BMD80N400E1

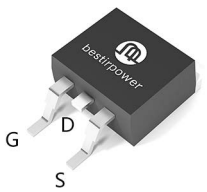
Super Junction Power MOSFET

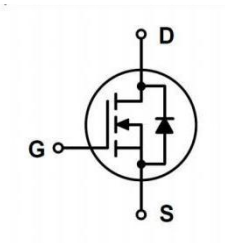
800 V, 13 A, 400 mΩ

Description

BMD80N400E1is 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.

BV_{DSS} @ $T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
850 V	13 A	400 mΩ	27 nC





Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- Low Power Chargers and Adapters

Features

- Very low FOM RDS(on)×Qg
- 100% avalanche tested
- Easy to use/drive
- RoHS compliant

Absolute Maximum Ratings (T_J = 25℃ unless otherwise noted)

Symbol	Parameter			Value	Unit	Note
V_{DSS}	Drain to Source Voltage			800	V	
V_{GSS}	Gate to Source Voltage			±30	V	
I_D	Drain Current (continuous)	V_{GS}=10V, T_C = 25℃		13	A	Fig 1
		V_{GS}=10V, T_C = 100℃		7.8		
I_{DM}	Drain Current	Pulsed	(Note1)	39	A	
E_{AS}	Single Pulsed Avalanche Energy		(Note2)	125	mJ	
I_{AR}	Avalanche Current		(Note2)	1.8	A	
dv/dt	MOSFET dv/dt			50	V/ns	
	Peak Diode Recovery dv/dt		(Note3)	15		
P_D	Power Dissipation	(T_C = 25℃)		105	W	
E_{AS}	Repetitive Avalanche Energy			125	mJ	
T_J, T_{STG}	Operating and Storage Temperature Range			-55 to 150	℃	

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	1.2	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62	
T_{sold}	Soldering temperature, wave soldering only allowed at leads	260	℃

Electrical Characteristics (T_J = 25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit	Note
Off Characteristics							
BV_{DSS}	Drain to Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	800	-	-	V	Fig 8
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 800 V, V_{GS} = 0 V	-	-	1	μA	
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±30 V	-	-	±100	nA	
On Characteristics							
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 uA	2.5	3.5	4.5	V	Fig 2
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 6.5A, T_J = 25℃	-	350	400	mΩ	Fig 3
Dynamic Characteristics							
C_{iss}	Input Capacitance	V_{DS} = 100 V, V_{GS} = 0 V, f = 1 MHz	-	1134.6	-	pF	Fig 4
C_{oss}	Output Capacitance		-	31.1	-	pF	
C_{rss}	Reverse transfer capacitance		-	0.29	-	pF	
$Q_{g(tot)}$	Total Gate Charge at 10 V	V_{DS} = 640 V, I_D =6 A, V_{GS} = 10 V	-	27	-	nC	Fig 5
Q_{gs}	Gate to Source Charge		-	6.18	-	nC	
Q_{gd}	Gate to Drain “Miller” Charge		-	11.7	-	nC	
R_G	Gate Resistance	f = 1 MHz, Open Drain	-	11.7	-	Ω	
Switching Characteristics							
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 400 V, I_D = 5 A, R_G = 25Ω	-	45.1	-	ns	
t_r	Turn-On Rise Time		-	32.3	-	ns	
$t_{d(off)}$	Turn-Off Delay Time		-	147.2	-	ns	
t_f	Turn-Off Fall Time		-	39.6	-	ns	
Source-Drain Diode Characteristics							
V_{SD}	Diode Forward Voltage	T_J = 25ºC, I_{SD} = 6.5A, V_{GS} = 0V	-	0.9	1.2	V	
I_{mm}	Peak Reverse Recovery Current	V_R = 400V, I_F=30A diF/dt = 100A/μs	-	22.6	-	A	
t_{rr}	Reverse Recovery Time		-	350.6	-	ns	
Q_{rr}	Reverse Recovery Charge		-	4.94	-	μC	

※Notes:

1. Repetitive rating: pulse-width limited by maximum junction temperature.
2. L=10mH, R_G = 25 Ω, starting T_J = 25℃.
3. Identical low side and high side switch with identical R_G

