# MT30N03

## N-Channel Enhancement Mode Field Effect Transistor

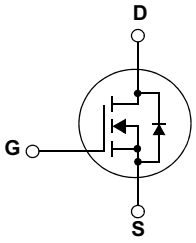
MT Semiconductor®

http://www.mtsemi.com

### Product Summary

| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DSS}$ | $I_D$ | $R_{DS(ON)}$ (mΩ) Typ |
| 30V | 30A | 11@ $V_{GS}$=10V |
| | | 17@ $V_{GS}$=4.5V |

### Simplified Schematic




### Features

- Super high dense cell design for low $R_{DS(ON)}$
- Rugged and reliable
- Simple drive requirement
- TO-252-2L package

### MARKING DIAGRAM & PIN ASSIGNMENT


TO-252-2L

### Applications

- DC-DC primary bridge
- DC-DC Synchronous rectification
- Hot swap

## Absolute Maximum Ratings ($T_A$ = 25℃ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous[a] @Tj=125℃ | $I_D$ | 30 | A |
| - Pulse *d*[b] | $I_{DM}$ | 90 | A |
| Drain-source Diode Forward Current[a] | $I_S$ | 30 | A |
| Maximum Power Dissipation[a] | $P_D$ | 50 | W |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55 to 175 | ℃ |

## THERMAL CHARACTERISTICS

| | | | |
|---|---|---|---|
| Thermal Resistance, Junction-to Ambient[a] | Rth $J_A$ | 50 | ℃/W |

## ELECTRICAL CHARACTERISTICS ($T_A$=25℃ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V,$I_D$=-250μA | 30 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=24V,$V_{GS}$=0V | | | 1 | μA |
| Gate-Body Leakage | $I_{GSS}$ | $V_{GS}$=±24V,$V_{DS}$=0V | | | ±100 | nA |
| ON CHARACTERITICS | | | | | | |
| Gate Threshold Voltage | $V_{GS}$(th) | $V_{DS}$=$V_{GS}$,$I_D$=-250μA | 1 | 1.5 | 3 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V,$I_D$=30A | | 11 | 14 | mΩ |
| | | $V_{GS}$=4.5V,$I_D$=30A | | 17 | 21 | |
| Forward Transconductance | $g_{FS}$ | $V_{GS}$=15V,$I_D$=15A | | 30 | | S |
| DAYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$=15V,$V_{GS}$=0V f=1.0MHz | | 1200 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 530 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 150 | | pF |
| SWITCHING CHARACTERISISTICS | | | | | | |
| Turn-On Delay Time | $t_{D(ON)}$ | $V_{DD}$=15V $I_D$=1A, $V_{GEN}$=10V $R_L$=15ohm $R_{GEN}$=6ohm | | 5 | | ns |
| Rise Time | tr | | | 65 | | ns |
| Turn-Off Delay Time | $t_{D(OFF)}$ | | | 67 | | ns |
| Fall Time | tf | | | 90 | | ns |
| Total Gate Charge | Qg | $V_{DS}$=15V,$I_D$=20A $V_{GS}$=5V $R_{GEN}$=4.7ohm | | 34.4 | 75 | nC |
| Gate-Source Charge | Qgs | | | 5.1 | | nC |
| Gate-Drain Charge | Qgd | | | 7 | | nC |

## ELECTRICAL CHARACTERICS (TA=25℃ unless otherwise noted)

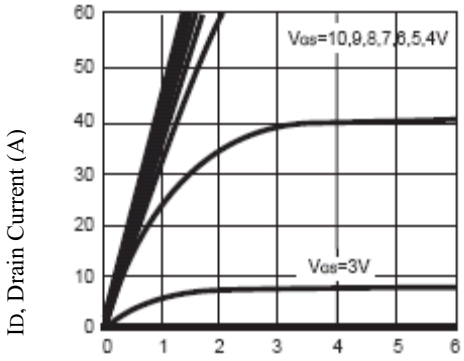
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| DRAIN-SOURCE DIODE CHARACTERISTICS | | | | | | |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V,$I_S$=30A | | 0.85 | 1.3 | V |

Notes

a. Surface Mounted on FR4 Board, t≦10sec

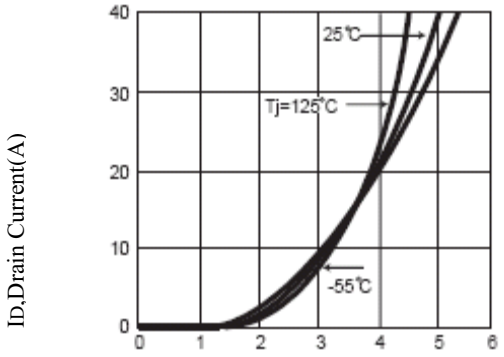
b. Pulse Test: Pulse Width≦300Us, Duty Cycle≦2%

c. Guaranteed by design, not subject to production testing.



