TM05N04I

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

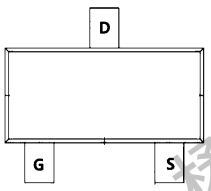
General Features

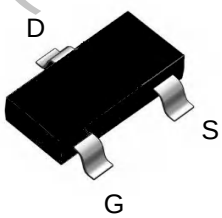
V_{DS} = 40V I_D =5.0A

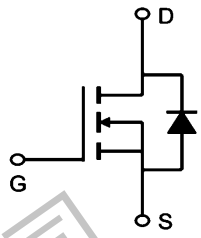
$R_{DS(ON)}$=30mΩ(Typ.)@ V_{GS}=10V

100% UIS Tested
100% R_g Tested

I:SOT-23







Marking: 2318

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	5	A
I_D@T_A=70˚C	Continuous Drain Current, V_{GS} @ 10V[1]	3	A
I_{DM}	Pulsed Drain Current[2]	19	A
P_D@T_A=25˚C	Total Power Dissipation[3]	1.6	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
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	162	˚C/W
$R_{\theta JC}$	Thermal Resistance Junction Case[1]	---	---	˚C/W

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Electrical Characteristics (T_J=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =40V, V_{GS}=0V,	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.2	1.6	2.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS}=10V, I_D=4A	-	30	40	mΩ
		V_{GS}=4.5V, I_D=3A	-	40	60	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1.0MHz	-	435	-	pF
C_{oss}	Output Capacitance		-	58	-	pF
C_{rss}	Reverse Transfer Capacitance		-	35	-	pF
Q_g	Total Gate Charge	V_{DS}=20V, I_D=3A, V_{GS}=10V	-	11	-	nC
Q_{gs}	Gate-Source Charge		-	2	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	2.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=20V, I_D=4A, R_L=1Ω, R_{GEN}=3Ω, V_{GS}=10V	-	10	-	ns
t_r	Turn-on Rise Time		-	8	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	29	-	ns
t_f	Turn-off Fall Time		-	12	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	5	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	19	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=5A	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	T_J=25℃, I_F=5A,dI/dt=100A/μs	-	20	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	11	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

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Typical Performance Characteristics

