TM04N15MI

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

V_{DS} =150V I_D =4.0A

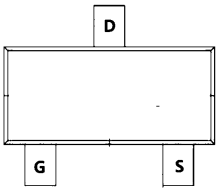
$R_{DS(ON)}$ = 245 mΩ(Typ.)@ V_{GS}=10V

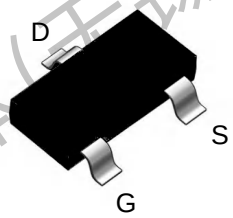
100% UIS Tested

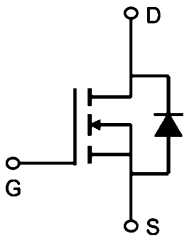
100% R_g Tested

Green Product

MI:SOT-23-3L







Marking: 04N15 OR 3N150

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	4	A
I_D@T_A=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	2	A
I_{DM}	Pulsed Drain Current[2]	15	A
P_D	Total Power Dissipation[3]	3	W
EAS	Single Pulse Avalanche Energy[2]	1.25	mJ
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	74	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	80	℃/W

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

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	150	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = 150V, V_{GS} = 0V	-	-	1	μA
	T_J=100°C			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	2.5	3.0	V
Drain-Source on-Resistance[4]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 4A	-	245	300	mΩ
Forward Transconductance[4]		g_{fs}	V_{DS} = 10V, I_D = 4A	-	25	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = 75V, V_{GS} =0V, f =1MHz	-	450	-	pF
Output Capacitance		C_{oss}		-	23	-	
Reverse Transfer Capacitance		C_{rss}		-	14	-	
Gate Resistance		R_g	f =1MHz	-	1.5	-	Ω
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} = 10V,V_{DS} = 75V, I_D=1.5A	-	8.2	-	nC
Gate-Source Charge		Q_{gs}		-	1.5	-	
Gate-Drain Charge		Q_{gd}		-	2.2	-	
Turn-on Delay Time		$t_{d(on)}$	V_{GS} =10V, V_{DD}=75V, R_G = 6Ω, I_D= 1A,R_G = 75Ω	-	8.2	-	ns
Rise Time		t_r		-	10.2	-	
Turn-off Delay Time		$t_{d(off)}$		-	20.5	-	
Fall Time		t_f		-	15.3	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = 1A, V_{GS} = 0V	-	-	1.2	V
Continuous Source Current	T_C=25°C	I_S	-	-	-	4.0	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=5A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