Typical Performance Characteristics

Figure 1. Output Characteristics

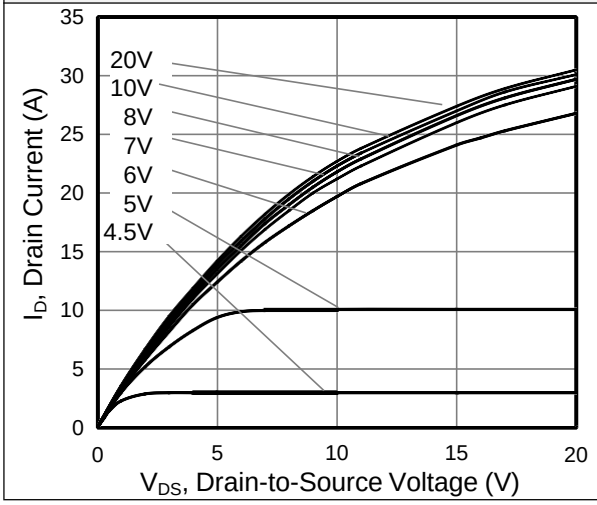


Figure 2. Transfer Characteristics

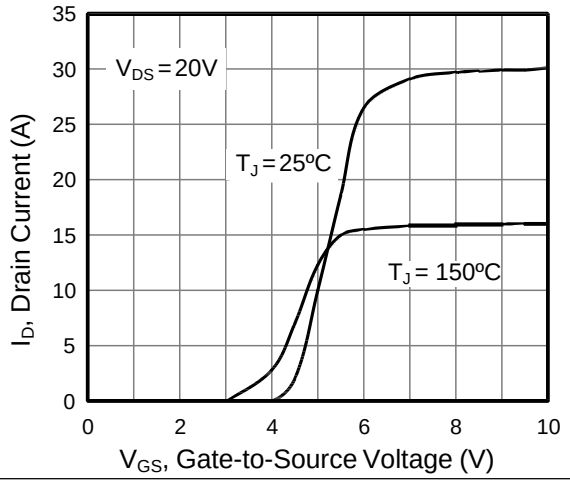


Figure 3. On-Resistance vs. Drain Current

