TM04N03MI

N-Channel Enhancement Mosfet

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General Description

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

Applications

- Load switch
- PWM

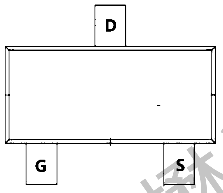
General Features

V_{DS} = 30V I_D =3.8A

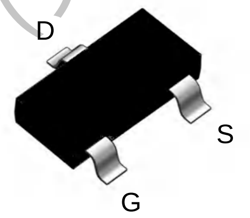
$R_{DS(ON)}$=38 mΩ (Typ.) @ V_{GS}=10V

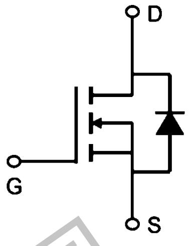
100% UIS Tested
100% R_g Tested

MI:SOT-23-3L



Marking: 4N03 OR 3402





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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	3.8	A
I_D@T_A=100°C	Continuous Drain Current, V_{GS} @ 10V[1]	2.8	A
I_{DM}	Pulsed Drain Current[2]	19	A
P_D@T_A=25°C	Total Power Dissipation[3]	1.25	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]	---	48	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	---	°C/W

Electrical Characteristics： (T$_C$=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV$_{DSS}$	Drain-Sourtce Breakdown Voltage	V$_{GS}$=0V,I$_D$=250 μ A	30	---	---	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{GS}$=0V, V$_{DS}$=30V	---	---	1	μ A
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±12V, V$_{DS}$=0A	---	---	±100	nA
On Characteristics						
V$_{GS(th)}$	GATE-Source Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$=250 μ A	0.9	1.2	1.5	V
R$_{DS(ON)}$	Drain-Source On Resistance^{note2}	V$_{GS}$=10V,I$_D$=4A	---	38	42	m Ω
		V$_{GS}$=4.5V,I$_D$=3A	---	43	48	
Dynamic Characteristics						
C$_{iss}$	Input Capacitance	V$_{DS}$=15V, V$_{GS}$=0V, f=1MHz	---	280	---	pF
C$_{oss}$	Output Capacitance		---	30	---	
C$_{rss}$	Reverse Transfer Capacitance		---	25	---	
Switching Characteristics						
t$_{d(on)}$	Turn-On Delay Time	V$_{DS}$=15V,I$_D$=2A, V$_{GS}$=4.5V,R$_{GEN}$=3 Ω	---	15	---	ns
t$_r$	Rise Time		---	42	---	ns
t$_{d(off)}$	Turn-Off Delay Time		---	16	---	ns
t$_f$	Fall Time		---	10	---	ns
Q$_g$	Total Gate Charge	V$_{GS}$=4.5V, V$_{DS}$=15V, I$_D$=4.2A	---	2.6	---	nC
Q$_{gs}$	Gate-Source Charge		---	0.6	---	nC
Q$_{gd}$	Gate-Drain “Miller” Charge		---	0.9	---	nC
Drain-Source Diode Characteristics						
V$_{SD}$	Forward Voltage	V$_{GS}$=0V,I$_S$=4.2A	---	---	1.2	V
I$_S$	Source drain current(Body Diode)	---	---	---	3.8	A
I$_{SM}$	Source Diode Forward Current	---	---	---	16	A

