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

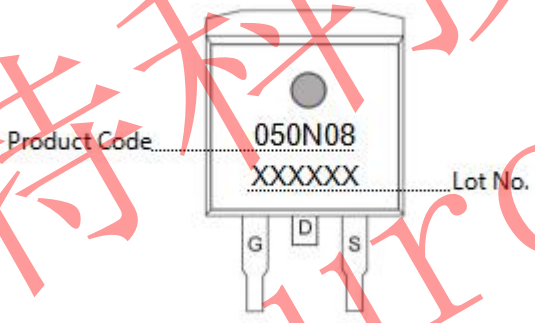
- V_{DS}=85V, I_D=120A
  $R_{DS(ON)}$(Typ.)=5.3mΩ @ V_{GS}=10V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

APPLICATION

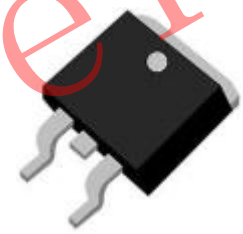
- Battery management
- Motor controller and driver
- UPS
- PWM applications

PINOUT

Schematic diagram



Marking and pin Assignment



TO-263 top view

KEY PERFORMANCE PARAMETERS

Parameter	Value	Unit
V_{DS} @ TA=25℃	85	V
$R_{DS(ON)}$(Typ.) @ V_{GS}=10V	5.3	mΩ
Q_g(Typ.)	40	nC
I_D @ TA=25℃	120	A
P_D @ TA=25℃	180	W
T_J, TSTG	-55 to 175	℃

PACKAGE INFORMATION

Package	TO-263

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

ABSOLUTE MAXIMUM RATINGS(TA=25°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°C)	I_D(T_C=100°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	°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	°C/W

Note 2 . Surface Mounted on FR4 Board, t ≤ 10sec.

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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=250μA	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}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics(Note3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS, I_D=250μA	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	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D =40A	-	70	-	S
Dynamic Characteristics(Note4)						
Input Capacitance	C_{lss}	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=1Ω V_{GS}=10V,R_G=3Ω	-	10	-	nS
Turn-on Rise Time	t_r		-	22	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	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 ≤ 10sec.
Note 3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
Note 4. Guaranteed by design, not subject to product.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure1. Switching Test Circuit

