



TM03P10MI

P-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

$V_{DS} = -100V$ $I_D = -3.0A$

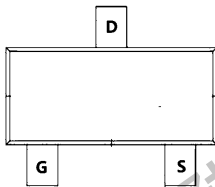
$R_{DS(ON)} = 282m\Omega (Typ.) @ V_{GS} = -10V$

100% UIS Tested

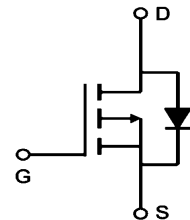
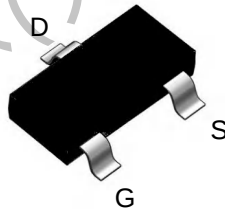
100% R_g Tested



MI:SOT-23-3L



Marking: 3P10 OR H300P



Absolute Maximum Ratings ($T_c = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-3	A
$I_D @ T_A = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-2.1	A
I_{DM}	Pulsed Drain Current	-12.1	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation	40	W
EAS	Single Pulse Avalanche Energy	109	mJ
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	---	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	3.7	$^\circ C/W$

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Electrical Characteristics: $T = 25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	---	---	$\text{V}/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-1.4A$	---	282	367	$\text{m}\Omega$
		$V_{GS}=-4.5V, I_D=-1.4A$	---	---	---	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1	-2	-3	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	$\text{mV}/^{\circ}\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-200V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	-1	μA
		$V_{DS}=-200V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	---	---	-100	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V, I_D=-10A$	---	10	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	5.2	---	Ω
Q_g	Total Gate Charge	$V_{DS}=-50V, V_{GS}=-10V, I_D=-1.4A$	---	19.6	---	nC
Q_{gs}	Gate-Source Charge		---	6	---	
Q_{gd}	Gate-Drain Charge		---	4.2	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{GS}=-10V, V_{DS}=-50V,$ $R_L=16\Omega, R_{GEN}=3\Omega$	---	13.5	---	ns
T_r	Rise Time		---	3.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	42	---	
T_f	Fall Time		---	6.4	---	
C_{iss}	Input Capacitance	$V_{DS}=-50V, V_{GS}=0V, f=1\text{MHz}$	---	1199	---	pF
C_{oss}	Output Capacitance		---	33.8	---	
C_{rss}	Reverse Transfer Capacitance		---	28.2	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	-3	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1.4A, T_J=25^{\circ}\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-1.4A, di/dt=100A/\mu s,$	---	42.9	---	nS
Q_{rr}	Reverse Recovery Charge	$T_J=25^{\circ}\text{C}$	---	83.7	---	nC

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Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

