TM03N06I

N-Channel Enhancement Mosfet

General Description

- Low R DS(ON)
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

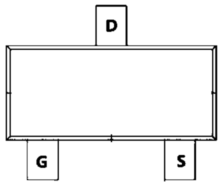
V_{DS} = 60V I_D =2.9 A

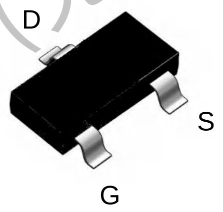
$R_{DS(ON)}$ = 75 mΩ(typ.)@ V_{GS}=10V

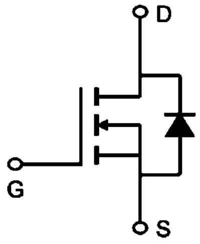
100% UIS Tested

100% R_g Tested

I:SOT-23







Marking: 6003 OR S10

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	2.9	A
I_D@T_A=70˚C	Continuous Drain Current, V_{GS} @ 10V[1]	2.3	A
I_{DM}	Pulsed Drain Current[2]	12	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

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient [1]	---	162	˚C/W
$R_{θJC}$	Thermal Resistance Junction Case[1]	---	---	˚C/W

Electrical Characteristics (T_A=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	60	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25˚C , I_D=1mA	---	0.054	---	V/˚C
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=2A	---	75	85	mΩ
		V_{GS}=4.5V , I_D=1A	---	85	120	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	2.0	3.0	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.96	---	mV/˚C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=48V , V_{GS}=0V , T_J=25˚C	---	---	1	uA
		V_{DS}=48V , V_{GS}=0V , T_J=55˚C	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=2A	---	13	---	S
Q_g	Total Gate Charge (4.5V)	V_{DS}=48V , V_{GS}=4.5V , I_D=2A	---	5		nC
Q_{gs}	Gate-Source Charge		---	1.68		
Q_{gd}	Gate-Drain Charge		---	1.9		
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , R_G=3.3 , I_D=2A	---	1.6		ns
T_r	Rise Time		---	7.2		
$T_{d(off)}$	Turn-Off Delay Time		---	25		
T_f	Fall Time		---	14.4		
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	311		pF
C_{oss}	Output Capacitance		---	38		
C_{rss}	Reverse Transfer Capacitance		---	25		
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	2.9	A
I_{SM}	Pulsed Source Current[2,4]		---	---	9.2	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25˚C	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=2A , dI/dt=100A/μs , T_J=25˚C	---	9.7	---	nS
Q_{rr}	Reverse Recovery Charge		---	5.8	---	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˚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

