# AT050SN100MTB

N-Channel Enhancement Mode Power MOSFET

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---|---|---|
| 100V | 28mΩ@10V | 50A |
| | 36mΩ@4.5V | |

## Feature

- Advanced trench technology
- Excellent $R_{DS(ON)}$
- Low gate charge

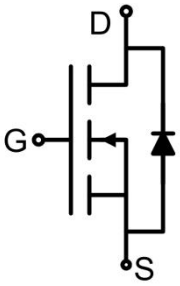
## Application

- Automative lighting
- Load switch
- Uninterruptible power supply

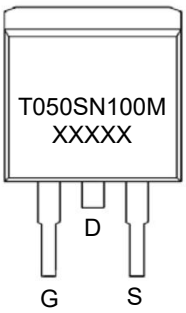
## Package

**TO-263AB**

## Circuit diagram




## Marking



# AT050SN100MTB

N-Channel Enhancement Mode Power MOSFET

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

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current ($V_{GS}$=10V) | $I_D$ | 50 | A |
| Continuous Drain Current ($V_{GS}$=10V, $T_C$=100℃) | $I_D$(100℃) | 22 | A |
| Pulsed Drain Current[1)] | $I_{DM}$ | 122 | A |
| Power Dissipation[2)] | $P_D$ | 114 | W |
| Single pulse avalanche energy[3)] | $E_{AS}$ | 59 | mJ |
| Thermal Resistance,Junction-to-Case | $R_{\theta JC}$ | 1.4 | ℃/W |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55 ~ +150 | ℃ |

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

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ =0V, $I_D$ =250mA | 100 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =100V, $V_{GS}$ =0V | | | 1 | mA |
| Gate-body leakage current | $I_{GSS}$ | $V_{DS}$ =0V, $V_{GS}$ =±20V | | | ±100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250mA | 1.2 | 1.6 | 2.5 | V |
| Drain-source on-resistance | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ =20A | | 22 | 28 | mΩ |
| | | $V_{GS}$ =4.5V, $I_D$ =10A | | 24 | 36 | mΩ |
| **Dynamic characteristics[4)]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =50V, $V_{GS}$ =0V, f =1MHz | | 2902 | | pF |
| Output Capacitance | $C_{oss}$ | | | 95 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 84 | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ =50V, $V_{GS}$ =10V, $I_D$ =20A | | 72 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 11 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 19 | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DS}$ =50V, $V_{GS}$ =10V, $I_D$ =20A $R_G$ =3Ω | | 10 | | nS |
| Turn-on rise time | $t_r$ | | | 24 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 63 | | |
| Turn-off fall time | $t_f$ | | | 45 | | |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward Current | $I_S$ | | | | 50 | A |
| Diode Forward voltage | $V_{SD}$ | $V_{GS}$ =0V, $I_S$ =30A | | | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ =20A, di/dt =100A/μs | | 29 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 44.4 | | nC |

Notes:

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

2) The power dissipation is limited by 150℃ junction temperature.

3) The EAS data shows Max. rating . $I_{AS}$=15A,$V_{DD}$=50V,$R_G$ =25Ω, Starting $T_J$ = 25 ºC.

4) Guaranteed by design, not subject to production testing.

