BMF80N250C1

N-Channel Power MOSFET

800V, 18A, 250mΩ

bestirpower

Description

BMF80N250C1 is power MOSFET using bestirpower's advanced super junction technology that can realize very low on-resistance and gate charge.
It will provide much high efficiency by using optimized charge coupling technology. These user friendly devices give an advantage of Low EMI to designers as well as low switching loss.

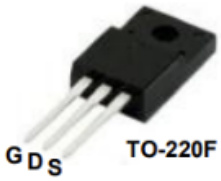
Features

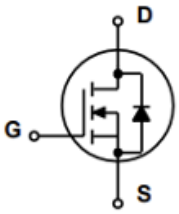
V_{DS} @ $T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
850V	18 A	250 mΩ	27nC

- Ultra-fast body diode
- Extremely low losses due to very low FOM
- Very high commutation ruggedness
- Halogen Free, and RoHS Compliant

Applications

- PC power
- Telecom / Server power supply
- LED lighting
- EV charger
- Solar / UPS





Absolute Maximum Ratings (T_C = 25℃ unless otherwisenoted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage[1]		800	V
V_{GSS}	Gate to Source Voltage		±30	V
I_D	Drain Current[2]	Continuous (T_C = 25℃)	18	A
		Continuous (T_C = 125℃)	8	
I_{DM}	Drain Current	Pulsed	54	A
E_{AS}	Single Pulsed Avalanche Energy[3]		650	mJ
I_{AR}	Repotitive Avalanche Energy		5.1	A
dv/dt	MOSFET dv/dt ruggedness		50	V/ns
	Diode Recovery dv/dt ruggedness[4]		50	
P_D	Power Dissipation	(T_C = 25℃)	34	W
T_J, T_{STG}	Storage Temperature Range		-55 to 150	℃
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 10 Seconds		260	℃

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	3.67	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max. *minimal footprint	62.5	

1) Limited by T_j max. Maximum duty cycle D=0.75.
2) Pulse width t_p limited by T_j,max.
3) V_{DD}=50V, R_G=25Ω, Starting T_j=25°C.
4) V_{DClink}=400V; $V_{DS,peak}$<$V_{(BR)DSS}$; identical low side and high side switch with identical R_G.

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMF80N250C1	BMF80N250C1	TO220F	Tube	50 units

Electrical Characteristics (T_C = 25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	800	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 800V, V_{GS} = 0V, Tj=25°C	-	-	10	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±30V, V_{DS} = 0V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	2.0	3.0	4.0	V
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10V, I_D = 8.5A Tj=25° C	-	220	250	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=100V, f=250KHz	-	1510	-	pF
C_{oss}	Output Capacitance		-	58	-	pF
C_{rss}	Reverse Transfer Capacitance		-	2	-	pF
Q_g	Total Gate Charge	V_{GS} = 0-10V, V_{DD} =400V, I_D = 9A	-	27	-	nC
Q_{gs}	Gate to Source Charge		-	5.5	-	nC
Q_{gd}	Gate to Drain “Miller” Charge		-	8	-	nC
$V_{plateau}$	Gate plateau voltage		-	3.8	-	V
R_G	Gate Resistance	V_{DD}= 0V, V_{GS} = 0V, f= 1.0MHz	-	15	-	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{GS} = 10V, V_{DD}= 400V, I_D= 9A	-	13	-	ns
t_r	Turn-On Rise Time		-	2	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	80	-	ns
t_f	Turn-Off Fall Time		-	7	-	ns
Reverse Diode Characteristics						
I_{SD}	Continuous Diode Forward Current		-	-	18	A
V_{SD}	Diode Forward Voltage	I_F = 8.5A, V_{GS} = 0V, Tj=25°C	-	0.8	-	V
t_{rr}	Reverse Recovery Time	V_R = 400V, I_F= 9A, di_F/dt=100A/μs	-	255	-	ns
Q_{rr}	Reverse Recovery Charge		-	3.1	-	μC
I_{rrm}	Reverse Recovery Current		-	20	-	A

Figure 1. Power dissipation

P_{tot}=f(TC)