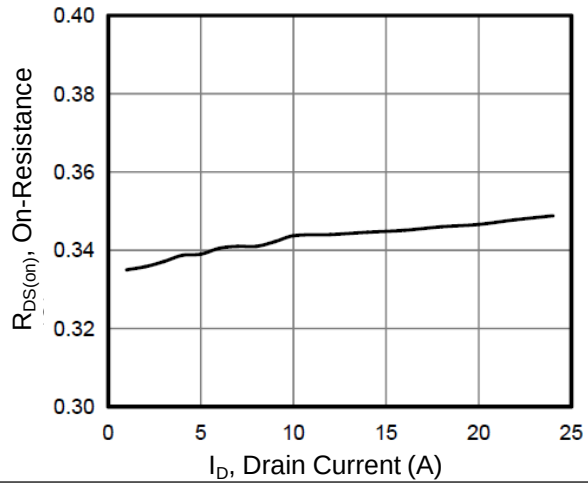


Figure 4. Capacitance

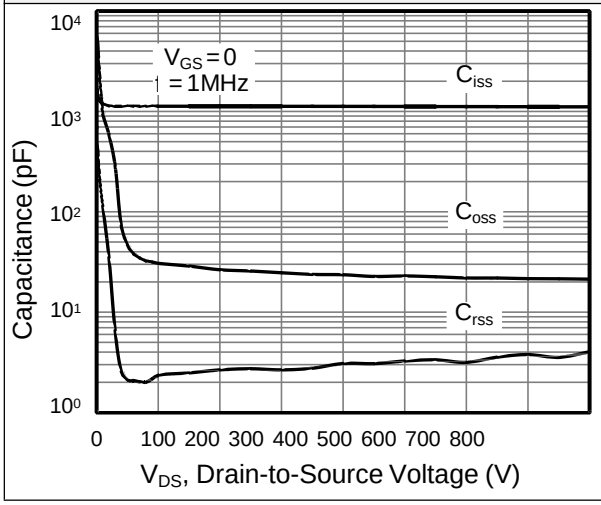


Figure 5. Gate Charge

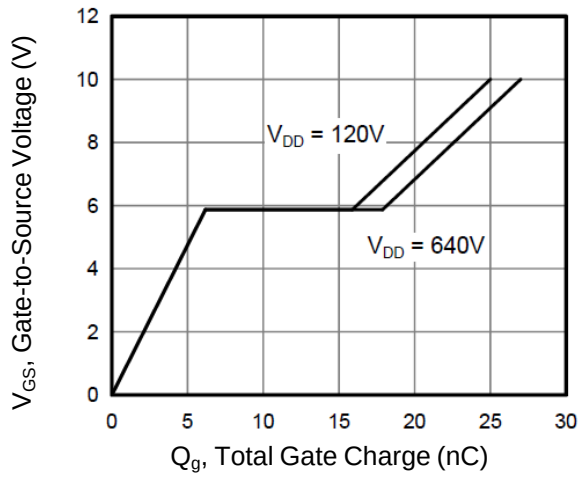
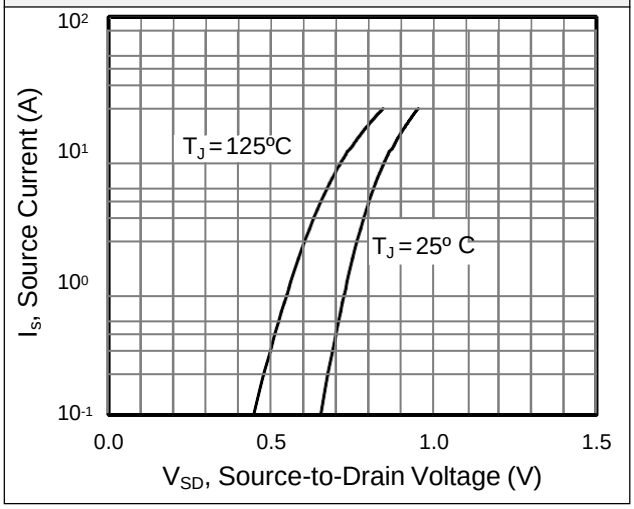