## Typical Characteristics

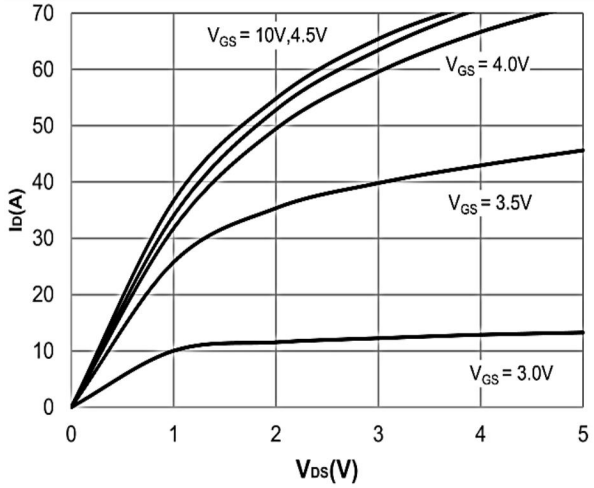



Figure 1: Output Characteristics

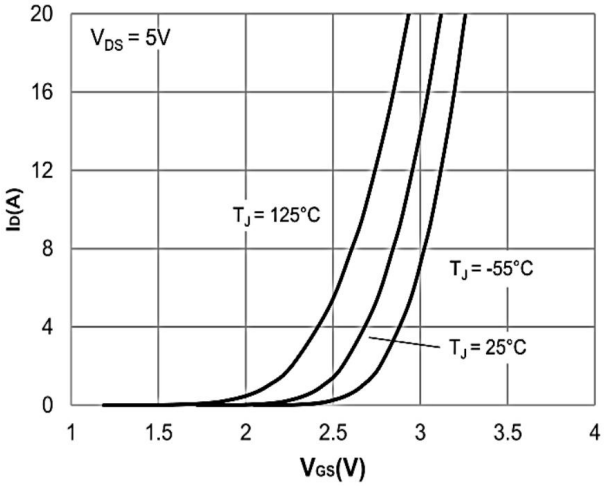



Figure 2: Typical Transfer Characteristics

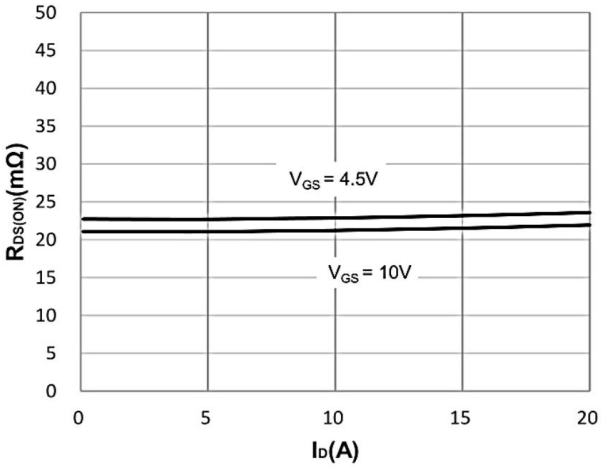



Figure 3: On-resistance vs. Drain Current

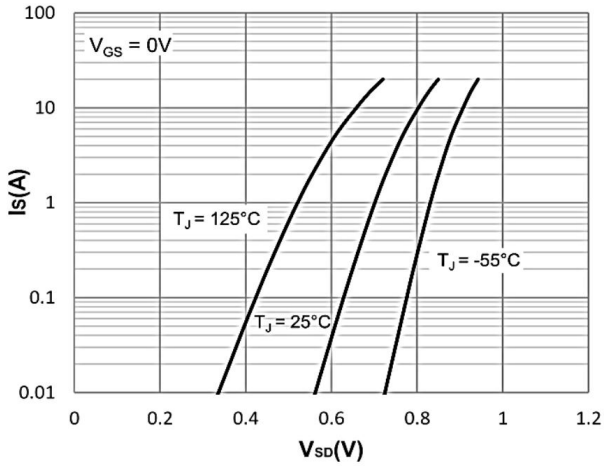



Figure 4: Body Diode Characteristics

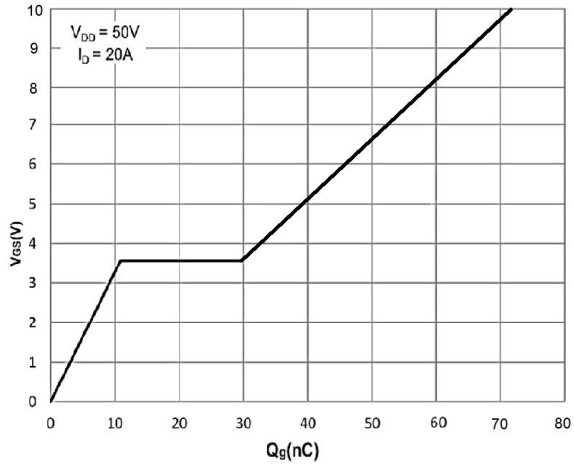



Figure 5: Gate Charge Characteristics

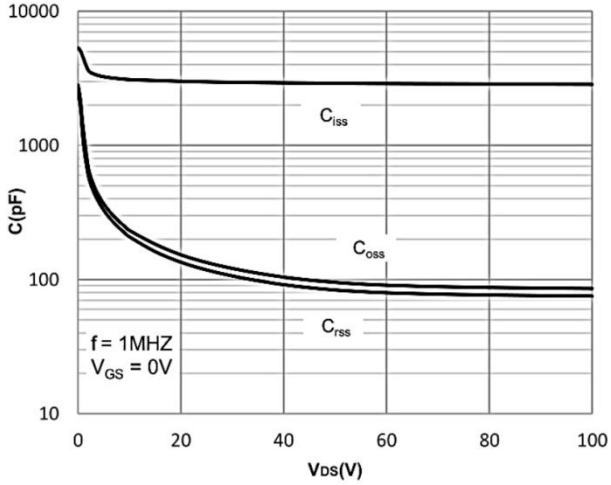



Figure 6: Capacitance Characteristics

## Typical Characteristics

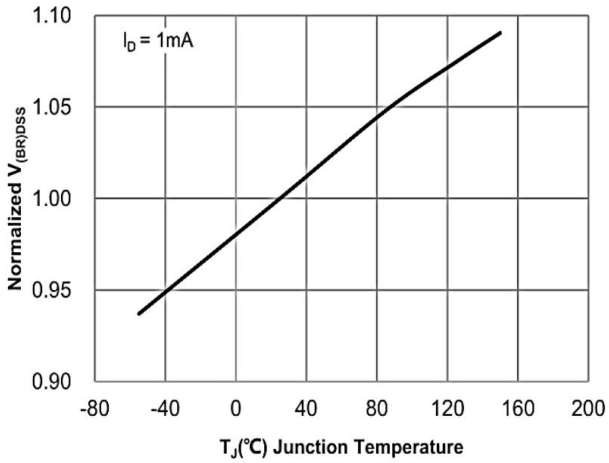