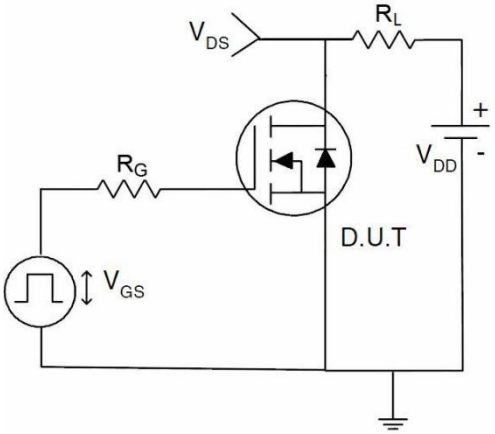


Figure2. Switching Waveform

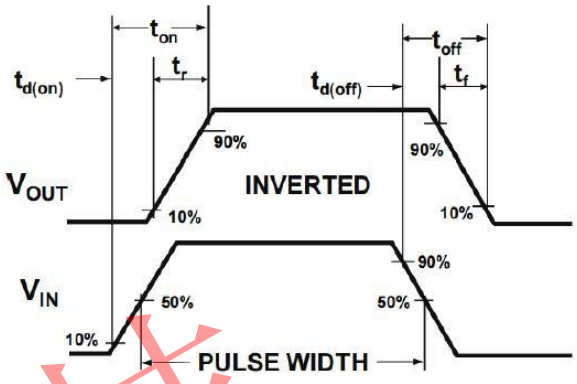


Figure3. Power De-rating

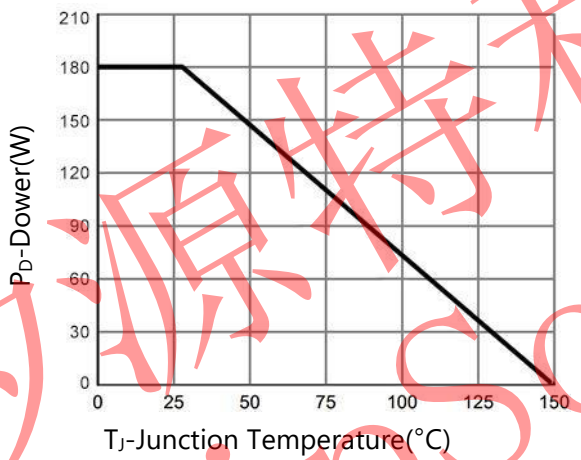


Figure4. Drain Current

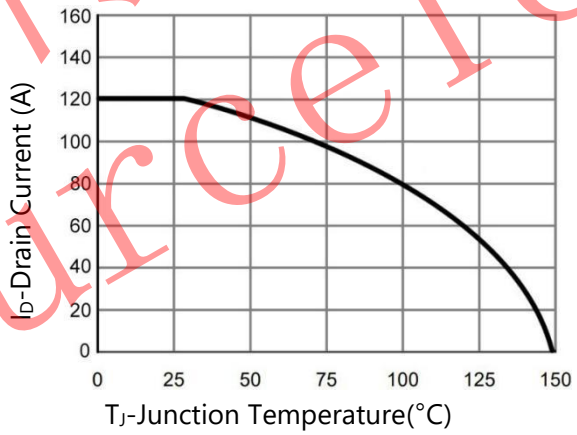


Figure5. Output Characteristics

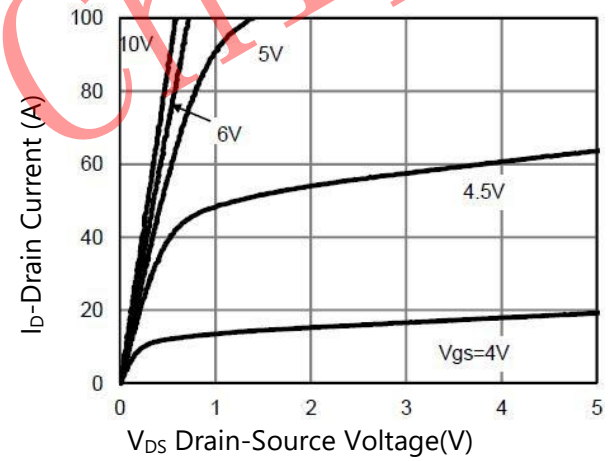
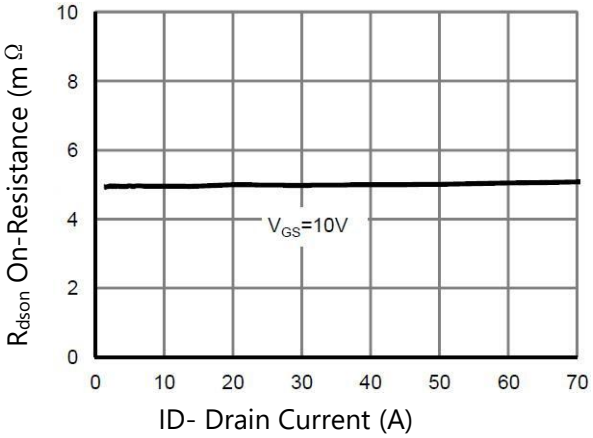


Figure6. R_{dson} vs Drain Current



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure7. Transfer Characteristics

