

## DESCRIPTION

The MXB200N03 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

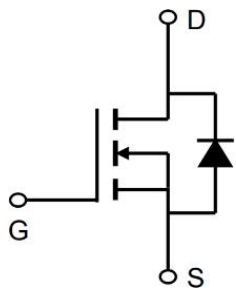
## GENERAL FEATURES

- $V_{DS}=30V$ ,  $I_D=200A$   
 $R_{DS(ON)}(Typ.)=2.5m\Omega$  @  $V_{GS}=4.5V$   
 $R_{DS(ON)}(Typ.)=1.5m\Omega$  @  $V_{GS}=10V$
- Advanced trench cell design
- Low Thermal Resistance

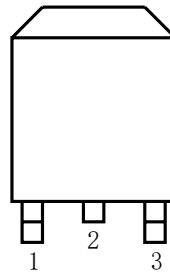
## APPLICATION

- 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
MXB200N03	-55°C to 150°C	TO-263	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous ( $V_{GS}=10V$ ) <sup>(Note1)(Note3)</sup>	$I_D$	200	A
Pulsed Source Current <sup>(Note1)(Note2)(Note3)</sup>	$I_{DM}$	300	A
Diode Forward Current	$I_S$	200	A
Total Power Dissipation <sup>(Note1)</sup>	$P_{tot}$	166	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C
Thermal Resistance, Junction-to-Ambient <sup>(Note1)</sup>	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case <sup>(Note1)</sup>	$R_{\theta JC}$	0.75	°C/W

Note 1. Surface Mounted on 1 in<sup>2</sup> 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
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**Off Characteristics**

Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	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 <sup>(Note1)</sup>	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=10A$	-	2.5	3.0	m $\Omega$
		$V_{GS}=10V, I_D=20A$	-	1.5	1.8	m $\Omega$

**Dynamic Characteristics**<sup>(Note2)</sup>

Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, F=1.0MHz$	-	10423	-	pF
Output Capacitance	$C_{oss}$		-	1181	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	343	-	pF

**Switching Characteristics**<sup>(Note2)</sup>

Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=15V, I_D=20A, V_{GEN}=10V, R_G=4.5\Omega, R_L=0.75\Omega,$	-	33	-	nS
Turn-on Rise Time	$t_r$		-	88	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	108	-	nS
Turn-Off Fall Time	$t_f$		-	82	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=15V, I_{DS}=20A, V_{GS}=10V$	-	160	-	nC
Gate-Source Charge	$Q_{gs}$		-	45	-	nC
Gate-Drain Charge	$Q_{gd}$		-	27	-	nC

**Drain-Source Diode Characteristics**

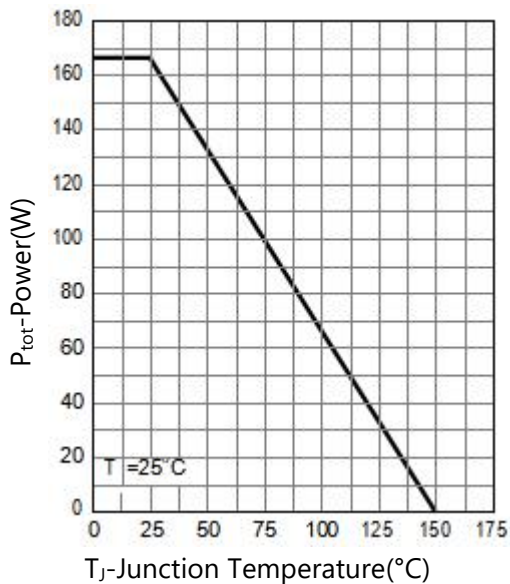
Diode Forward Voltage <sup>(Note1)</sup>	$V_{SD}$	$V_{GS}=0V, I_{SD}=20A$	-	0.7	1.3	V
Reverse Recovery Time	$t_{rr}$	$I_{SD}=20A, di/dt=100A/\mu s$	-	45	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	44	-	nC