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 Characteristics

Figure1: Output Characteristics

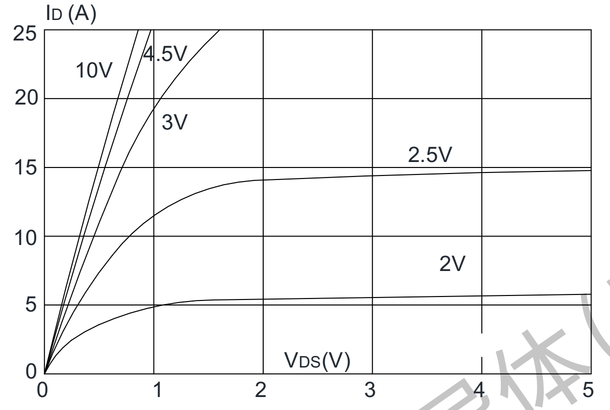

Figure 2: Typical Transfer Characteristics

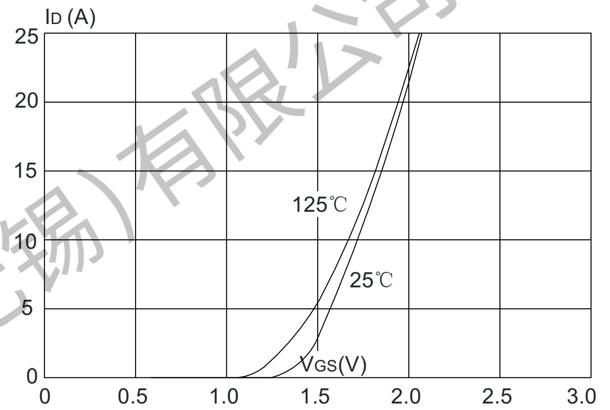

Figure 3: On-resistance vs. Drain Current

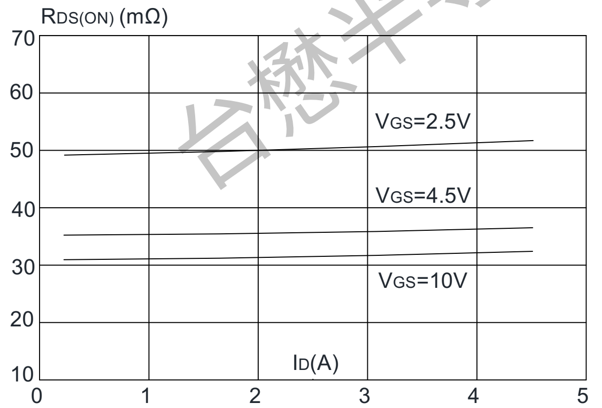

Figure 4: Body Diode Characteristics

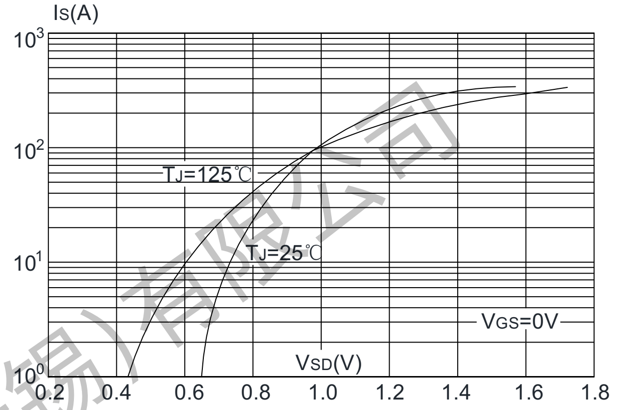

Figure 5: Gate Charge Characteristics

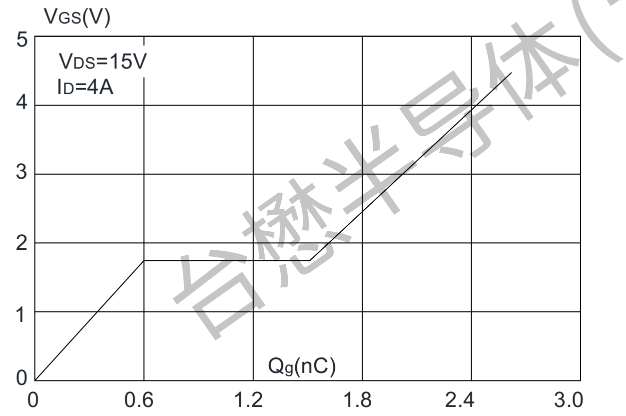

Figure 6: Capacitance Characteristics

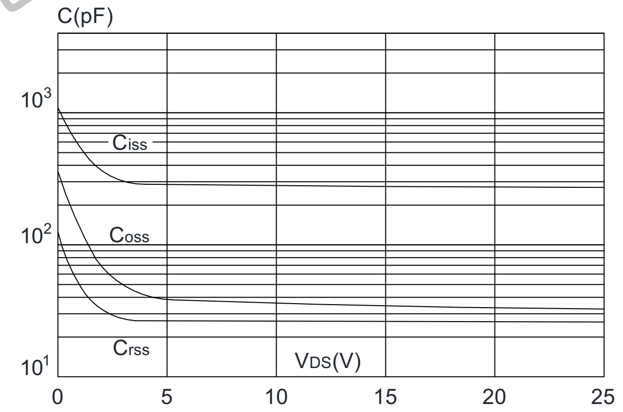

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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

