

DESCRIPTION

The MXB200N04 uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

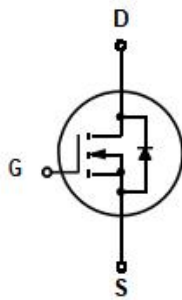
GENERAL FEATURES

- $V_{DS}=40V$, $I_D=200A$
 $R_{DS(ON)}(Typ.)=3m\Omega$ @ $V_{GS}=4.5V$
 $R_{DS(ON)}(Typ.)=2m\Omega$ @ $V_{GS}=10V$
- Advanced trench cell design
- Low Thermal Resistance

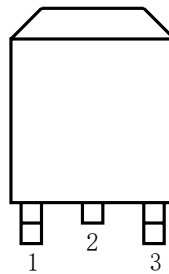
APPLICATION

- Motor drivers
- DC-DC Converter

PINOUT



Schematic diagram



Top View TO-263

| Pin | Description |
|-----|-------------|
| 1 | Gate(G) |
| 2 | Drain(D) |
| 3 | Source(S) |

ORDERING INFORMATION

| Part Number | Storage Temperature | Package | Devices Per Reel |
|-------------|---------------------|---------|------------------|
| MXB200N04 | -55°C to 150°C | TO-263 | 800 |

ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|-----------------|------------|------|
| Drain-Source Voltage | V_{DS} | 40 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous ($V_{GS}=10V$) ^{(Note1)(Note3)} | I_D | 200 | A |
| Pulsed Source Current ^{(Note1)(Note2)(Note3)} | I_{DM} | 280 | A |
| Diode Forward Current | I_S | 200 | A |
| Total Power Dissipation ^(Note1) | P_{tot} | 166 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | °C |
| Thermal Resistance, Junction-to-Ambient ^(Note1) | $R_{\theta JA}$ | 62.5 | °C/W |
| Thermal Resistance, Junction-to-Case ^(Note1) | $R_{\theta JC}$ | 0.75 | °C/W |

Note 1. Surface Mounted on 1 in² pad area, $t \leq 10$ sec

Note 2. Pulse width $\leq 10 \mu s$, duty cycle $\leq 1\%$

Note 3. Limited by bonding wire



ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|-----------|--------|------------|-----|-----|-----|------|
|-----------|--------|------------|-----|-----|-----|------|

Off Characteristics

| | | | | | | |
|---------------------------------|------------|-----------------------------|----|---|-----------|---------|
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 40 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=32V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |

On Characteristics

| | | | | | | |
|---|--------------|-------------------------------|-----|-----|-----|------------|
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.5 | 2.0 | 2.5 | V |
| Drain-Source On-State Resistance ^(Note1) | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=10A$ | - | 3 | 3.3 | m Ω |
| | | $V_{GS}=10V, I_D=20A$ | - | 2 | 2.2 | m Ω |

Dynamic Characteristics^(Note2)

| | | | | | | |
|------------------------------|-----------|-----------------------------------|---|-------|---|----|
| Input Capacitance | C_{iss} | $V_{DS}=20V, V_{GS}=0V, F=1.0MHz$ | - | 10861 | - | pF |
| Output Capacitance | C_{oss} | | - | 757 | - | pF |
| Reverse Transfer Capacitance | C_{rss} | | - | 165 | - | pF |

Switching Characteristics^(Note2)

| | | | | | | |
|---------------------|--------------|---|---|------|---|----|
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS}=20V, I_D=20A, V_{GEN}=10V, R_G=4.5\Omega, R_L=1\Omega,$ | - | 32 | - | nS |
| Turn-on Rise Time | t_r | | - | 73 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 119 | - | nS |
| Turn-Off Fall Time | t_f | | - | 84 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=20V, I_{DS}=20A, V_{GS}=10V$ | - | 163 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 48.2 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 25.6 | - | nC |