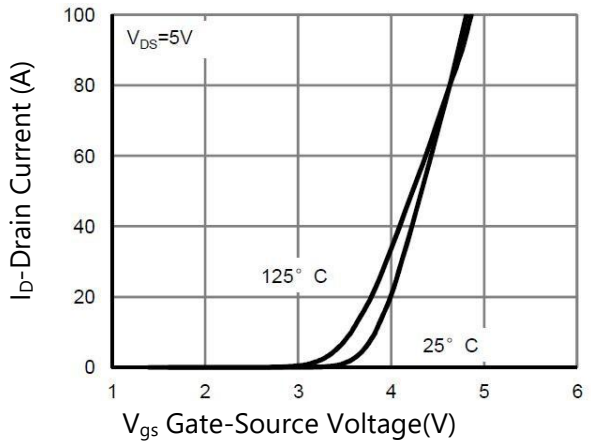


Figure8. R_{dson} vs Junction Temperature

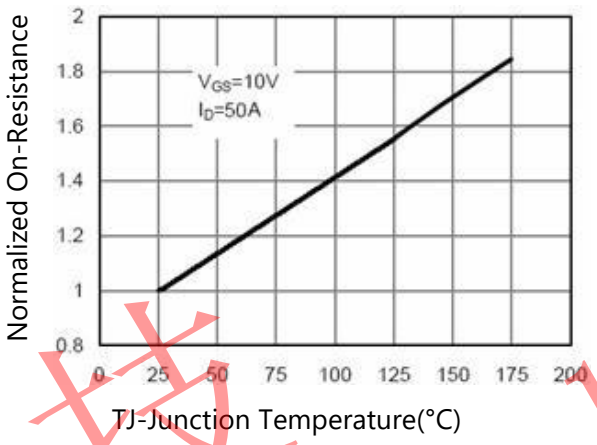


Figure9. R_{dson} vs V_{gs}

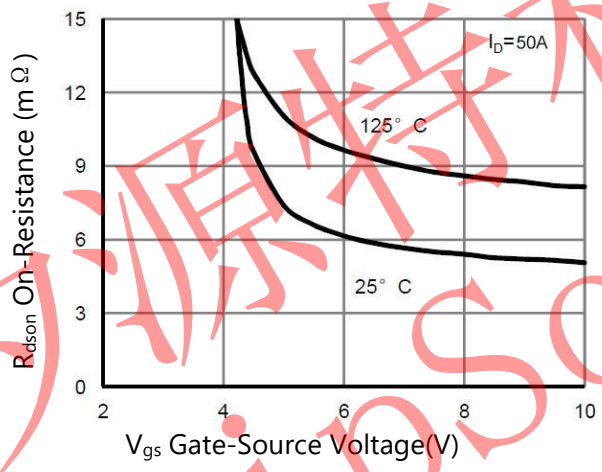


Figure10. Capacitance vs V_{DS}

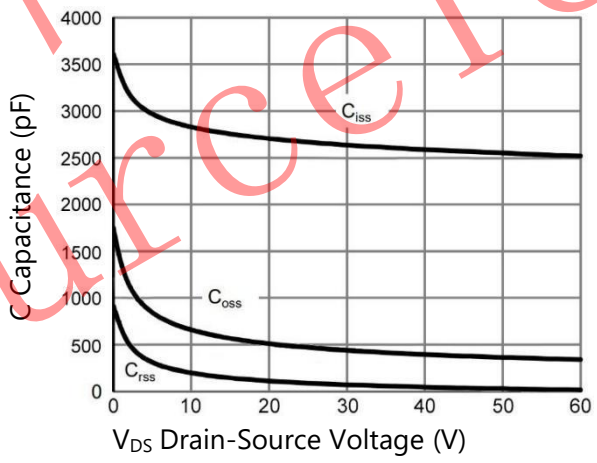


Figure11. Gate Charge

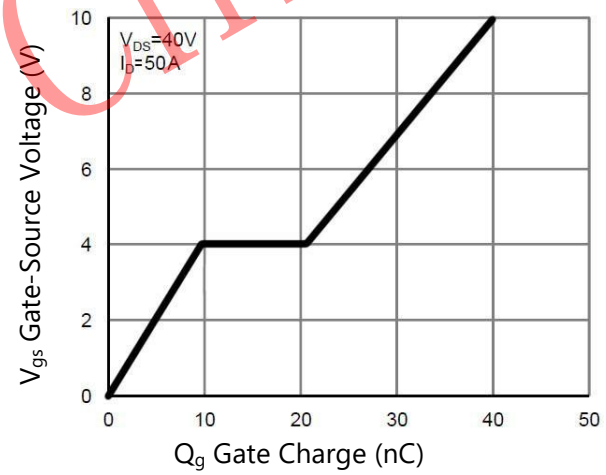
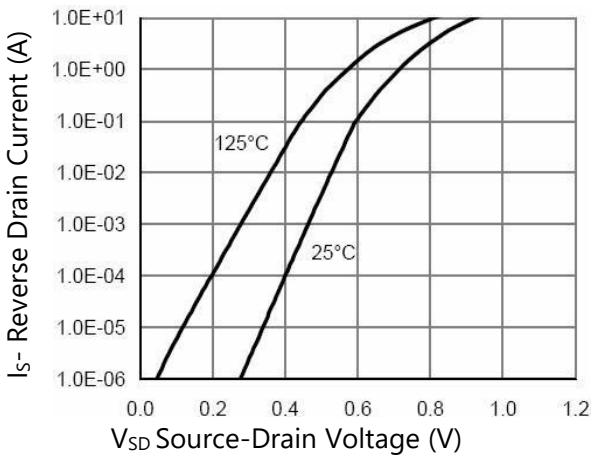