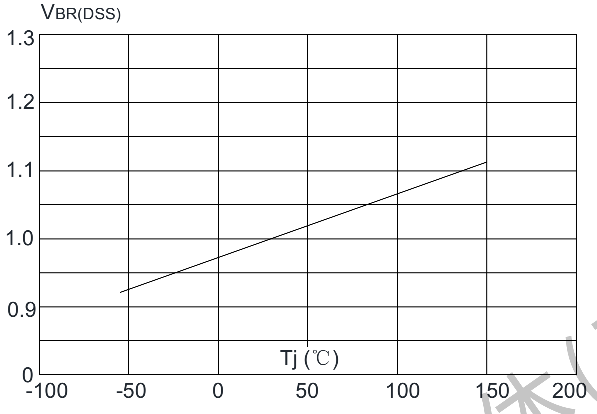

Figure 8: Normalized on Resistance vs. Junction Temperature

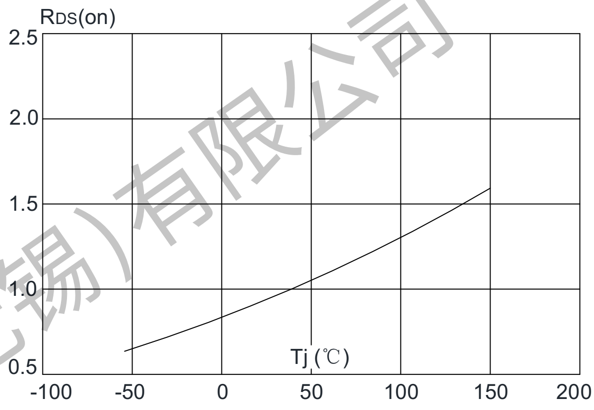

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Figure 9: Maximum Safe Operating Area

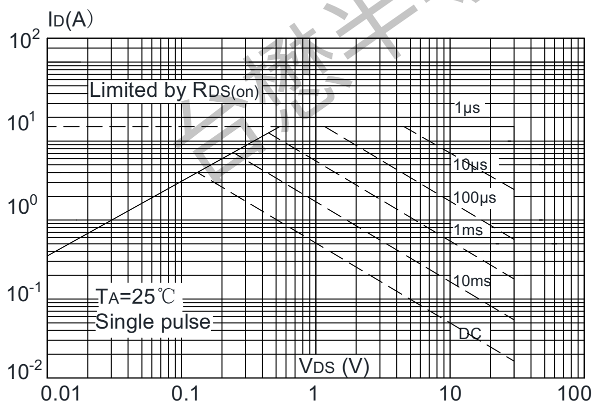


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

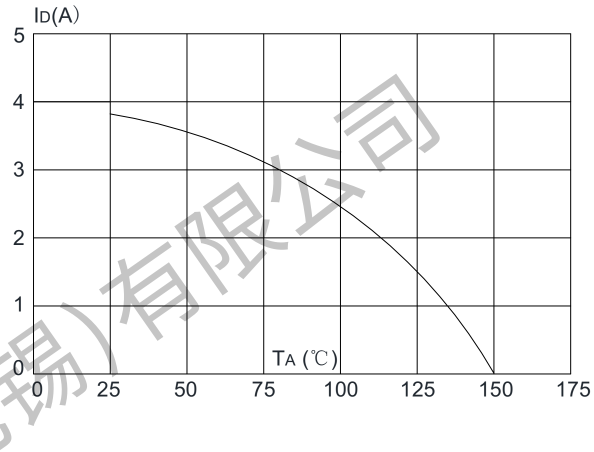
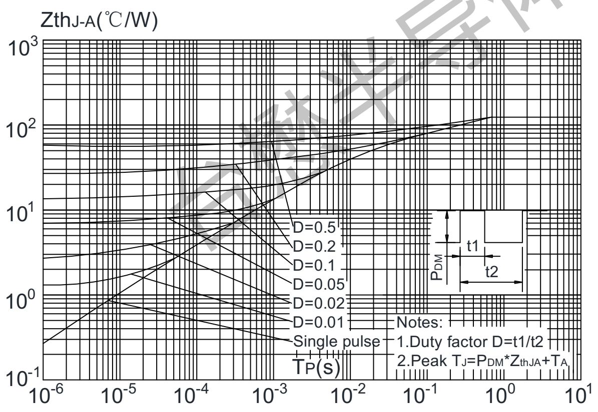