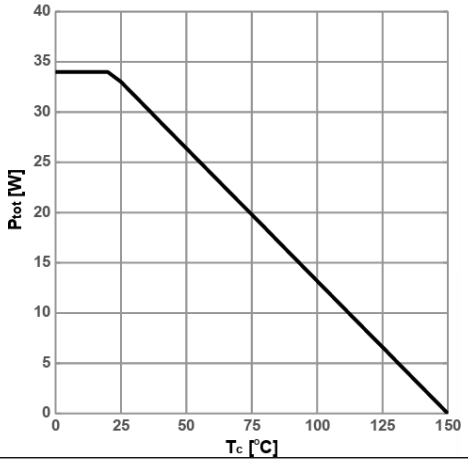


Figure 2. Max. transient thermal impedance

ZthJC=f(tp); parameter: D= tp/T

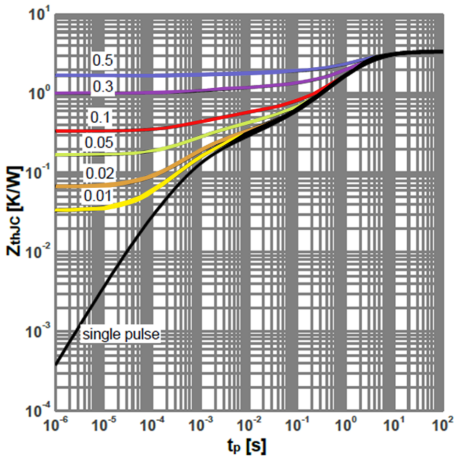


Figure 3: Safe operating area

I_D=f(V_{DS}); Tj=25°C; D=0; parameter: tp

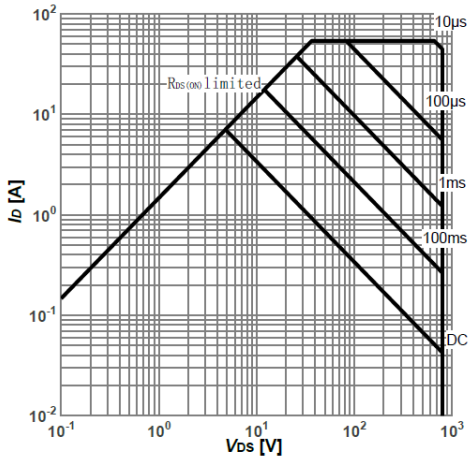


Figure 4: Typ. output characteristics

I_D=f(V_{DS}); Tj=25°C; parameter: V_{GS}

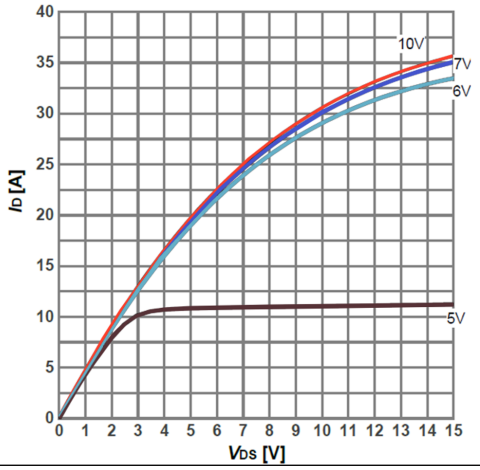


Figure 5:Typ. output characteristics

I_D=f(V_{DS}); Tj=125°C; parameter: V_{GS}

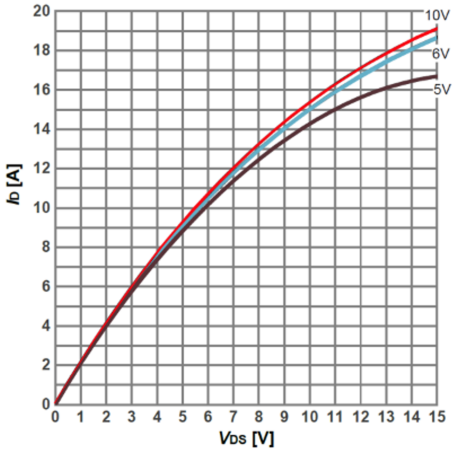


Figure 6: Typ. drain-source on-state resistance

R_{DS}(on)=f(ID); Tj=25°C; parameter: V_{GS}

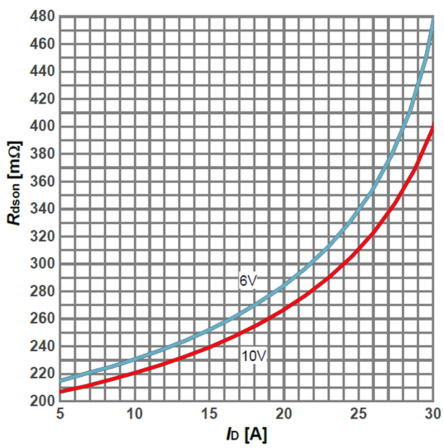


Figure 7: drain-source on-state resistance

R_{DS}(on)=f(T_j); I=8.5A; V_{GS}=10V