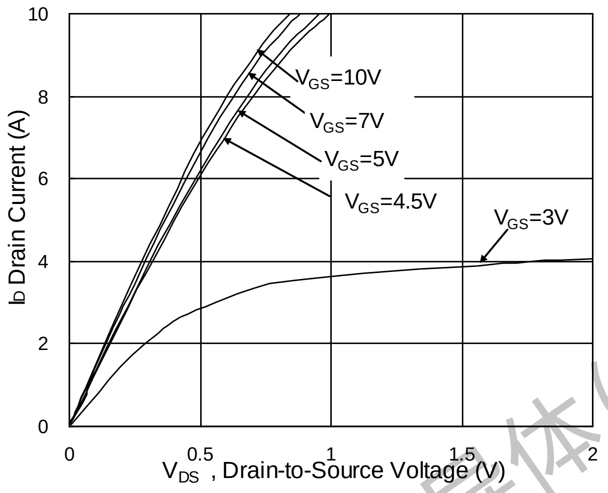


Fig.1 Typical Output Characteristics

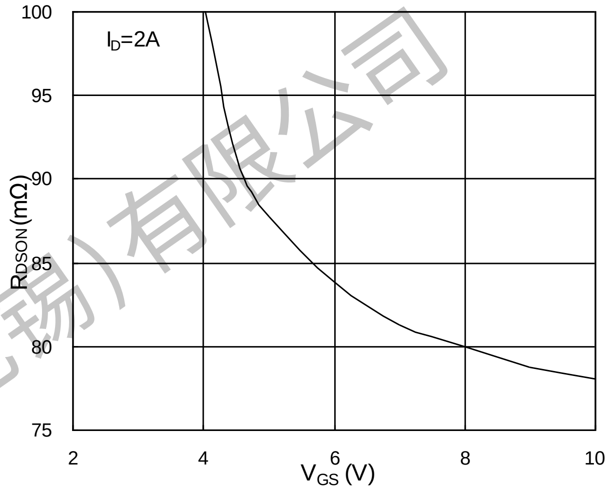


Fig.2 On-Resistance v.s Gate-Source

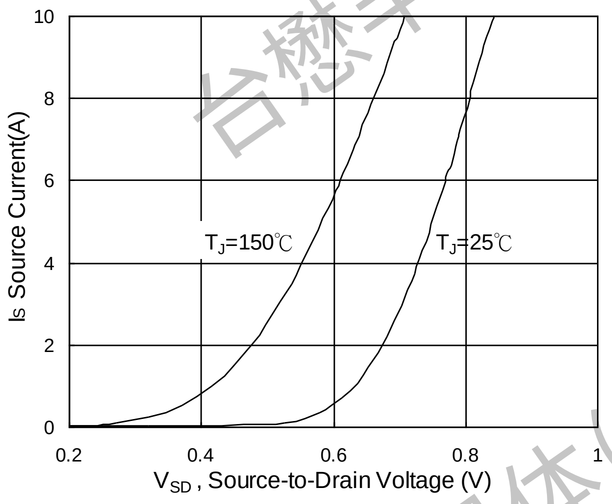


Fig.3 Forward Characteristics of Reverse

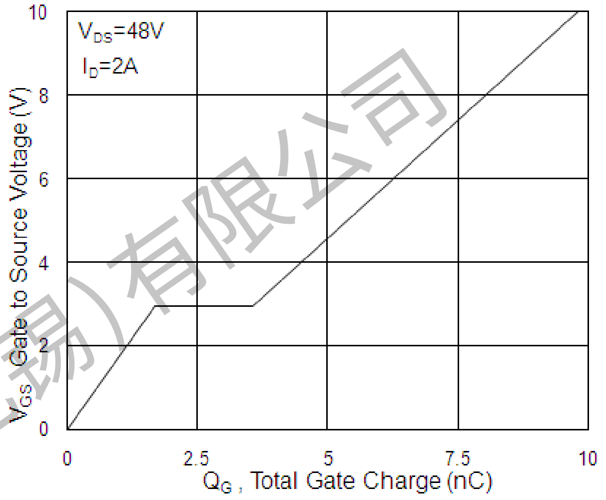
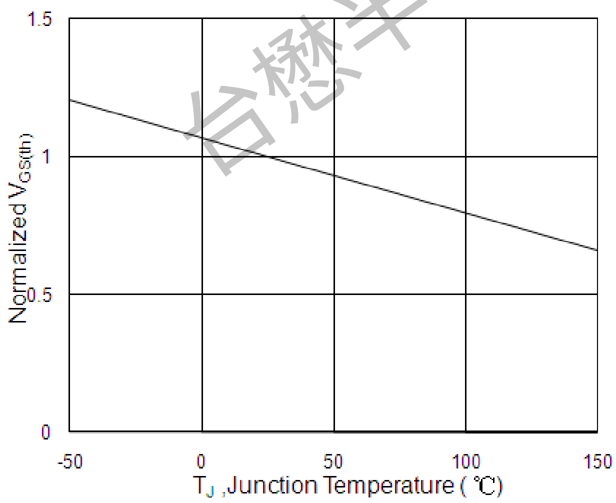
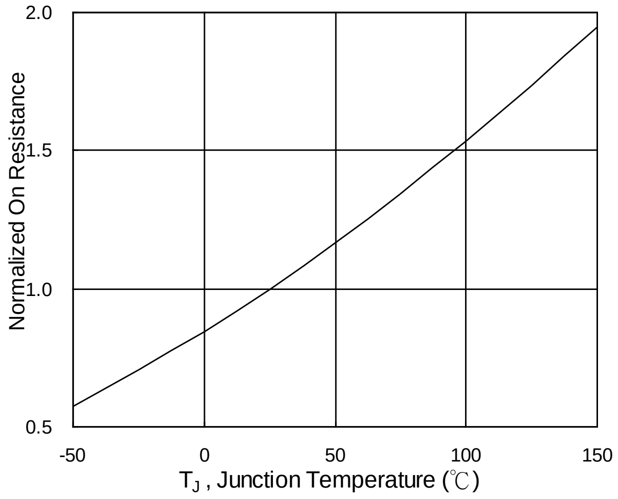


