# TM07N03MI

## N-Channel Enhancement Mosfet

**General Description**

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

**Applications**

- Load switch
- PWM

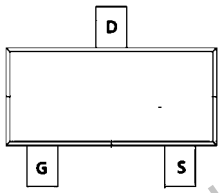
**General Features**

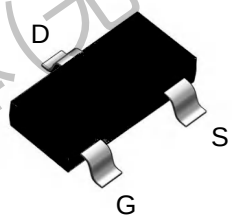
$V_{DS}$ = 30V $I_D$ =6.6A

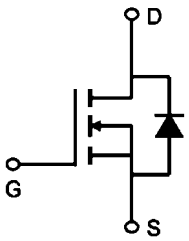
$R_{DS(ON)}$=23mΩ(Typ.)@ $V_{GS}$=10V

100% UIS Tested
100% $R_g$ Tested

MI:SOT-23-3L




Marking: XO

**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℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 6.6 | A |
| $I_D$@$T_A$=70℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 5.0 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 21 | A |
| $P_D$@$T_A$=25℃ | Total Power Dissipation[3] | 1.0 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

**Thermal Data**

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient [1] | --- | 170 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case[1] | --- | --- | ℃/W |

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## Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 30 | --- | --- | V |
| $\triangle BV_{DSS}/\triangle T_J$ | BVDSS Temperature Coefficient | Reference to 25℃ , $I_D$=1mA | --- | 0.029 | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=5A | --- | 23 | 25 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=3A | --- | 26 | 31 | |
| | | $V_{GS}$=2.5V , $I_D$=1A | --- | 30 | 49 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 0.9 | 1.2 | 1.5 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | -2.82 | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±12V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_D$=5A | --- | 25 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 1.5 | --- | Ω |
| $Q_g$ | Total Gate Charge (4.5V) | $V_{DS}$=15V , $V_{GS}$=4.5V , $I_D$=5.8A | --- | 11.5 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 1.6 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 2.9 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=15V , $V_{GS}$=10V , $R_G$=3Ω $I_D$=5A | --- | 5 | --- | ns |
| $T_r$ | Rise Time | | --- | 47. | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 26 | --- | |
| $T_f$ | Fall Time | | --- | 8 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 530 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 130 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 36 | --- | |
| $I_S$ | Continuous Source Current[1,4] | $V_G$=$V_D$=0V , Force Current | --- | --- | 6.6 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.2 | V |

**Note :**

1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2、The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3、The power dissipation is limited by 150℃ junction temperature

