

BMD60N600C1

N-Channel Power MOSFET

600 V, 8 A, 600 mΩ



bestirpower

Description

BMD60N600C1 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.

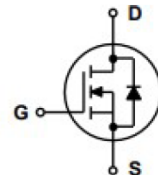
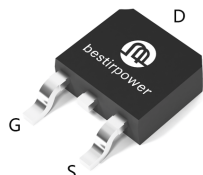
Features

$V_{DS} @ T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
650 V	8 A	600 mΩ	15 nC

- Extremely low losses due to very low FOM $R_{DS(on)} \cdot Q_g$ and E_{oss} .
- Very high commutation ruggedness.

Applications

CPFC.
CSPWM.
CLCD TV.
CLighting.
CUPS.



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

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage ¹⁾		600	V
V_{GSS}	Gate to Source Voltage		± 30	V
I_D	Drain Current ²⁾	$V_{GS} = 10\text{ V}, (T_C = 25^\circ\text{C})$	8	A
		$V_{GS} = 10\text{ V}, (T_C = 100^\circ\text{C})$	5	
I_{DM}	Drain Current	Pulsed	24	A
P_D	Power Dissipation		62.5	W
E_{AS}	Single Pulsed Avalanche Energy ³⁾		81	mJ
dv/dt	MOSFET dv/dt ruggedness		50	V/ns
	Diode Recovery dv/dt ruggedness ⁴⁾		15	
T_{STG}	Storage Temperature Range		-55 to 150	$^\circ\text{C}$
T_J	Maximum Operating Junction Temperature		150	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 10 Seconds		260	$^\circ\text{C}$

1) Limited by T_J max. Maximum duty cycle $D=0.75$.

2) Pulse width t_p limited by T_J max.

3) $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.

4) $V_{DClk}=400\text{V}$; $V_{DS,peak} < V_{(BR)DSS}$; identical low side and high side switch with identical R_G .

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, max $T_C = 25^\circ\text{C}$	2	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, max $T_C = 25^\circ\text{C}$	62	

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	600	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}, T_J = 25^\circ\text{C}$	-	-	1	μA
		$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}, T_J = 150^\circ\text{C}$	-	-	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$	-	-	± 100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	2	3	4	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 3.5\text{ A}, T_J = 25^\circ\text{C}$	-	500	600	mΩ

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=50\text{V}, f = 1\text{MHz}$	-	370	-	pF
C_{oss}	Output Capacitance		-	23	-	pF
C_{rss}	Reverse Transfer Capacitance		-	1.3	-	pF
$C_{o(er)}$	Energy Related Output Capacitance ¹⁾	$V_{DS} = 0\text{V to } 400\text{V}, V_{GS} = 0\text{V}$	-	16	-	pF
$C_{o(tr)}$	Time Related Output Capacitance ²⁾	$V_{DS} = 0\text{V to } 400\text{V}, V_{GS} = 0\text{V}$	-	87	-	pF
Q_g	Total Gate Charge	$V_{GS} = 0\text{-}10\text{V},$ $V_{DD} = 480\text{V}, I_D = 4\text{A}$	-	15	-	nC
Q_{gs}	Gate to Source Charge		-	2.4	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	9	-	nC
$V_{plateau}$	Gate plateau voltage		-	6	-	V
R_G	Gate Resistance	$V_{GS} = 0\text{V}, f = 1\text{MHz open drain}$	-	3.6	-	Ω

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{V}, V_{DD} = 400\text{V}, I_D = 4\text{A}$	-	18	-	ns
t_r	Turn-On Rise Time		-	12	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	50	-	ns
t_f	Turn-Off Fall Time		-	16	-	ns

Reverse Diode Characteristics

I_{SD}	Continuous Diode Forward Current	$T_C = 25^\circ\text{C}$	-	-	8	A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{V}, I_F = 4\text{A}, T_J = 25^\circ\text{C}$	-	0.86	-	V
t_{rr}	Reverse Recovery Time	$V_R = 400\text{V}, I_F = 4\text{A}$ $di_F/dt = 100\text{A}/\mu\text{s}$	-	200	-	ns
Q_{rr}	Reverse Recovery Charge		-	1.25	-	μC
I_{rm}	Reverse Recovery Current		-	14	-	A

1) $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 400V.

2) $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 400V.