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



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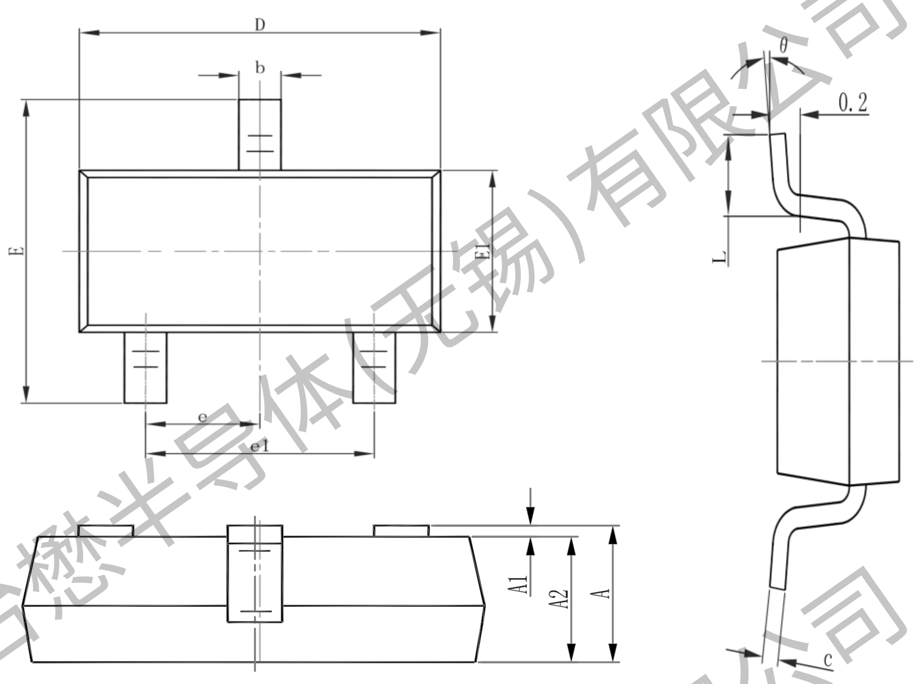
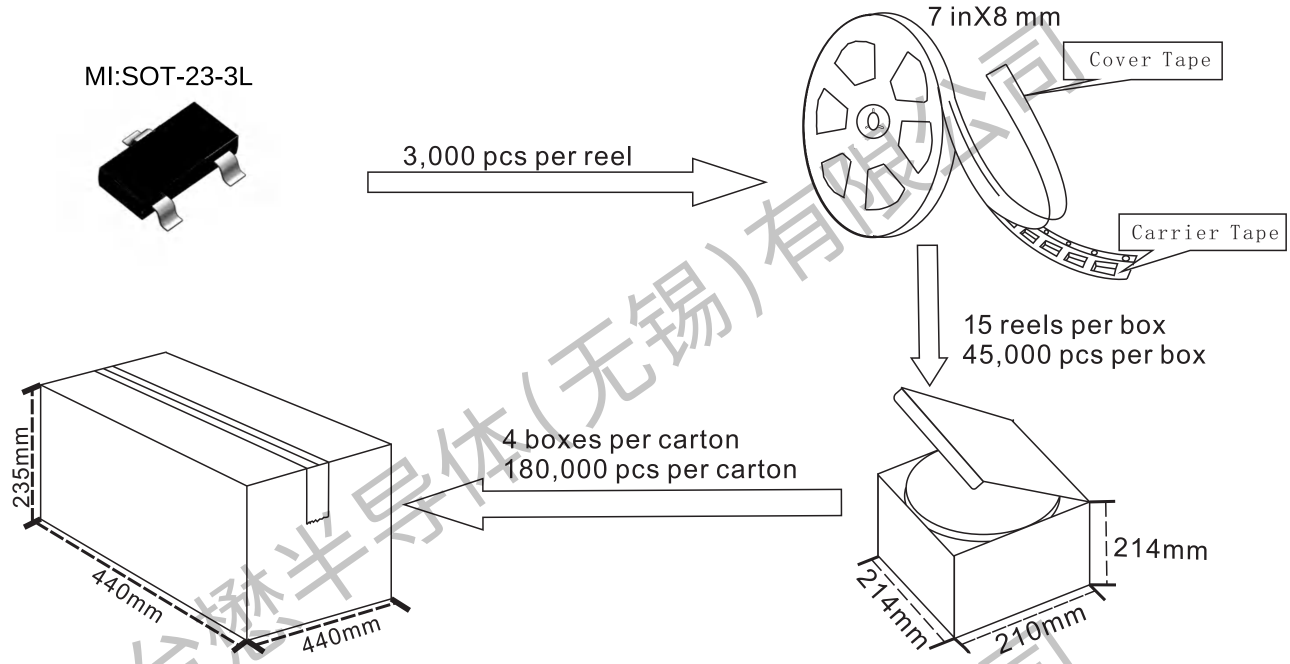
Package Mechanical Data:SOT-23-3L