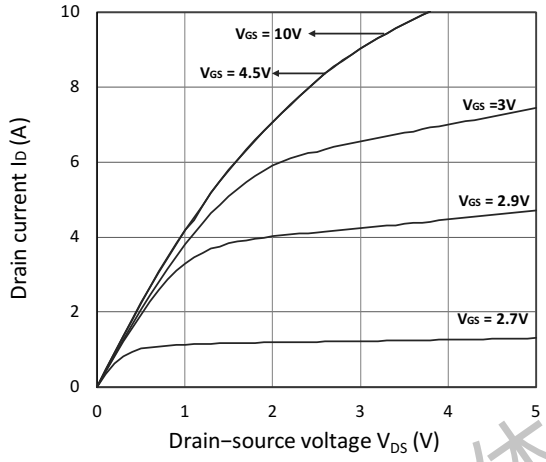


Figure 1. Output Characteristics

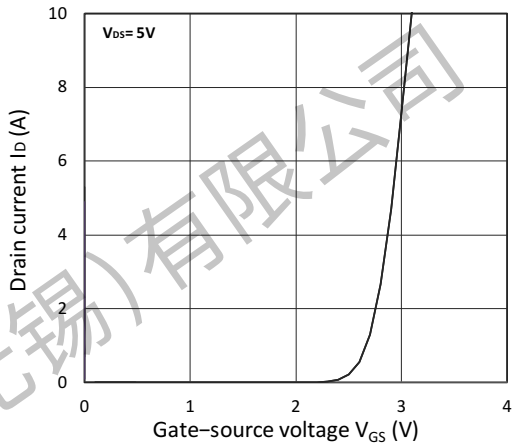


Figure 2. Transfer Characteristics

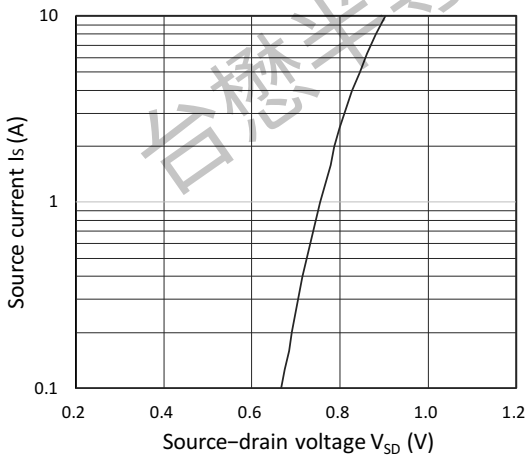


Figure 3. Forward Characteristics of Reverse

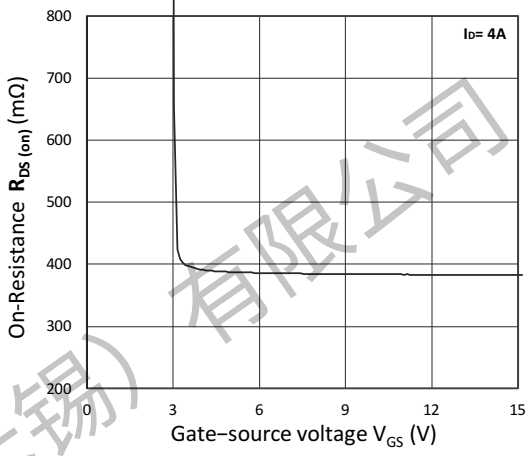