4 、The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

## Typical Characteristics

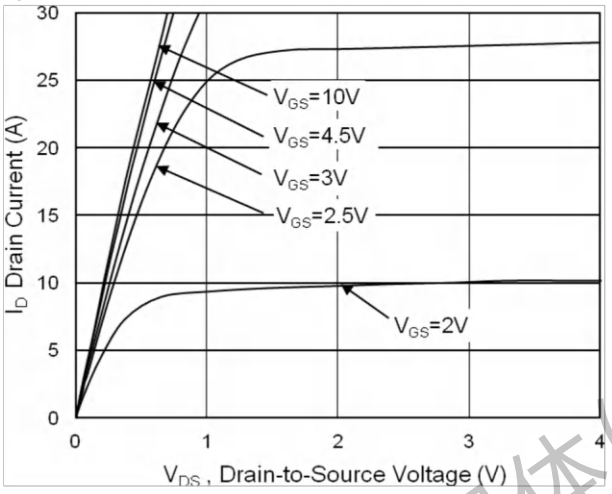


Fig.1 Typical Output Characteristics

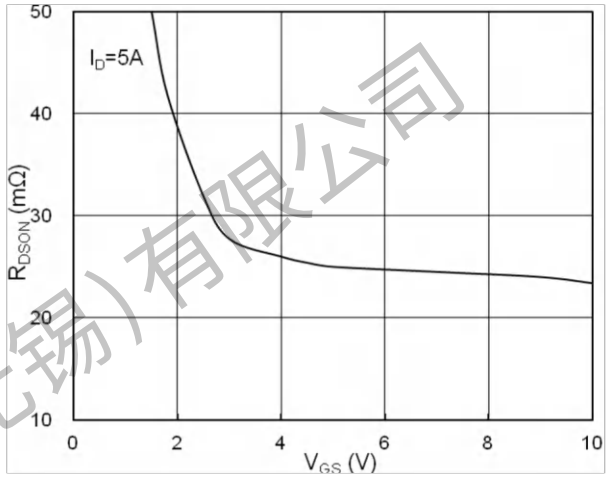


Fig.2 On-Resistance vs. Gate-Source

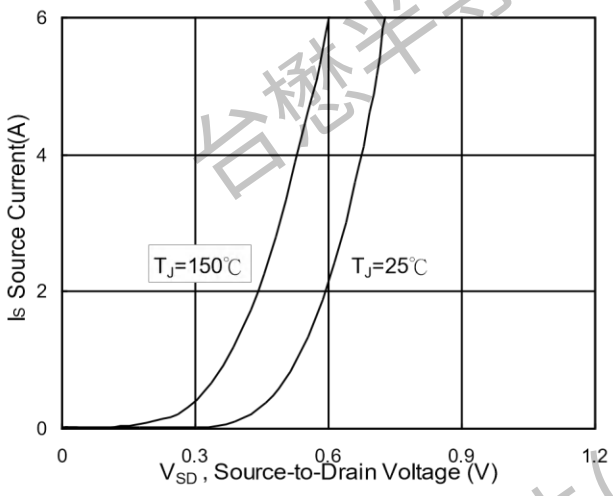


Fig.3 Forward Characteristics Of Reverse

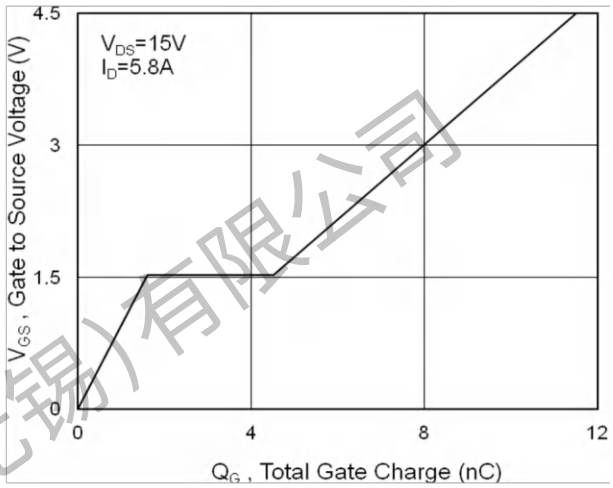


Fig.4 Gate-Charge Characteristics

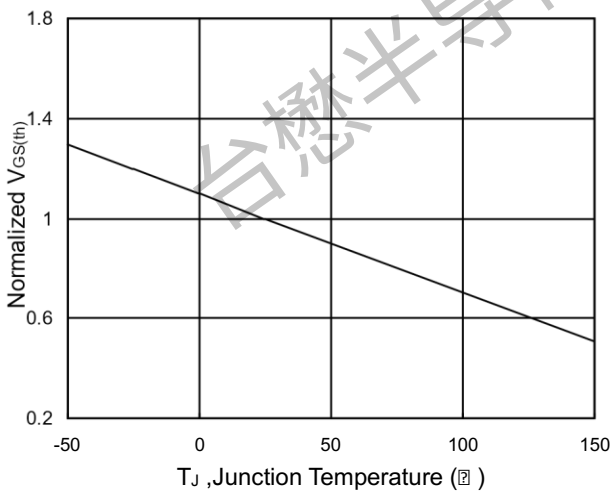


Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$

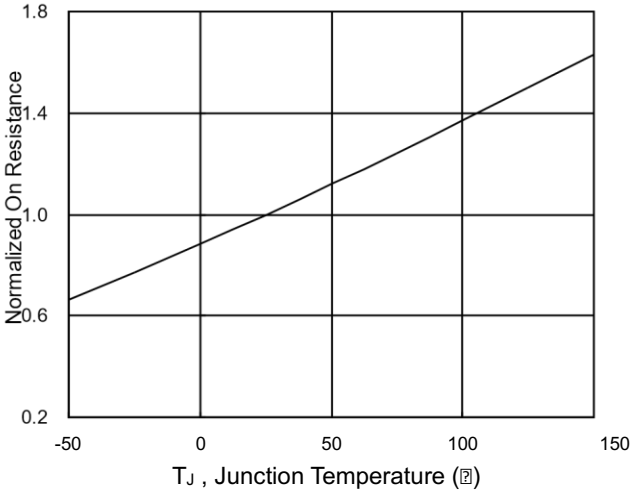


Fig.6 Normalized $R_{DSON}$ vs. $T_J$

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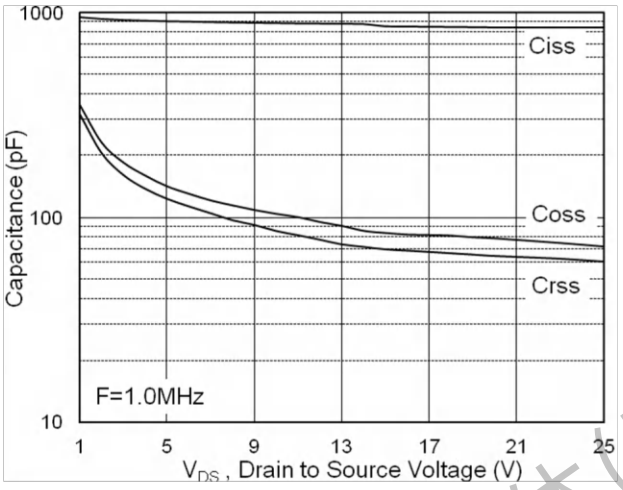