Figure 6. Body Diode Forward Voltage



Typical Performance Characteristics

Figure 7. On-Resistance vs.Temperature

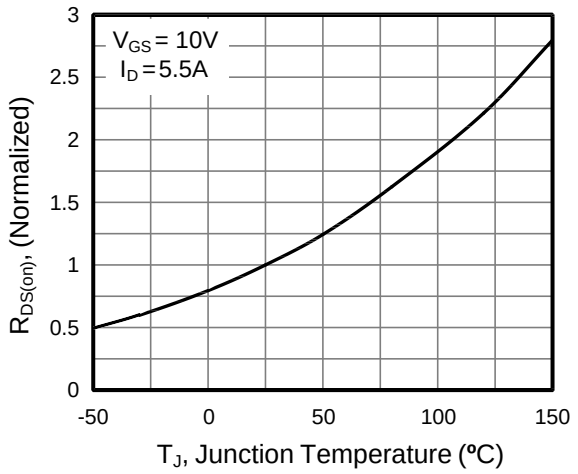


Figure 8. Breakdown Voltage vs.Junction Temperature

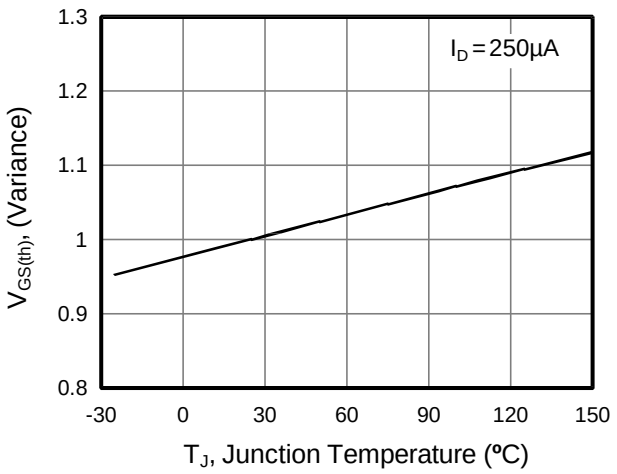


Figure 9. Transient Thermal Impedance

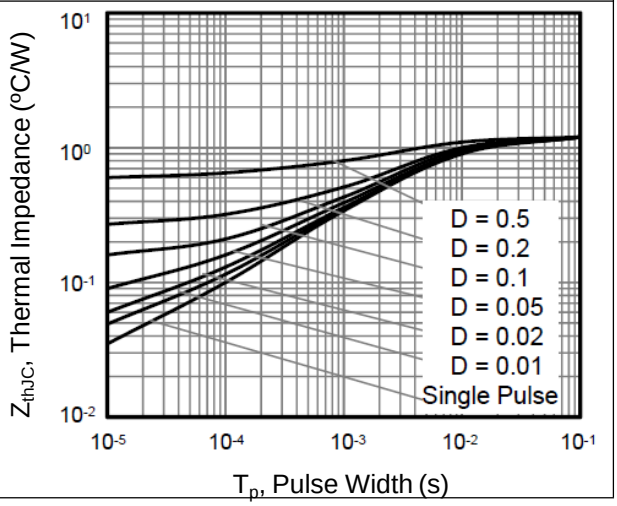


Figure 10. Safe Operation Area

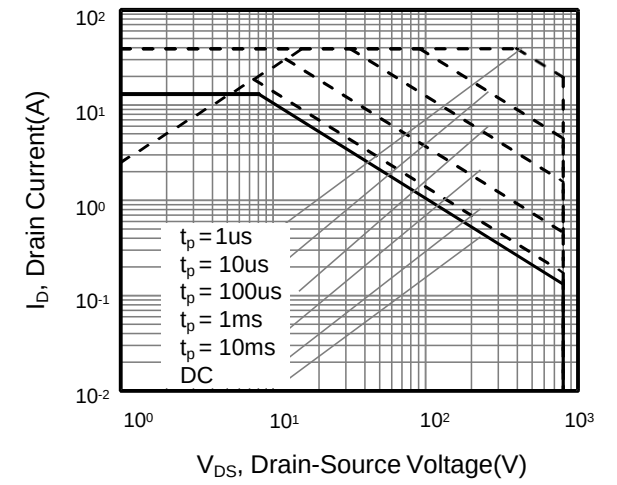
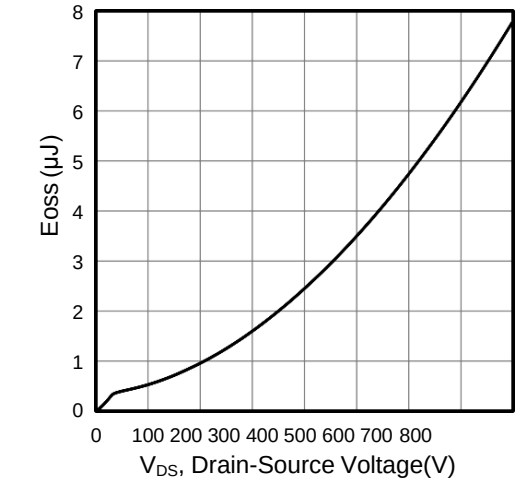