Typical Performance Characteristics

Figure 1. Power dissipation

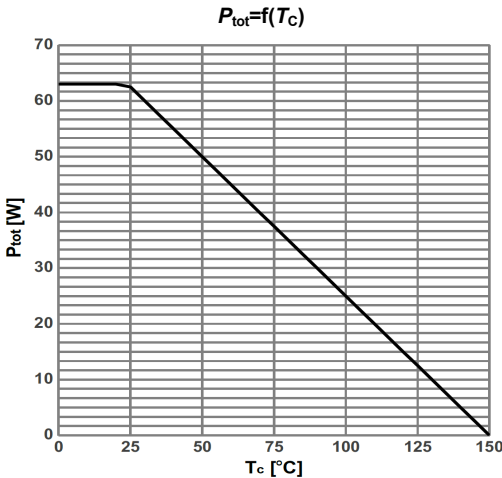


Figure 2. Max. transient thermal impedance

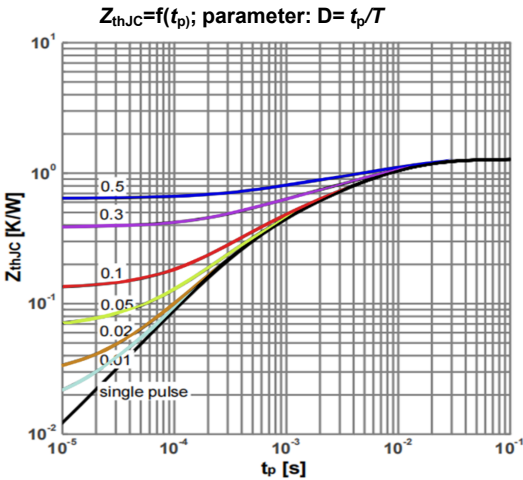


Figure 3: Safe operating area

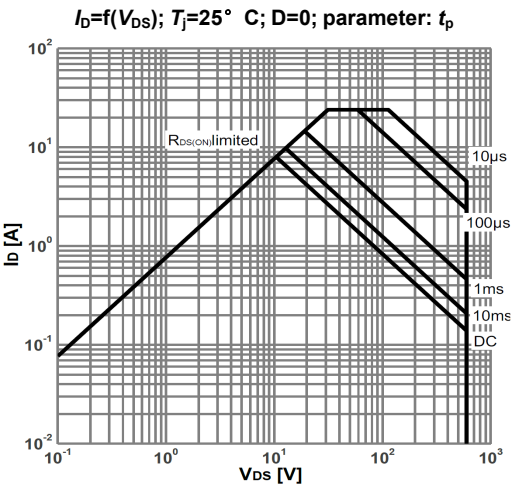


Figure 4: Typ. output characteristics

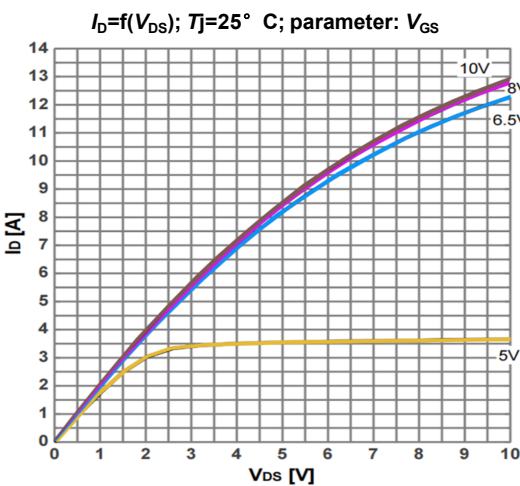


Figure 5:Typ. output characteristics

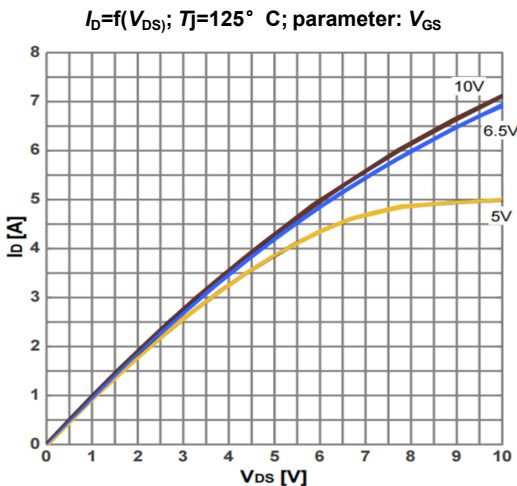
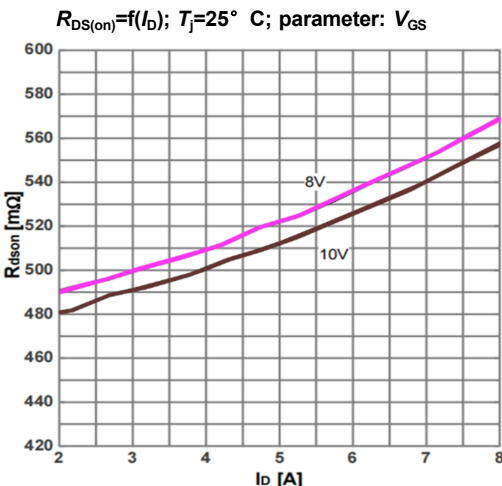


