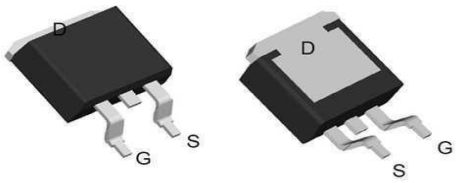
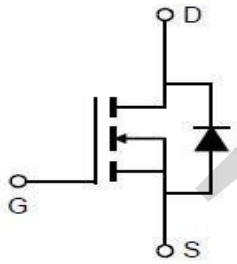
## SGT N-channel Power MOSFET

**MTR3R4N08CTB**

TO-263




| | | |
|---|---|---|
| $V_{DS}$ | 80 | V |
| $R_{DS(on),TYP}$@ $V_{GS}$=10 V | 2.9 | mΩ |
| $I_D$ | 180 | 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 | | 80 | V |
| $V_{GS}$ | Gate-Source voltage | | ±20 | V |
| $I_D$ | Continuous drain current @VGS=10V | $T_C$ =25°C | 180 | A |
| | | $T_C$ =100°C | 114 | A |
| $I_{DM}$ | Pulse drain current tested ① | $T_C$ =25°C | 720 | A |
| EAS | Avalanche energy, single pulsed ② | | 1122 | mJ |
| $P_D$ | Maximum power dissipation | $T_C$ =25°C | 208 | W |
| $T_{STG}$,$T_J$ | Storage and Junction Temperature Range | | -55 to 150 | °C |

## Thermal Characteristics

| Symbol | Parameter | Typical | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | 0.6 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 53 | °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 | 80 | -- | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=80V,$V_{GS}$=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 ④ | $V_{GS}$=10V, $I_D$=50A | -- | 2.9 | 3.4 | mΩ |
| $g_{fs}$ | Transconductance | $V_{DS}$=5V,$I_D$=40A | -- | 113 | -- | S |
| **Dynamic Electrical Characteristics @ $T_j$ = 25°C (unless otherwise stated)** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=40V,$V_{GS}$=0V, f=1MHz | -- | 6280 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 1100 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 58.4 | -- | pF |
| $R_g$ | Gate Resistance | VGS=0V, f=1MHz VDS=0V, | -- | 1.3 | -- | Ω |
| $Q_g$ | Total Gate Charge | $V_{DS}$=40V,$I_D$=50A , $V_{GS}$=10V | -- | 74 | -- | nC |
| $Q_{gs}$ | Gate-Source Charge | | -- | 23 | -- | nC |
| $Q_{gd}$ | Gate-Drain Charge | | -- | 21 | -- | nC |

### Switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Td(on) | Turn-on Delay Time | $V_{DS}$=40V, VGS=10V, $R_L$=3.0Ω, Tj=25°C | -- | 32 | -- | ns |
| Tr | Turn-on Rise Time | | -- | 53 | -- | ns |
| Td(off) | Turn-Off Delay Time | | -- | 59 | -- | ns |
| Tf | Turn-Off Fall Time | | -- | 34 | -- | ns |

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

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_{SD}$ | Forward on voltage | $I_{SD}$=50A,$V_{GS}$=0V | -- | 0.9 | 1.2 | V |
| Trr | Reverse Recovery Time | IF=30A, di/dt=500A/μs | -- | 78 | -- | ns |
| Qrr | Reverse Recovery Charge | IF=30A, di/dt=500A/μs | -- | 97 | -- | nC |

NOTE: ① Repetitive rating; pulse width limited by max junction temperature.

② Limited by $T_{Jmax}$, starting $T_J$ = 25°C, L = 0.5mH, $R_G$ = 25Ω. Part not recommended for use above this value

③ The power dissipation $P_{DSM}$ is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

④ Pulse width ≤ 380μs; duty cycle≤ 2%.

