BMF65N075UC1

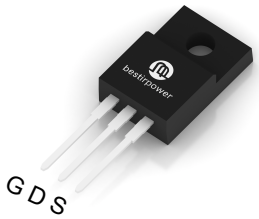
Super Junction Power MOSFET

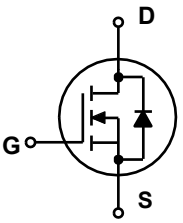
650 V,45 A, 75 mΩ

Description

BMF65N075UC1 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.

BV_{DSS} @ $T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
700 V	45 A	75 mΩ	81 nC





Applications

. Switch Mode Power Supply (SMPS)
. Uninterruptible Power Supply (UPS)
. Power Factor Correction (PFC)
. LLC Half-bridge
. Charger

Features

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

Absolute Maximum Ratings

Symbol	Parameter		Value max	Unit	Note
V_{DSS}	Drain to Source Voltage		650	V	
V_{GSS}	Gate to Source Voltage		±30	V	
I_D	Drain Current	Continuous (T_C=25℃)	45	A	Fig 1.2
		Continuous (T_C=100℃)	28	A	
I_{DM}	Drain Current	Pulsed (note1)	135	A	
E_{AS}	Single Pulse Avalanche Energy (note 2)		900	mJ	
dv/dt	MOSFET dv/dt Ruggedness, VDS = 0...650V		50	V/ns	
	Reverse Diode dv/dt (note 3)		50		
P_D	Power Dissipation	(T_C=25℃)	53	W	
T_J, T_{STG}	Operating junction and storage temperature		-55 to 150	℃	
I_S	Continuous diode forward current	(T_C=25℃)	45	A	Fig 6
$I_{S,pulse}$	Diode pulsed current (note 1)		135	A	
E_{AR}	Repetitive Avalanche Energy (note 2)		144	mJ	
I_{AR}	Avalanche Current		6	A	

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_D = 10A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
3. Identical low side and high side switch with identical R_G

Thermal Characteristics

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal Resistance, Junction to Case	2.35	℃/W
R_{thJA}	Thermal Resistance, Junction to Ambient	80	
T_{sold}	Soldering temperature, wavesoldering onlyallowed atleads	260	℃

Electrical Characteristics (T_j = 25℃ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit	Note
Off Characteristics							
BV_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	650	-	-	V	Fig.8
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=650V, V_{GS}=0V, T_j=25°C	-	-	10	μA	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±30V	-	-	±100	nA	
On Characteristics							
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2.5	4	4.5	V	Fig.2
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS}=10V, I_D=22A, T_j=25℃	-	58	75	mΩ	Fig.3.7
		V_{GS}=10V, I_D=22A, T_j=150℃		160	206		
Dynamic Characteristics							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=100V, f=1MHz	-	4640	-	pF	Fig.4
C_{oss}	Output Capacitance		-	123	-	pF	
C_{rss}	Reverse Transfer Capacitance		-	3.55	-	pF	
$Q_{g(tot)}$	Total Gate Charge at 10 V	V_{GS}=10V, V_{DD}=400V, I_D=22A	-	81	-	nC	Fig.5
Q_{gs}	Gate to Source Charge		-	25	-	nC	
Q_{gd}	Gate to Drain Charge		-	24	-	nC	
R_G	Gate Resistance	f =1MHz open drain	-	1	-	Ω	
$t_{d(on)}$	Turn-on Delay Time	I_D=22A,V_{DD}=400V, R_G=25Ω, V_{Gs}=10V	-	107	-	ns	
t_r	Rise Time		-	80	-	ns	
$t_{d(off)}$	Turn-off Delay Time		-	164	-	ns	
t_f	Fall Time		-	52	-	ns	
Source-Drain Diode Characteristics							
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=22A , T_j=25℃	-	0.9	1.2	V	
t_{rr}	Reverse Recovery Time	V_R=400V, I_s=22A dif/dt=100A/μs	-	176	-	ns	
Q_{rr}	Reverse Recovery Charge		-	1.4	-	μC	
I_{rrm}	Peak Reverse Recovery Current		-	16	-	A	

