BMF65N100UC1

N-Channel Power MOSFET

650 V, 35 A, 100 mΩ

bestirpower

Description

BMF65N100UC1 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.

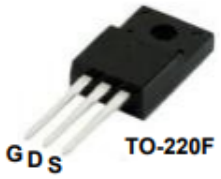
Features

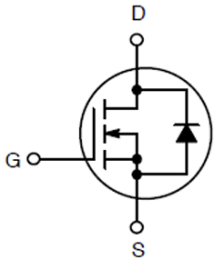
BV_{DSS} @ $T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
700 V	35 A	100 mΩ	66 nC

- Ultra-fast body diode.
- Extremely low losses due to very low FOM Rdson*Qg and Eoss.
- Very high commutation ruggedness.

Applications

- AC/DC power supply.
- PC power.
- Telecom/Sever.
- Solar invertor.





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

Symbol	Parameter		Value max	Unit
V_{DSS}	Drain to Source Voltage[1]		650	V
V_{GSS}	Gate to Source Voltage		±30	V
I_D	Drain Current[2]	Continuous (T_C = 25℃)	35	A
		Continuous (T_C = 125℃)	15	
I_{DM}	Drain Current	Pulsed	105	A
E_{AS}	Avalanche Energy,Single Pulsed [3]	I_D=12.5A, V_{DD}=50V	750	mJ
I_{AR}	Avalanche current, repetitive		12.5	A
dv/dt	MOSFET dv/dt ruggedness		50	V/ns
	Reverse diode dv/dt[4]		50	
P_D	Power Dissipation	(T_C = 25℃)	34	W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to 150	℃
I_s	Continuous diode forward current		35	A
$I_{S,pulse}$	Diode pulse current[2]		105	A

1) Limited by Tj 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.

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.	62.5	
T_{sold}	Soldering temperature, wavesoldering only allowed at leads	260	℃

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMF65N100UC1	BMF65N100UC1	TO-220F	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} = 0 V, I_D = 1 mA	650	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 650 V, V_{GS} = 0 V	-	-	10	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±30V, V_{DS} = 0 V	-	-	±100	nA
On Characteristics						
V_{GS}(th)	Gate Threshold Voltage	V_{GS} = V_{DS} , I_D = 1 mA	3.5	4.0	4.5	V
R_{DS}(on)	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D =18A Tj=25℃	-	82	100	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=50V, f=250KHz	-	2990	-	pF
C_{oss}	Output Capacitance		-	141	-	pF
C_{rss}	Reverse transfer capacitance		-	5.8	-	pF
$C_{o(tr)}$	Time Related Output Capacitance[2]	V_{DS} = 0 to 400 V, V_{GS} = 0 V	-	452	-	pF
$C_{o(er)}$	Energy Related Output Capacitance[1]		-	88	-	pF
$Q_{g(tot)}$	Total Gate Charge at 10 V	V_{DD} = 400 V, I_D = 18A, V_{GS} =0 to 10 V	-	66	-	nC
Q_{gs}	Gate to Source Charge		-	20	-	nC
Q_{gd}	Gate to Drain “Miller” Charge		-	25	-	nC
$V_{plateau}$	Gate plateau voltage		-	6.1	-	V
R_G	Gate Resistance	f = 1 MHz	-	2.7	-	Ω
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 400 V, I_D = 18A, V_{GS} = 10 V,	-	21	-	ns
t_r	Turn-On Rise Time		-	19	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	76	-	ns
t_f	Turn-Off Fall Time		-	8	-	ns
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V,I_F=18A Tf=25℃	-	0.88	-	V
t_{rr}	Reverse Recovery Time	V_R = 400 V, I_F= 18 A, di_F/dt = 100 A/μs	-	140	-	ns
Q_{rr}	Reverse Recovery Charge		-	1.15	-	μC
I_{mm}	Peak reverse recovery current		-	15	-	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

Ptot=f(Tc)