Fig.4 Gate-Charge Characteristics





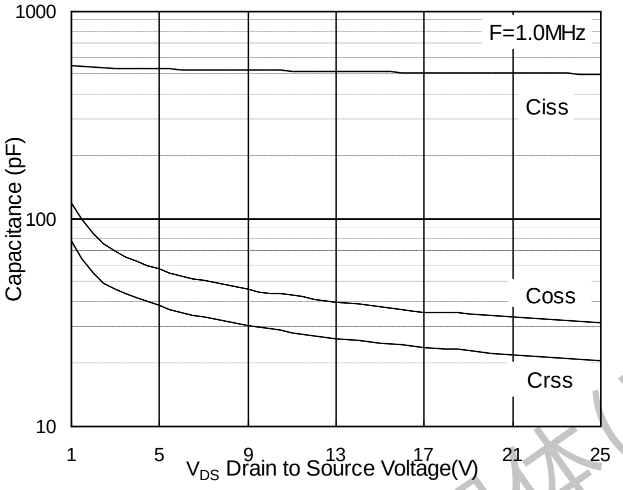


Fig.7 Capacitance

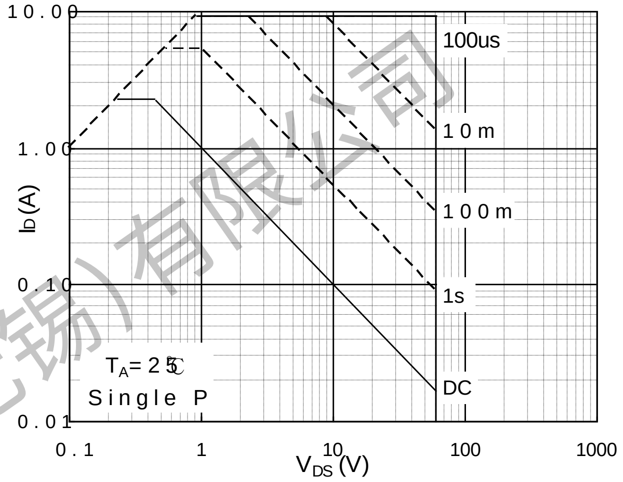


Fig.8 Safe Operating Area