Fig.7 Capacitance

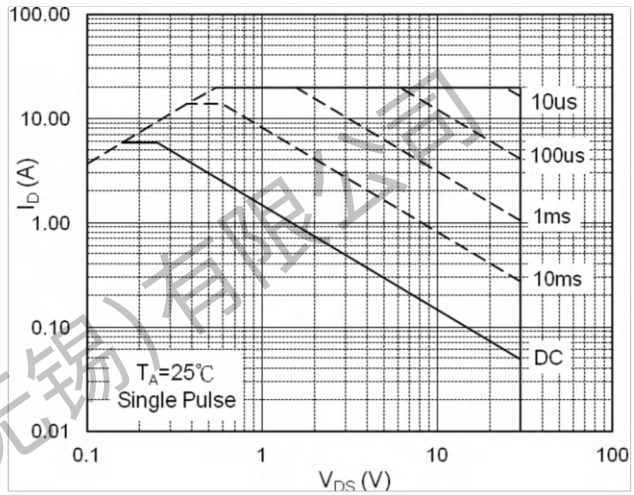



Fig.8 Safe Operating Area

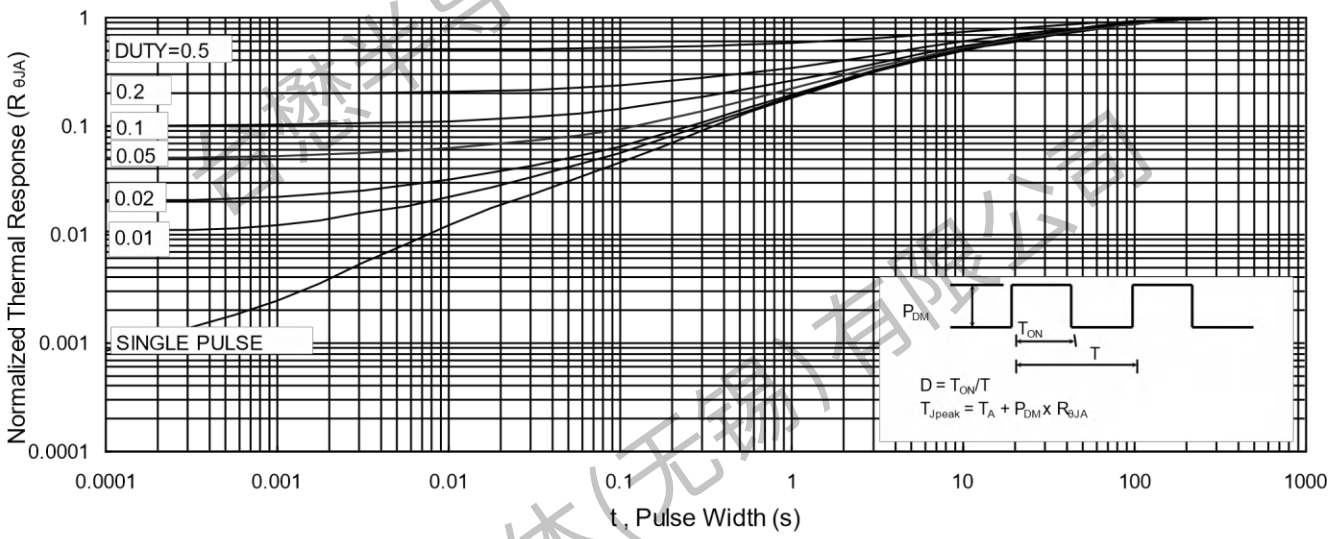



Fig.9 Normalized Maximum Transient Thermal Impedance

