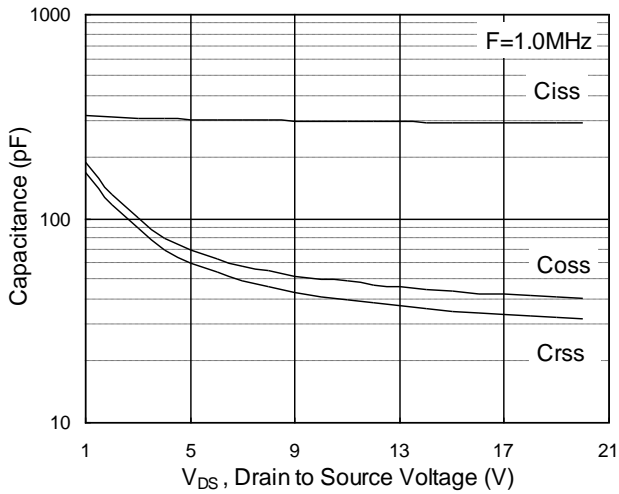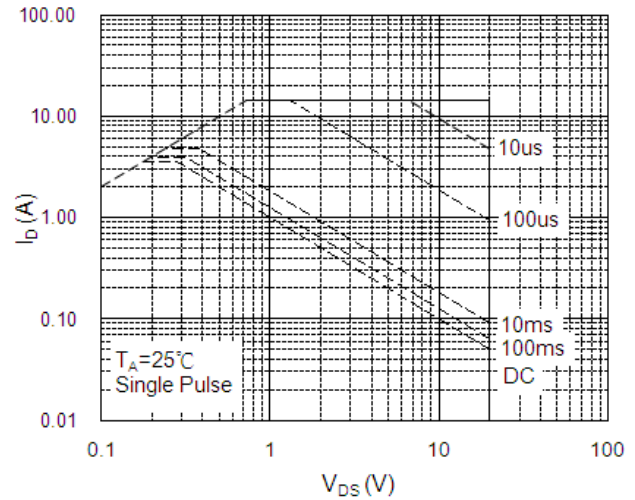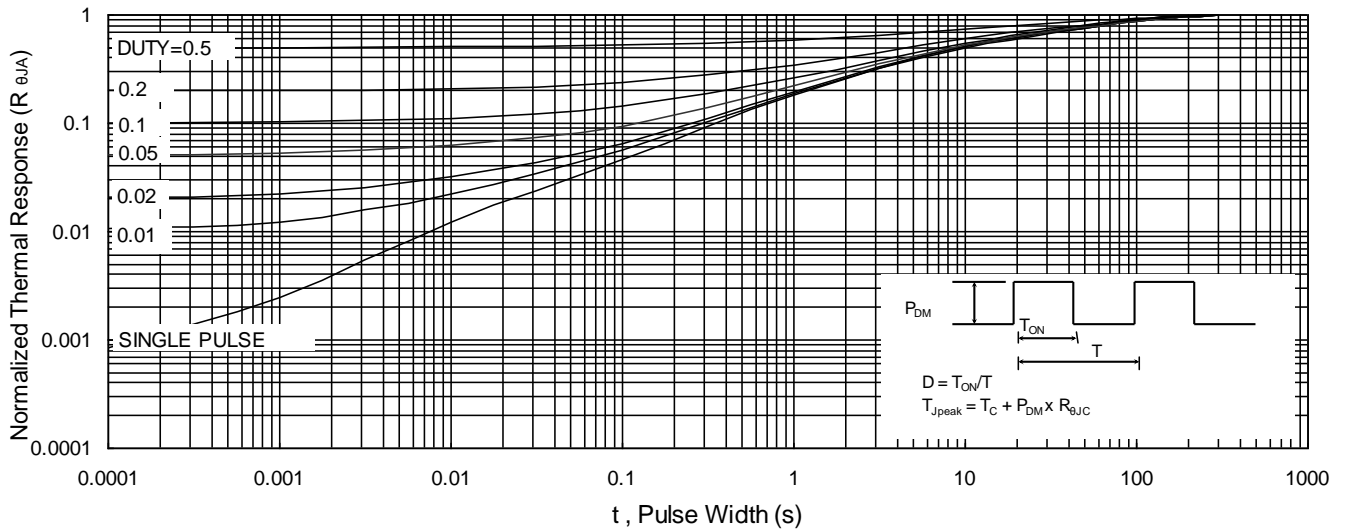**Fig.6 Normalized R_{DSON} vs. T_J**

