



N-Channel Enhancement Mode Power MOSFET **MXB050N08**

DESCRIPTION

The MXB050N08 uses deep trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

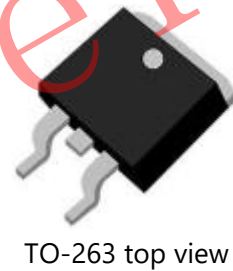
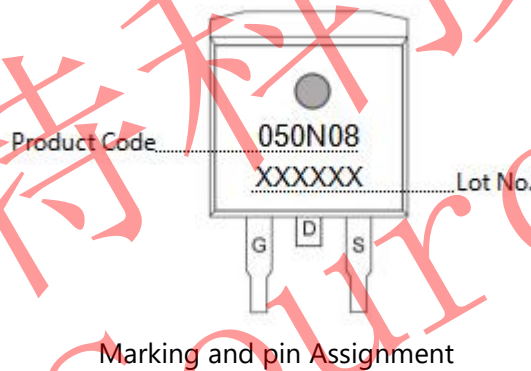
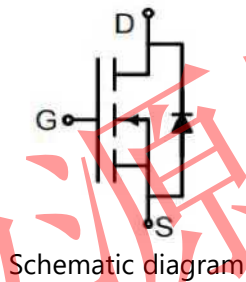
GENERAL FEATURES

- $V_{DS}=85V$, $I_D=120A$
 $R_{DS(ON)}(Typ.)=5.3m\Omega$ @ $V_{GS}=10V$
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

APPLICATION

- Battery management
- Motor controller and driver
- UPS
- PWM applications

PINOUT



KEY PERFORMANCE PARAMETERS

Parameter	Value	Unit
V_{DS} @ $T_A=25^\circ C$	85	V
$R_{DS(ON)}(Typ.)$ @ $V_{GS}=10V$	5.3	m Ω
$Q_g(Typ.)$	40	nC
I_D @ $T_A=25^\circ C$	120	A
P_D @ $T_A=25^\circ C$	180	W
$T_J, TSTG$	-55 to 175	$^\circ C$

PACKAGE INFORMATION

Package	TO-263
---------	--------



N-Channel Enhancement Mode Power MOSFET **MXB050N08**

ABSOLUTE MAXIMUM RATINGS($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	85	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	120	A
Drain Current-Continuous ($T_C=100^{\circ}\text{C}$)	$I_D(T_C=100^{\circ}\text{C})$	80	A
Pulsed Drain Current ^(Note1)	I_{DM}	360	A
Maximum Power Dissipation	P_D	180	W
Avalanche Energy (L=0.5mH)	E_{AS}	725	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^{\circ}\text{C}$

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

THERMAL RESISTANCE

Parameter	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	2.34	$^{\circ}\text{C}/\text{W}$

Note 2 . Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.



N-Channel Enhancement Mode Power MOSFET **MXB050N08**



ELECTRICAL CHARACTERISTICS(TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
-----------	--------	-----------	-----	-----	-----	------

Off Characteristics

Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	85	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA

On Characteristics(Note3)

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.2	3.0	4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=50A$	4.5	5.3	6	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=40A$	-	70	-	S

Dynamic Characteristics(Note4)

Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V, F=1.0MHz$	-	2600	-	PF
Output Capacitance	C_{oss}		-	420	-	PF
Reverse Transfer Capacitance (Note4)	C_{rss}		-	20	-	PF
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, F=1.0MHz$	-	1	-	Ω

Switching Characteristics

Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=40V, I_D=10A, R_L=1\Omega$	-	10	-	nS
Turn-on Rise Time	t_r		-	22	-	nS
Turn-Off Delay Time	$t_{d(off)}$	$V_{GS}=10V, R_G=3\Omega$	-	25	-	nS
Turn-Off Fall Time	t_f		-	13	-	nS
Total Gate Charge	Q_g	$V_{DS}=40V, I_D=50A, V_{GS}=10V$	-	40	-	nC
Gate-Source Charge	Q_{gs}		-	11	-	nC
Gate-Drain Charge	Q_{gd}		-	10	-	nC

Drain-Source Diode Characteristics

Diode Forward Voltage (Note3)	V_{SD}	$V_{GS}=0V, I_S=50A$	-	-	1.2	V
Diode Forward Current (Note2)	I_S		-	-	120	A

Note 2. Surface Mounted on FR4 Boar, $t \leq 10sec$.

Note 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Note 4. Guaranteed by design, not subject to product.