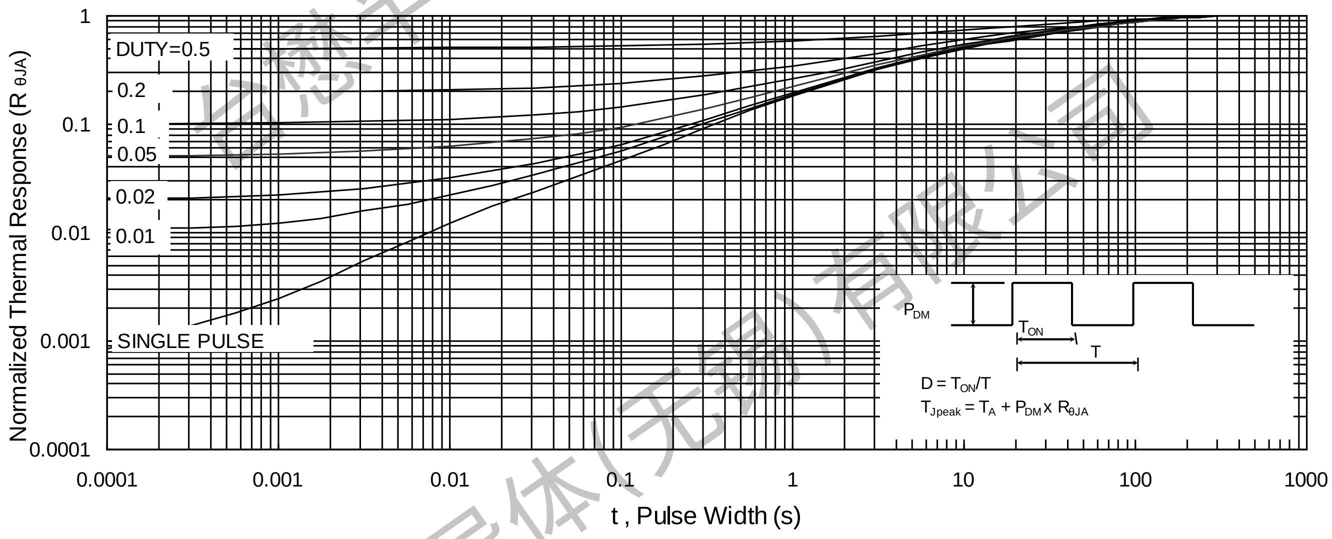
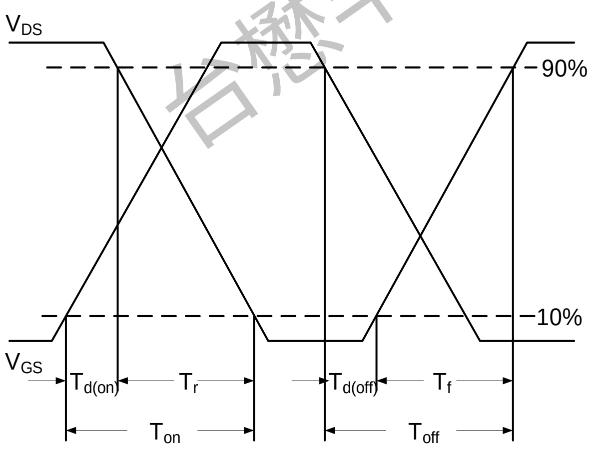
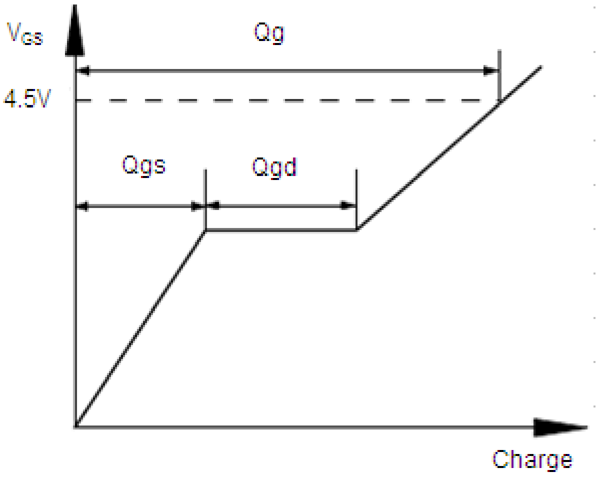
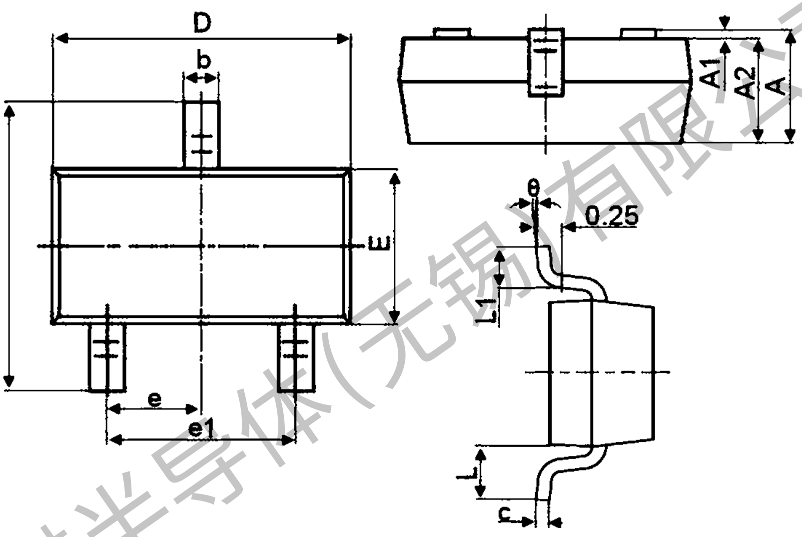