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

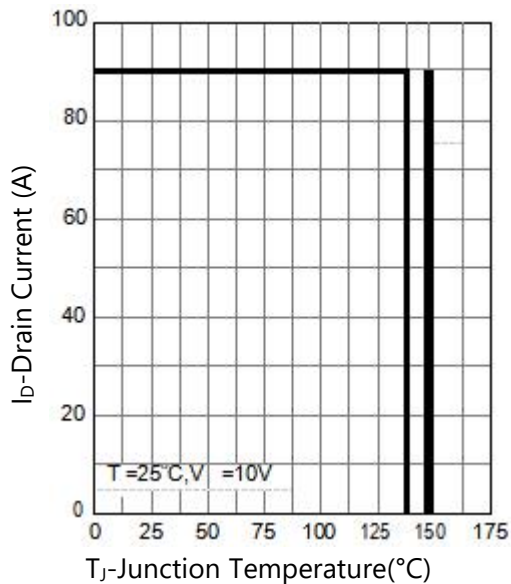
Note 2. Guaranteed by design, not subject to production testing

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

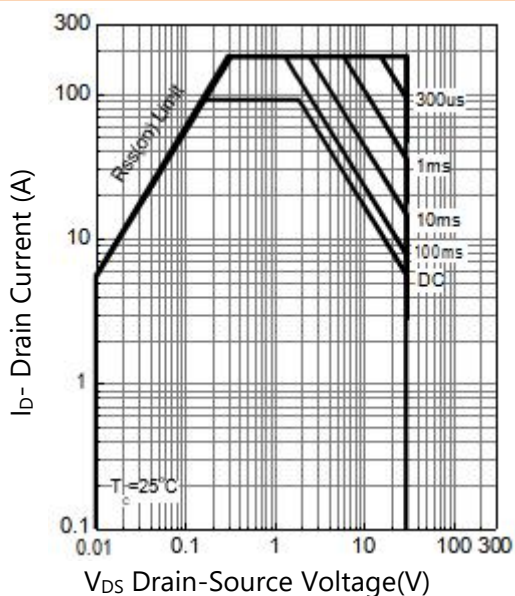
**Figure 1. Power Capability**



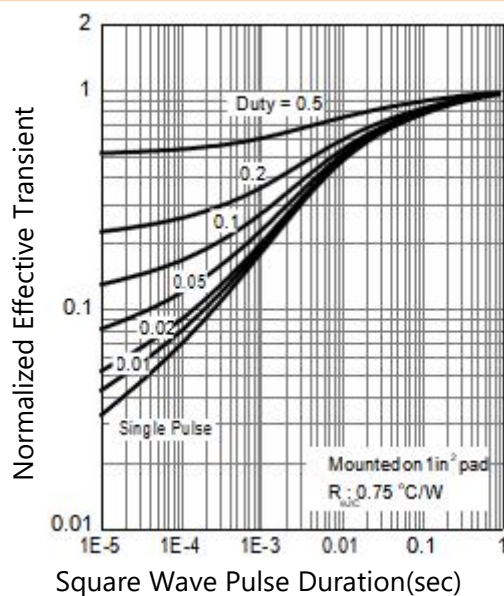
**Figure 2. Current Capability**



**Figure 3. Safe Operation Area**



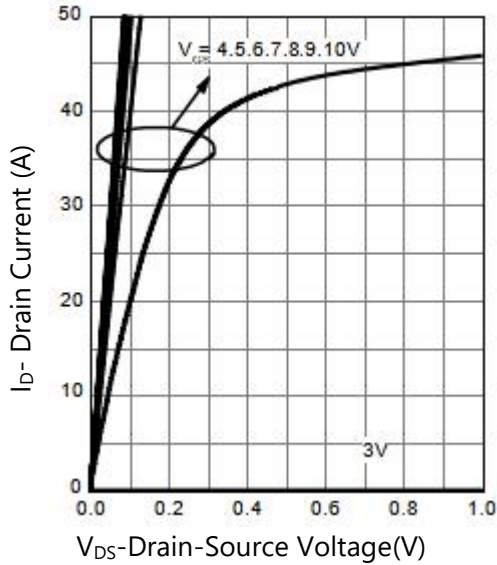
**Figure 4. Transient Thermal Impedance**