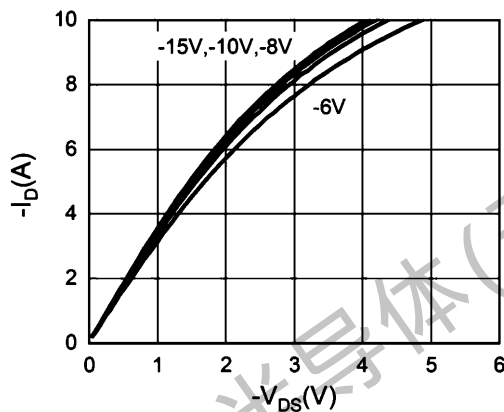


Figure 2. Transfer Characteristics

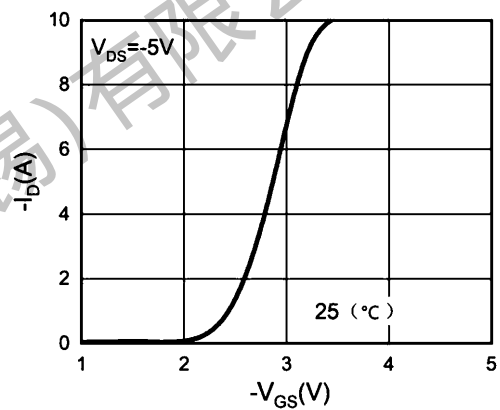


Figure 3. Power Dissipation

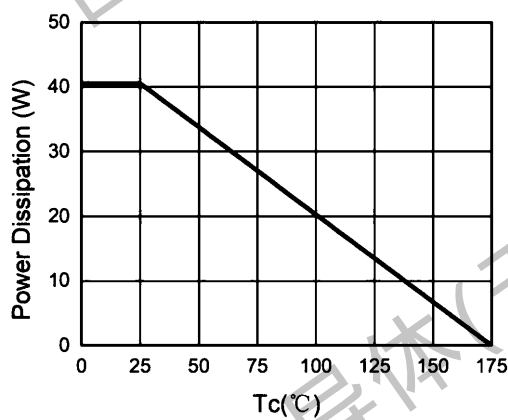


Figure 4. Drain Current

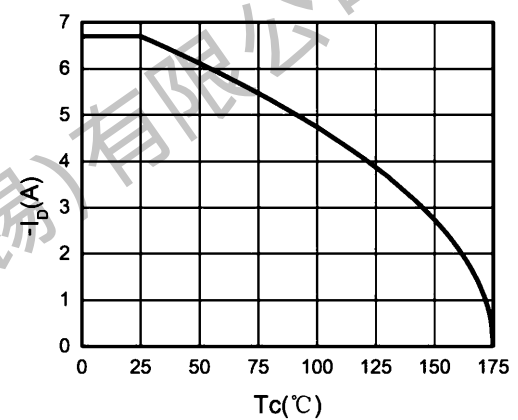


Figure 5. BV_{DSS} vs Junction Temperature

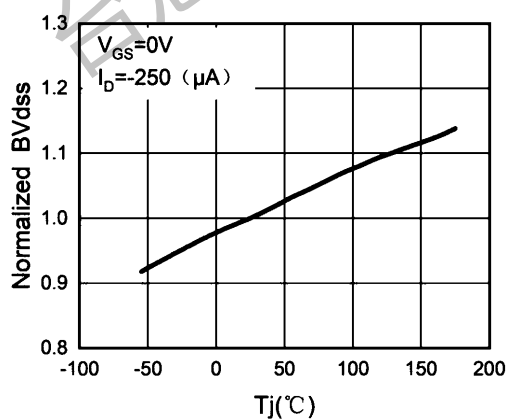
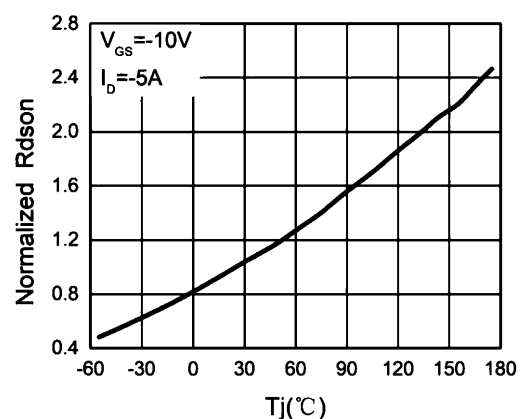