Fig.9 Normalized Maximum Transient Thermal Impedance





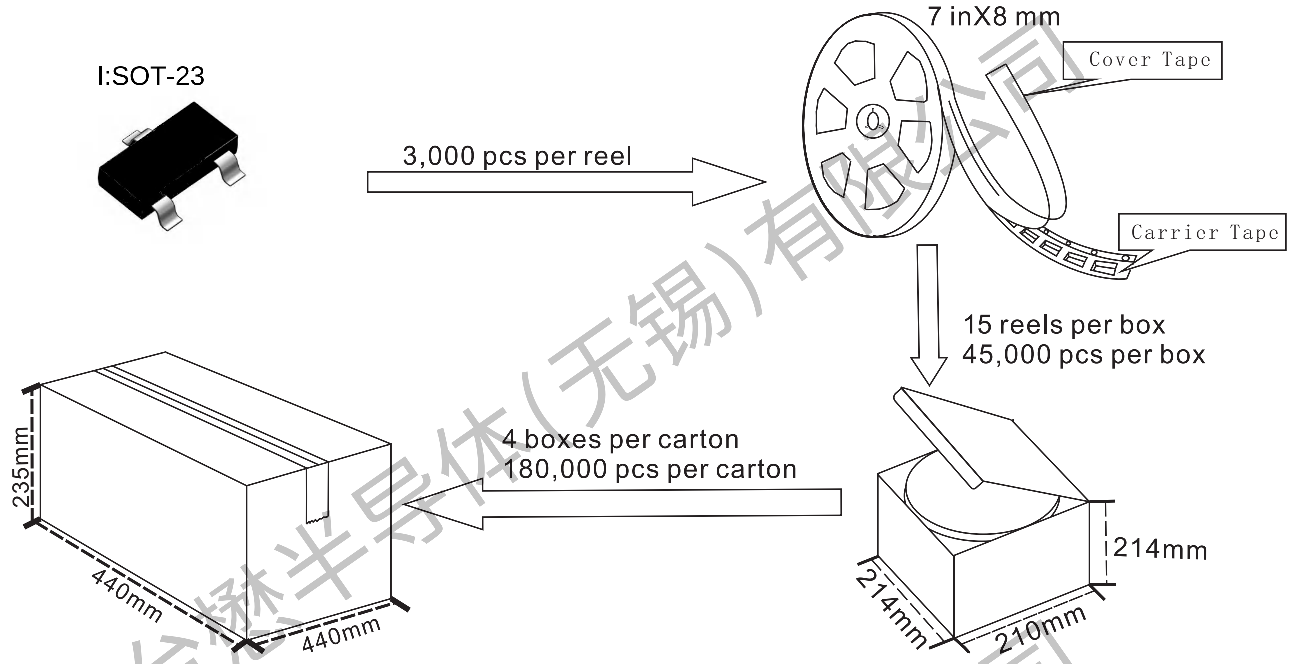
Package Mechanical Data:SOT-23



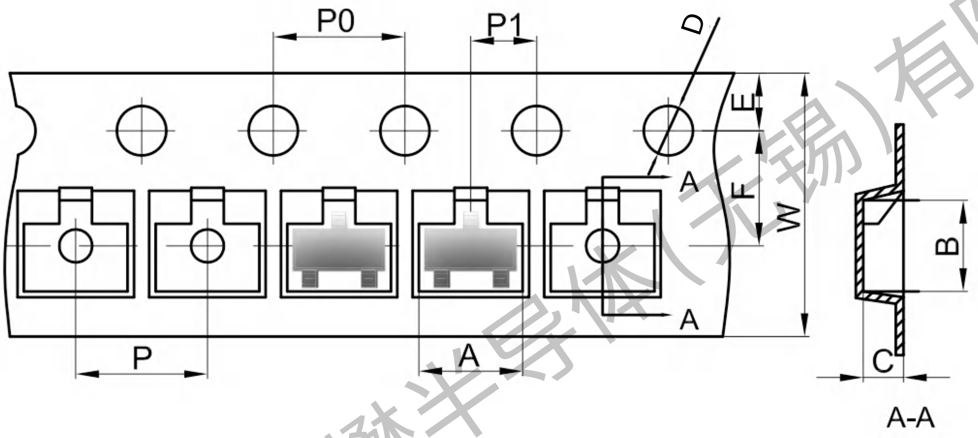
Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

SOT-23 Packing

1.The method of packaging and dimension are shown as below figure. (Dimension in mm)

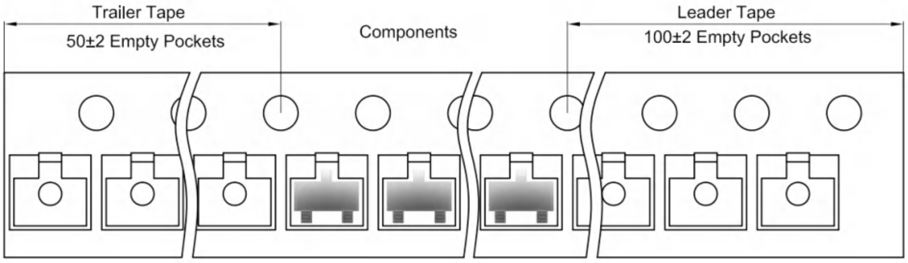


SOT-23 Embossed Carrier Tape



Dimensions are in millimeter										
Pkg type	A	B	C	D	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23 Tape Leader and Trailer



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Revision history:

Date	Rev	Description	Page
2023.08.09	23.08	Original	