Typical Performance Characteristics

Figure 1. Output Characteristics

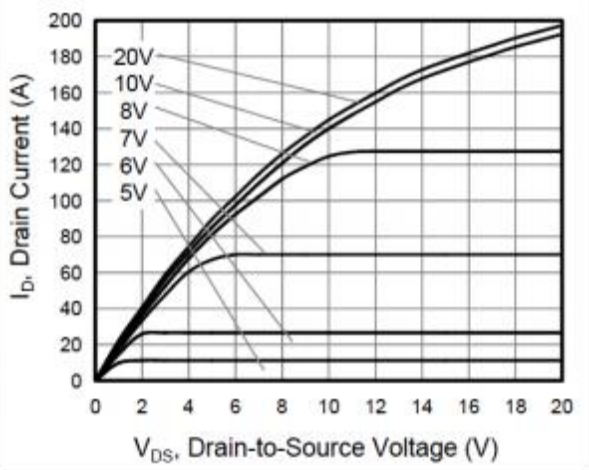


Figure 2. Transfer Characteristics

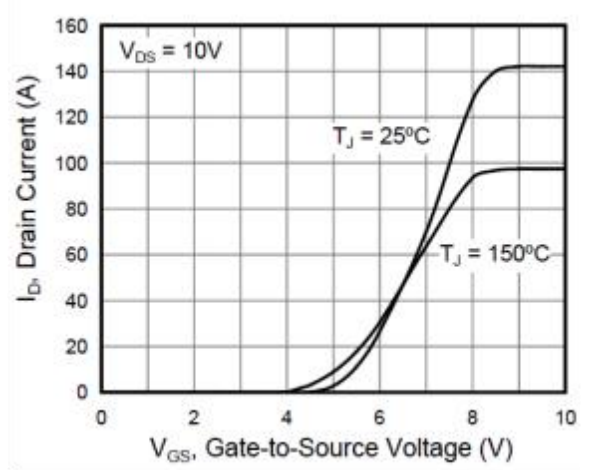


Figure 3. On-Resistance vs. Drain Current

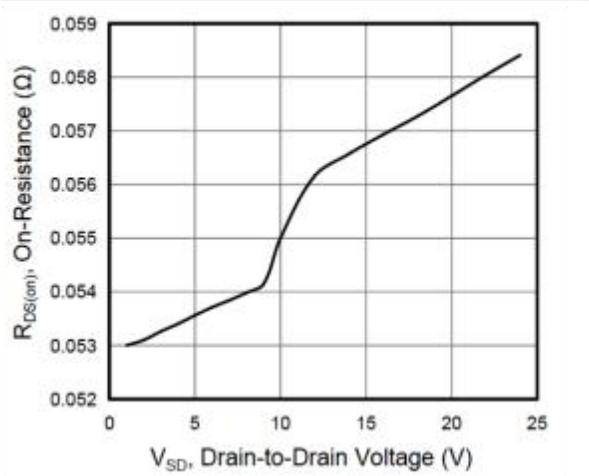


Figure 4. Capacitance

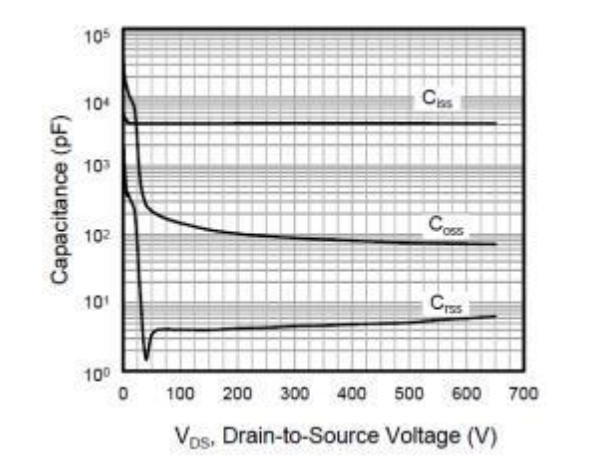


Figure 5. Gate Charge

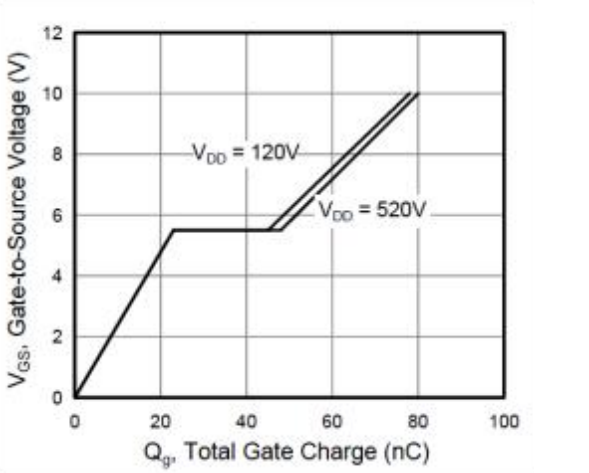
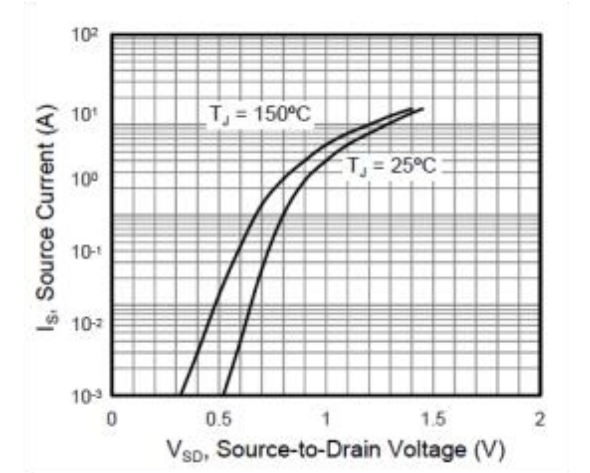