**Figure 7: Normalized Breakdown voltage vs. Junction Temperature**

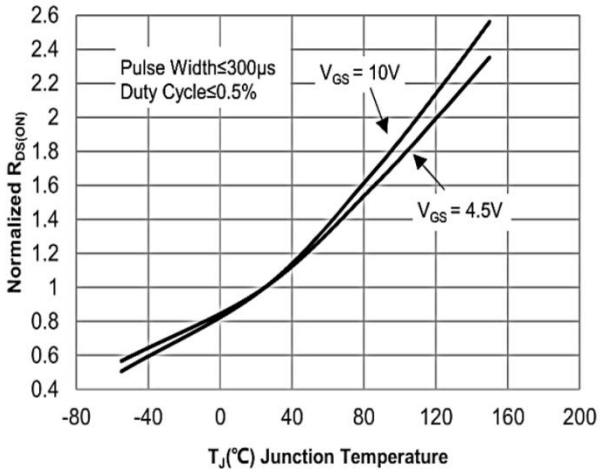



**Figure 8: Normalized on Resistance vs. Junction Temperature**

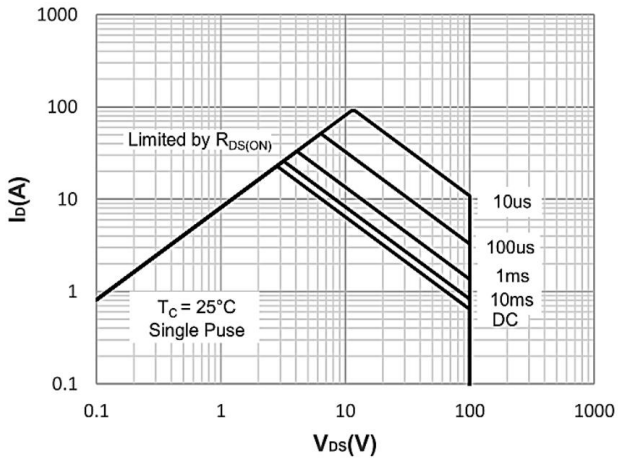



**Figure 9: Maximum Safe Operating Area**

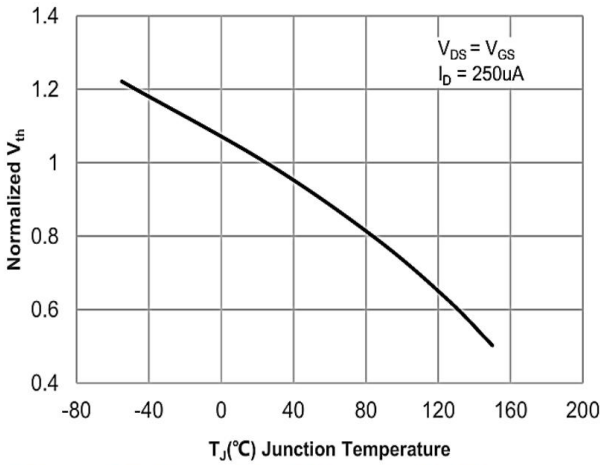



**Figure 10: Normalized Threshold Voltage vs. Case Temperature**

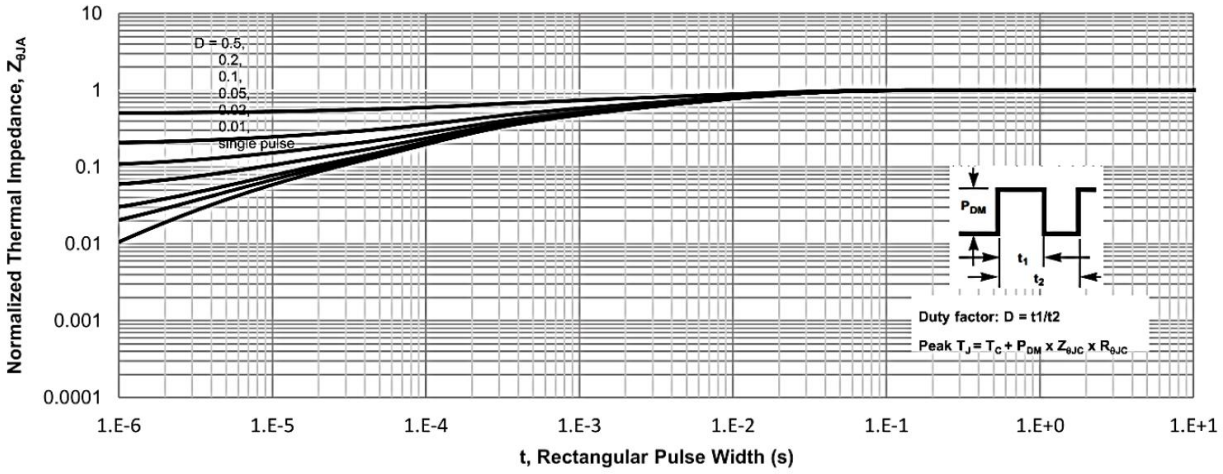
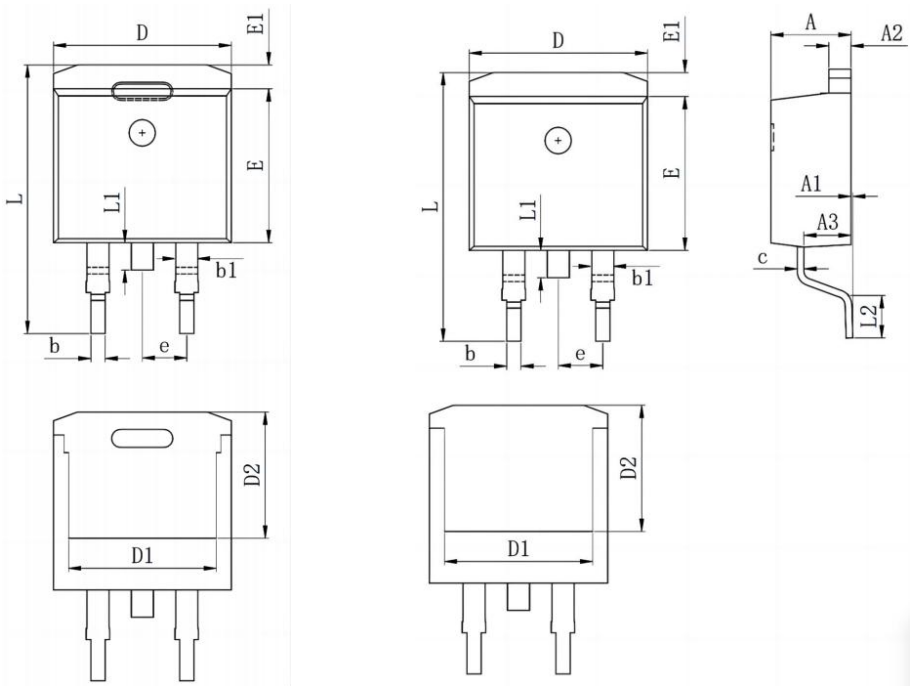



**Figure 11: Normalized Maximum Transient Thermal Impedance**

## TO-263AB Package Information




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 4.370 | 4.770 | 0.172 | 0.188 |
| A1 | 0.000 | 0.250 | 0.000 | 0.010 |
| A2 | 1.220 | 1.420 | 0.048 | 0.056 |
| A3 | 2.490 | 2.890 | 0.098 | 0.114 |
| b | 0.700 | 0.960 | 0.028 | 0.038 |
| b1 | 1.170 | 1.470 | 0.046 | 0.058 |
| c | 0.300 | 0.530 | 0.012 | 0.021 |
| D | 9.860 | 10.360 | 0.388 | 0.408 |
| D1 | 8.400 REF. | | 0.331 REF. | |
| D2 | 7.073 REF. | | 0.278 REF. | |
| E | 8.500 | 8.900 | 0.335 | 0.350 |
| E1 | 1.070 | 1.470 | 0.042 | 0.058 |
| e | 2.540 BSC. | | 0.100 BSC. | |
| L | 17.70 | 15.500 | 0.697 | 0.610 |
| L1 | 1.400 | 1.700 | 0.055 | 0.067 |
| L2 | 2.000 | 2.600 | 0.079 | 0.102 |
| H | 6.000 | 6.850 | 0.236 | 0.270 |
| Q | 2.600 | 3.000 | 0.102 | 0.118 |
| ϕ | 3.400 | 3.800 | 0.134 | 0.150 |