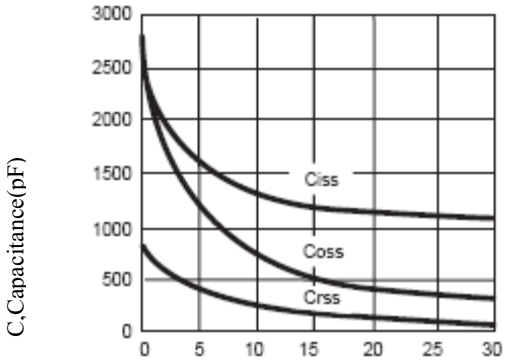

$V_{DS}$, Drain-to-Source Voltage (V)

Figure 1. Output Characteristics




$V_{GS}$, Gate-to-source Voltage (V)

Figure 2. Transfer Characteristics




VGS, Drain-to Source Voltage

Figure3. Capacitance

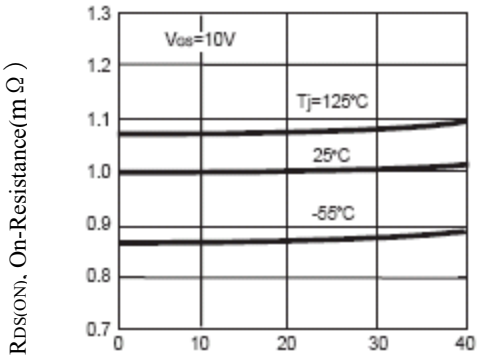



Figure4. On-Resistance Variation with Temperature

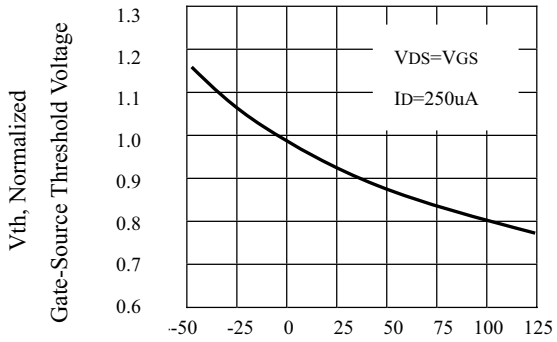



Figure5.Gate Threshold Variation With Temperature

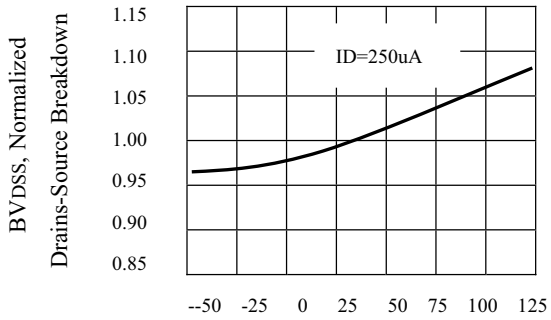



Figure6.Breakdown Voltage Variation With Temperature

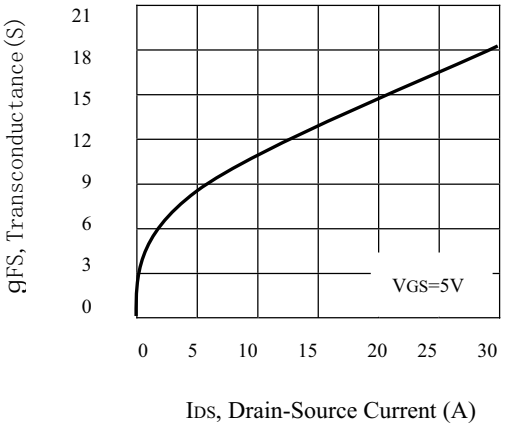



Figure7.Transconductance Variation With Drain Current

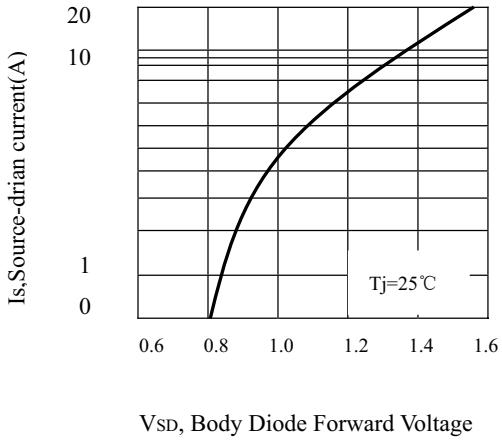



Figure8.Body Diode Forward Voltage

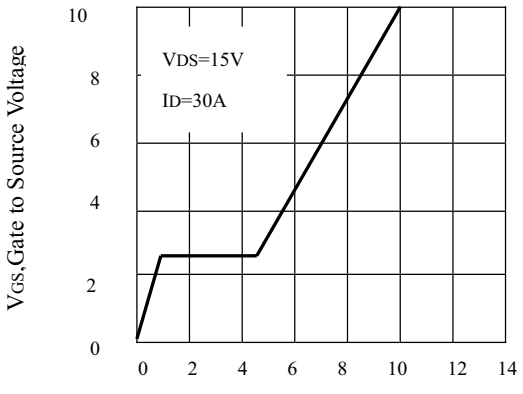



Figure9. Gate Charge

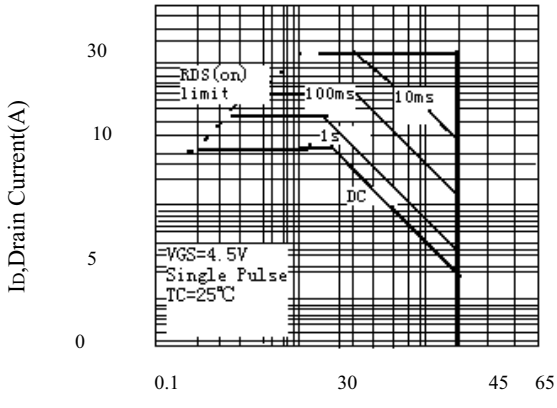
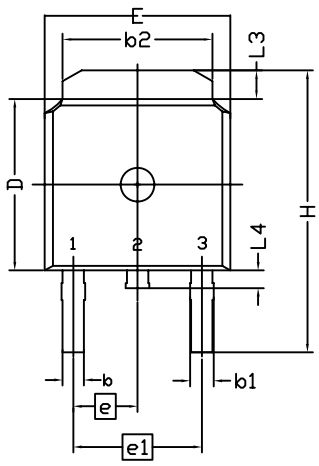
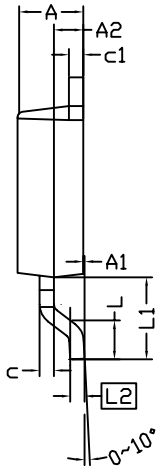


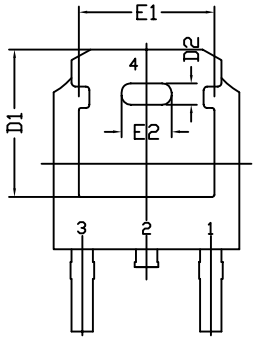

Figure10.Maximum Safe Operating Area

| Document No. | PO−00009 |
|---|---|
| Version | S |

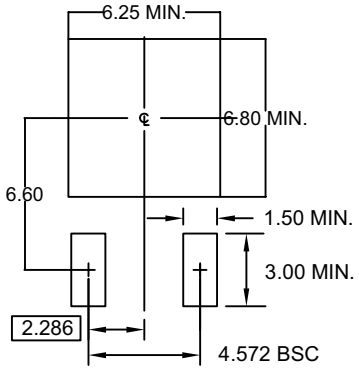
# TO252(DPAK) PACKAGE OUTLINE




RECOMMENDED LAND PATTERN




UNIT: mm

| SYMBOL | DIMENSION IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---|---|---|---|---|---|---|
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 2.184 | 2.286 | 2.388 | 0.086 | 0.090 | 0.094 |
| A1 | 0.000 | ----- | 0.127 | 0.000 | ----- | 0.005 |