Figure 6. Body Diode Forward Voltage



Typical Performance Characteristics

Figure 7. On-Resistance vs. Temperature

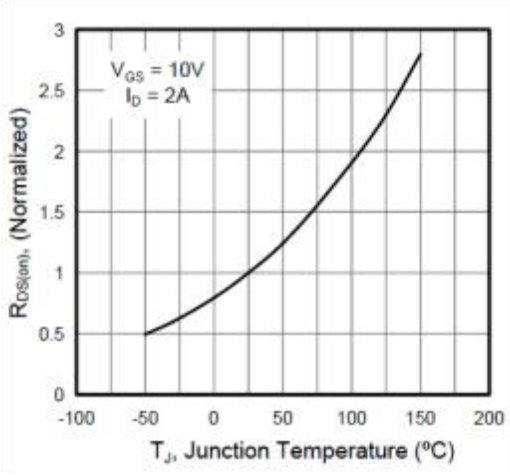


Figure 8. Breakdown voltage vs. Temperature

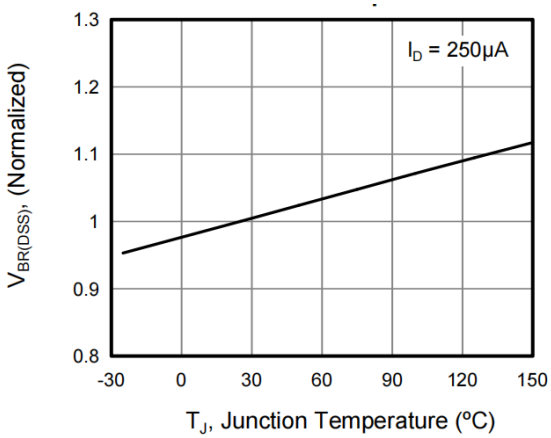


Figure 9. Transient Thermal Impedance

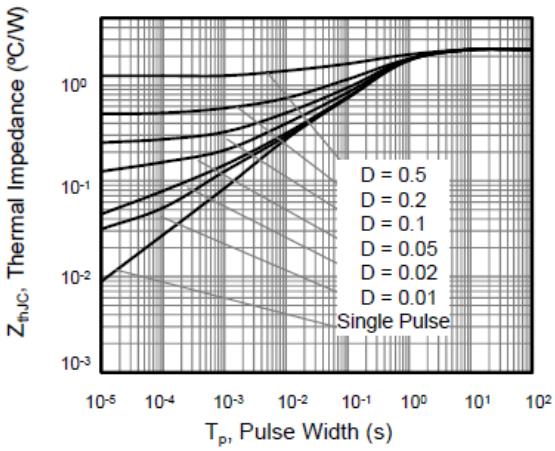


Figure 10. Safe Operation Area

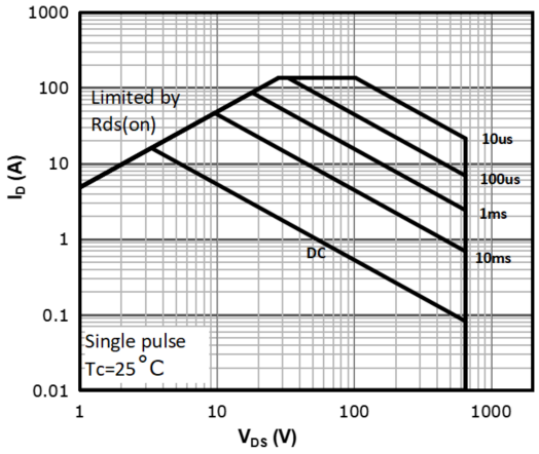
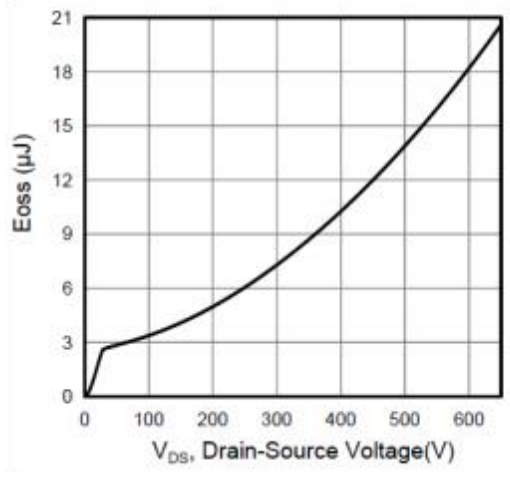


