



TMG05N10MI

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

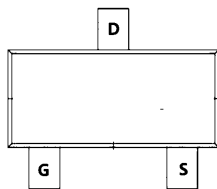
$V_{DS} = 100V$ $I_D = 5.0A$

$R_{DS(ON)} = 95m\Omega$ (typ.) @ $V_{GS} = 10V$

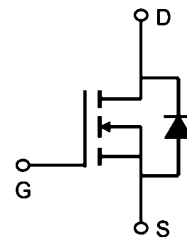
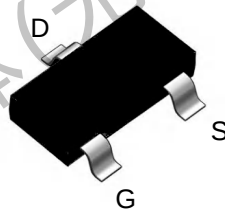
100% UIS Tested
100% R_g Tested



MI:SOT-23-3L



Marking: 1005S



Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	5.0	A
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	3.2	A
I_{DM}	Pulsed Drain Current ²	21	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation ³	1	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	170	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	---	$^\circ\text{C/W}$



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Electrical Characteristics $T_C=25^{\circ}\text{C}$ 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	100	110	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics ^{note3}						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1.0	2.0	3.0	V
R _{DS(on)}	Static Drain-Source On-Resistance ^{note2}	V _{GS} = 10V, I _D = 3A	-	95	125	mΩ
Dynamic Characteristics ^{note4}						
C _{iss}	Input Capacitance	V _{DS} = 50V, V _{GS} = 0V, f = 1.0MHz	-	196	-	pF
C _{oss}	Output Capacitance		-	25.9	-	pF
C _{rss}	Reverse Transfer Capacitance		-	21.4	-	pF
Q _g	Total Gate Charge	V _{DS} = 50V, I _D = 3A, V _{GS} = 10V	-	4.3	-	nC
Q _{gs}	Gate-Source Charge		-	3.5	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	3.1	-	nC
Switching Characteristics ^{note4}						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 50V, I _{DS} =3A R _G = 2Ω, V _{GEN} = 10V	-	14.7	-	ns
t _r	Turn-On Rise Time		-	3.5	-	ns
t _{d(off)}	Turn-Off Delay Time		-	20.9	-	ns
t _f	Turn-Off Fall Time		-	2.7	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current ^{note2}		-	-	5.0	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	12	A
V _{SD}	Drain to Source Diode Forward Voltage ^{note3}	V _{GS} = 0V, I _S =3A	-	-	1.3	V
t _{rr}	Body Diode Reverse Recovery Time	V _{GS} = 0V, I _F = 3A, di/dt =100A/μs	-	32.1	-	ns
Q _{rr}	Body Diode Reverse Recovery Time Charge		-	39.4	-	nC
I _{rrm}	Peak Reverse Recovery Current		-	2.1	-	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. $V_{DD}=50$ V, $R_G=50$ Ω , $L=0.3$ mH, starting $T_J=25^{\circ}\text{C}$