Drain-Source Diode Characteristics

| | | | | | | |
|--|----------|--------------------------------|---|-----|-----|----|
| Diode Forward Voltage ^(Note1) | V_{SD} | $V_{GS}=0V, I_{SD}=20A$ | - | 0.7 | 1.3 | V |
| Reverse Recovery Time | t_{rr} | $I_{SD}=20A, di/dt=100A/\mu s$ | - | 42 | - | nS |
| Reverse Recovery Charge | Q_{rr} | | - | 39 | - | nC |

Note 1. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

Note 2. Guaranteed by design, not subject to production testing

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Power Capability

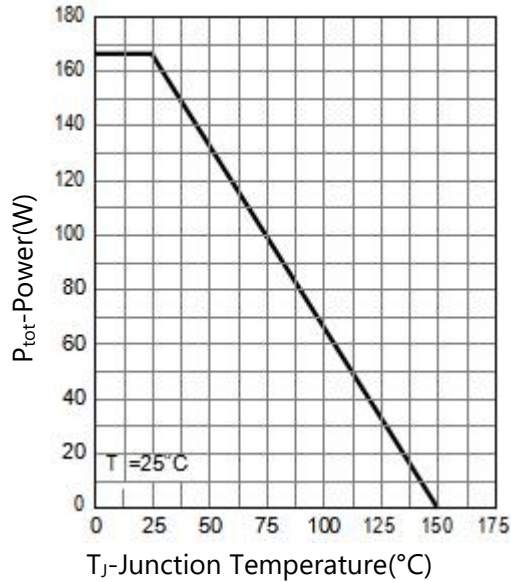


Figure 2. Current Capability

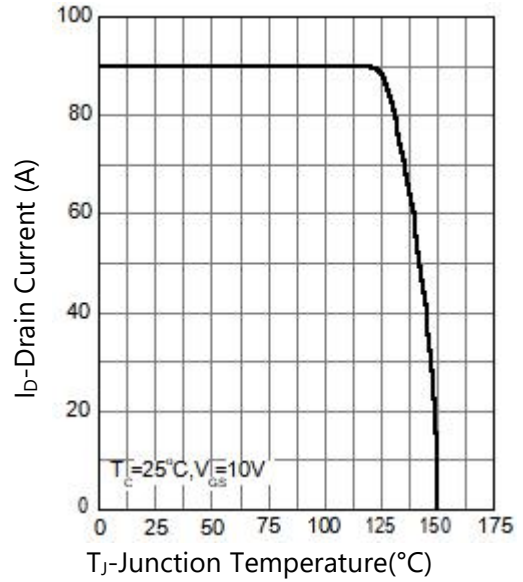


Figure 3. Safe Operation Area

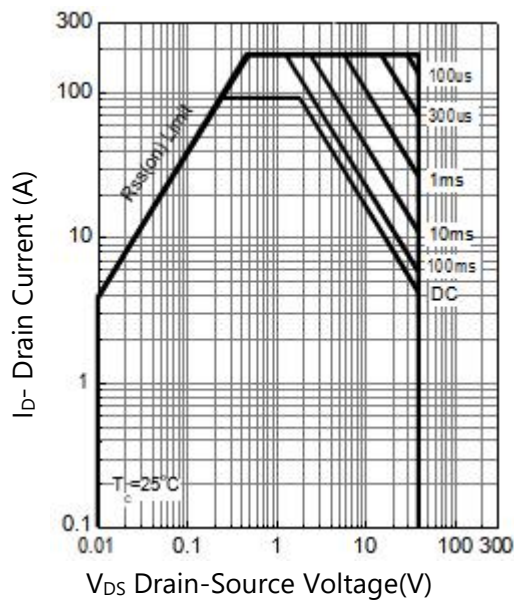
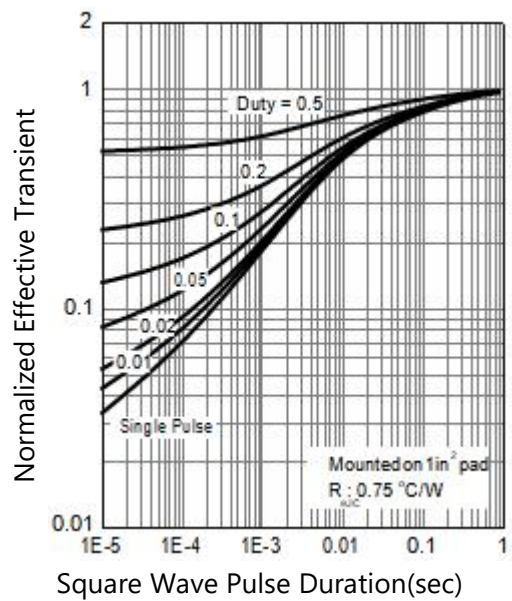


