



# 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.

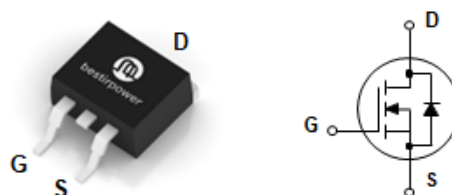
### Applications

- 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 Compliant



### Absolute Maximum Ratings ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain to Source Voltage <sup>1)</sup>	800	V
$V_{GSS}$	Gate to Source Voltage	$\pm 30$	V
$I_D$	Drain Current <sup>2)</sup>	Continuous ( $T_C = 25^\circ\text{C}$ )	23
		Continuous ( $T_C = 125^\circ\text{C}$ )	10
$I_{DM}$	Drain Current	Pulsed	70
$E_{AS}$	Single Pulsed Avalanche Energy	845	mJ
$I_{AR}$	Repetitive Avalanche Energy	13	A
dv/dt	MOSFET dv/dt ruggedness	50	V/ns
	Diode Recovery dv/dt ruggedness	50	
$P_D$	Power Dissipation ( $T_C = 25^\circ\text{C}$ )	250	W
$T_J, T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_L$	Maximum Lead Temperature for Soldering, 1/8" from Case for 10 Seconds	260	$^\circ\text{C}$

### Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	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<sub>C</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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### Off Characteristics

BV <sub>DSS</sub>	Drain to Source Breakdown Voltage	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250μA	800	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 800 V, V <sub>GS</sub> = 0 V T <sub>J</sub> =25°C	-	-	10	μA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0 V	-	-	± 100	nA

### On Characteristics

V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250μA	2.5	3.5	4.5	V
R <sub>DS(on)</sub>	Static Drain to Source On Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 12A, T <sub>J</sub> =25°C	-	150	180	mΩ

### Dynamic Characteristics

C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =100V, f=250KHz	-	2440	-	pF
C <sub>oss</sub>	Output Capacitance		-	83	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	1.9	-	pF
C <sub>o(er)</sub>	Energy Related Output Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V to 500 V	-	66	-	pF
C <sub>o(tr)</sub>	Time Related Output Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V to 500 V	-	214	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 0 - 10V, V <sub>DD</sub> =640V, I <sub>D</sub> = 24A	-	56	-	nC
Q <sub>gs</sub>	Gate to Source Charge		-	15	-	nC
Q <sub>gd</sub>	Gate to Drain "Miller" Charge		-	21	-	nC
V <sub>plateau</sub>	Gate plateau voltage		-	5.5	-	V
R <sub>G</sub>	Gate Resistance	V <sub>DD</sub> =0V, V <sub>GS</sub> = 0V, f = 1.0MHz	-	4	-	Ω

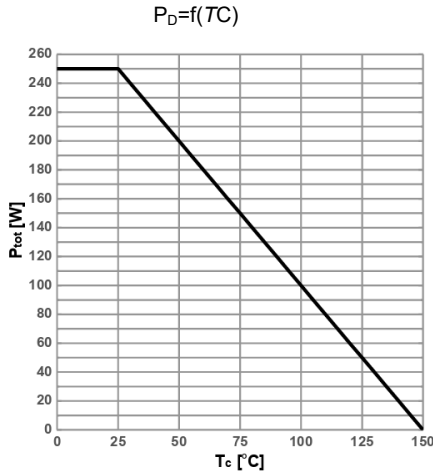
### Switching Characteristics

t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 400V, I <sub>D</sub> = 12A	-	20	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	13	-	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		-	117	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	12	-	ns