N-Channel Enhancement Mode Power MOSFET **MXB050N08**

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure1. Switching Test Circuit

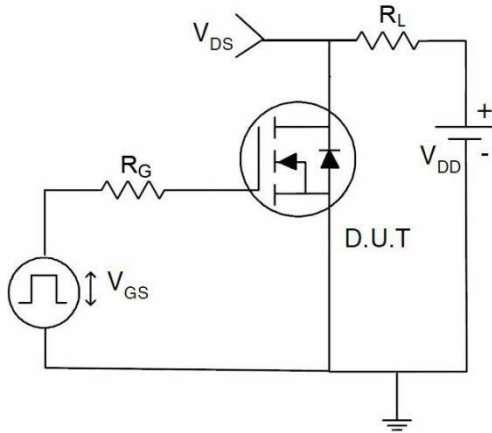


Figure2. Switching Waveform

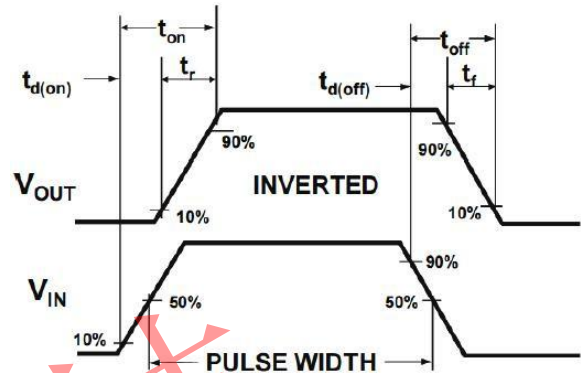


Figure3. Power De-rating

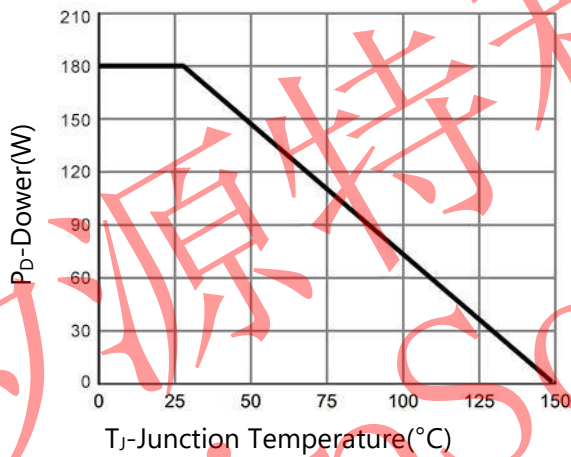


Figure4. Drain Current

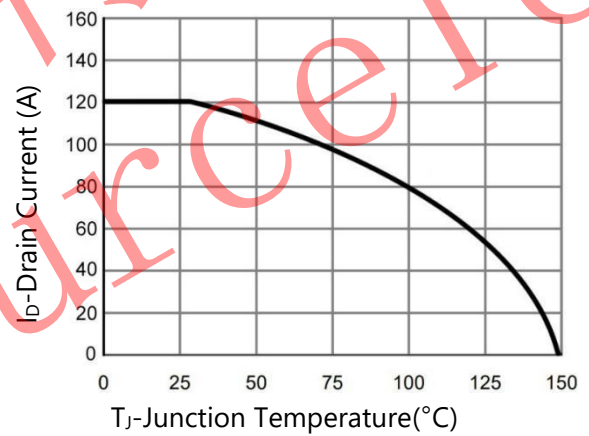


Figure5. Output Characteristics

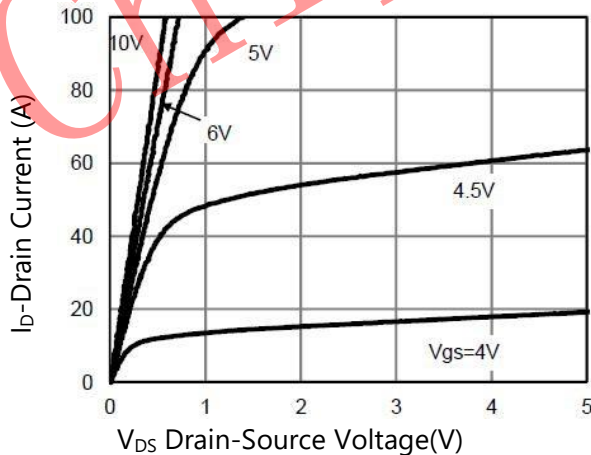
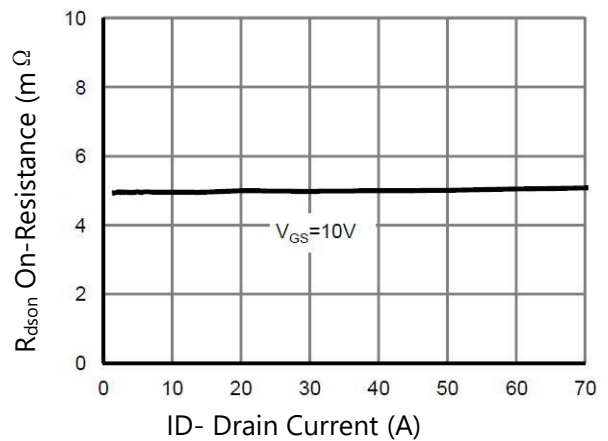


