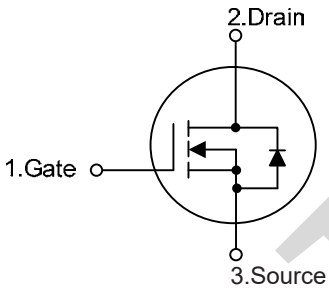
## SGT N-channel Power MOSFET

**MTR005N08CTB**

**TO-263**


| | | |
|---|---|---|
| $V_{DS}$ | 85 | V |
| $R_{DS(on),TYP}$@ $V_{GS}$=10 V | 4.2 | mΩ |
| $I_D$ | 140 | A |

## Features

1、Low on – resistance

2、Package TO-263

3、SGT N-channel Power MOSFET

## Applications

1、Load Switch for Portable Devices

2、DC/DC Converter

**Maximum ratings, at $T_A$ =25°C, unless otherwise specified**

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-Source breakdown voltage | | 85 | V |
| $V_{GS}$ | Gate-Source voltage | | ±20 | V |
| $I_D$ | Continuous drain current @VGS=10V | $T_C$=25°C | 140 | A |
| $I_{DM}$ | Pulse drain current tested(Note 1) | $T_C$=25°C | 520 | A |
| EAS | Avalanche energy, single pulsed(Note 2) | | 156 | mJ |
| $P_D$ | Maximum power dissipation | $T_C$=25°C | 174 | W |
| | Derating Factor | | 0.5 | W/°C |
| $T_{STG}$,$T_J$ | Storage and Junction Temperature Range | | -55 to 150 | °C |

Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2.EAS condition:$T_J$=25℃,L=10mH.

## Thermal Characteristics

| Symbol | Parameter | Typical | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | 0.72 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 62.5 | °C/W |

## Electrical Characteristics

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics @ $T_j$=25°C (unless otherwise stated)** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250μA | 85 | 95 | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=85V,$V_{GS}$=0V | -- | -- | 1 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=±20V,$V_{DS}$=0V | -- | -- | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 2.0 | 3.0 | 4.0 | V |
| $R_{DS(on)}$ | Drain-Source On-State Resistance | $V_{GS}$=10V, $I_D$=50A | -- | 4.2 | 5.0 | mΩ |
| **Dynamic Electrical Characteristics @ $T_j$ = 25°C (unless otherwise stated)** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=40V,$V_{GS}$=0V, f=1MHz | -- | 4021 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 637 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 17 | -- | pF |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=10V,$I_D$=40A | -- | 60 | -- | S |
| Rg | Gate resistance | VGS=0V,VDS=0V | -- | 1.8 | -- | Ω |
| $Q_g$ (10V) | Total Gate Charge | $V_{DS}$=40V, $I_D$=50A, $V_{GS}$=10V | -- | 80 | -- | nC |
| $Q_{gs}$ | Gate-Source Charge | | -- | 23 | -- | nC |
| $Q_{gd}$ | Gate-Drain Charge | | -- | 24 | -- | nC |

### Switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Td(on) | Turn-on Delay Time | $V_{DS}$=40V, $I_D$=50A, $R_G$=3Ω, $V_{GS}$=10V, $R_L$=1.5Ω | -- | 22 | -- | ns |
| Tr | Turn-on Rise Time | | -- | 42 | -- | ns |
| Td(off) | Turn-Off Delay Time | | -- | 48 | -- | ns |
| Tf | Turn-Off Fall Time | | -- | 25 | -- | ns |

### Source- Drain Diode Characteristics@ $T_j$ = 25°C (unless otherwise stated)

| | | | | | | |
|---|---|---|---|---|---|---|
| $I_{SD}$ | Source-drain Current(Body Diode) | | -- | -- | 140 | A |
| $I_{SDM}$ | Pulsed Source-Drain Current (Body Diode) | | -- | -- | 520 | A |
| $V_{SD}$ | Forward on voltage (Note1) | $I_{SD}$=50A, $V_{GS}$=0V | -- | -- | 1.2 | V |
| Trr | Reverse Recovery Time (Note1) | $I_F$=20A, di/dt=100A/μs | -- | 60 | -- | ns |
| Qrr | Reverse Recovery Charge (Note1) | | -- | 136 | -- | nC |
| Ton | Forward Turn-on Time | Intrinsic turn-on time is negligible(turn-on is dominated by $L_S$+$L_D$) | | | | |

Notes:

1.Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

## Typical Characteristics

Figure 1. Typical Output Characteristics

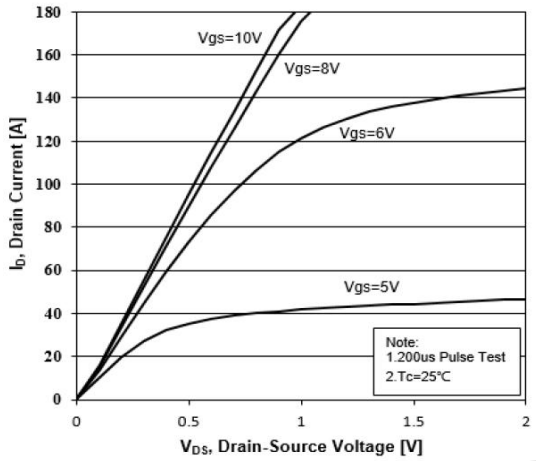



Figure 2. Typical Transfer Characteristics

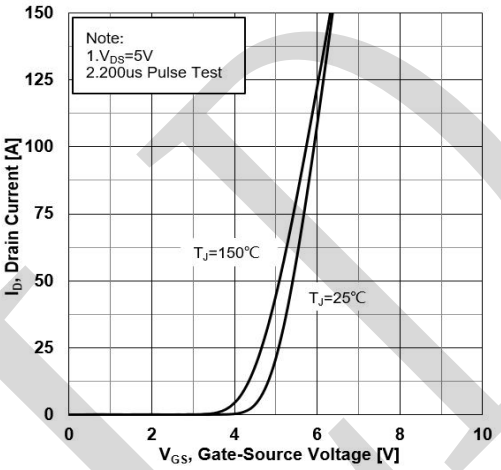



Figure 3. $R_{DS(ON)}$ vs. Drain Current

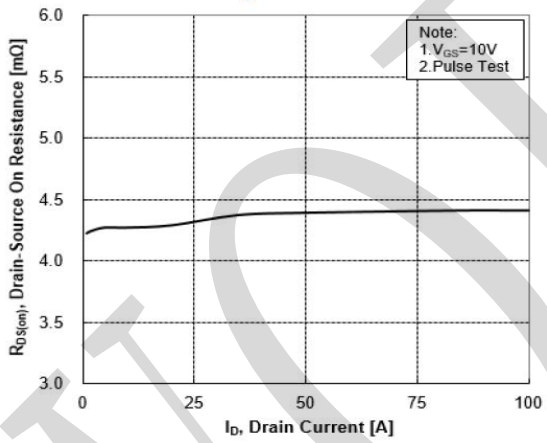



Figure 4. Body Diode Characteristics

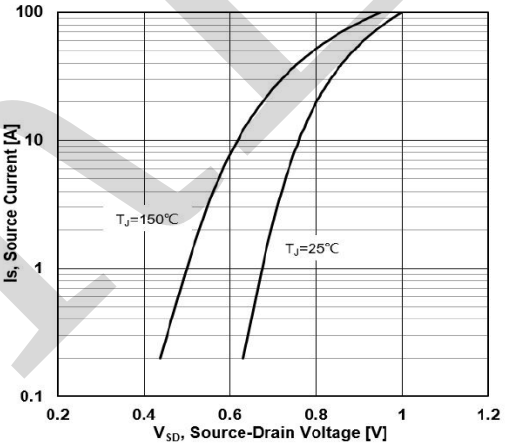



Figure 5 .$R_{DS(ON)}$ vs. Junction Temperature

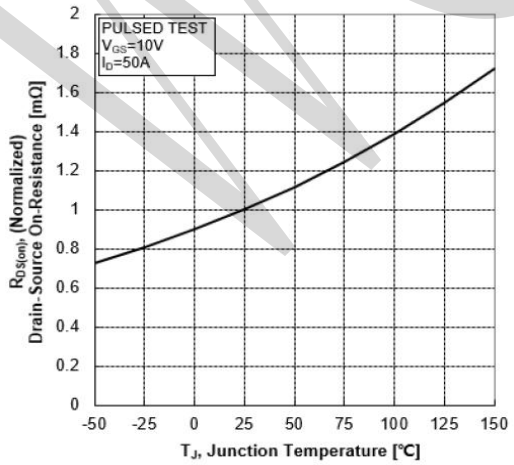
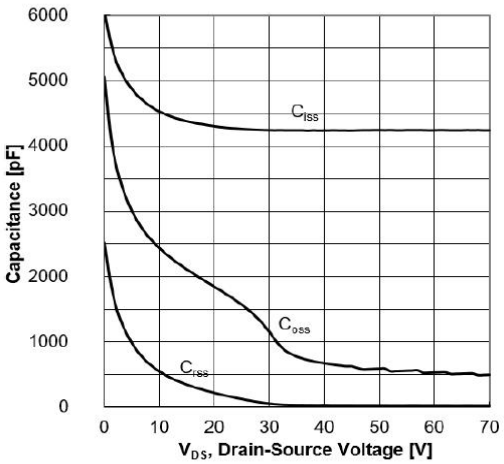