Figure 4. Transient Thermal Impedance



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 5. Output Characteristics

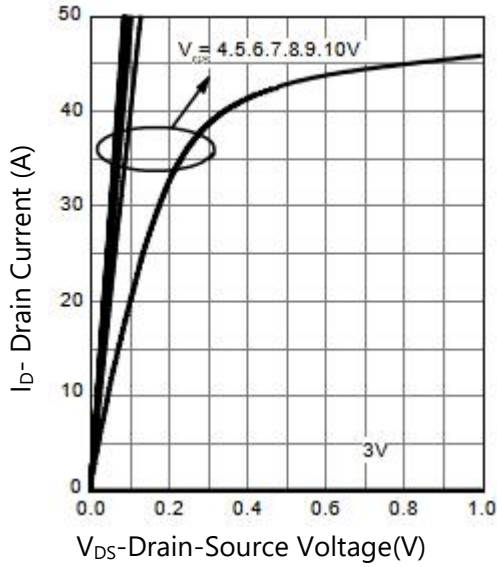


Figure 6. Drain-Source On Resistance

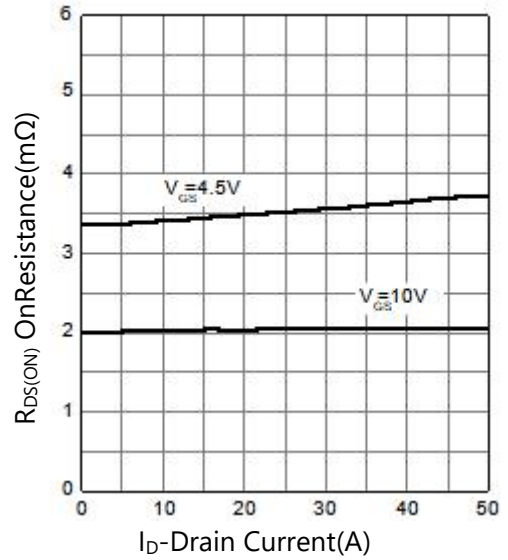


Figure 7. Transfer Characteristics

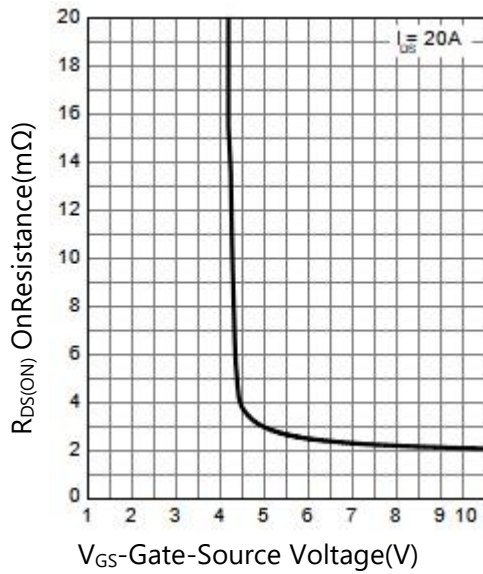
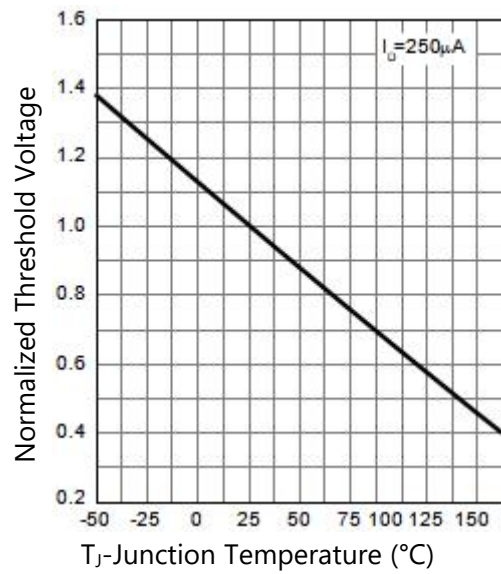