Figure6. R_dson vs Drain Current





N-Channel Enhancement Mode Power MOSFET **MXB050N08**

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure7. Transfer Characteristics

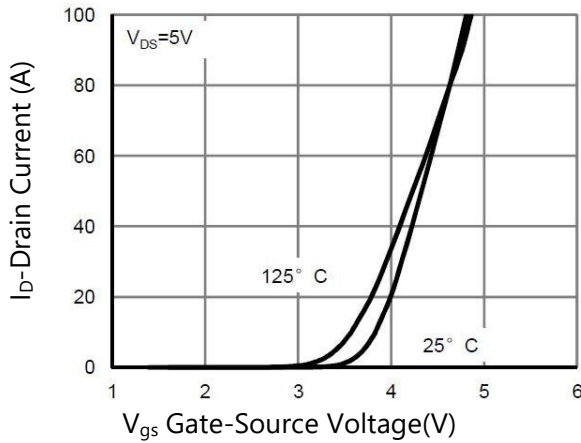


Figure8. R_{dson} vs Junction Temperature

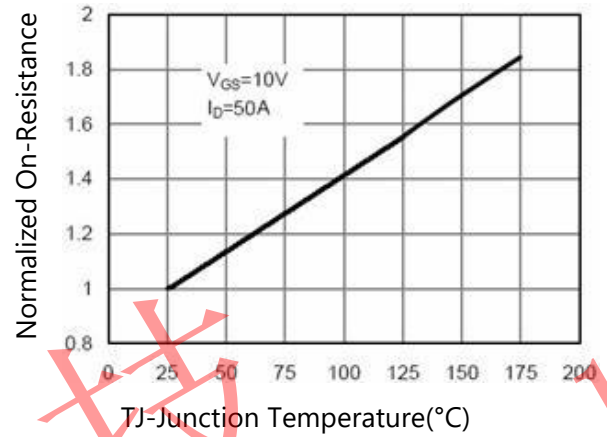


Figure9. R_{dson} vs V_{gs}

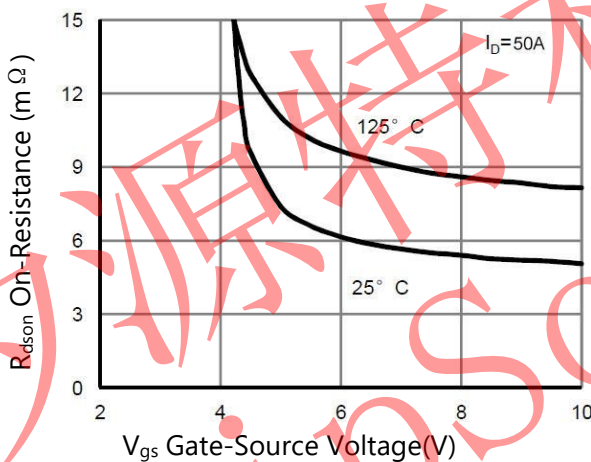


Figure10. Capacitance vs V_{DS}