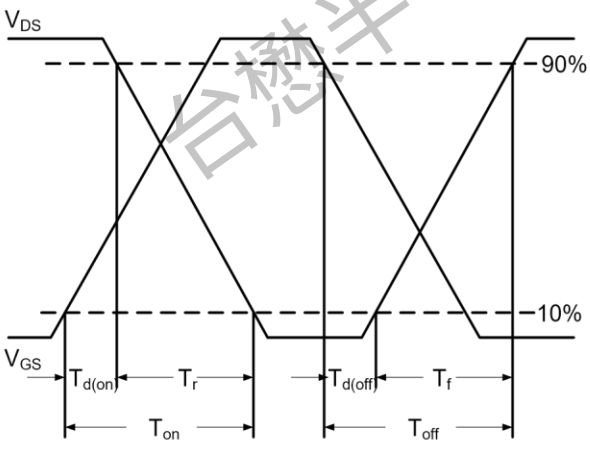



Fig.10 Switching Time Waveform

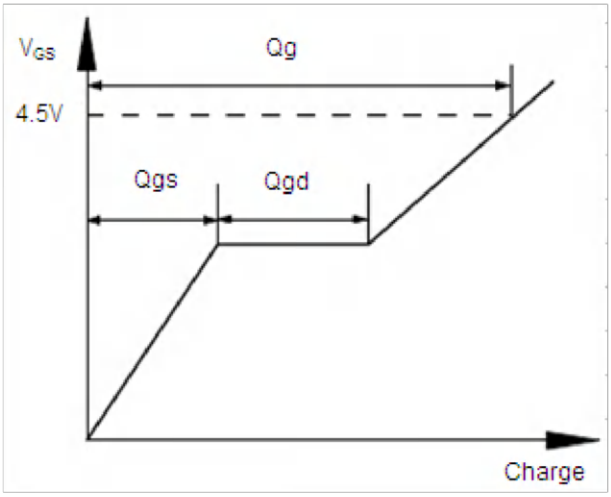
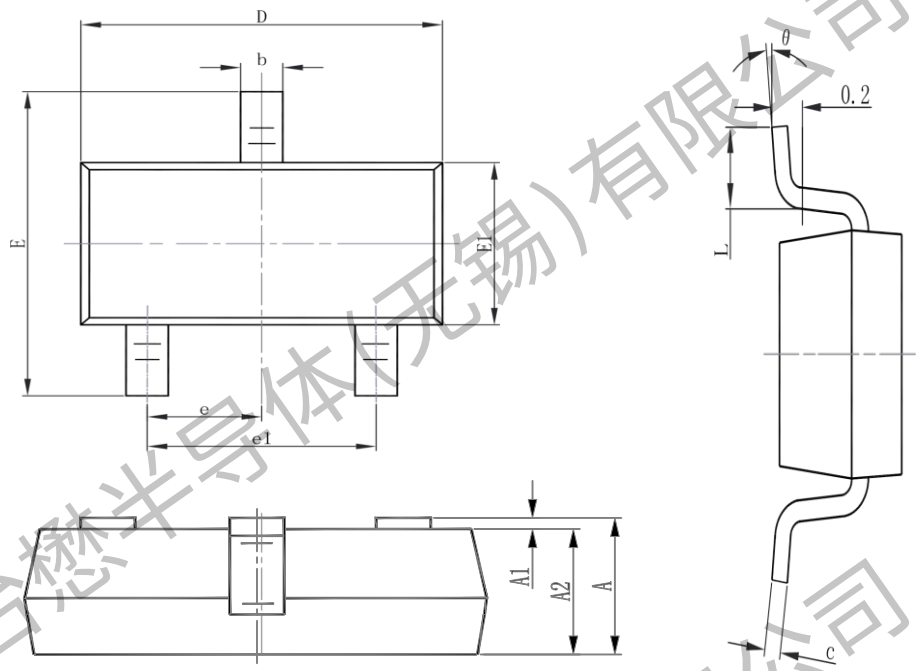