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

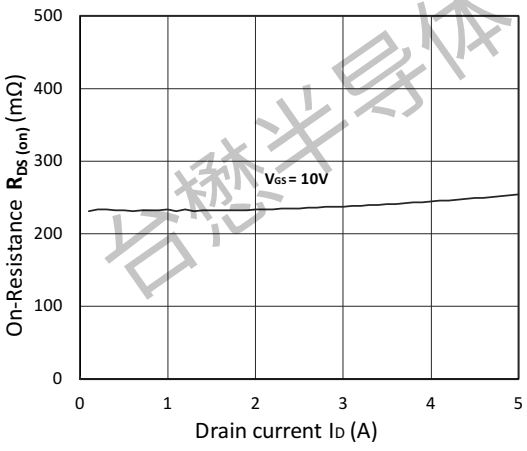


Figure 5. $R_{DS(ON)}$ vs. I_D

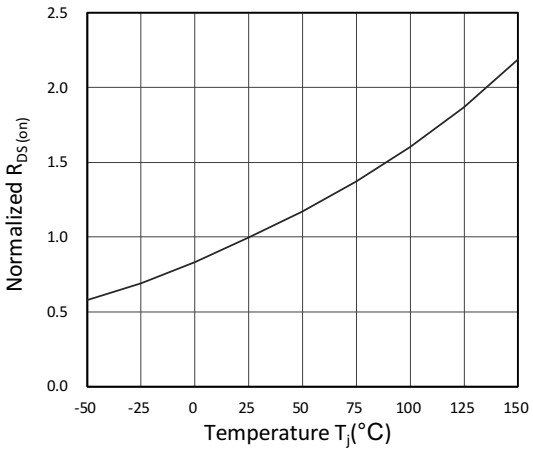


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

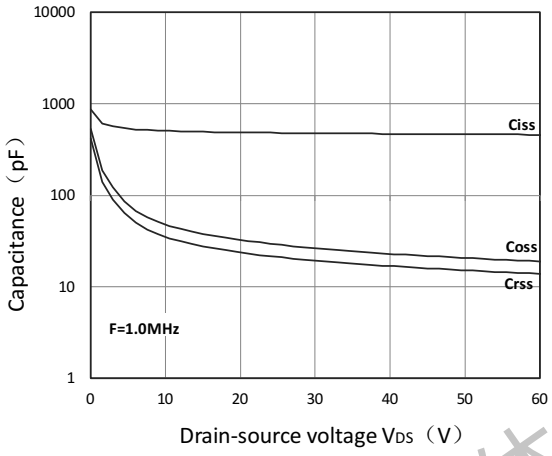


Figure 7. Capacitance Characteristics