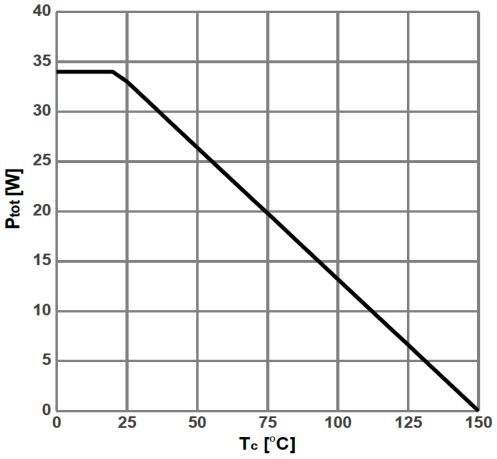


Figure 2: Max. transient thermal impedance

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

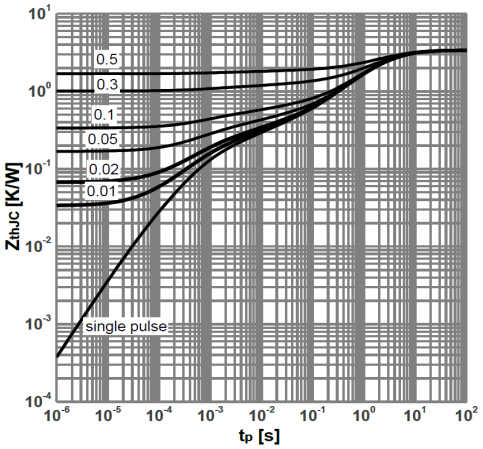


Figure 3: Safe operating area

*I*D=f(*V*DS); *T*j=25° C; D=0; parameter: *t*p

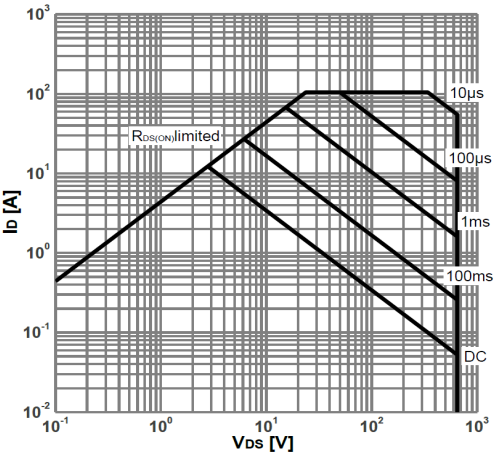


Figure 4: Typ. output characteristics

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

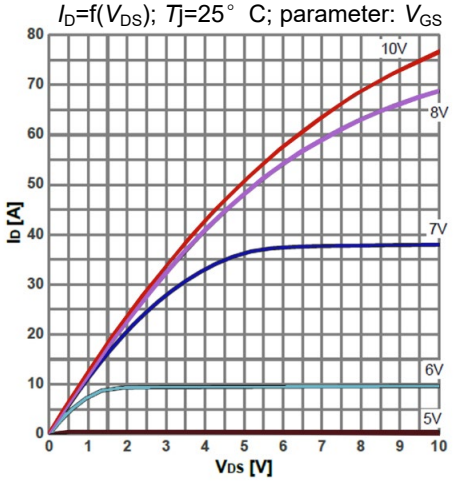


Figure 5: Typ. output characteristics

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

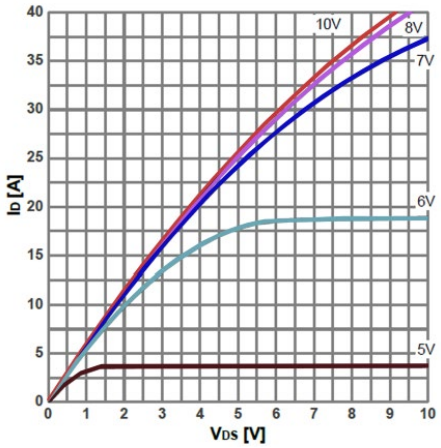
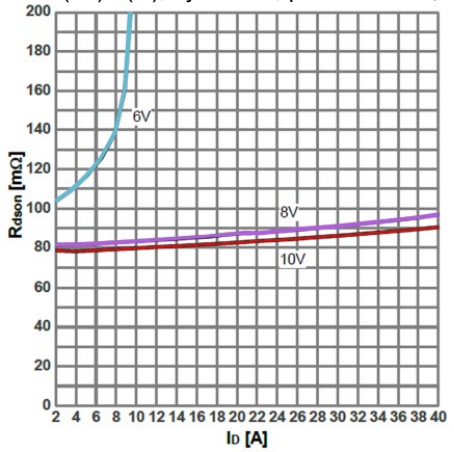