Figure 8. Gate Threshold Voltage





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 9. Normalized On Resistance

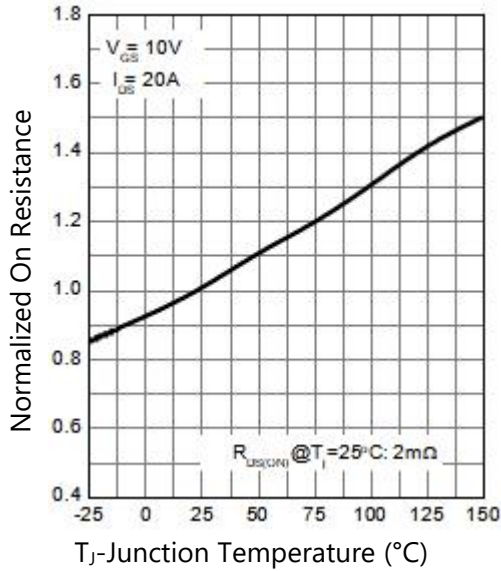


Figure 10. Diode Forward Current

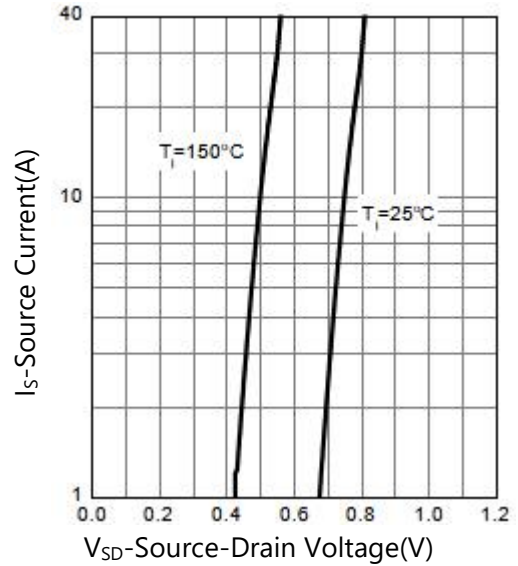


Figure 11. Capacitance

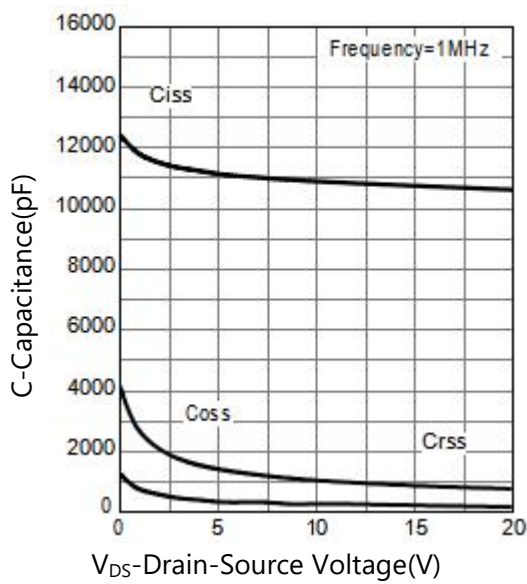
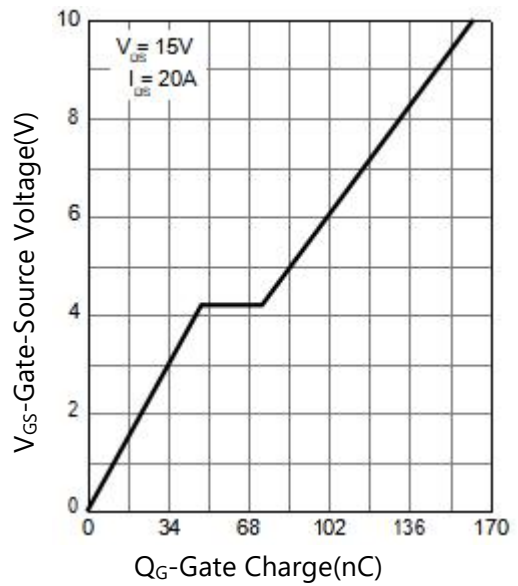