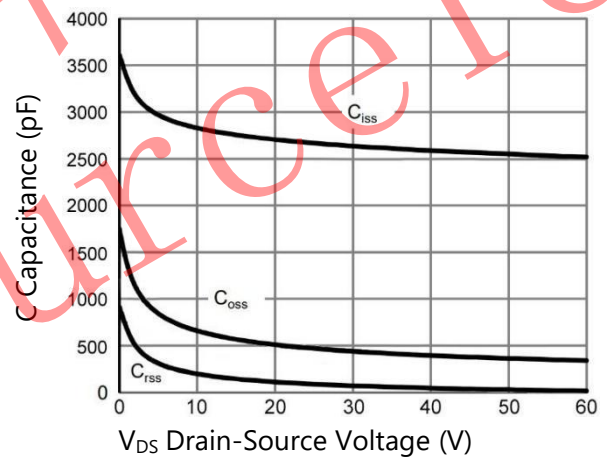


Figure11. Gate Charge

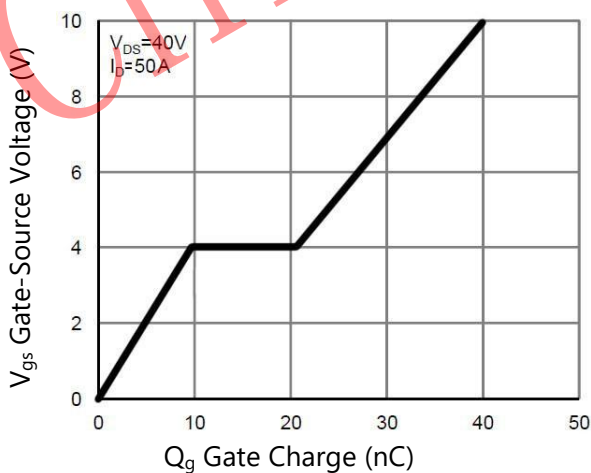
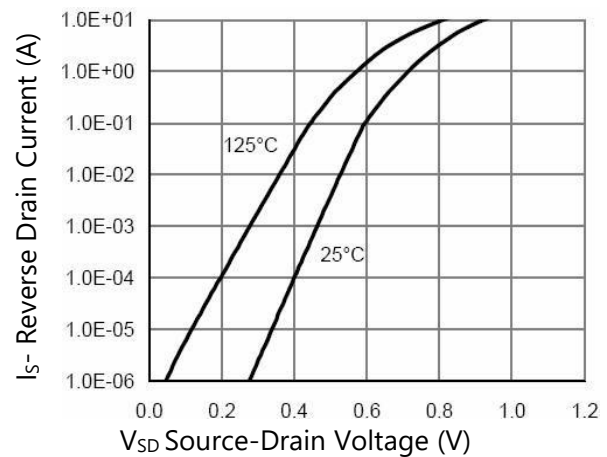


Figure12. Source-Drain Diode Forward





N-Channel Enhancement Mode Power MOSFET **MXB050N08**

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure13. Safe Operation Area

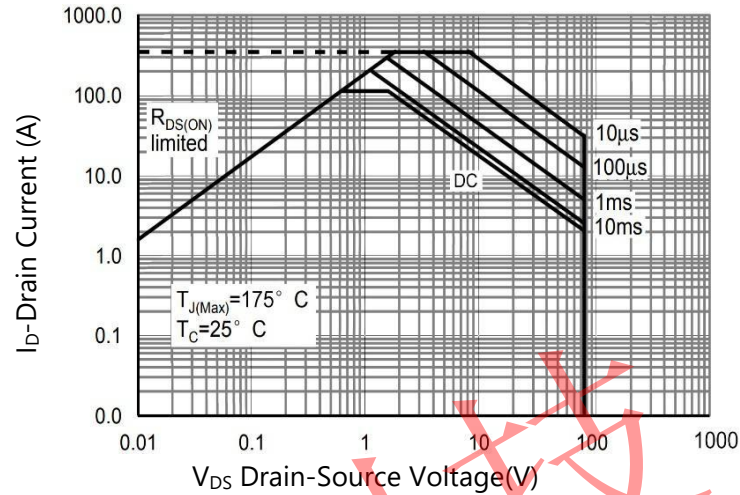
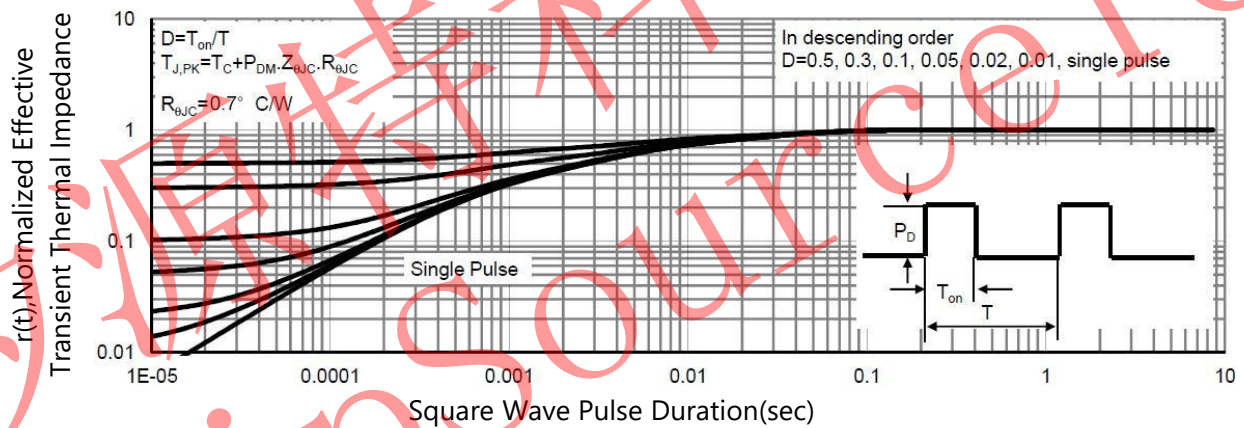