Figure 6: Typ. drain-source on-state resistance

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



Typical Performance Characteristics

Figure 7: Drain-source on-state resistance

*R*DS(on)=f(*T*j); *I*D=18A; *V*GS=10V

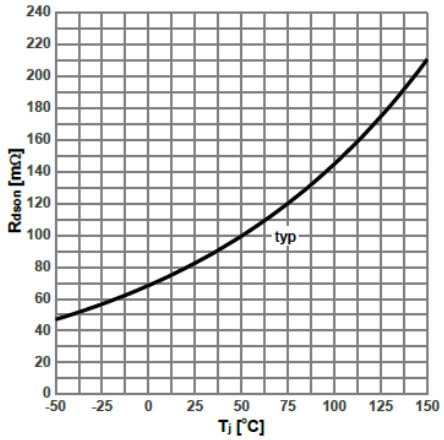


Figure 8: Typ. transfer characteristics

*I*D=f(*V*GS); *V*DS=20V; parameter: *T*j

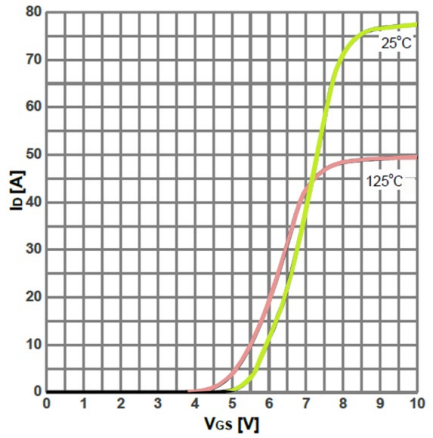


Figure 9: Typ. gate charge

*V*GS=f(*Q*gate); *I*D=18A pulsed; *V*DS=400V

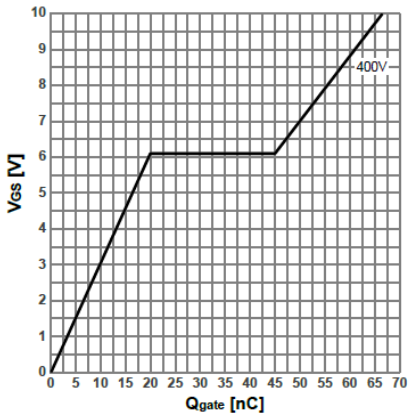


Figure 10: Forward characteristics of reverse diode

*I*F=f(V_{SD}); parameter: *T*j

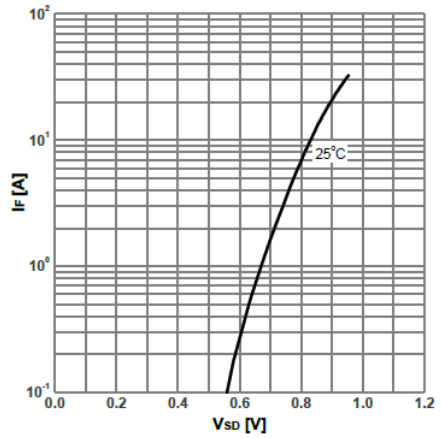


Figure 11: Drain-source breakdown voltage

*V*BR(DSS)=f(*T*j); *I*D=1mA

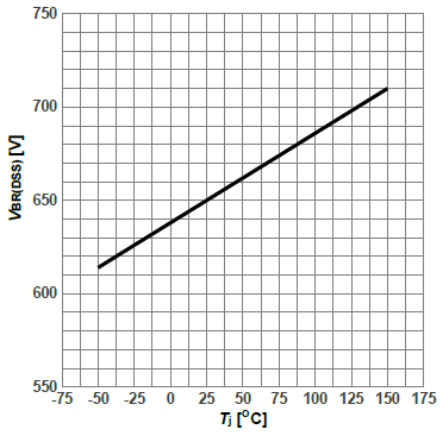
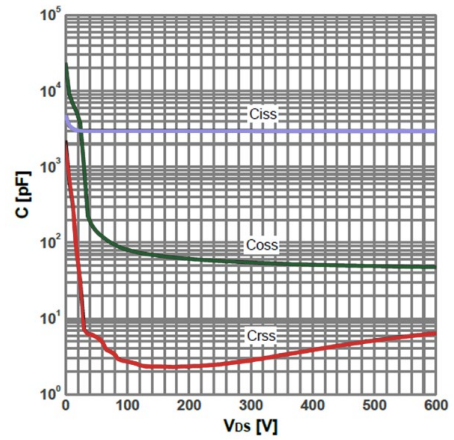