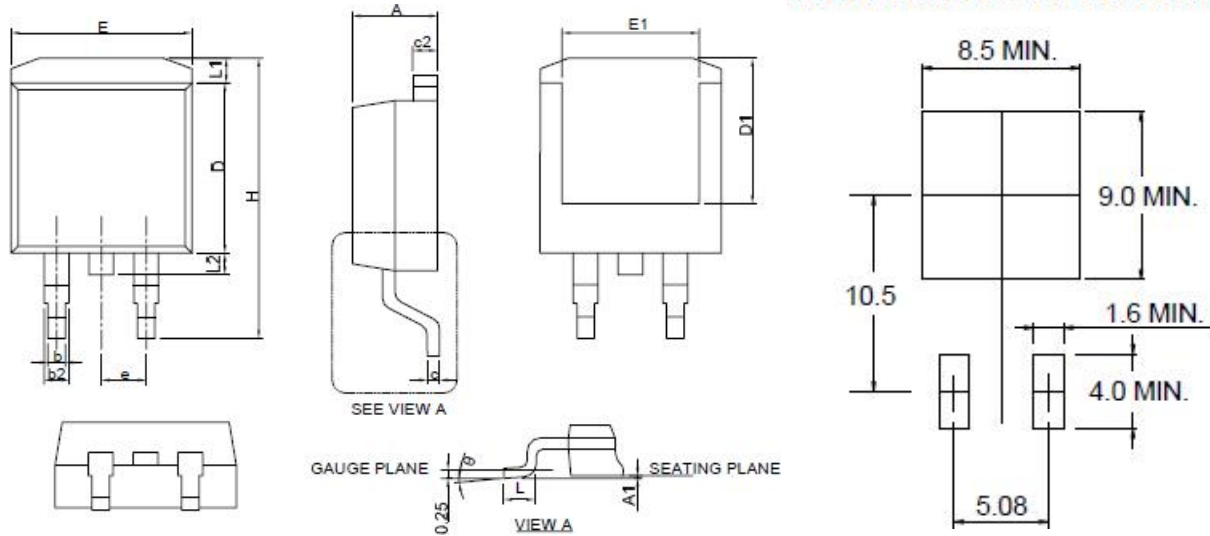
Figure 12. Gate Charge



PACKAGE INFORMATION

TO263-3L

RECOMMENDED LAND PATTERN



| Symbol | Dimensions In Millimeters | |
|--------|---------------------------|-------|
| | MIN. | MAX. |
| A | 4.06 | 4.83 |
| A1 | 0.00 | 0.25 |
| b | 0.51 | 0.99 |
| b2 | 1.14 | 1.78 |
| c | 0.38 | 0.74 |
| c2 | 1.14 | 1.65 |
| D | 8.38 | 9.65 |
| D1 | 6.00 | 9.00 |
| E | 9.65 | 11.43 |
| E1 | 6.22 | 9.00 |
| e | 2.54 BCS | |
| H | 14.61 | 15.88 |
| L | 1.78 | 2.79 |
| L1 | - | 1.68 |
| L2 | - | 1.78 |
| θ | 0° | 8° |