**Figure 6.** Capacitance Characteristics



## Typical Characteristics

Figure 7. Gate Charge

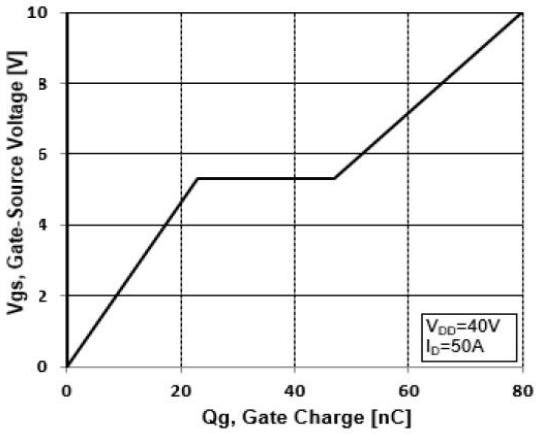



Figure 8. Maximum Power Dissipation vs Case Temperature

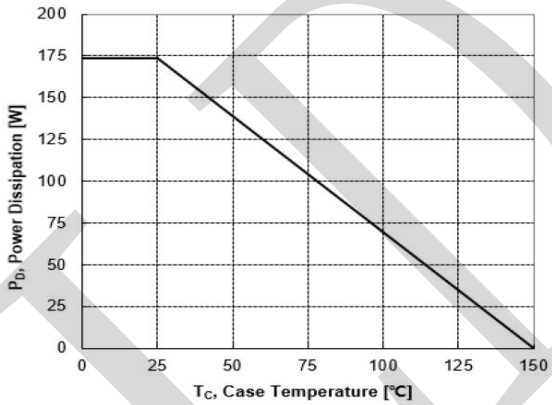



Figure 9.Maximum Safe Operating Area

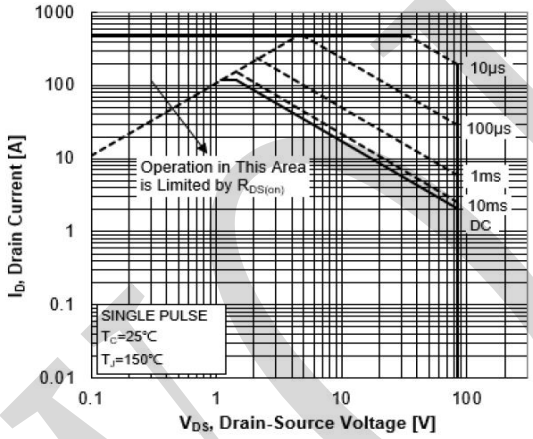



Figure 10. Maximum Continuous Drain Current vs. Case Temperature

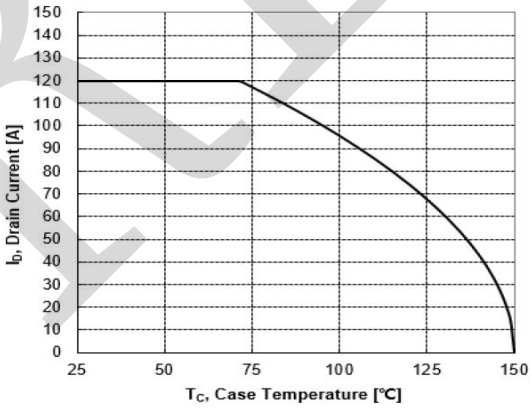
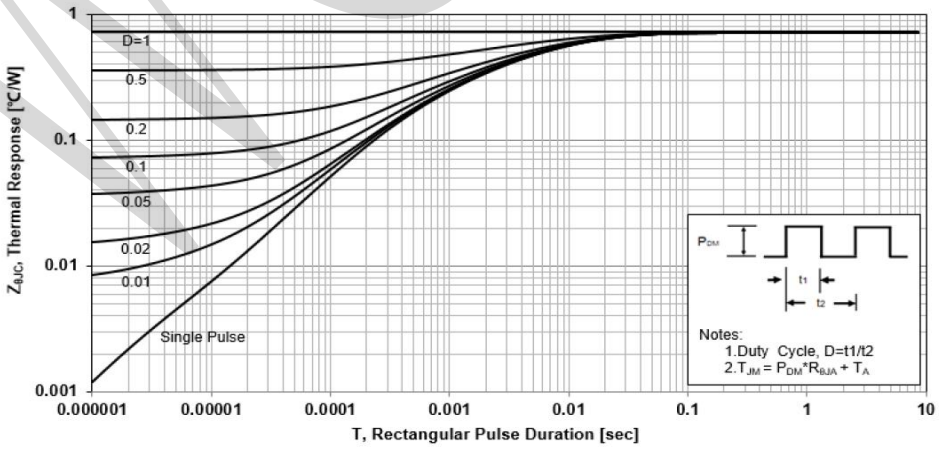
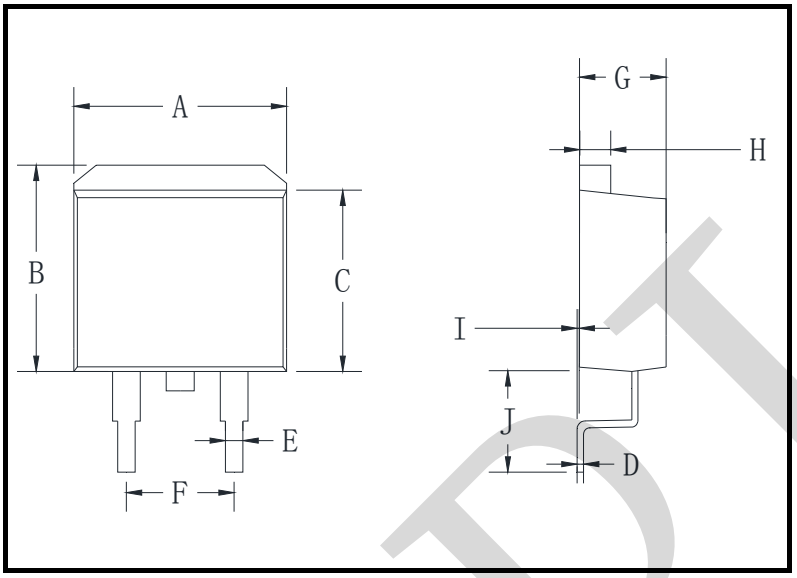



Figure 11: Normalized Maximum Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS

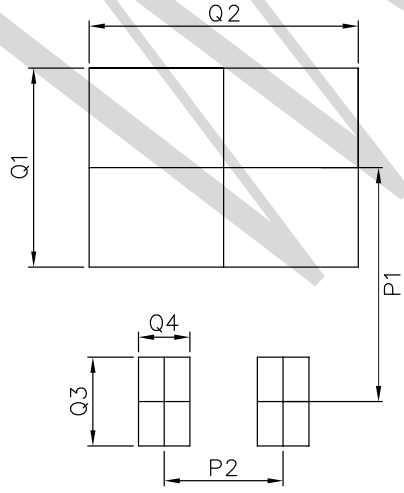
TO-263




TO-263 mechanical data

| UNIT | | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 11.5 | 10.5 | 9.0 | 0.64 | 0.94 | 5.6 | 5.1 | 1.4 | 0.6 | 6.1 |
| | min | 9.5 | 9.7 | 8.4 | 0.28 | 0.68 | 4.5 | 4.0 | 1.1 | 0 | 4.9 |
| mil | max | 452.7 | 413.3 | 354.3 | 25.2 | 37.0 | 220.5 | 200.8 | 55.1 | 23.6 | 240.1 |
| | min | 374.0 | 381.8 | 330.7 | 11.0 | 26.7 | 177.2 | 157.5 | 43.3 | 0 | 192.9 |

## TO-263 Suggested Pad Layout




| UNIT | | P1 | P2 | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|---|---|---|
| mm | min | 10.0 | 4.00 | 8.5 | 11.5 | 3.8 | 2.1 |
| mil | min | 393.3 | 157.5 | 39.37 | 334.6 | 149.6 | 82.7 |