| A2 | 0.889 | 1.041 | 1.143 | 0.035 | 0.041 | 0.045 |
| b | 0.635 | 0.762 | 0.889 | 0.025 | 0.030 | 0.035 |
| b1 | 0.762 | 0.840 | 1.143 | 0.030 | 0.033 | 0.045 |
| b2 | 4.953 | 5.340 | 5.461 | 0.195 | 0.210 | 0.215 |
| c | 0.450 | 0.508 | 0.610 | 0.018 | 0.020 | 0.024 |
| c1 | 0.450 | 0.508 | 0.610 | 0.018 | 0.020 | 0.024 |
| D | 5.969 | 6.096 | 6.223 | 0.235 | 0.240 | 0.245 |
| D1 | 5.210 | 5.249 | 5.380 | 0.205 | 0.207 | 0.212 |
| D2 | 0.662 | 0.762 | 0.862 | 0.026 | 0.030 | 0.034 |
| E | 6.350 | 6.604 | 6.731 | 0.250 | 0.260 | 0.265 |
| E1 | 4.318 | 4.826 | 4.901 | 0.170 | 0.190 | 0.193 |
| E2 | 1.678 | 1.778 | 1.878 | 0.066 | 0.070 | 0.074 |
| e | 2.286 BSC | | | 0.090 BSC | | |
| e1 | 4.572 BSC | | | 0.180 BSC | | |
| H | 9.398 | 10.033 | 10.414 | 0.370 | 0.395 | 0.410 |
| L | 1.270 | 1.520 | 2.032 | 0.050 | 0.060 | 0.080 |
| L1 | 2.921 REF. | | | 0.115REF. | | |
| L2 | 0.408 | 0.508 | 0.608 | 0.016 | 0.020 | 0.024 |
| L3 | 0.889 | 1.016 | 1.270 | 0.035 | 0.040 | 0.050 |
| L4 | 0.635 | ----- | 1.016 | 0.025 | ----- | 0.040 |

NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS. MOLD FLASH SHOULD BE LESS THAN 6 MILS.
2. DIMENSION L IS MEASURED IN GAUGE PLANE
3. TOLERANCE 0.10 mm UNLESS OTHERWISE SPECIFIED
4. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
5. REFER TO JEDEC TO-252 (AA)

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