Figure 6: Typ. drain-source on-state resistance



Typical Performance Characteristics

Figure 7: drain-source on-state resistance

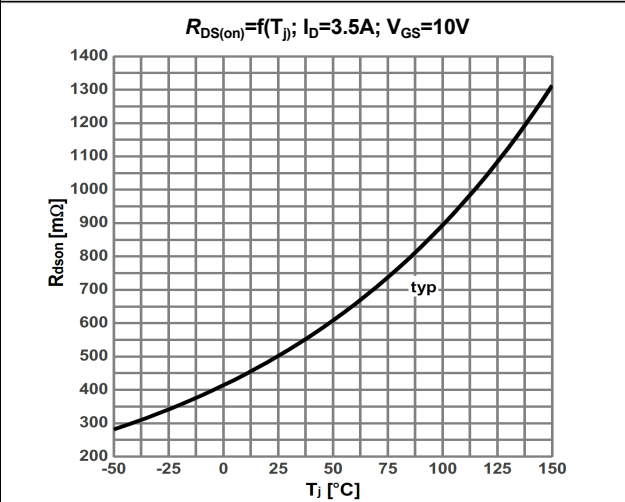


Figure 8: Typ. transfer characteristics

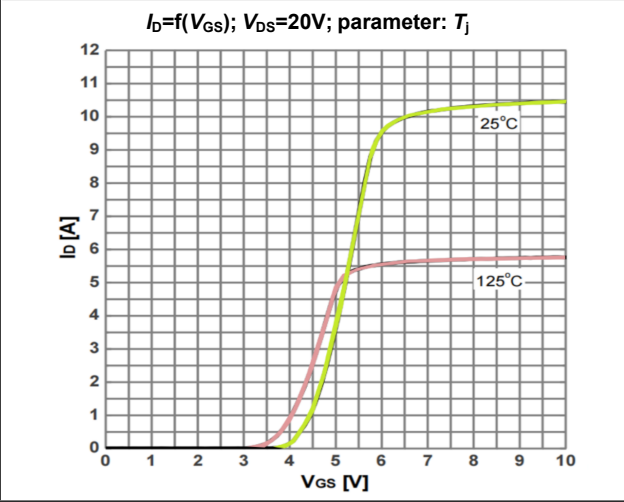


Figure 9:Typ. gate charge