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Typical Characteristics

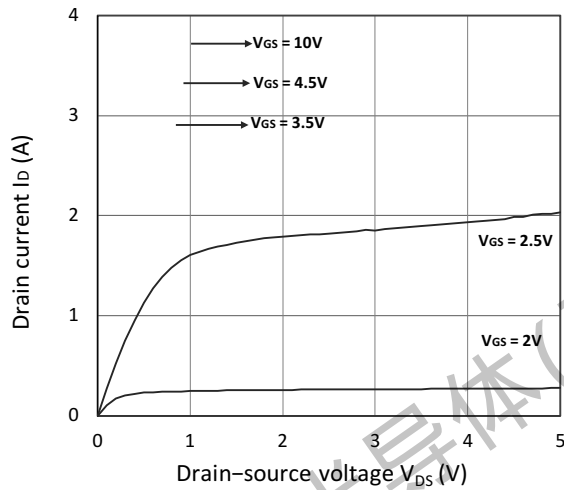


Figure 1. Output Characteristics

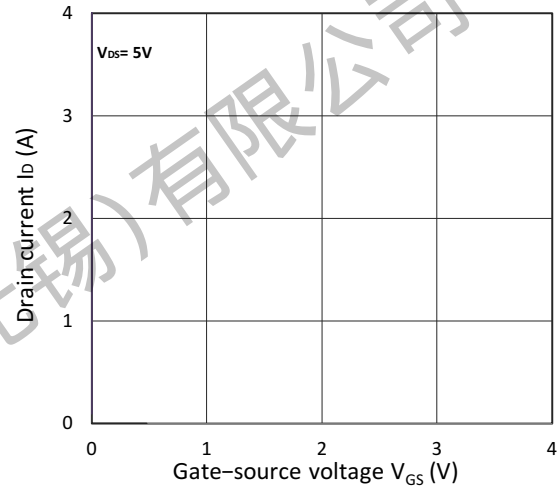


Figure 2. Transfer Characteristics

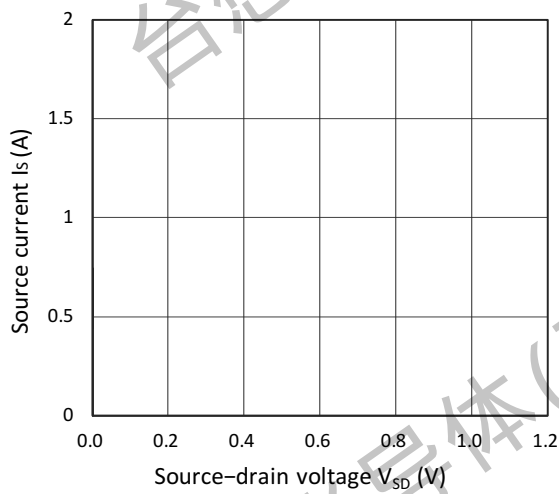


Figure 3. Forward Characteristics of Reverse

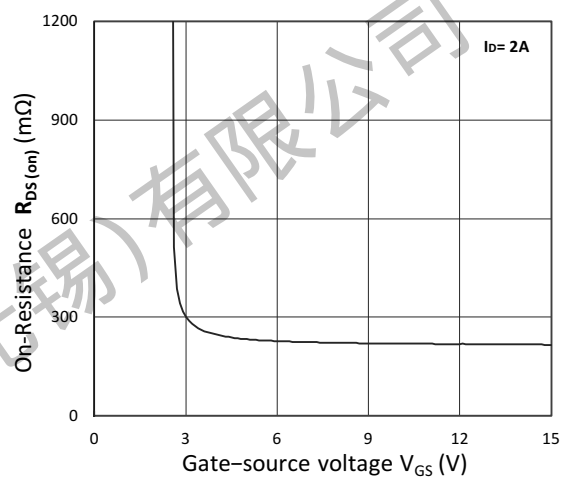


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

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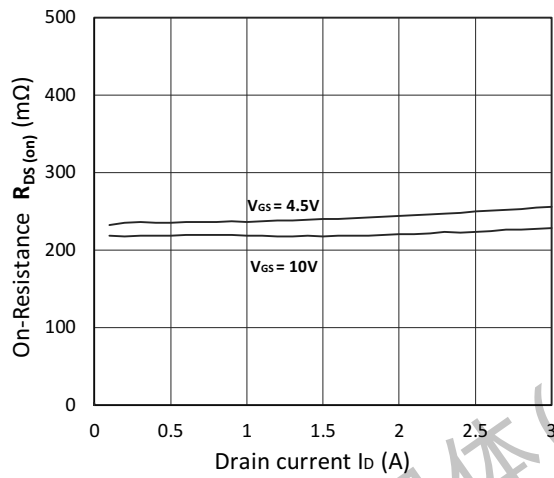