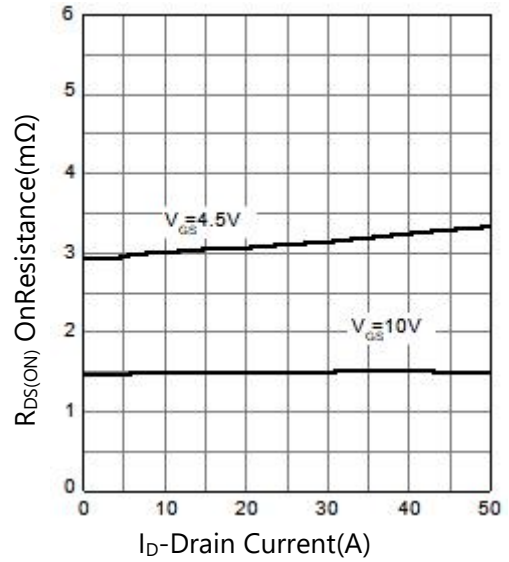


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

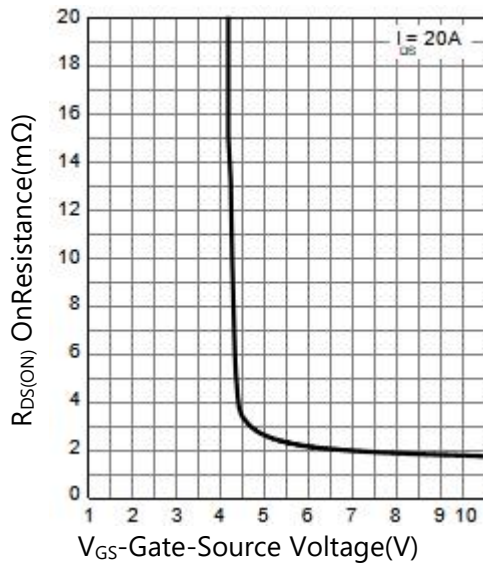
**Figure 5. Output Characteristics**



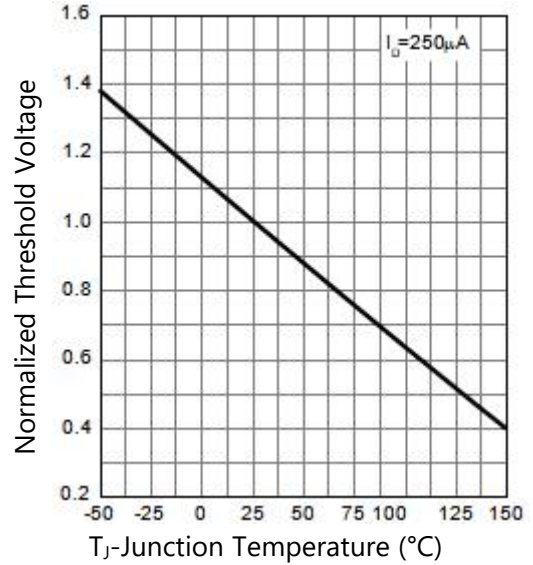
**Figure 6. Drain-Source On Resistance**