Figure12. Source-Drain Diode Forward



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure13. Safe Operation Area

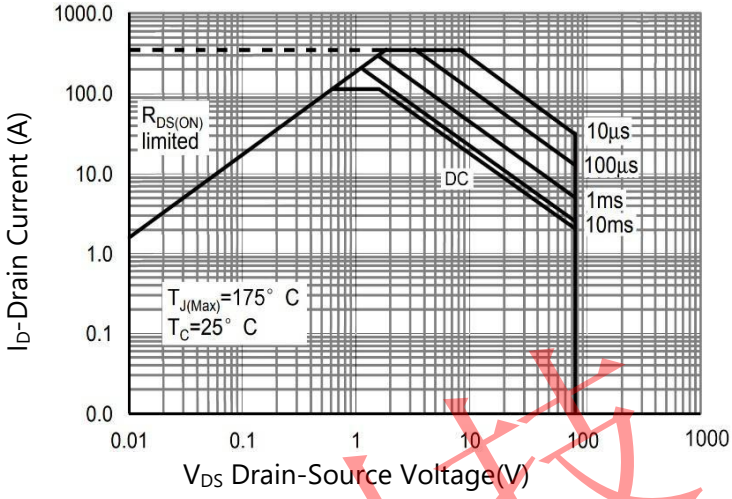
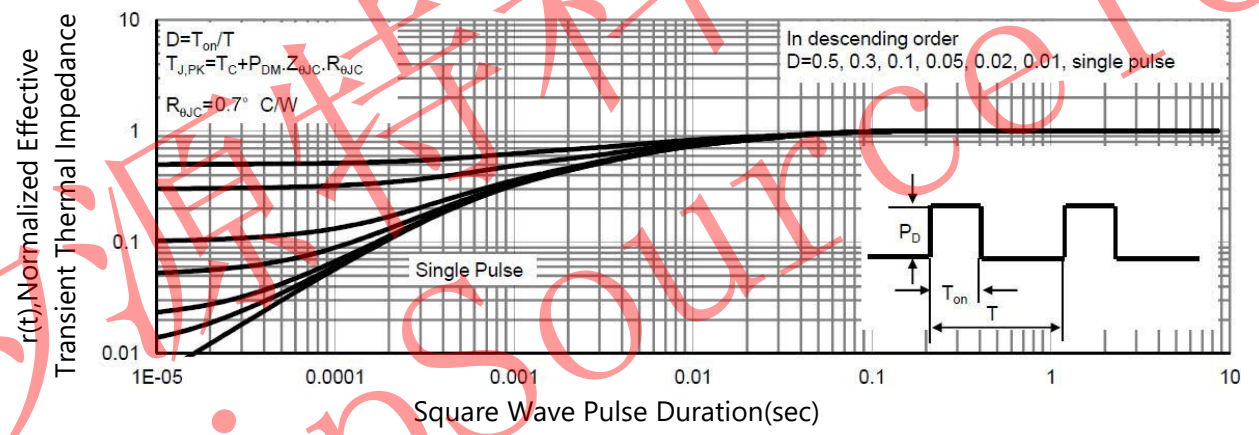


Figure14. Normalized Maximum Transient Thermal Impedance



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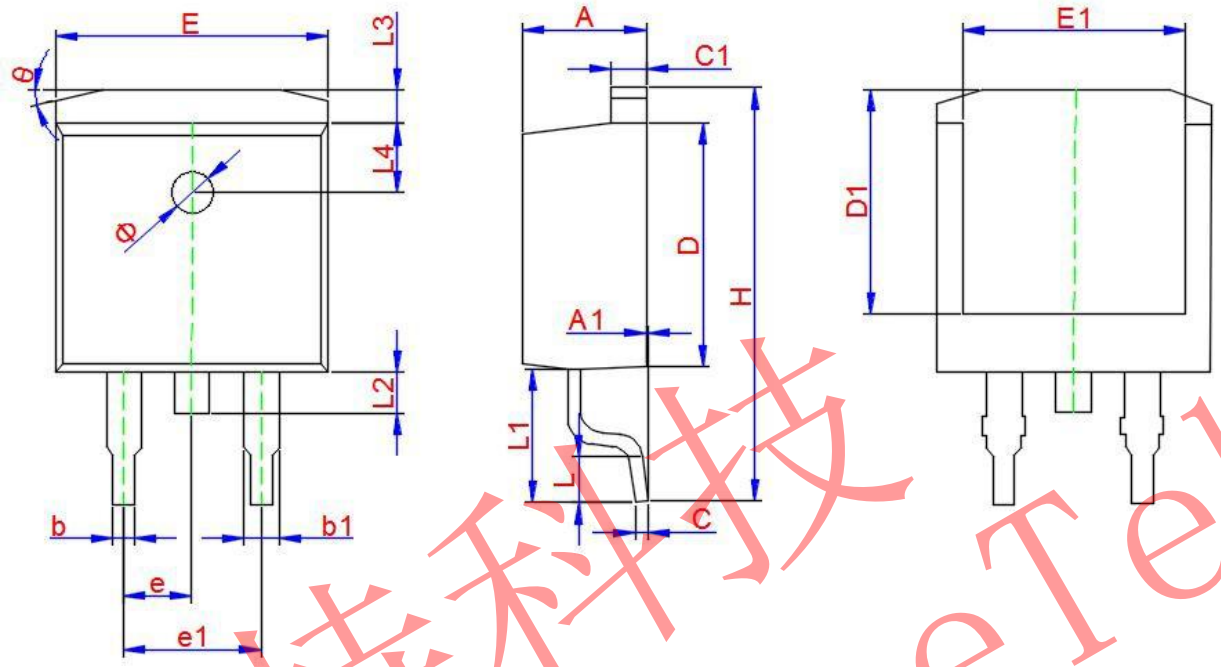
PACKAGE INFORMATION

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	815
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°	-