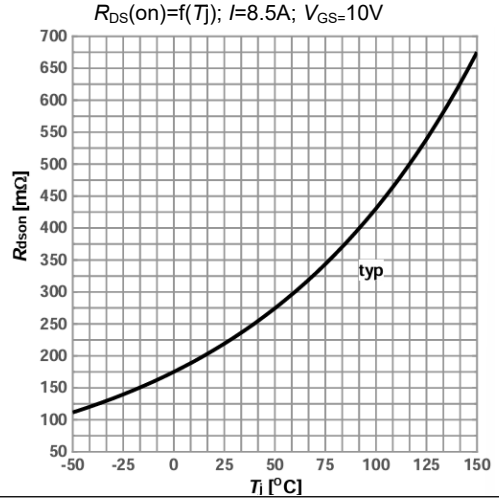


Figure 8: Typ. transfer characteristics

D=f(V_{GS}); V_{DS}=20V; parameter: Tj

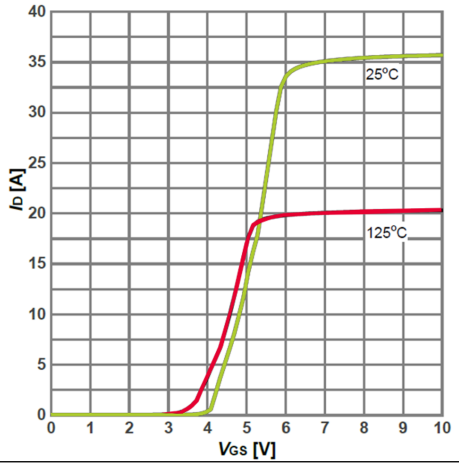


Figure 9:Typ. gate charge

V_{GS}=f(Qgate); I_D=9A pulsed; V_{DS}=400V

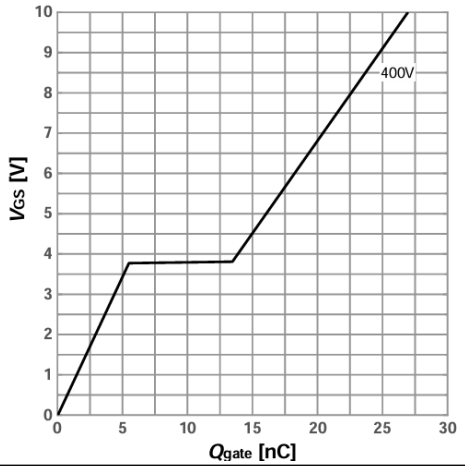


Figure10:Forward characteristics of reverse diode

IF=f(V_{SD}); parameter: T_j

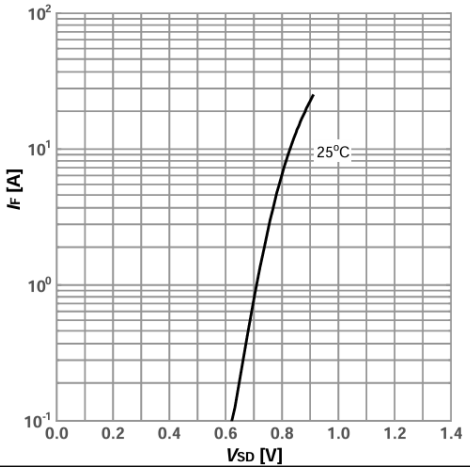


Figure11:Drain-source breakdown voltage

$V_{BR(DSS)}$=f(T_j); I_D=1mA

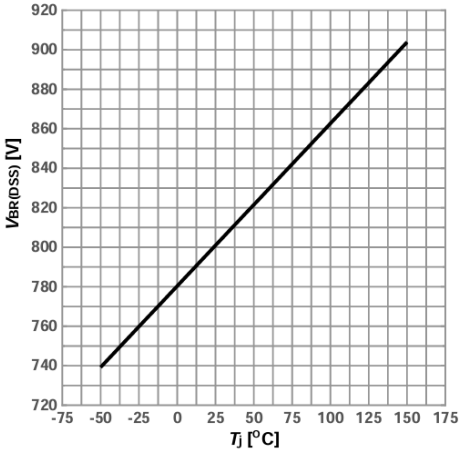


Figure12:Maximum Drain Current

I_D= f(Tc); V_{GS}=10V

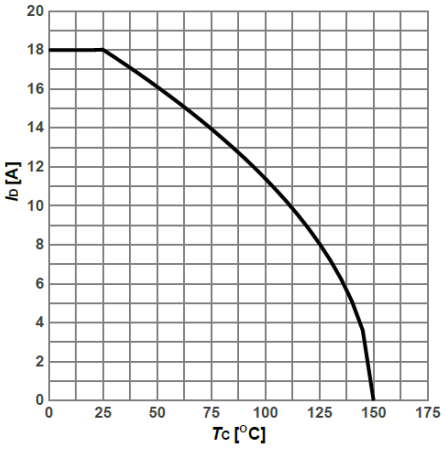


Figure13:Typ. capacitances

C=f(V_{DS}); V_{GS}=0V; f=250KHz

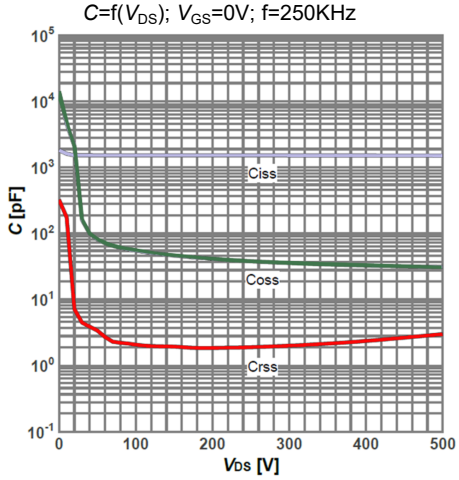
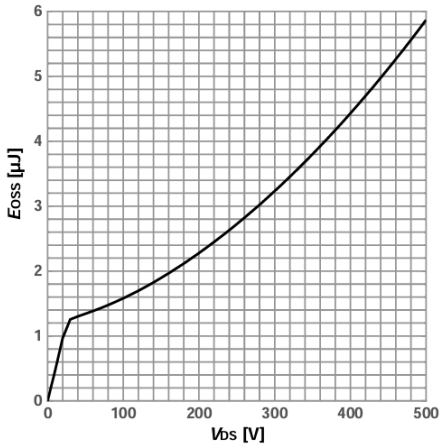