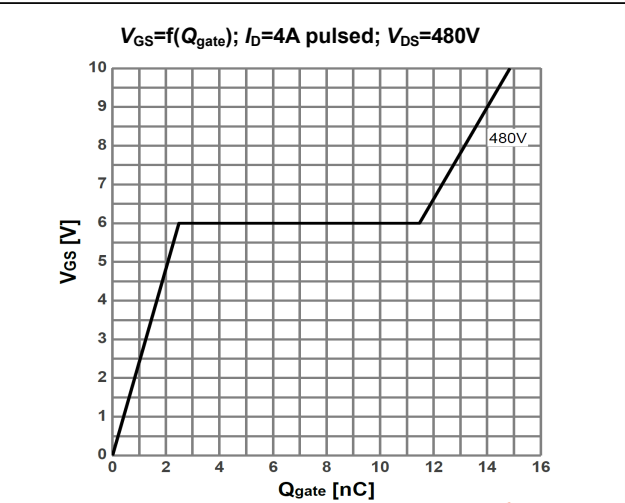


Figure 10:Forward characteristics of reverse diode

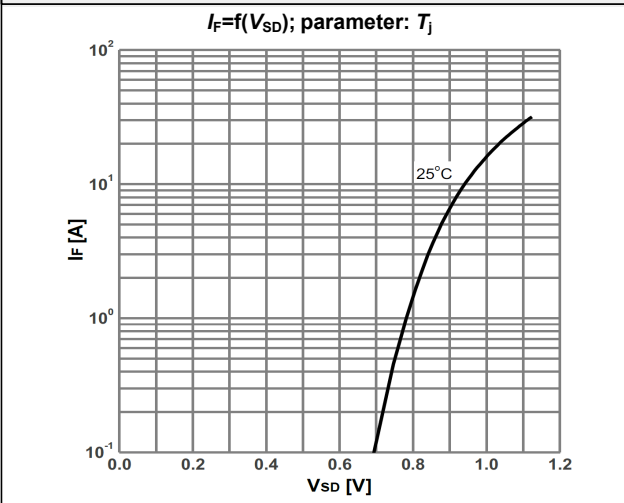


Figure 11:Drain-source breakdown voltage

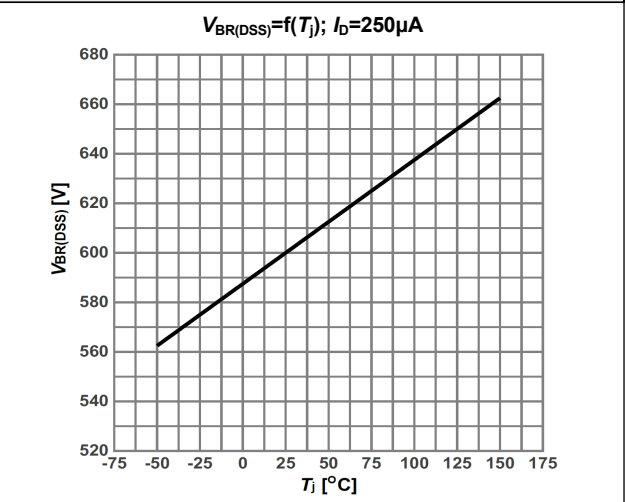
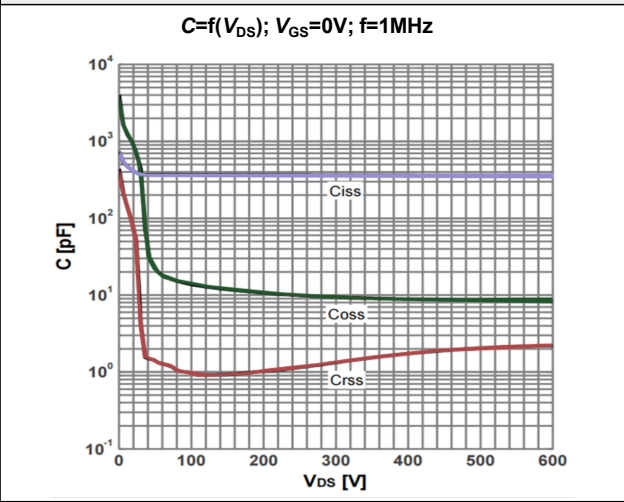