Figure 12: Typ. capacitances

C=f(*V*DS); *V*GS=0V; f=250KHz



Typical Performance Characteristics

Figure 13: Typ. Coss stored energy

*E*OSS =f(*V*DS)

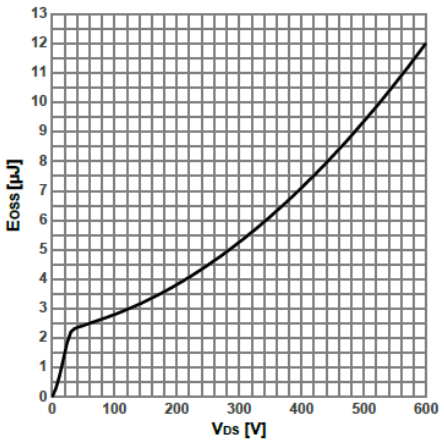
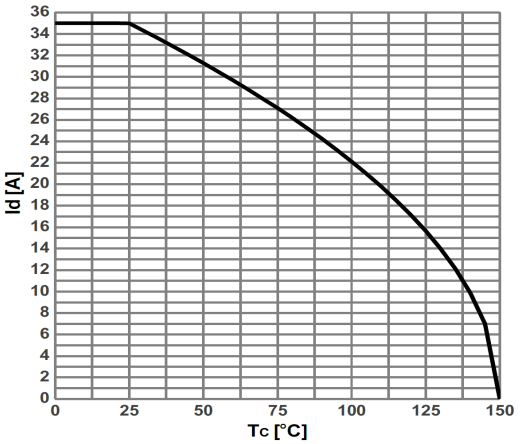