Figure1: Output Characteristics

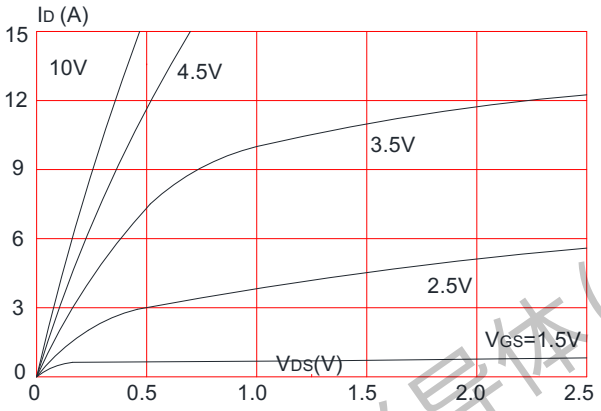

Figure 2: Typical Transfer Characteristics

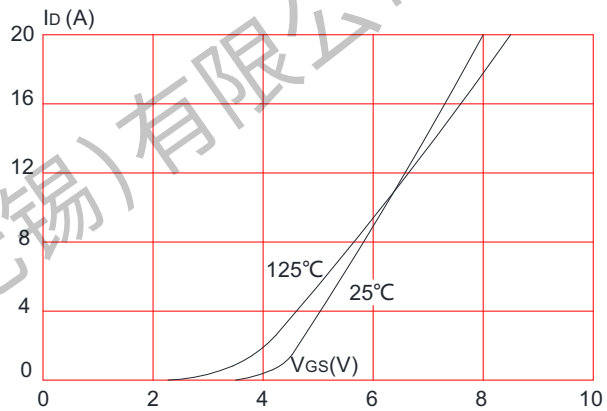

Figure 3: On-resistance vs. Drain Current

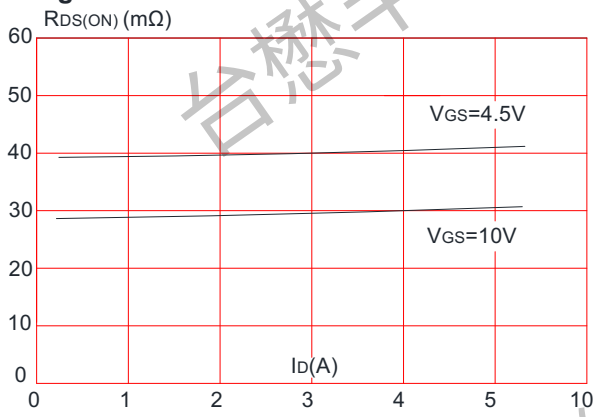

Figure 4: Body Diode Characteristics

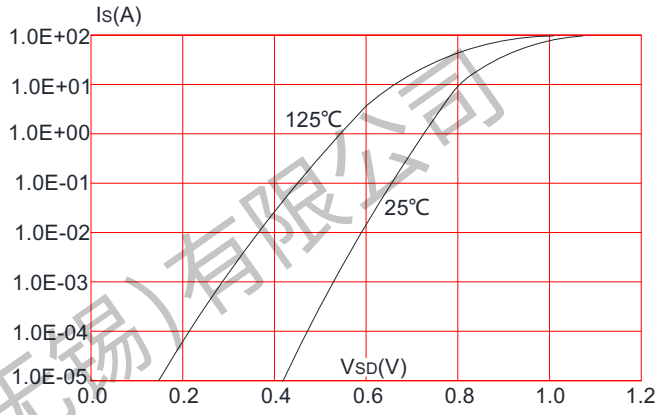

Figure 5: Gate Charge Characteristics

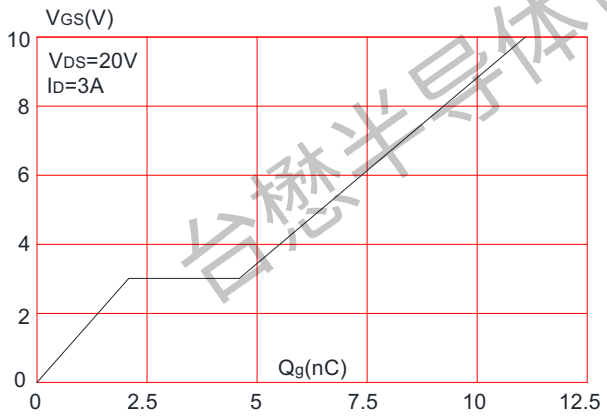

Figure 6: Capacitance Characteristics

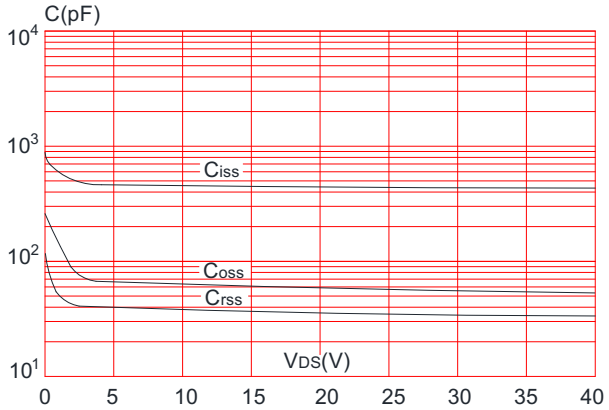

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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