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
θ	0°	8°	0°	8°

SOT-23-3L Packing

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



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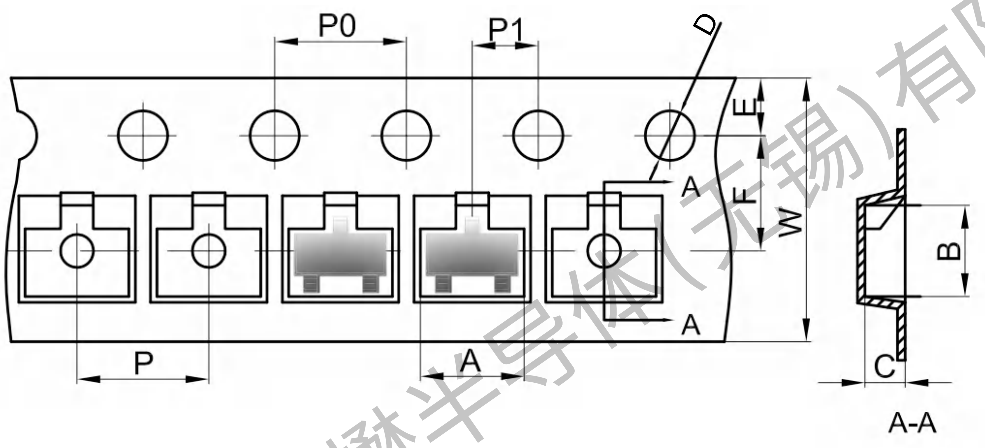
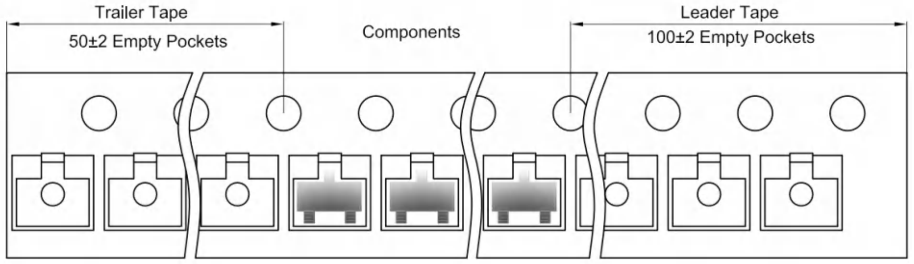
SOT-23-3L Embossed Carrier Tape



Dimensions are in millimeter										
Pkg type	A	B	C	D	E	F	P0	P	P1	W
SOT-23-3L	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23-3L Tape Leader and Trailer



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Revision history:

Date	Rev	Description	Page
2023.05.11	23.05	Original	