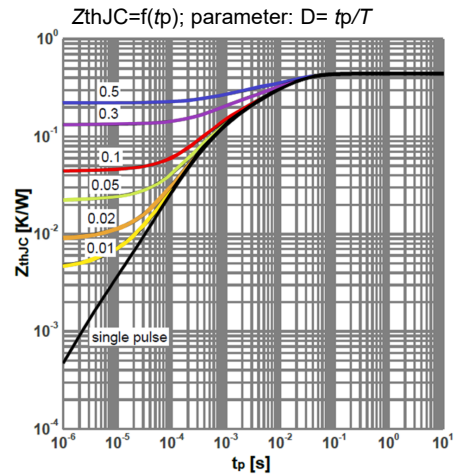
### Reverse Diode Characteristics

I <sub>SD</sub>	Continuous Diode Forward Current	-	-	23	A
V <sub>SD</sub>	Diode Forward Voltage	I <sub>F</sub> = 12A, V <sub>GS</sub> = 0V	-	0.8	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>R</sub> = 60V	-	375	ns
Q <sub>rr</sub>	Reverse Recovery Charge	I <sub>F</sub> =24A	-	6.7	μC
I <sub>rm</sub>	Reverse Recovery Current	di <sub>F</sub> /dt = 100A/μs	-	29	A

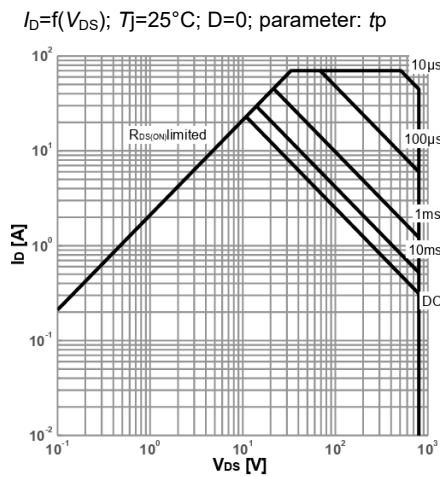
**Figure 1. Power dissipation**



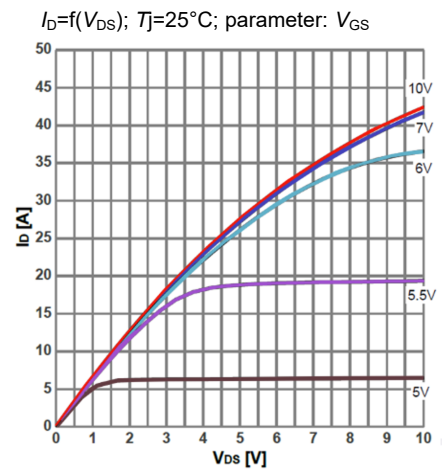
**Figure 2. Max. transient thermal impedance**



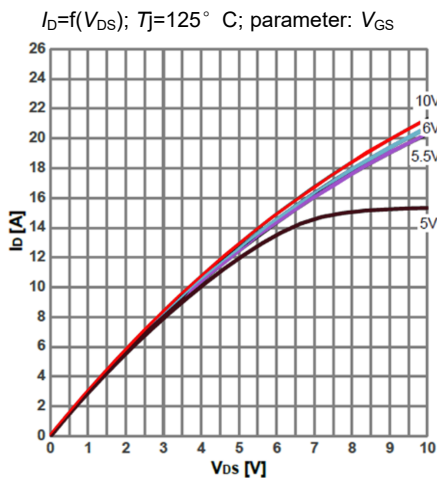
**Diagram 3: Safe operating area**



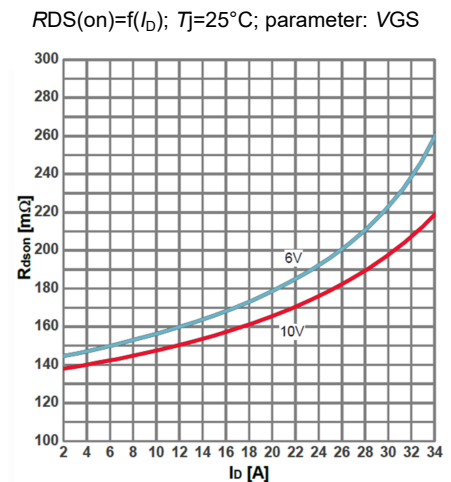
**Figure 4: Typ. output characteristics**



