

BMB80N180C1

N-Channel Power MOSFET

800V, 23A, 180mΩ



Description

BMB80N180C1 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.

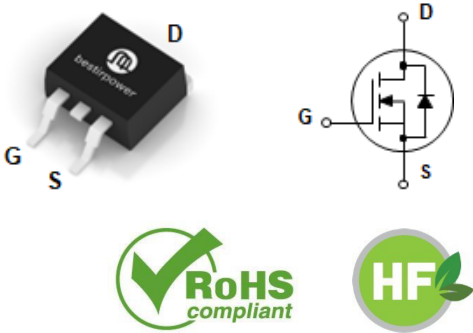
Applications

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

Features

$V_{DS} @ T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
850V	23 A	180 mΩ	56nC

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



Absolute Maximum Ratings (T_C = 25°C 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°C)	23	A
		Continuous (T _C = 100°C)	15	
I_{DM}	Drain Current	Pulsed	70	A
E_{AS}	Single Pulsed Avalanche Energy		845	mJ
I_{AR}	Repotitive Avalanche Energy		13	A
dv/dt	MOSFET dv/dt ruggedness		50	V/ns
	Diode Recovery dv/dt ruggedness		50	
P_D	Power Dissipation	(T _C = 25°C)	250	W
T_J, T_{STG}	Storage Temperature Range		-55 to 150	°C
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 10 Seconds		260	°C

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max. *minimal footprint	62.5	

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMB80N180C1	BMB80N180C1	TO263-2L	Tape & Reel	800 units

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	800	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}, T_J = 25^\circ\text{C}$	-	-	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	-	-	± 100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	2.5	3.5	4.5	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 12\text{ A}, T_J = 25^\circ\text{C}$	-	150	180	mΩ

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 100\text{ V}, f = 250\text{ KHz}$	-	2440	-	pF
C_{oss}	Output Capacitance		-	83	-	pF
C_{rss}	Reverse Transfer Capacitance		-	1.9	-	pF
$C_{o(er)}$	Energy Related Output Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 0\text{ V to } 500\text{ V}$	-	66	-	pF
$C_{o(tr)}$	Time Related Output Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 0\text{ V to } 500\text{ V}$	-	214	-	pF
Q_g	Total Gate Charge	$V_{GS} = 0 - 10\text{ V},$ $V_{DD} = 640\text{ V}, I_D = 24\text{ A}$	-	56	-	nC
Q_{gs}	Gate to Source Charge		-	15	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	21	-	nC
$V_{plateau}$	Gate plateau voltage		-	5.5	-	V
R_G	Gate Resistance	$V_{DD} = 0\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}$	-	4	-	Ω

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{ V}, V_{DD} = 400\text{ V}, I_D = 12\text{ A}$	-	20	-	ns
t_r	Turn-On Rise Time		-	13	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	117	-	ns
t_f	Turn-Off Fall Time		-	12	-	ns

Reverse Diode Characteristics

I_{SD}	Continuous Diode Forward Current	-	-	23	A
V_{SD}	Diode Forward Voltage	$I_F = 12\text{ A}, V_{GS} = 0\text{ V}$	-	0.8	V
t_{rr}	Reverse Recovery Time	$V_R = 60\text{ V}$	-	375	ns
Q_{rr}	Reverse Recovery Charge	$I_F = 24\text{ A}$	-	6.7	μC
I_{rm}	Reverse Recovery Current	$di_F/dt = 100\text{ A}/\mu\text{s}$	-	29	A