Figure 5. $R_{DS(on)}$ vs. I_D

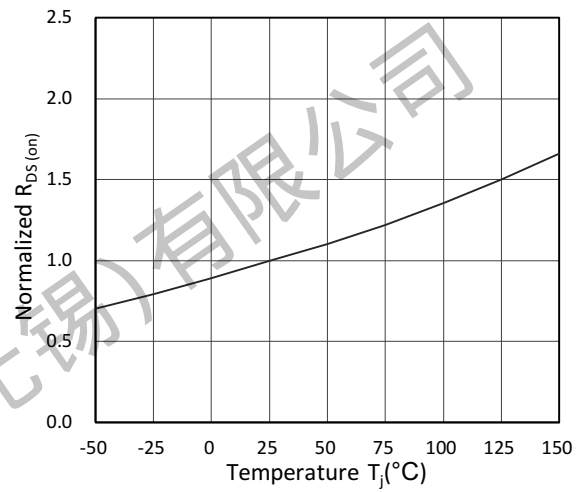


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

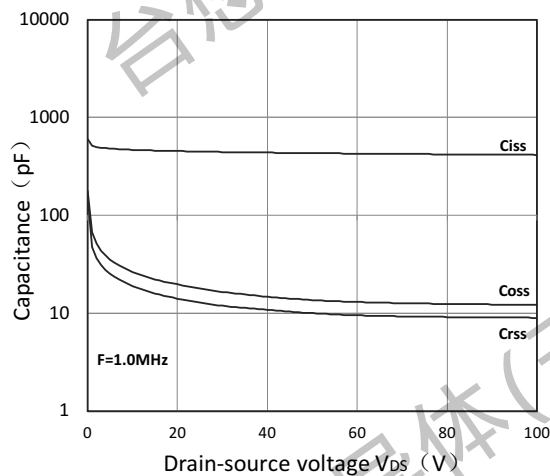


Figure 7. Capacitance Characteristics

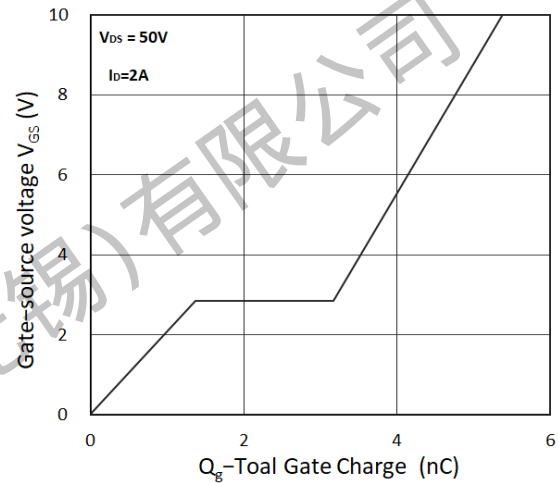


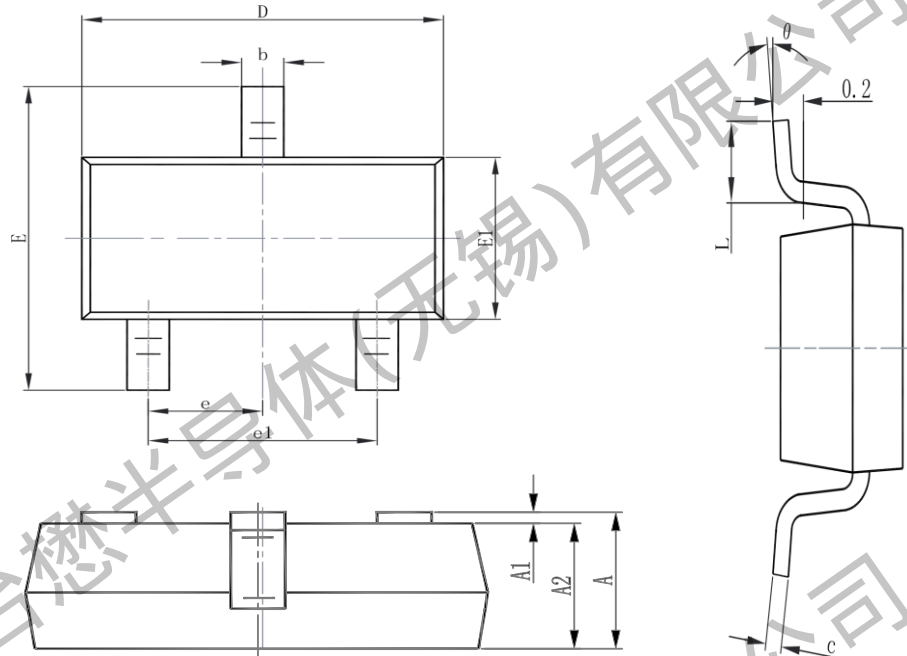
Figure 8. Gate Charge Characteristics



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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°