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

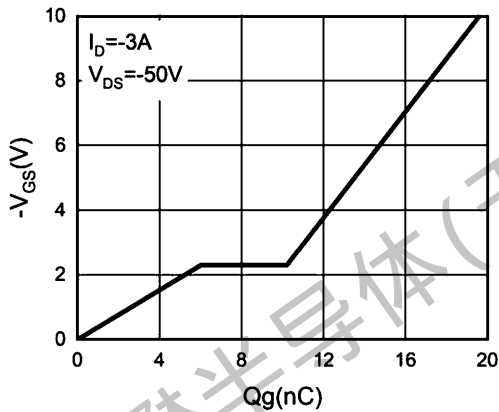


Figure 8. Capacitance

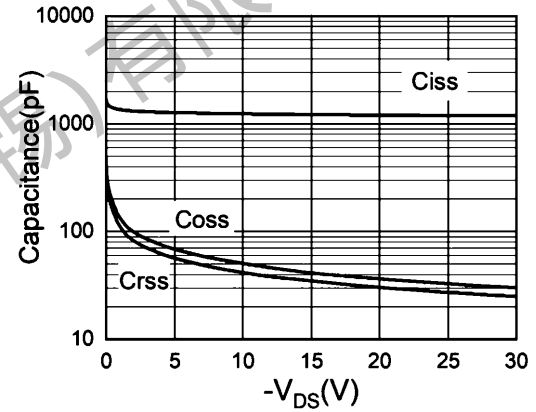


Figure 9. Body-Diode Characteristics

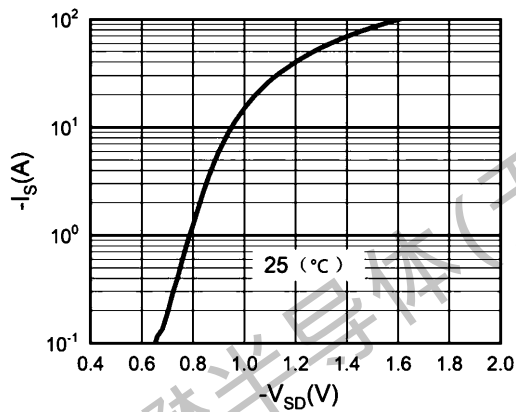
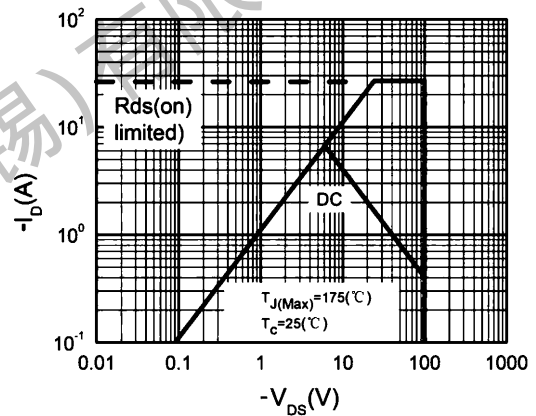


Figure 10. Maximum Safe Operating Area

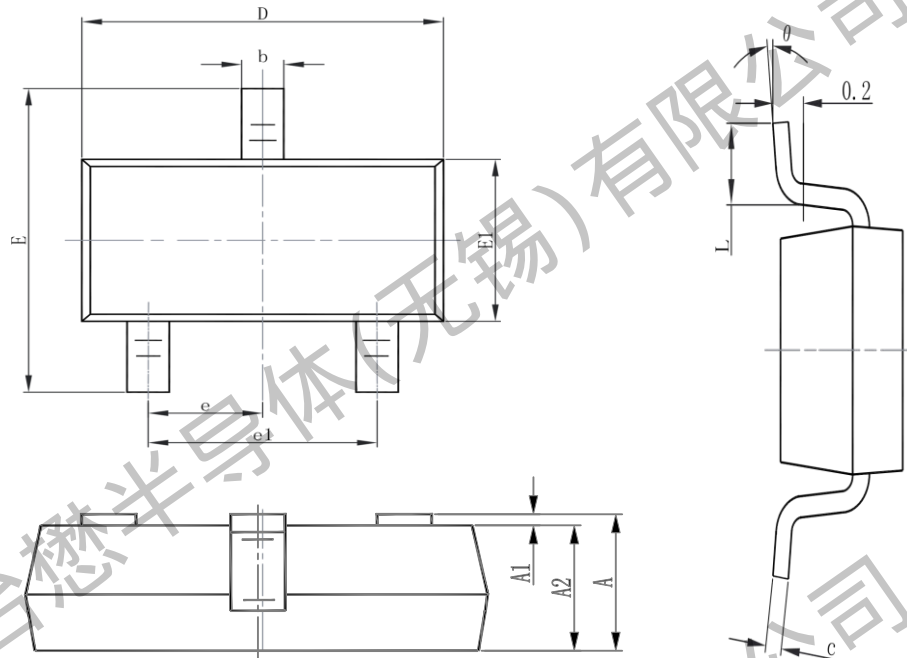




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Package Mechanical Data:SOT-23-3L