Figure 1. Power dissipation

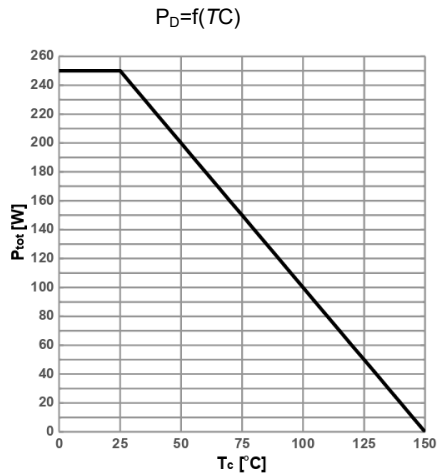


Figure 2. Max. transient thermal impedance

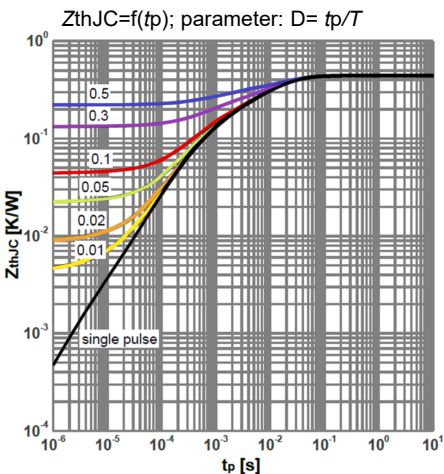


Diagram 3: Safe operating area

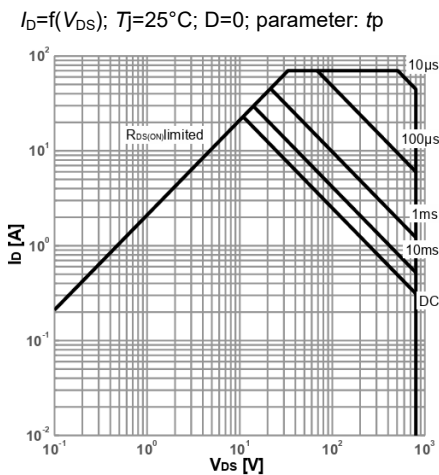


Figure 4: Typ. output characteristics

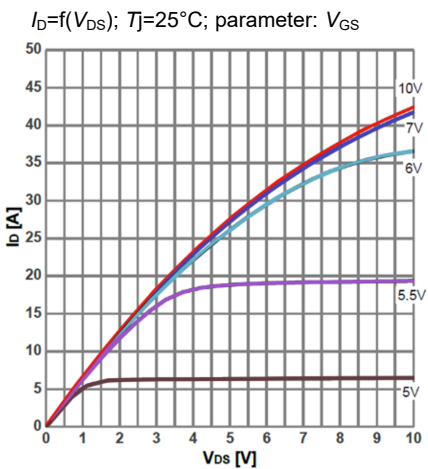


Figure 5: Typ. output characteristics

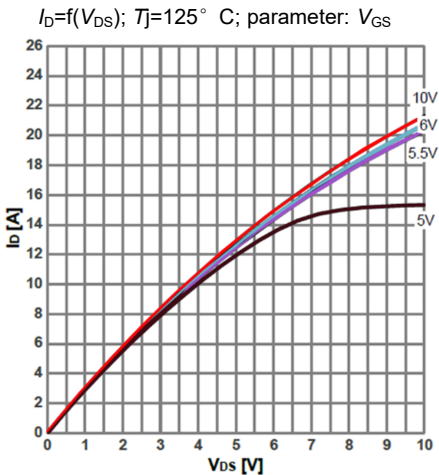


Figure 6: Typ. drain-source on-state resistance

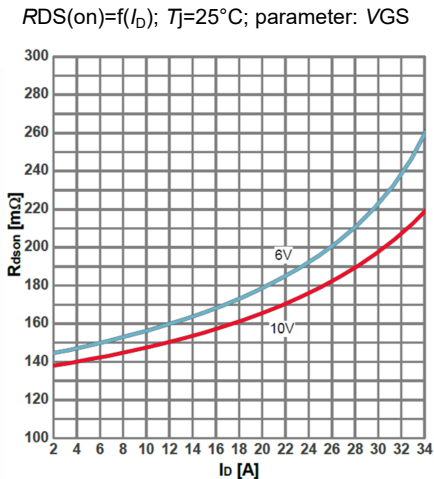


Figure 7: drain-source on-state resistance