## Typical Characteristics

**Figure 1. Typ. Output Characteristics (Tj=25℃)**

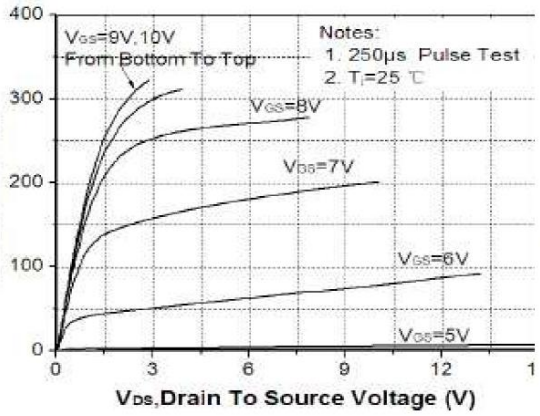



**Figure 2. Transfer Characteristics (Junction Temperature)**

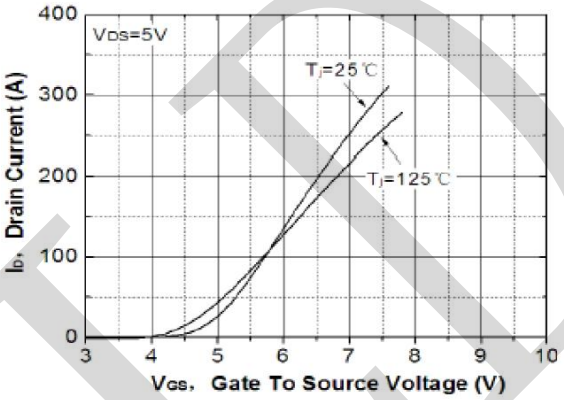



**Fig 3: Rdson Vs Ids Characteristics(Tc=25℃)**

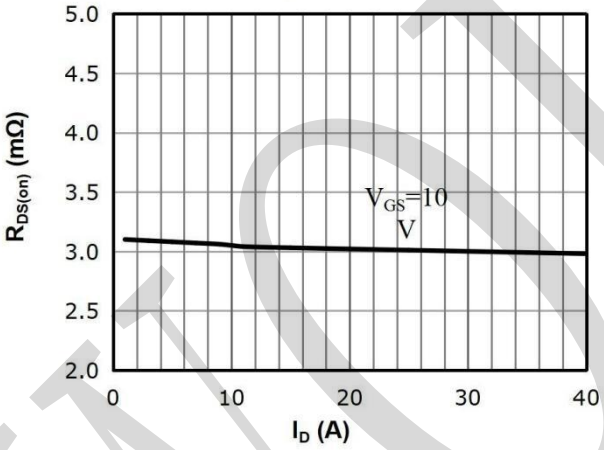



**Figure 4. On-Resistance vs. Temperature**

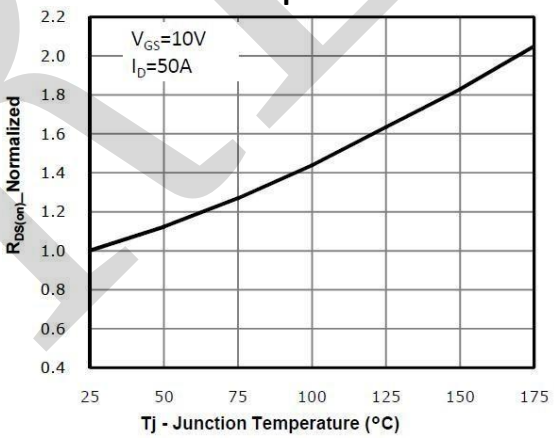