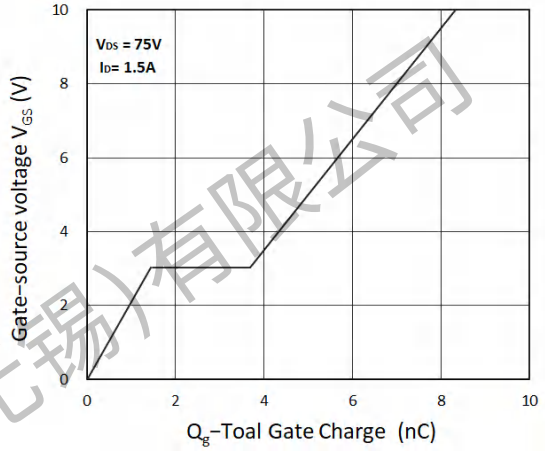


Figure 8. Gate Charge Characteristics

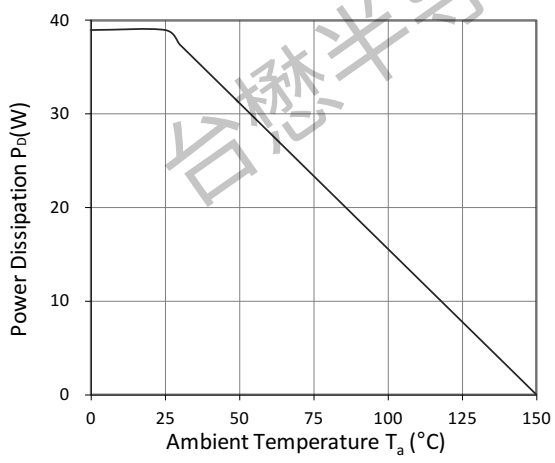


Figure 9. Power Dissipation

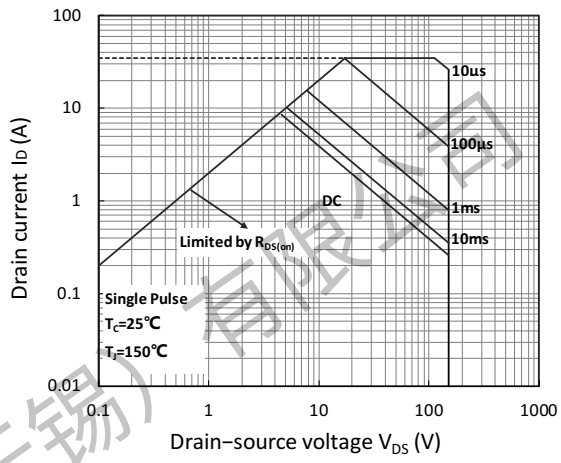


Figure10. Safe Operating Area

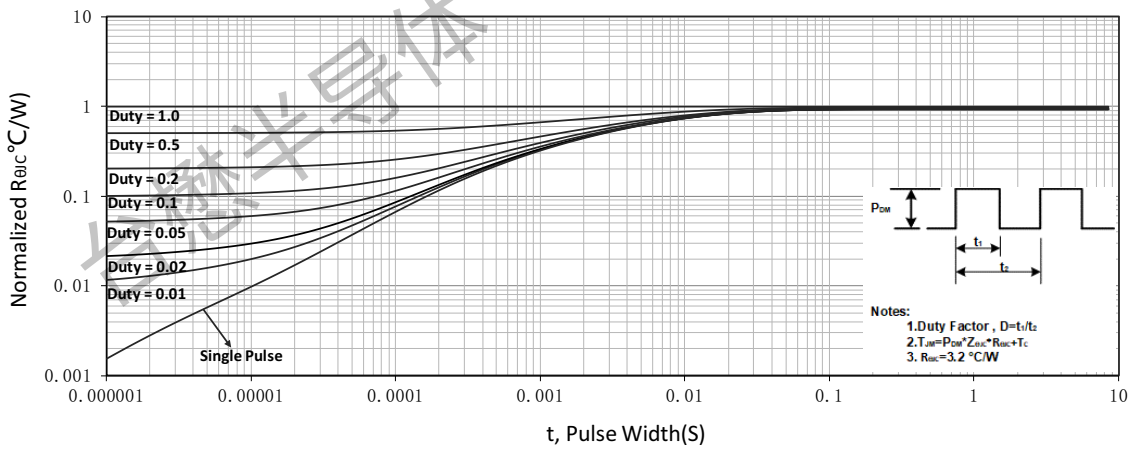
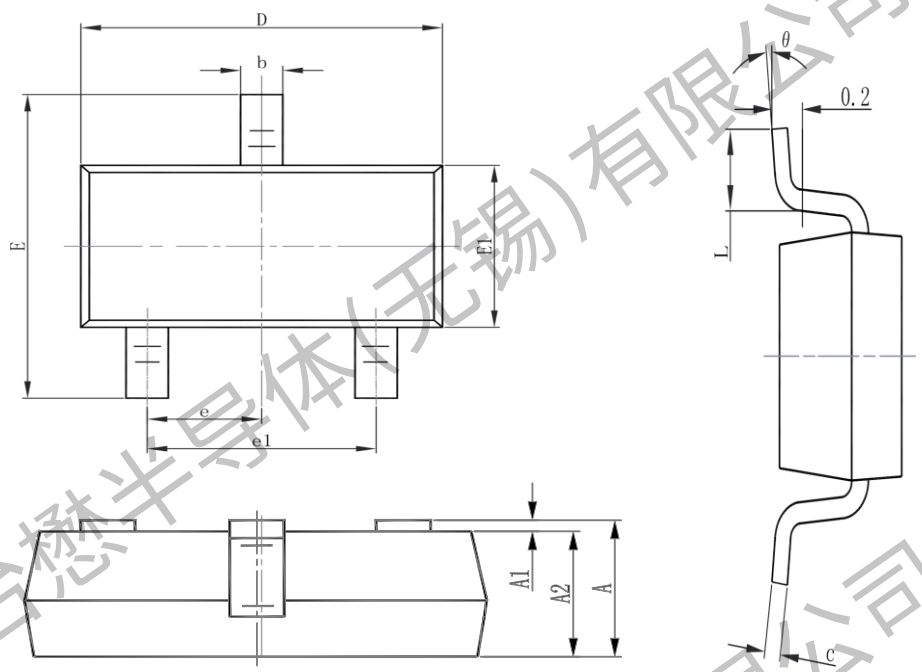