Fig.11 Gate Charge Waveform

## Package Mechanical Data:SOT-23-3L

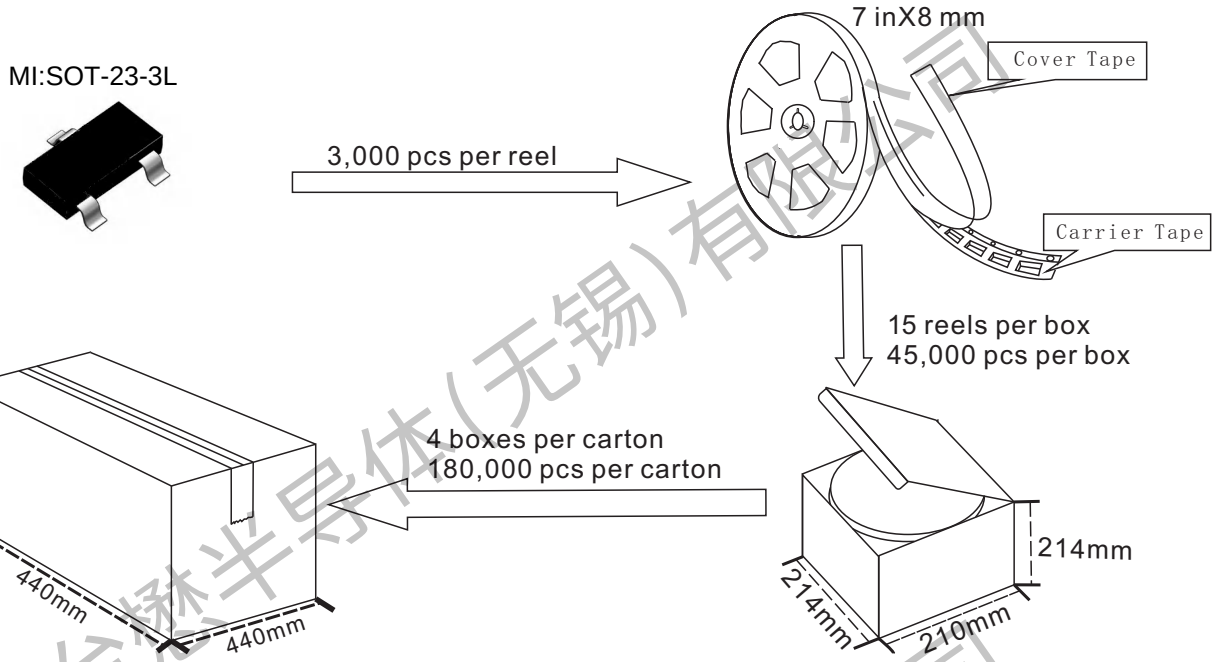



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 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° |

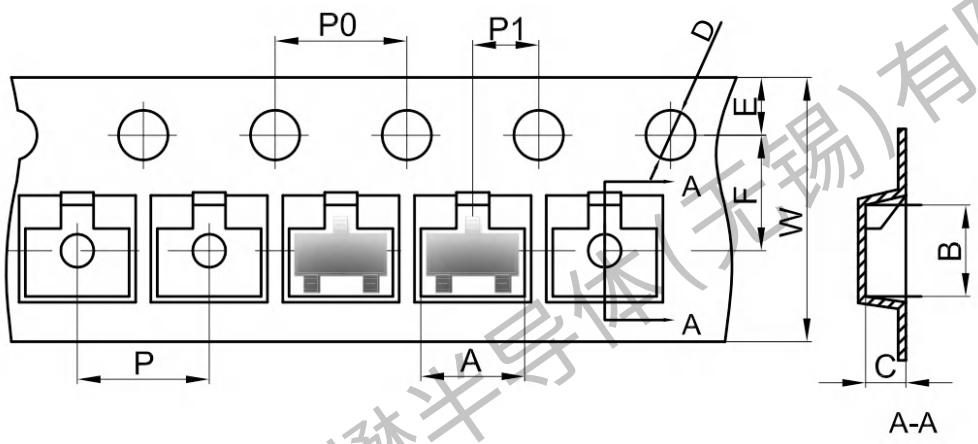
**TM07N03MI** **N-Channel Enhancement Mosfet**

# SOT-23-3L Packing

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

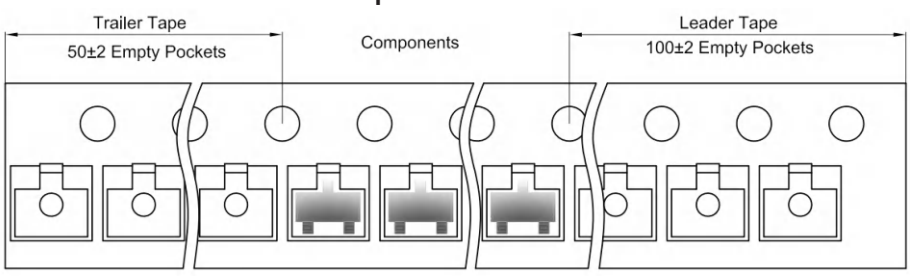



## SOT-23-3L Embossed Carrier Tape




| 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 |
|---|---|---|---|
| 2023.06.21 | 23.06 | Original | |