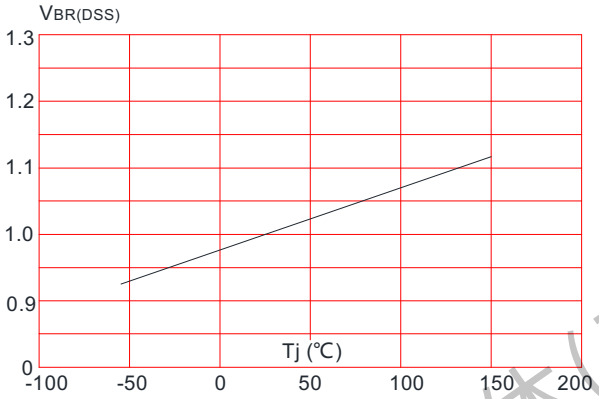


Figure 8: Normalized on Resistance vs. Junction Temperature

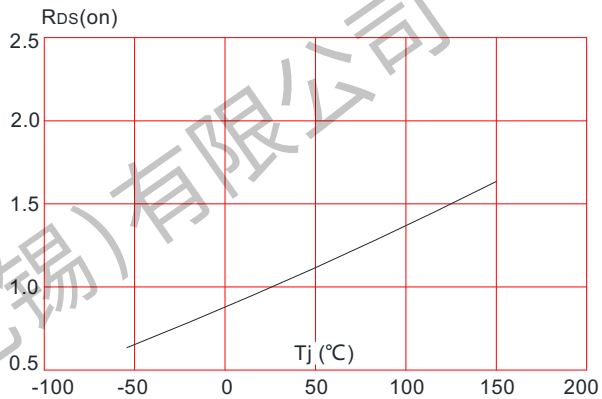


Figure 9: Maximum Safe Operating Area

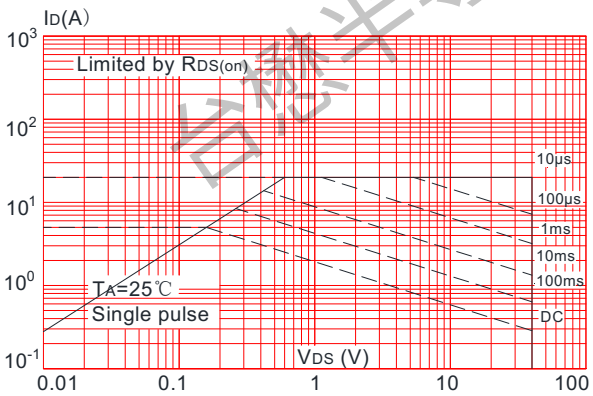


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

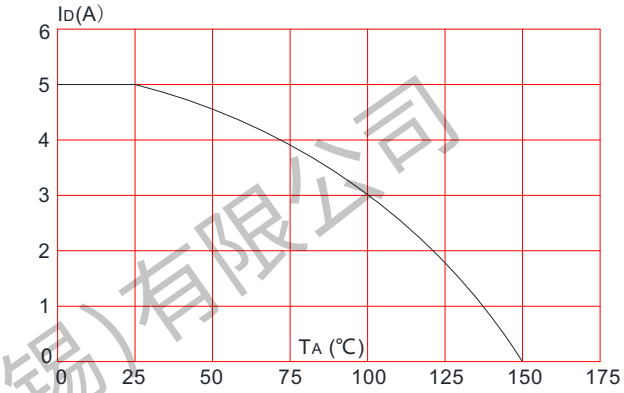
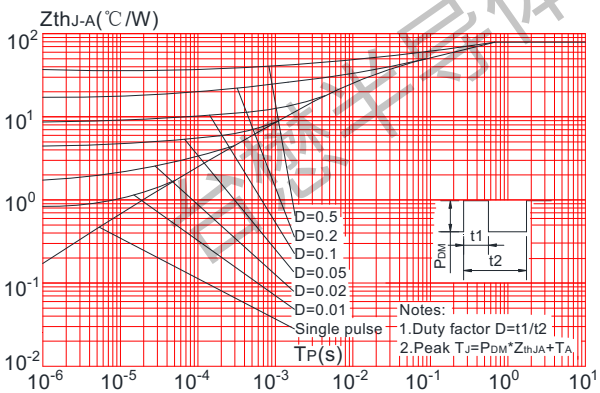


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



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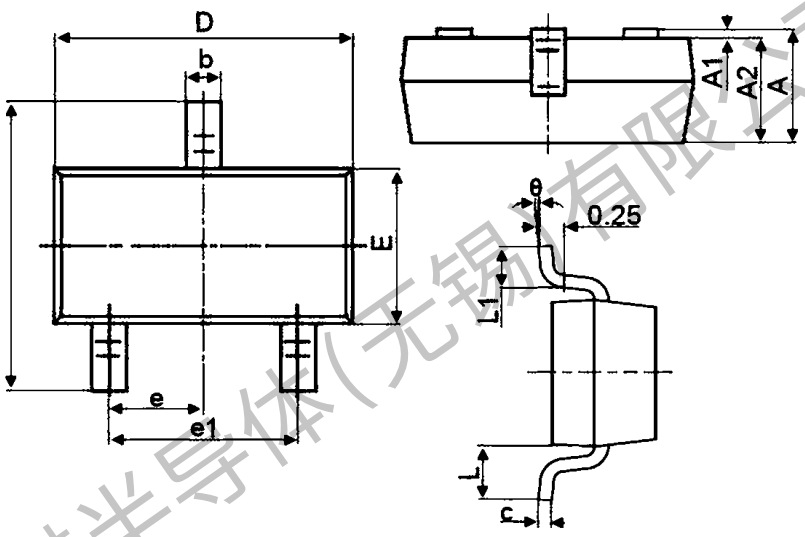
Package Mechanical Data:SOT-23