Figure14. Normalized Maximum Transient Thermal Impedance

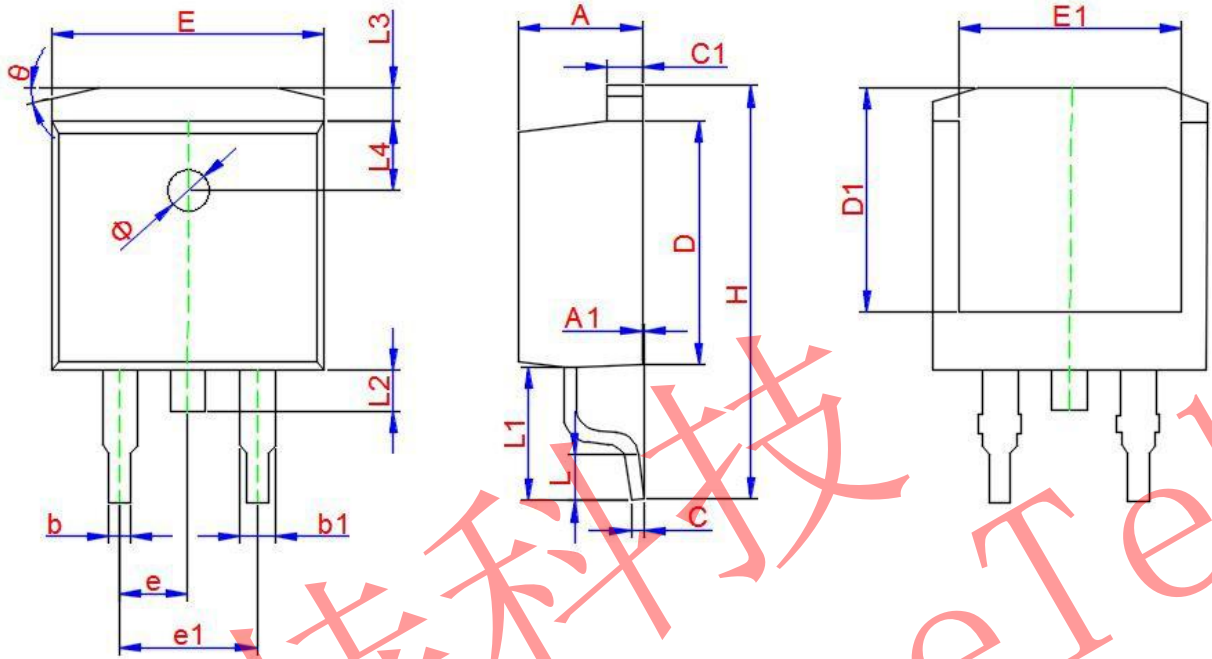




N-Channel Enhancement Mode Power MOSFET **MXB050N08**

PACKAGE INFORMATION

TO-263



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	4.30	4.50	4.70
A1	0.00	-	0.25
b	0.70	0.80	0.90
b1	1.20	1.30	1.40
c	0.40	0.47	0.55
c1	1.25	1.30	1.35
D	9.00	9.10	9.20
D1	8.00	8.10	8.20
H	14.90	15.20	15.50
E	9.80	10.00	10.20
E1	7.85	8.00	8.15
e1	4.93	5.08	5.23
L	2.00	2.20	2.45
L1	4.60	4.80	5.00
L2	1.30	1.50	1.70
L3	1.15	1.25	1.35
L4	2.40	2.50	2.60
Φ	-	1.5	-
e	-	2.54	-
θ	-	13°	-