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°

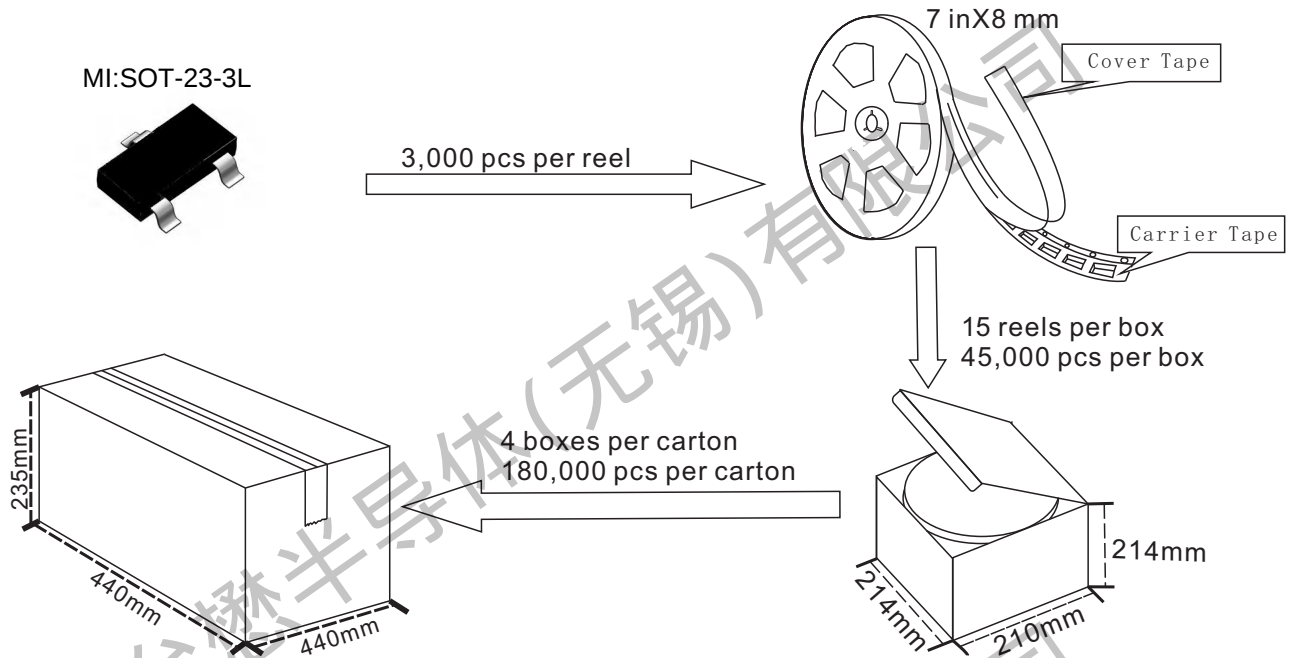


TM03P10MI

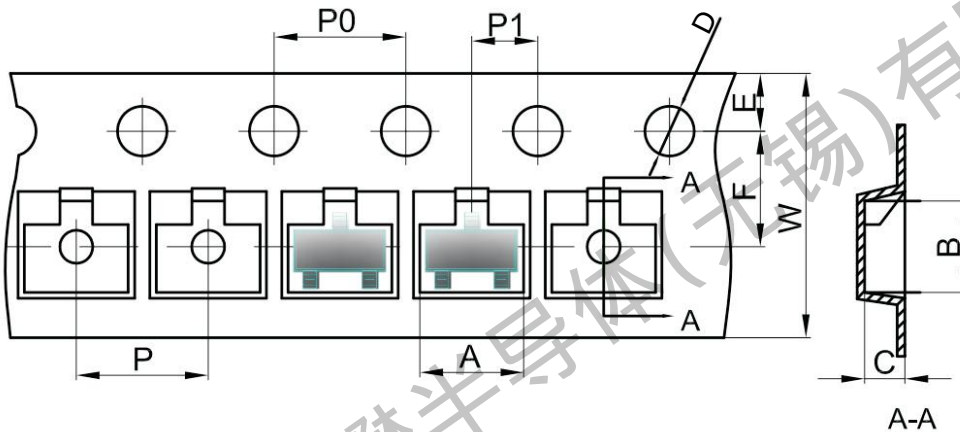
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SOT-23-3L Packing

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



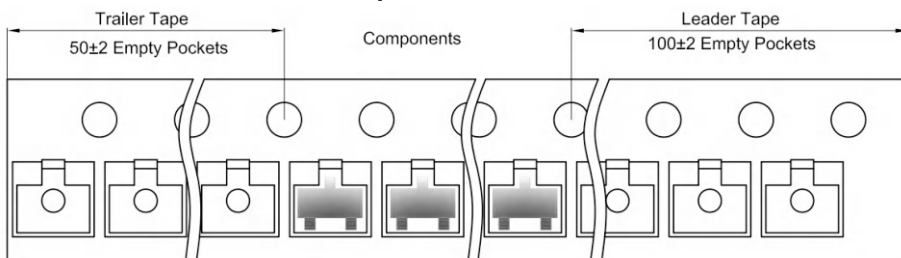
SOT-23-3L Embossed Carrier Tape



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
2023.04.08	23.04	Original	