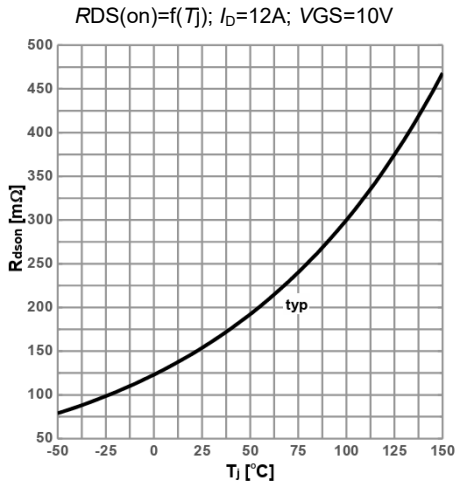
**Figure 5: Typ. output characteristics**



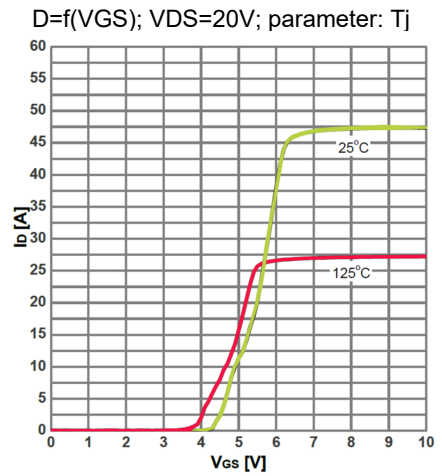
**Figure 6: Typ. drain-source on-state resistance**



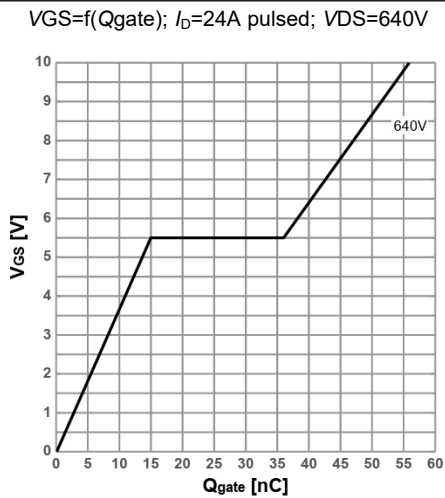
**Figure 7: drain-source on-state resistance**



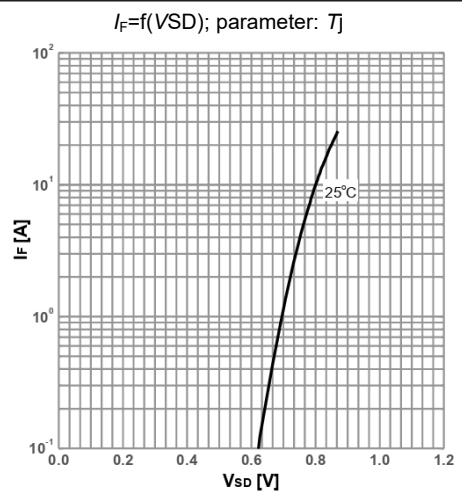
**Figure 8: Typ. transfer characteristics**



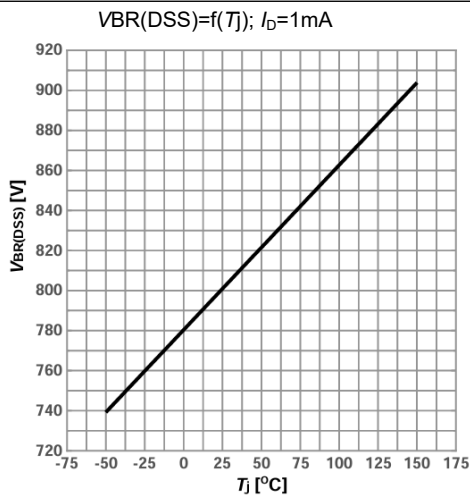
**Figure 9: Typ. gate charge**



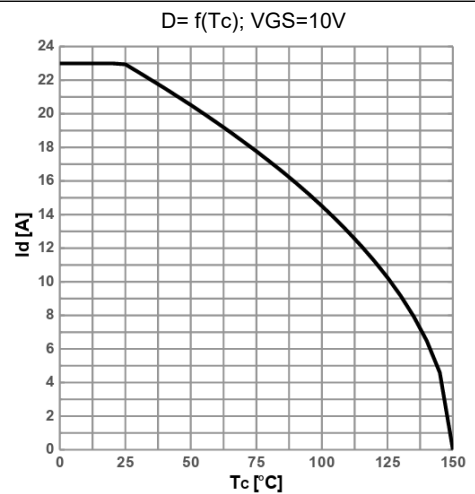
**Figure 10: Forward characteristics of reverse diode**