Figure14:Typ. Coss stored energy

E_{OSS} =$f(V_{DS})$



Test Circuits

Figure15:Diode Characteristics

Test circuit for diode characteristics and Diode recovery waveform

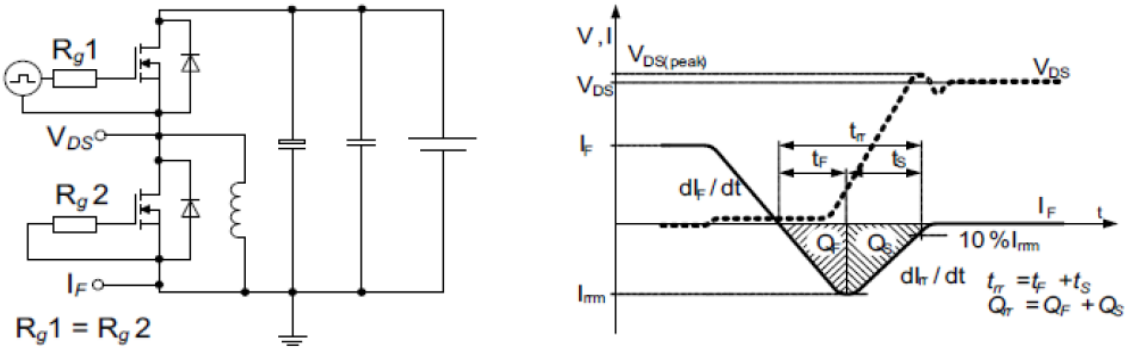


Figure16:Switching Times

Switching times test circuit for inductive load and Switching times waveform

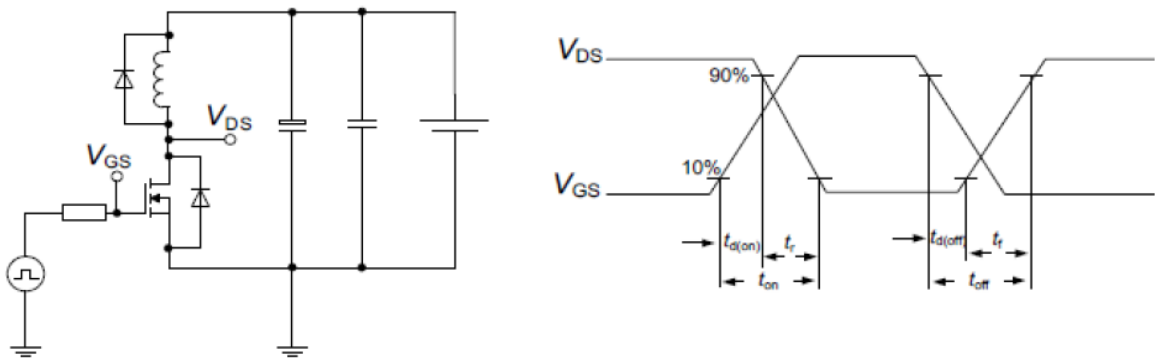
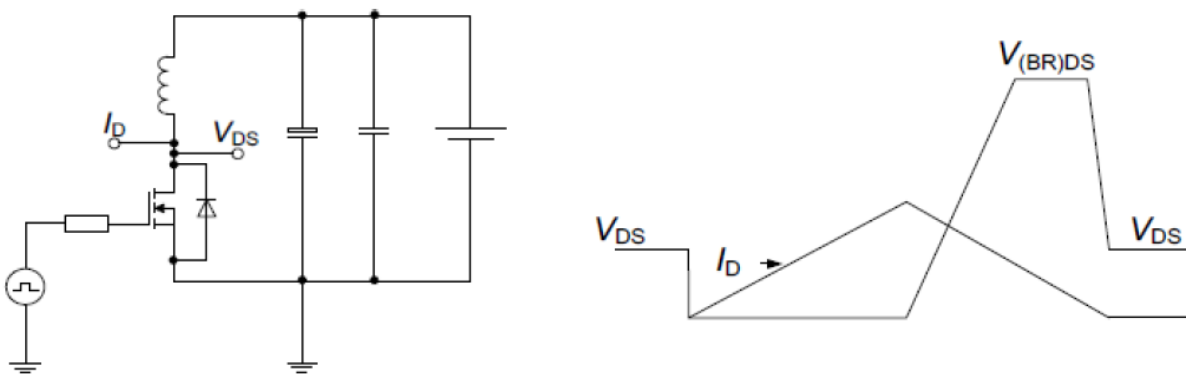


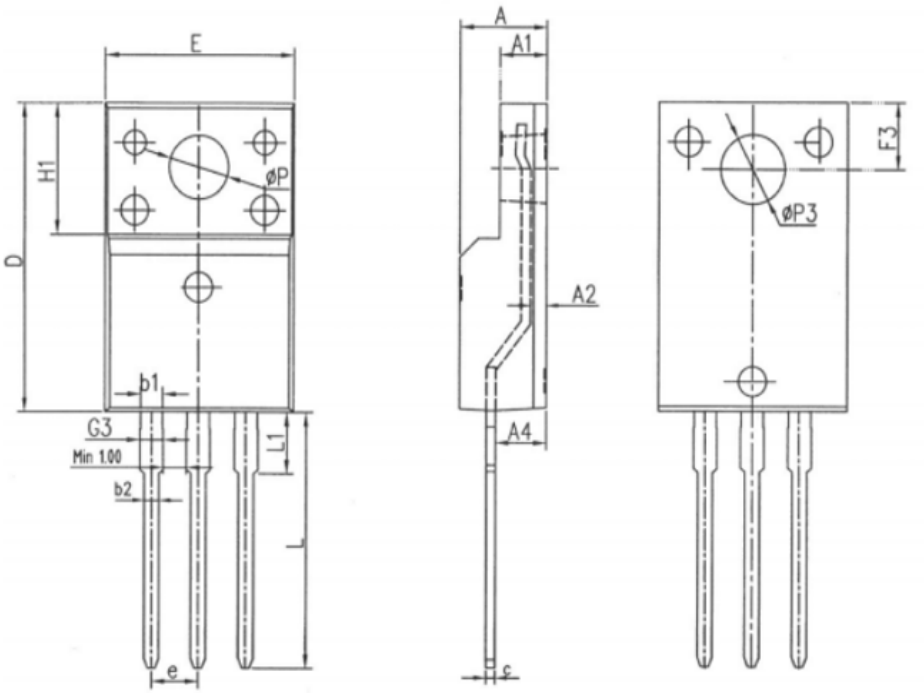
Figure17:Unclamped Inductive Load

Unclamped inductive load test circuit and Unclamped inductive waveform



Package Outlines

TO-220F



SYMBOL	MM		
	MIN	NOM	MAX
E	10.00	10.20	10.40
A	4.50	4.70	4.90
A1	2.34	2.54	2.74
A2	0.65	0.85	1.30
A4	2.55	2.75	2.95
c	0.40	0.50	0.65
D	15.57	15.87	16.17
H1	6.70REF		
e	2.54BSC		
ΦP	3.183REF		
L	12.68	12.98	13.28
L1	3.25	3.45	3.65
ΦP3	3.45REF		
F3	3.10	3.30	3.50
G3	1.10	1.30	1.50
b1	1.05	1.20	1.35
b2	0.70	0.80	0.92

* Dimensions in millimeters

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