Fig.7 Capacitance

Fig.8 Safe Operating Area

Fig.9 Normalized Maximum Transient Thermal Impedance

$D = T_{ON}/T$

$T_{Jpeak} = T_C + P_{DM} \times R_{\theta JC}$
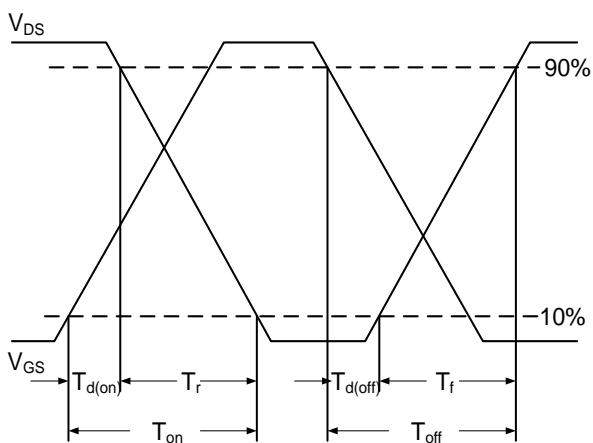
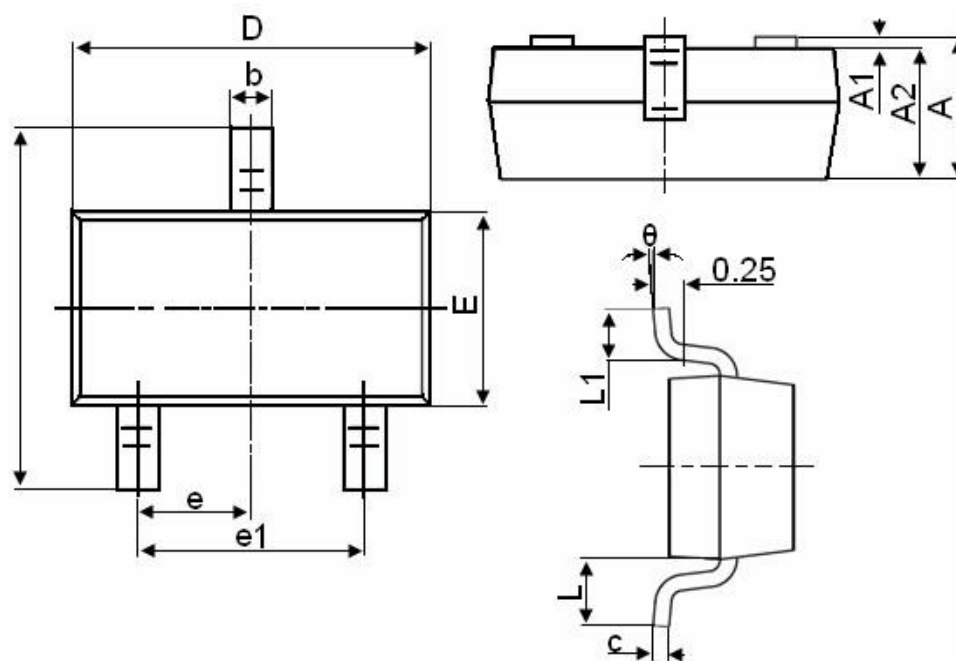**Fig.10 Switching Time Waveform**
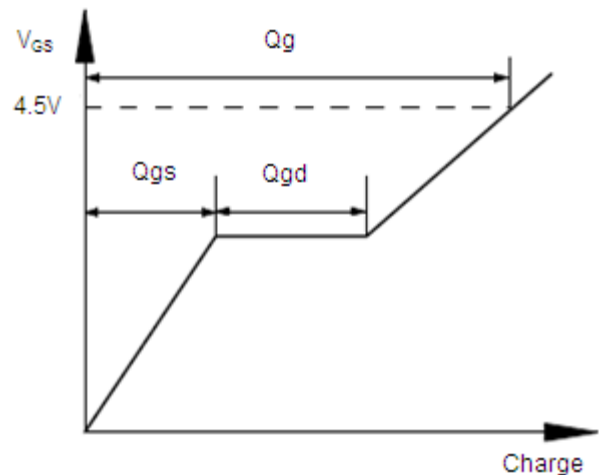
Fig.11 Gate Charge Waveform

Package Mechanical Data：SOT-23

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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