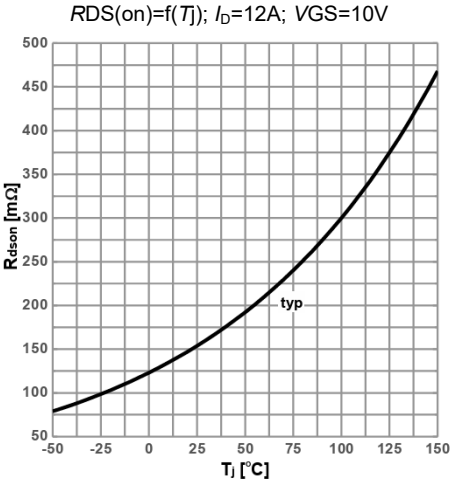


Figure 8: Typ. transfer characteristics

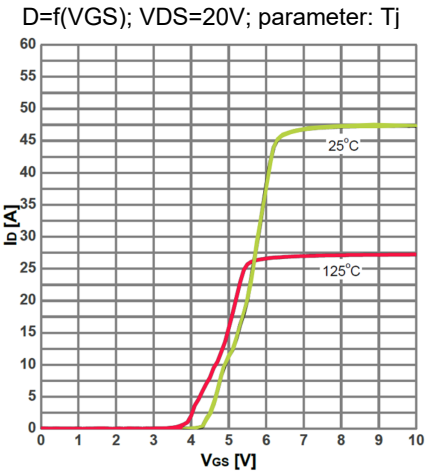


Figure 9:Typ. gate charge

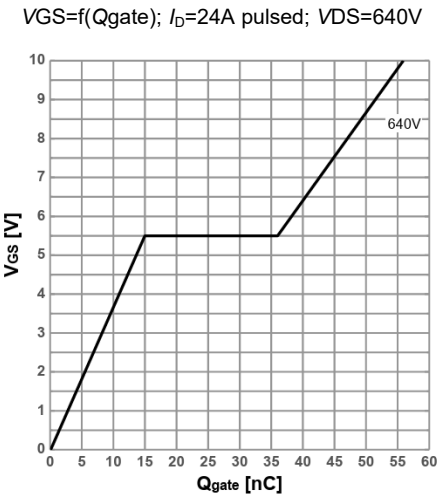


Figure10:Forward characteristics of reverse diode

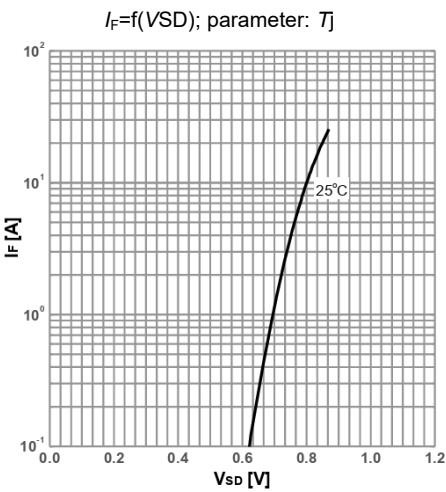


Figure11:Drain-source breakdown voltage

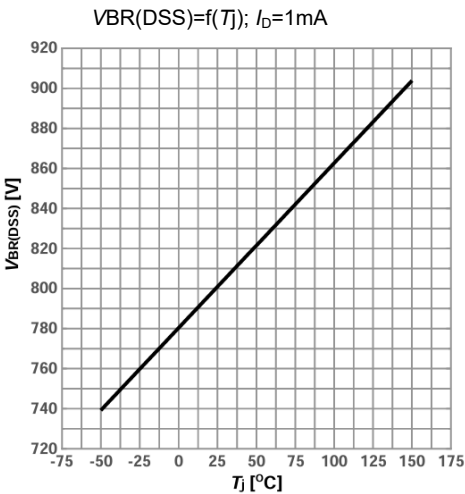


Figure12:Maximum Drain Current

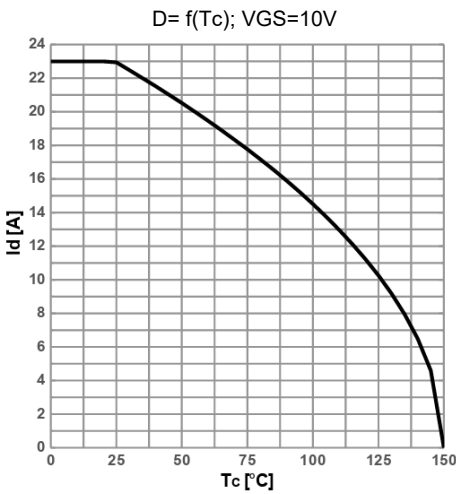


Figure13:Typ. capacitances

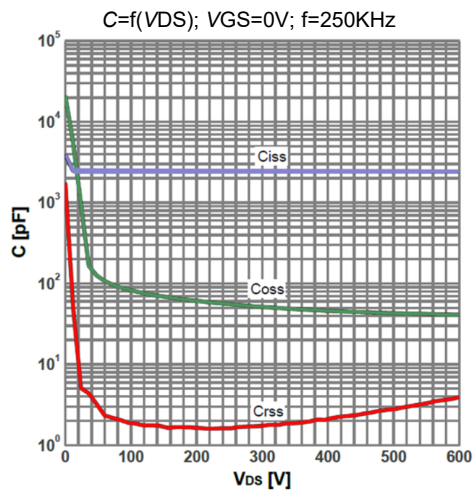