**Figure 5. On-Resistance vs. Gate-SourceVoltage (JunctionTemperature)**

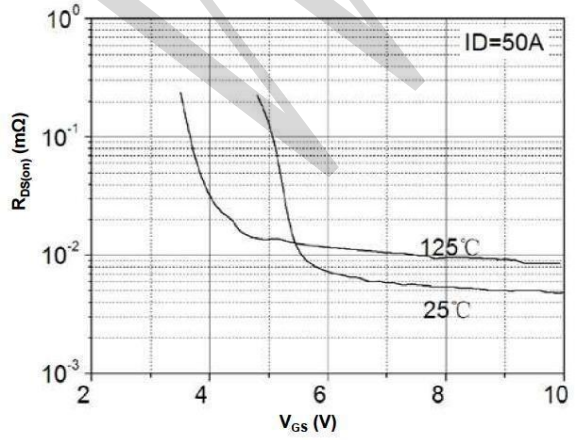



**Figure 6. Body-DiodeCharacteristics (JunctionTemperature)**

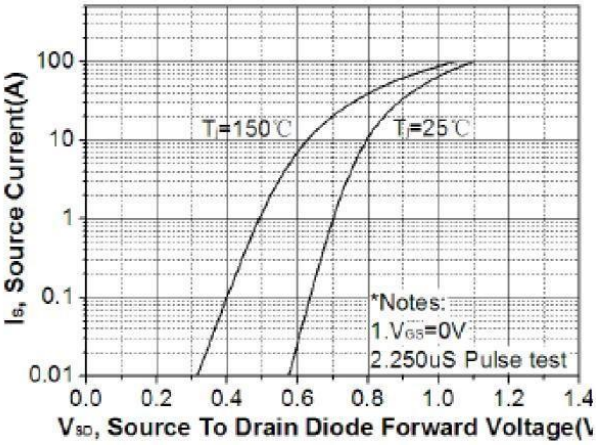


**Figure 7. Gate-ChargeCharacteristics**

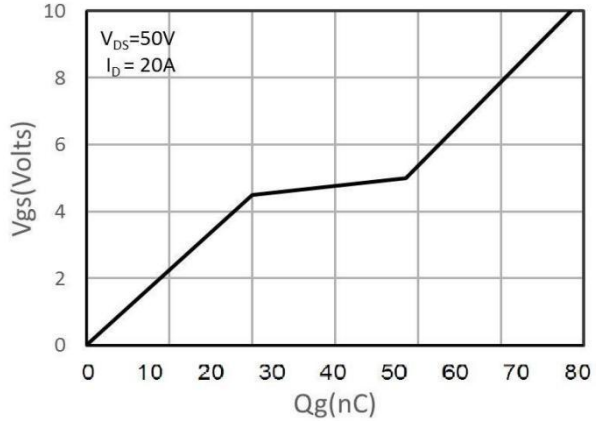



**Figure 8. Drain Current Derating**

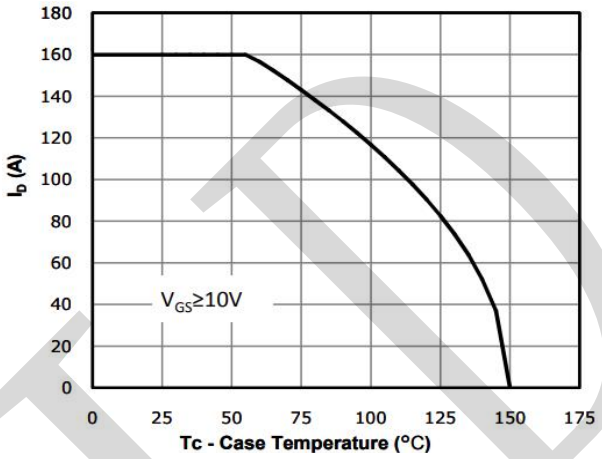