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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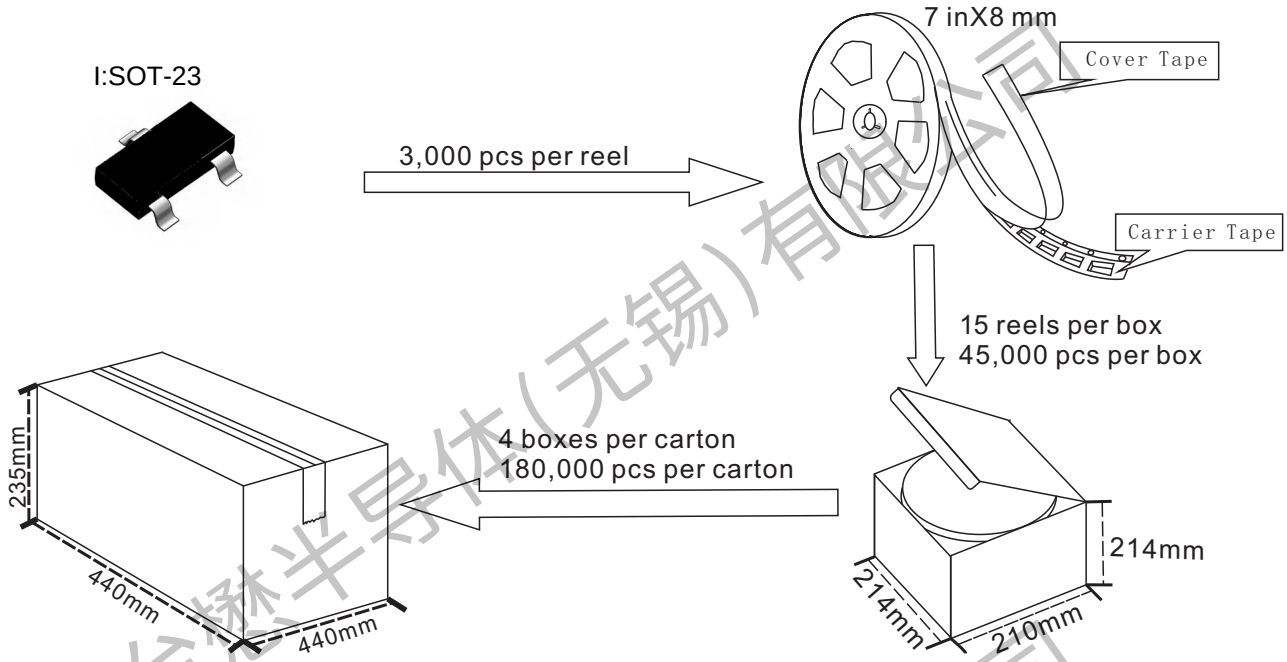
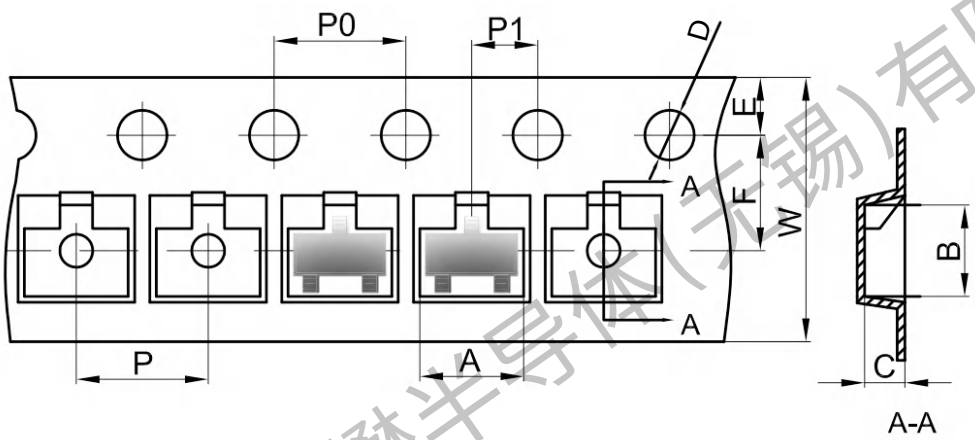
SOT-23 Packing

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

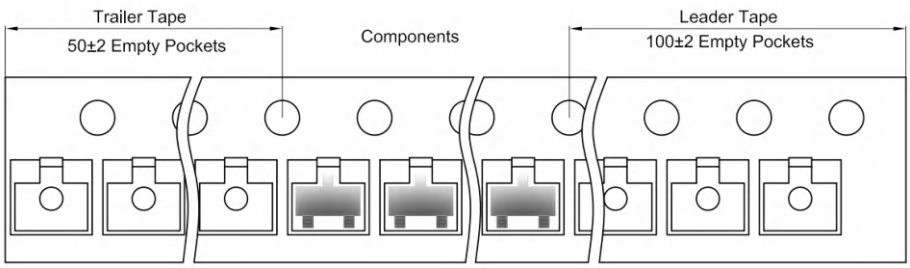


SOT-23 Embossed Carrier Tape



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
2023.06.30	23.06	Original	

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