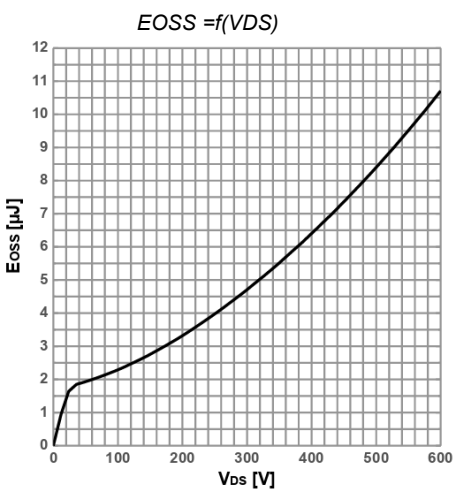


Figure14:Typ. Coss stored energy



Test Circuits

Figure15:Diode Characteristics

Test circuit for diode characteristics and Diode recovery waveform

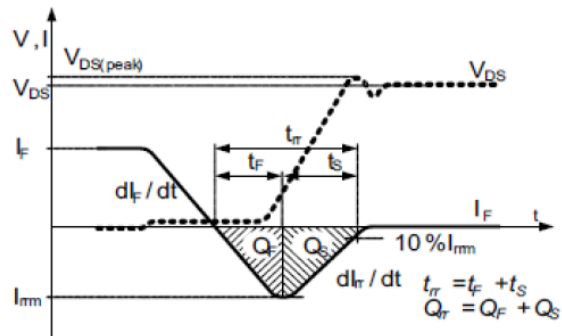
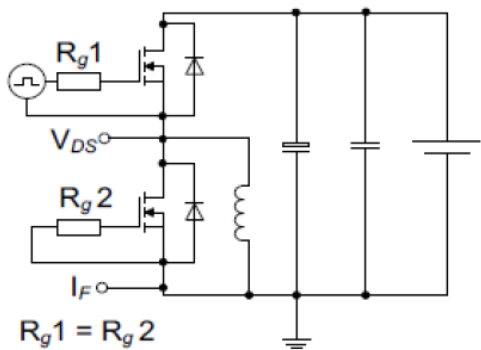


Figure16:Switching Times

Switching times test circuit for inductive load and Switching times waveform

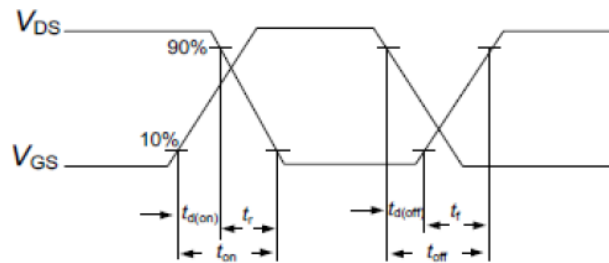
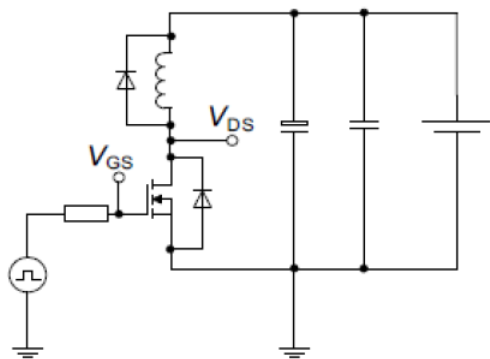
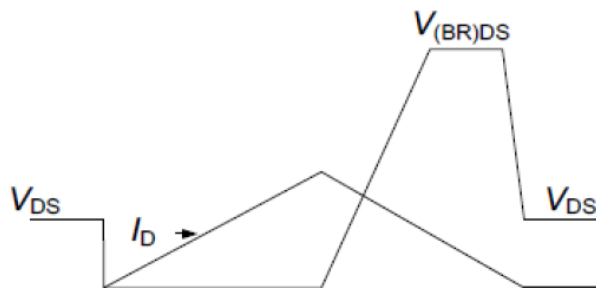
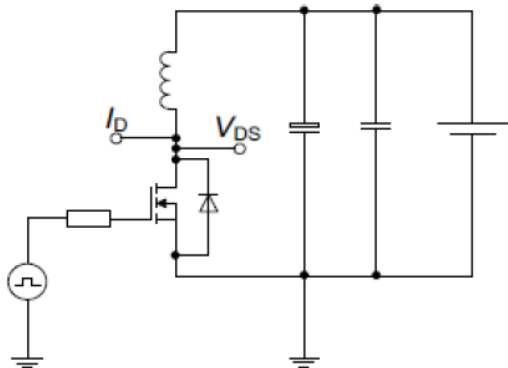