Figure 11. Normalized Maximum Transient Thermal Impedance

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°

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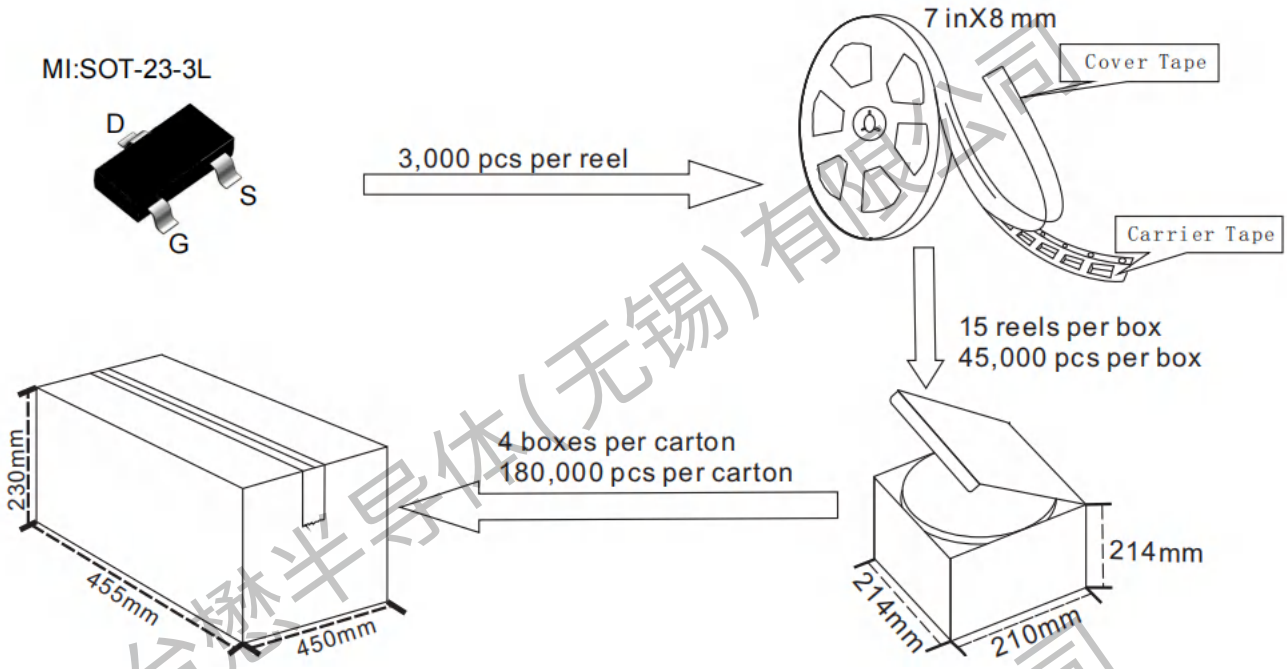
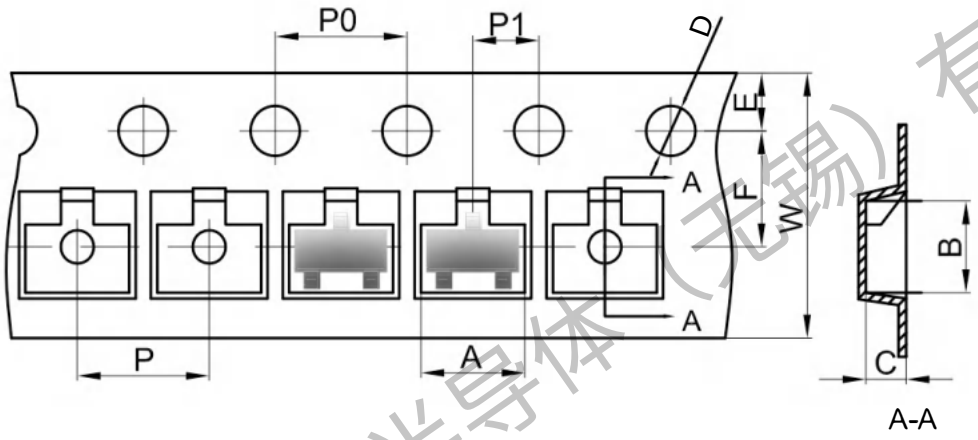
SOT-23-3L Packing

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

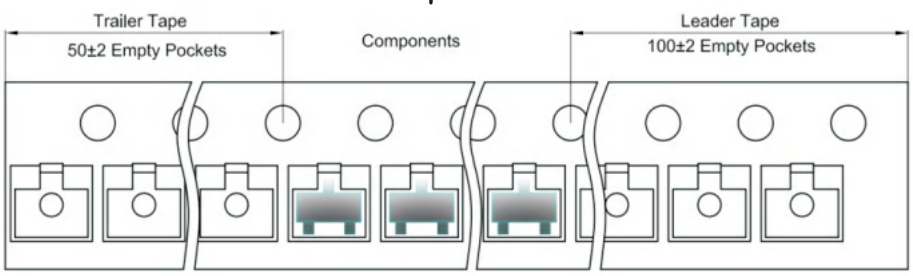


SOT-23-3L Embossed Carrier Tape



Dimensions are in millimeter										
Pkg type	A	B	C	D	E	F	P0	P	P1	W
SOT-23-3L	3.40	3.0	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23-3LTape Leader and Trailer



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Revision history:

Date	Rev	Description	Page
2024.06.10	24.06	Original	