Figure 11. Typ. Coss Stored Energy



Test Circuits

Figure 12: Gate Charge Test Circuit and Waveform

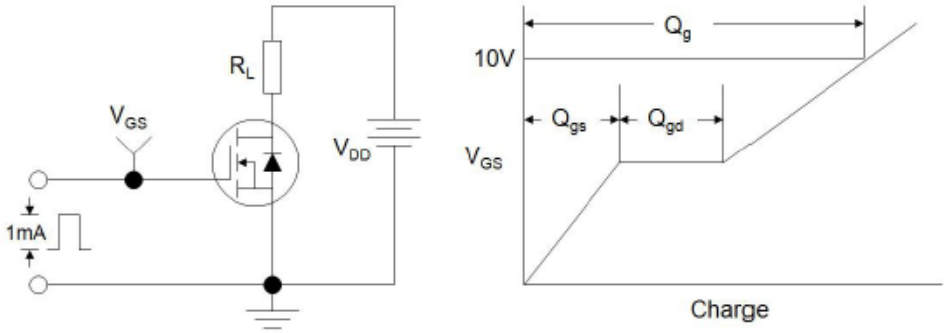


Figure 13: Resistive Switching Test Circuit and Waveform

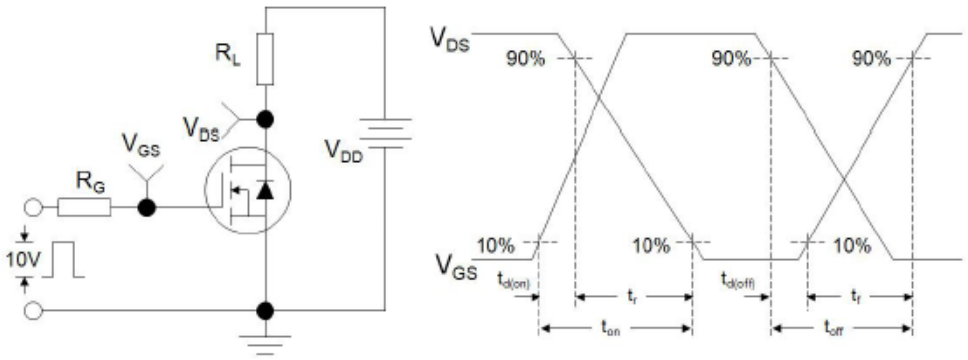
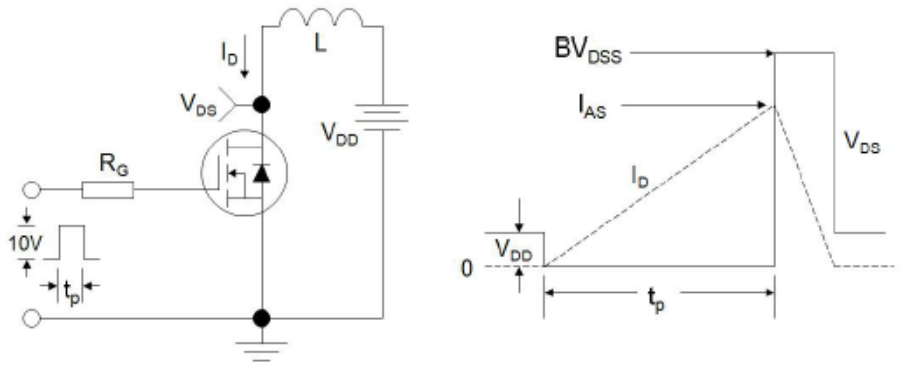
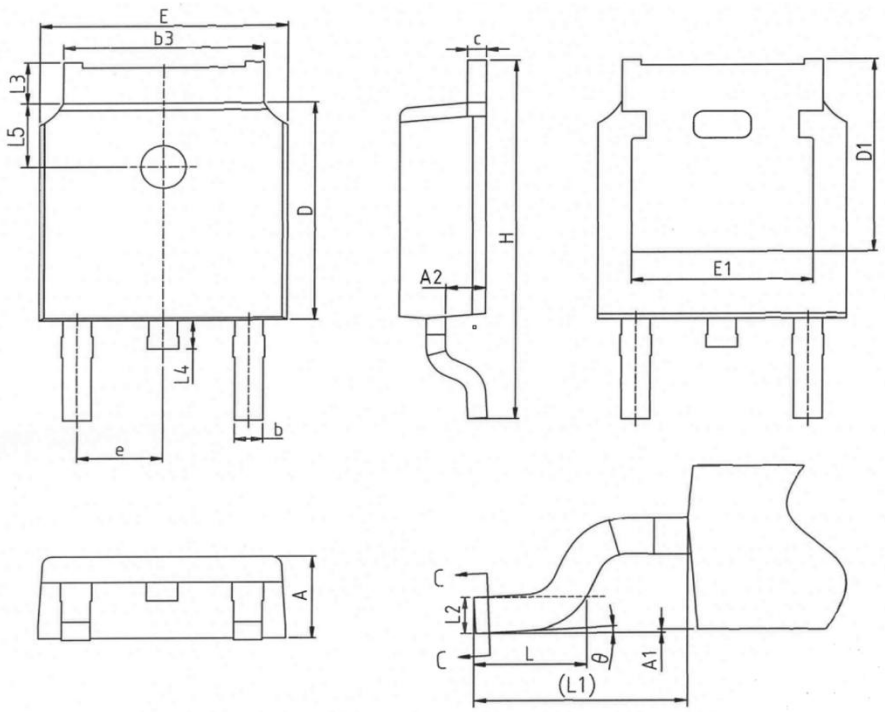


Figure 14: Unclamped Inductive Switching Test Circuit and Waveform



Package Outlines

DPAK



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.12
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.73
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°

* Dimensions in millimeters

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMD80N400E1	BMD80N400E1	DPAK	Tape & Reel	2500 units

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