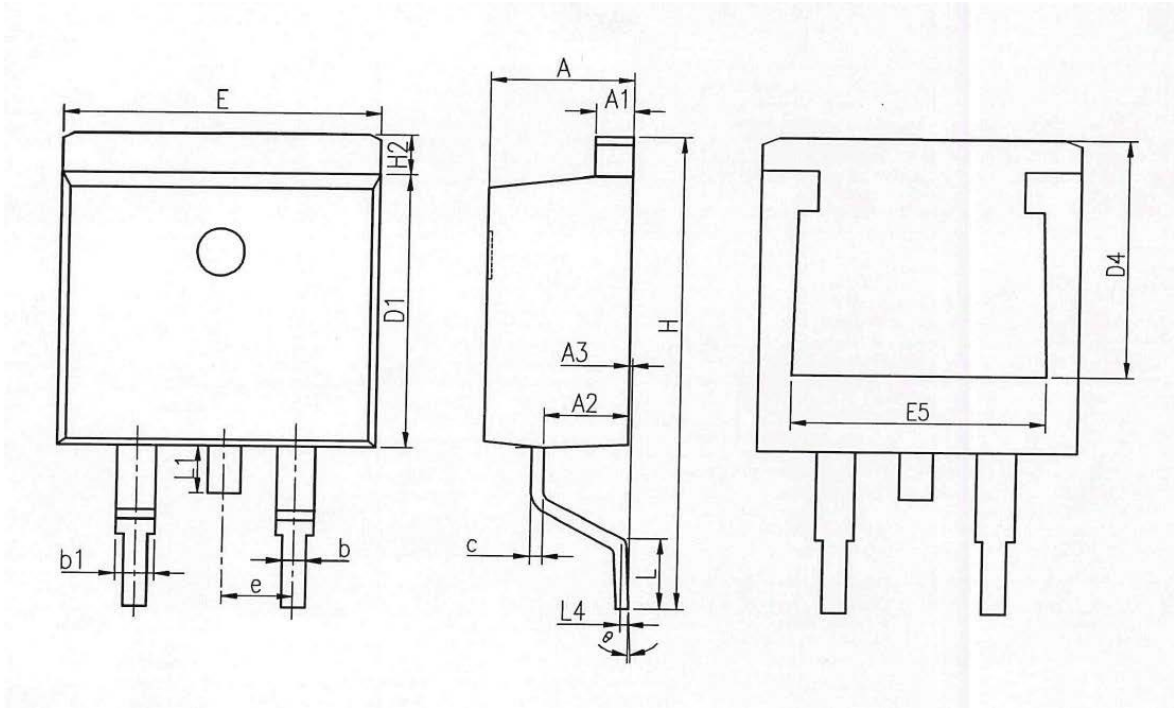
Figure17:Unclamped Inductive Load

Unclamped inductive load test circuit and Unclamped inductive waveform



Package Outlines

TO263-2L



COMMON DIMENSIONS

SYMBOL	MM		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0.00	0.13	0.25
b	0.70	0.81	0.96
b1	1.17	1.27	1.47
c	0.30	0.38	0.53
D1	8.50	8.70	8.90
D4	6.60	-	-
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54 BSC		
H	14.70	15.10	15.50
H2	1.07	1.27	1.47
L	2.00	2.30	2.60
L1	1.40	1.55	1.70
L4	0.25 BSC		
θ	0°	5°	9°

* Dimensions in millimeters

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