**Fig 9: Capacitance Characteristics**

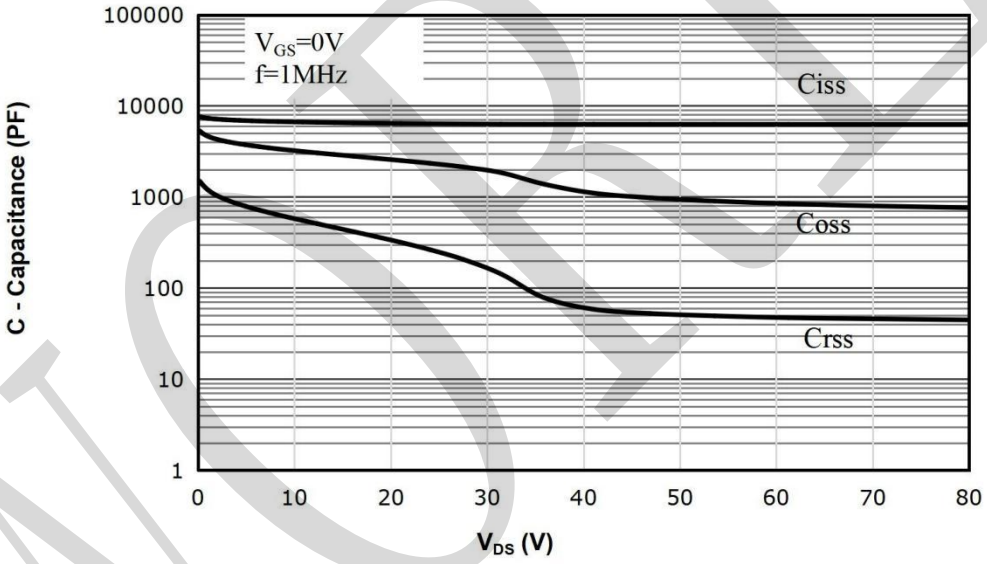
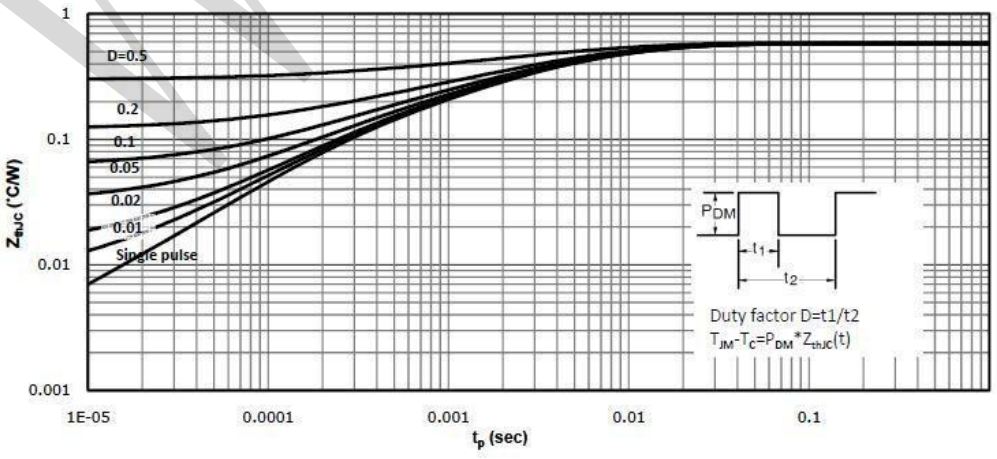
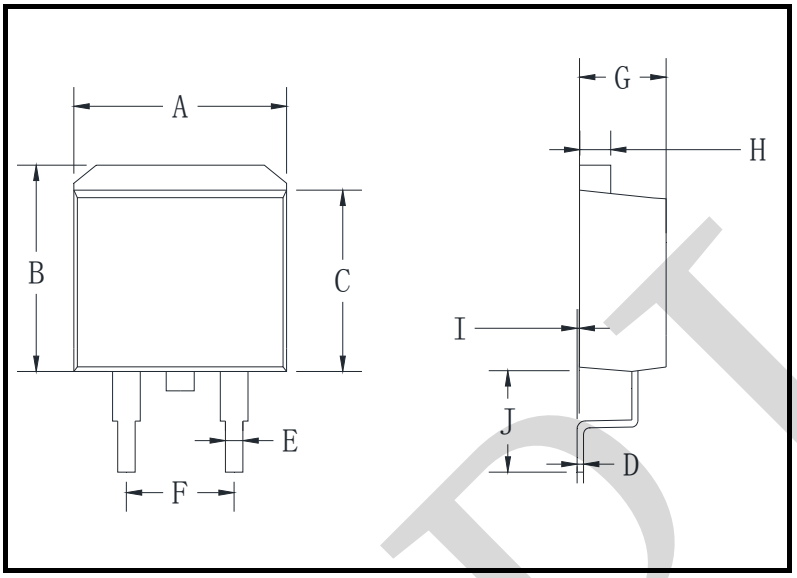



**Figure 10. Normalized Maximum Transient Thermal Impedance($R_{thJC}$)**



## PACKAGE OUTLINE DIMENSIONS

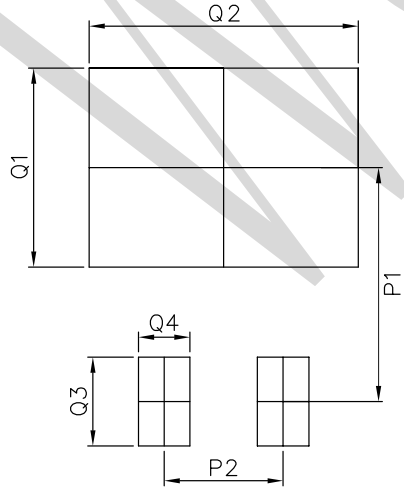
TO-263




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 |