Figure 12:Typ. capacitances



Typical Performance Characteristics

Figure 13:Typ. Coss stored energy

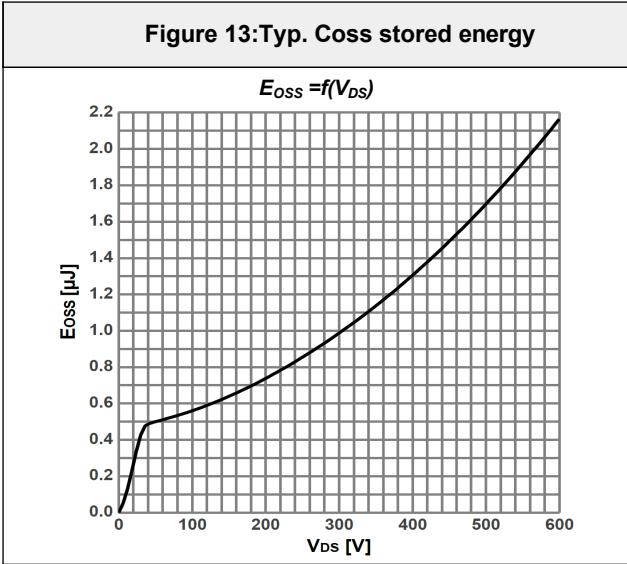
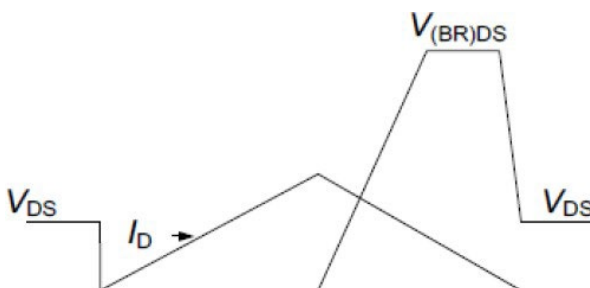
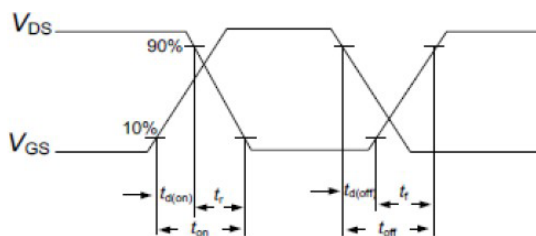
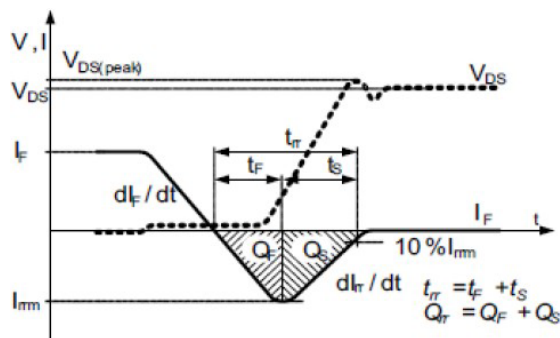
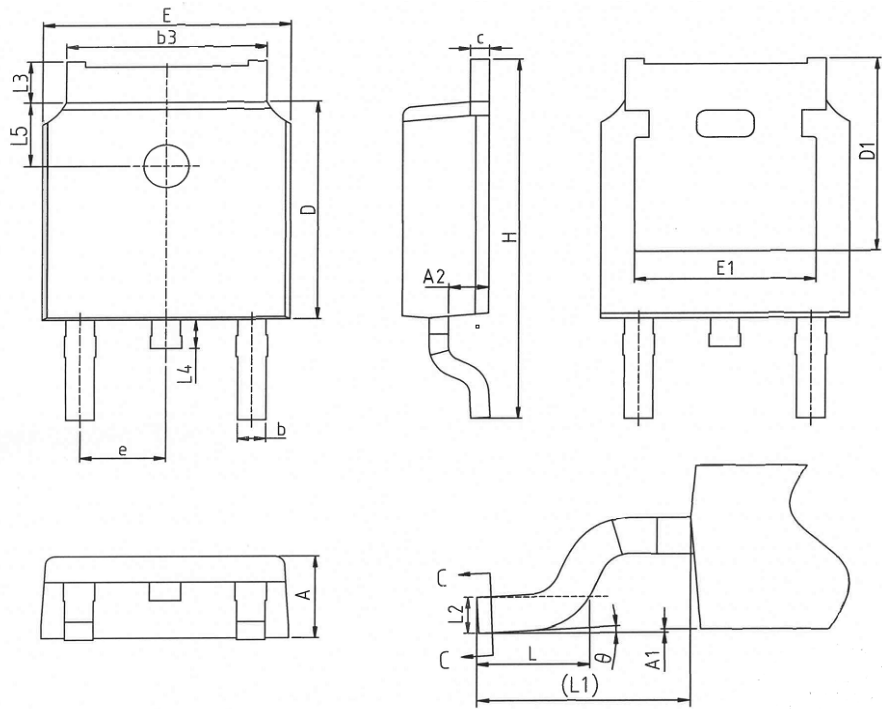


Figure 14: Diode Characteristics

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Package Outlines

D-Pak



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	Reel Size	Tape Width	Quantity
BMD60N600C1	BMD60N600C1	D-Pak	Tape & Reel	330 mm	16 mm	2500 units

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