Figure 14: Max. Drain Current

I_D= f(*T*c); VGS=10V



Test Circuits

Figure 15. Diode Characteristics

Test circuit for diode characteristics and Diode recovery waveform

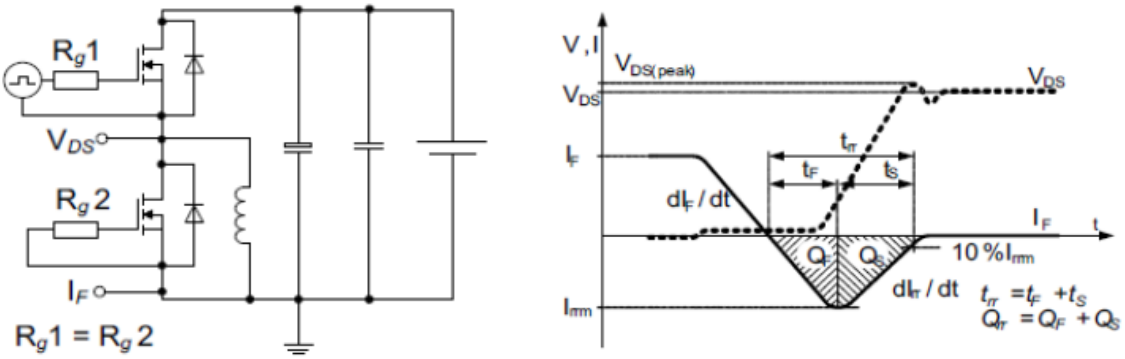


Figure 16. Switching Times

Switching times test circuit for inductive load and Switching times waveform

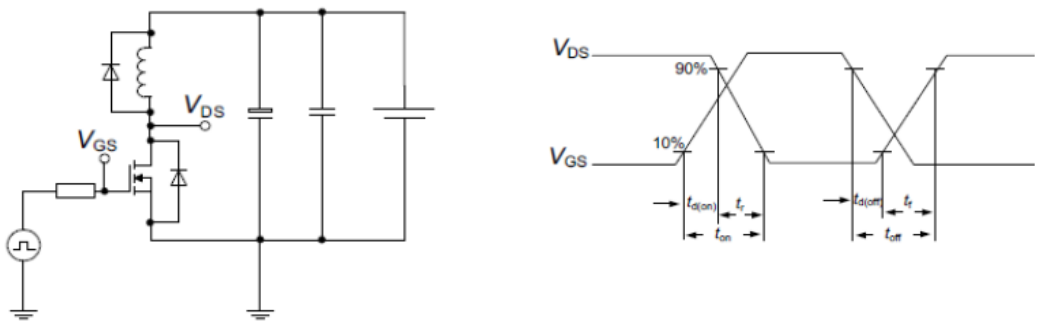
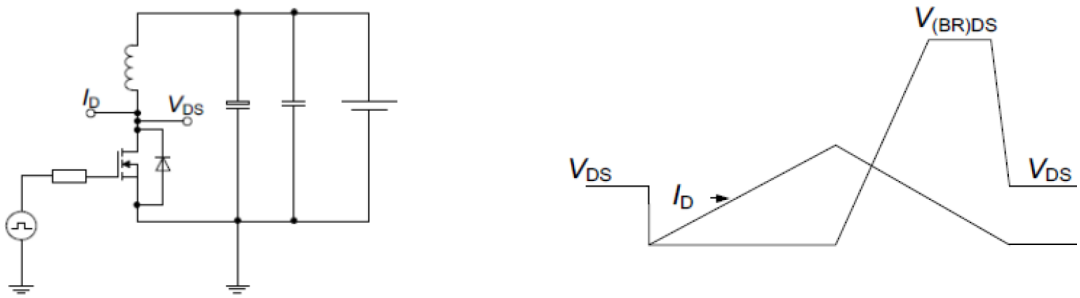


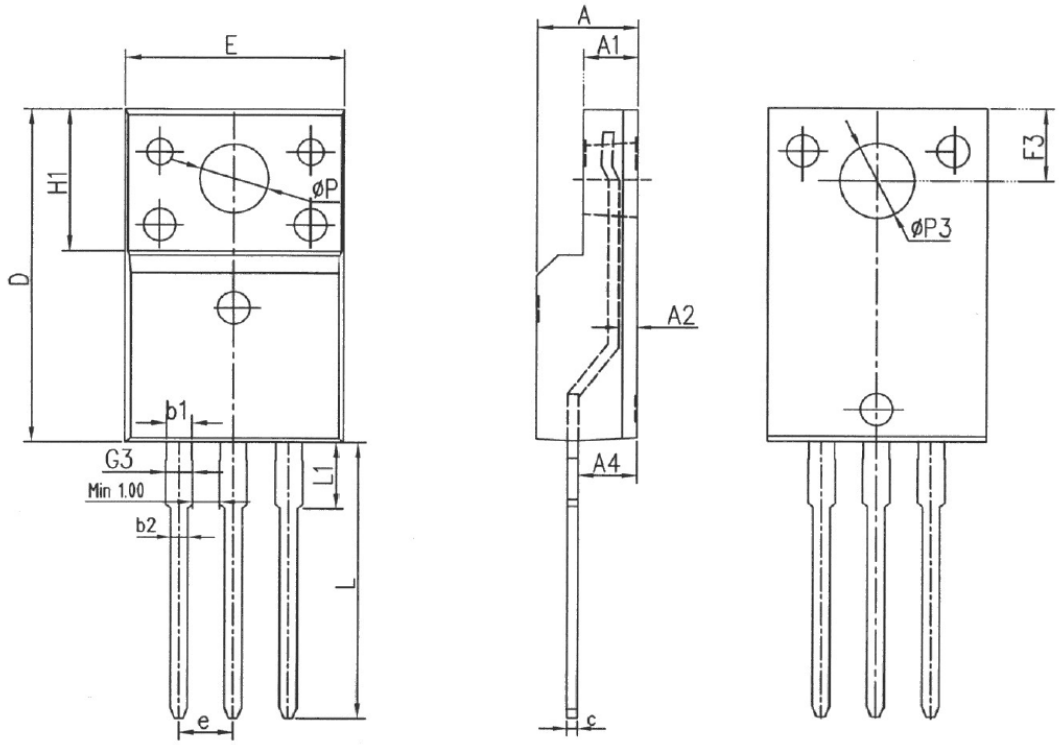
Figure 17. Unclamped Inductive Load

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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