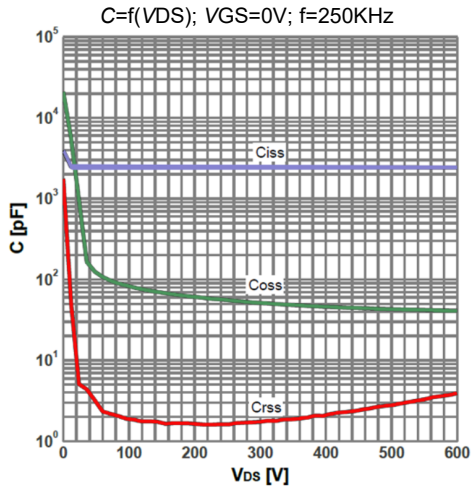
**Figure 11: Drain-source breakdown voltage**



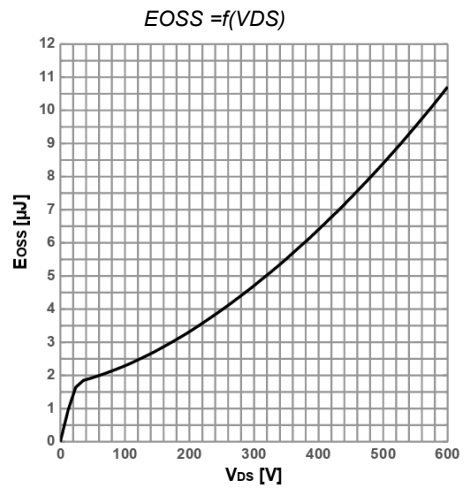
**Figure 12: Maximum Drain Current**



**Figure13:Typ. capacitances**



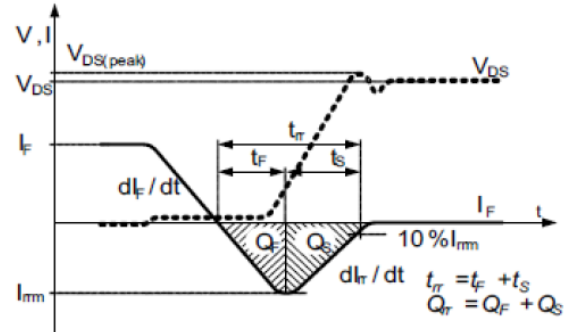
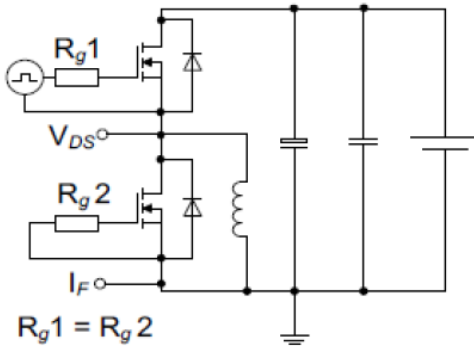
**Figure14:Typ. Coss stored energy**



### Test Circuits

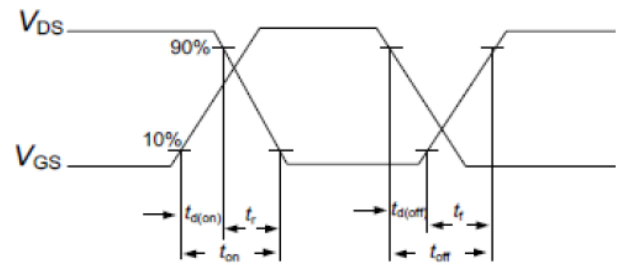
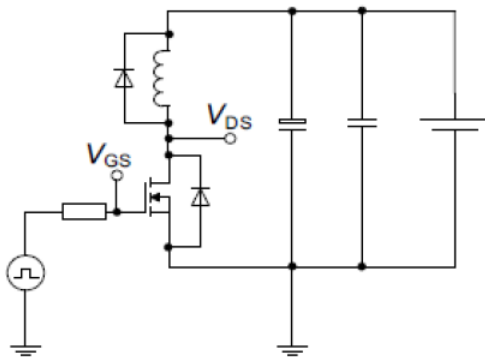
**Figure15:Diode Characteristics**