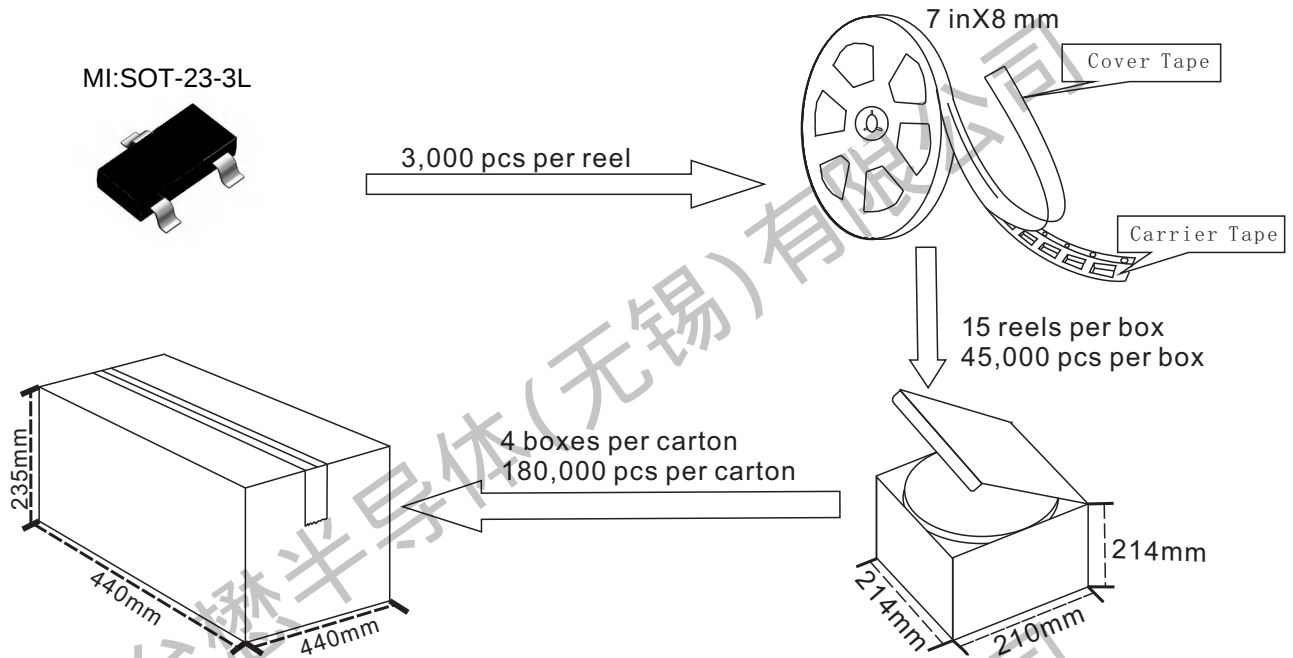


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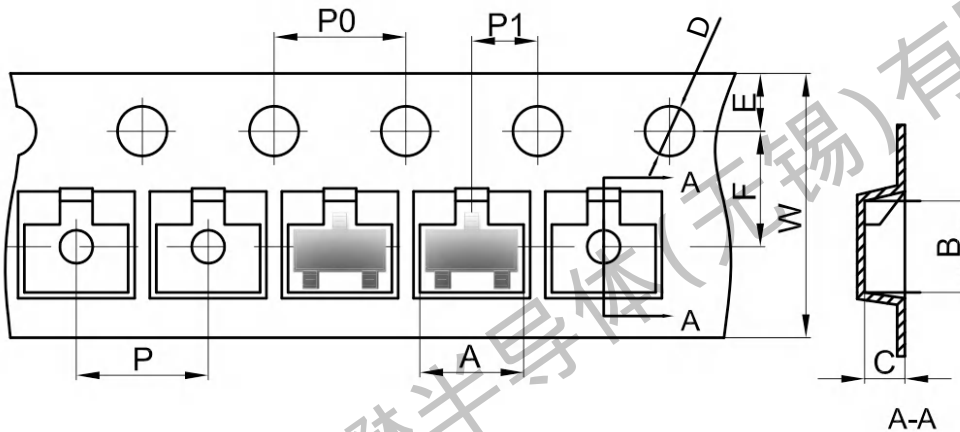
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SOT-23-3L Packing

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



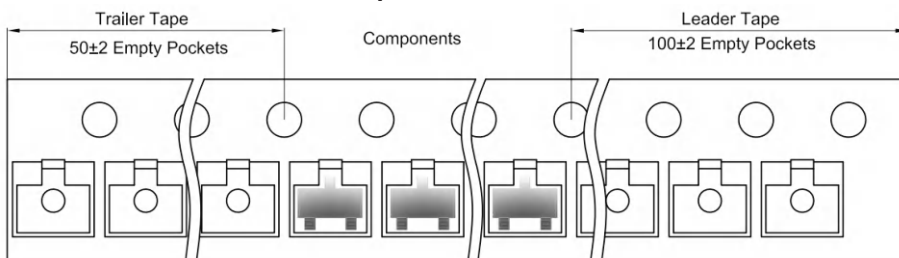
SOT-23-3L Embossed Carrier Tape



Dimensions are in millimeter

Pkg type	A	B	C	D	E	F	P0	P	P1	W
SOT-23-3L	3.15	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
2023.08.19	23.08	Original	