**Figure 7. Transfer Characteristics**



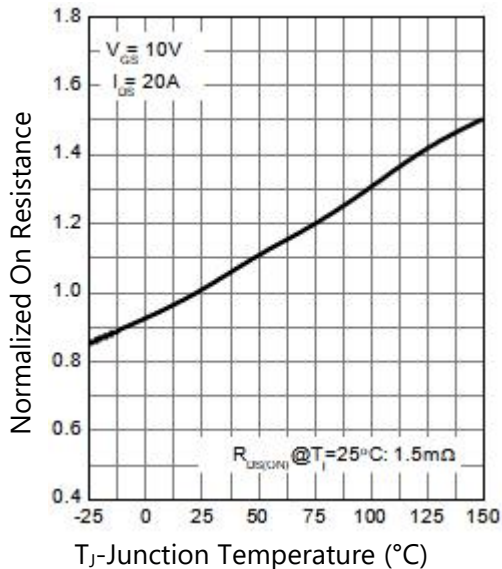
**Figure 8. Gate Threshold Voltage**



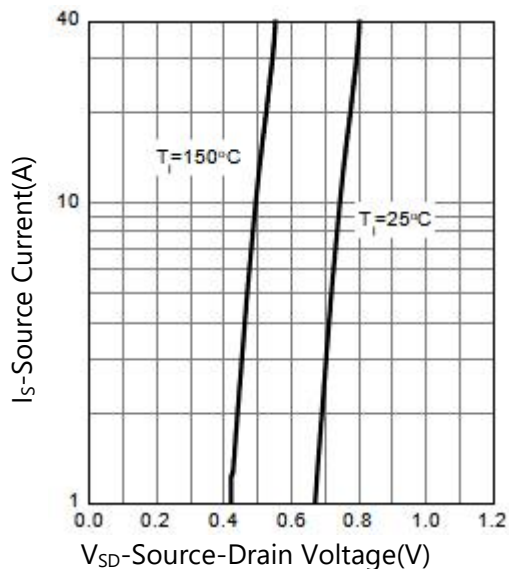


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

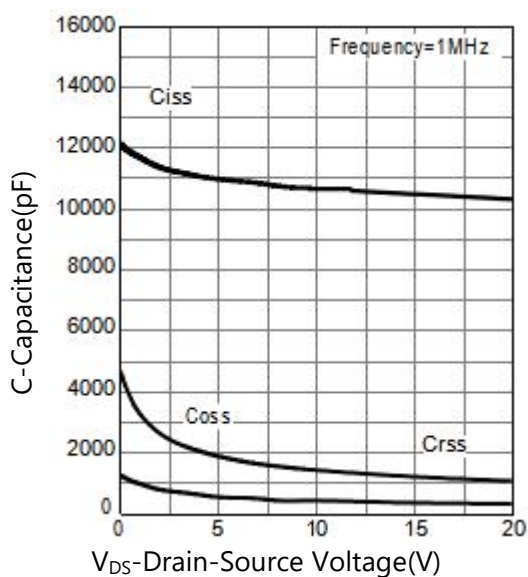
**Figure 9. Normalized On Resistance**



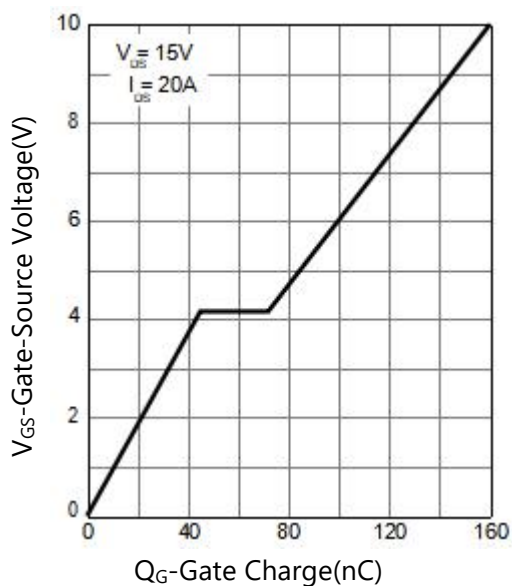
**Figure 10. Diode Forward Current**



**Figure 11. Capacitance**



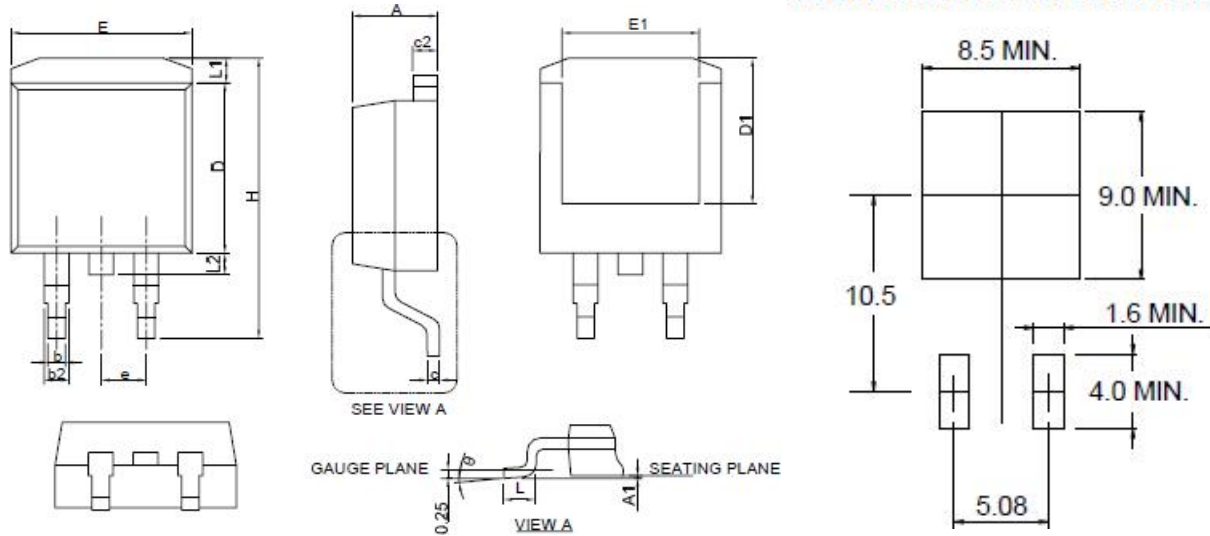
**Figure 12. Gate Charge**



**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
$\theta$	0°	8°