Test circuit for diode characteristics and Diode recovery waveform



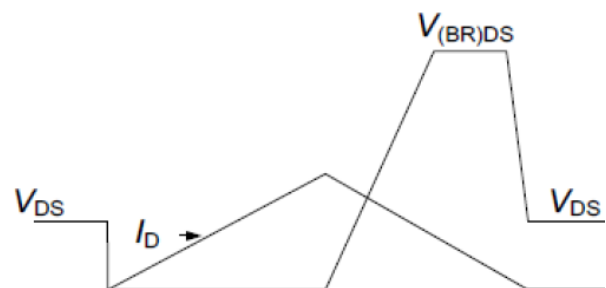
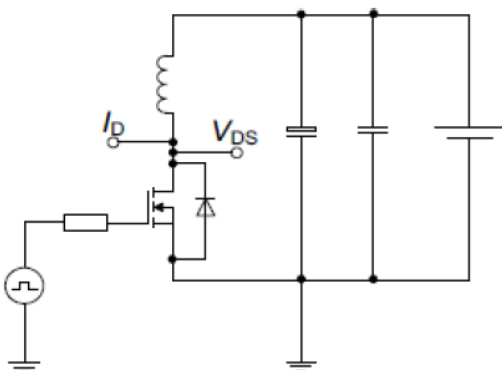
**Figure16:Switching Times**

Switching times test circuit for inductive load and Switching times waveform



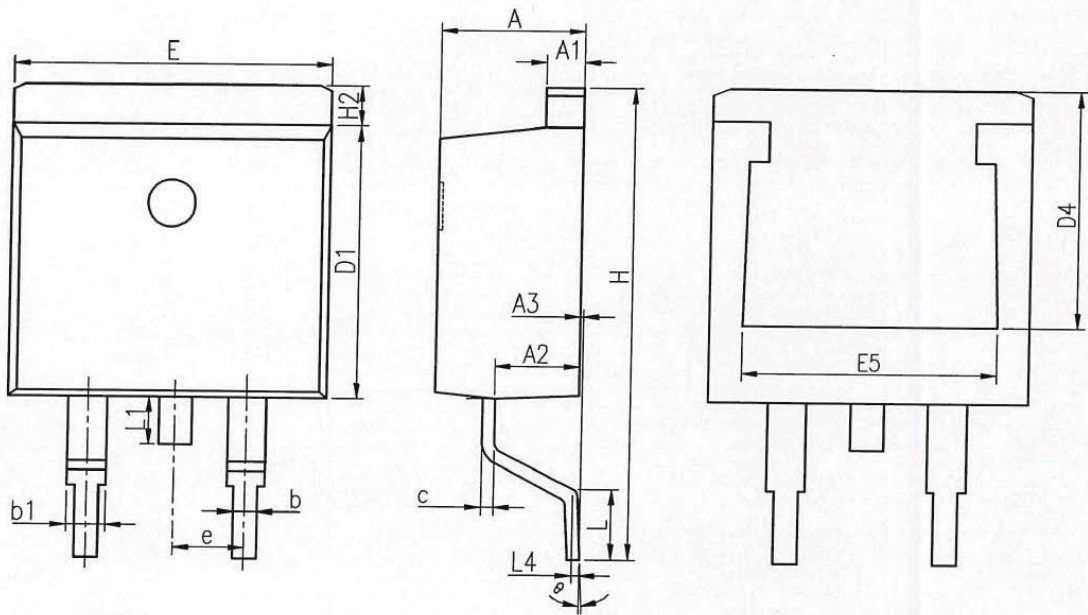
**Figure17:Unclamped Inductive Load**

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		
$\theta$	0°	5°	9°

\* Dimensions in millimeters

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