Figure 11. Typ. Coss Stored Energy



Test Circuits

Figure 12：Gate Charge Test Circuit and Waveform

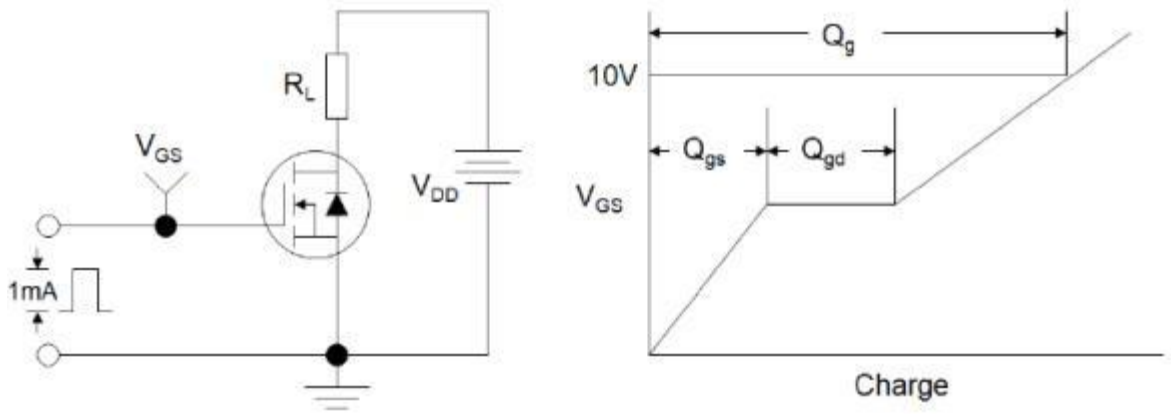


Figure 13：Resistive Switching Test Circuit and Waveform

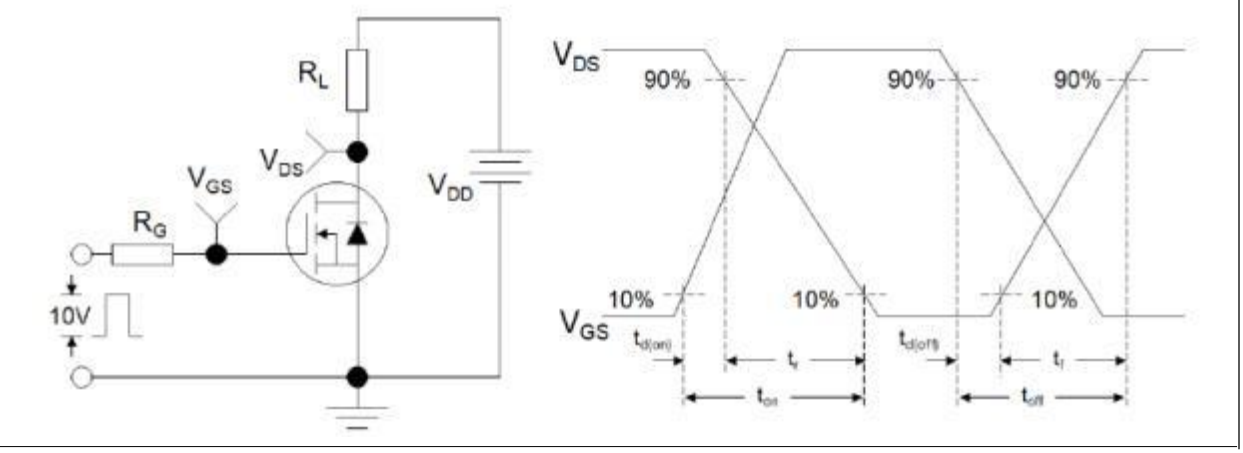
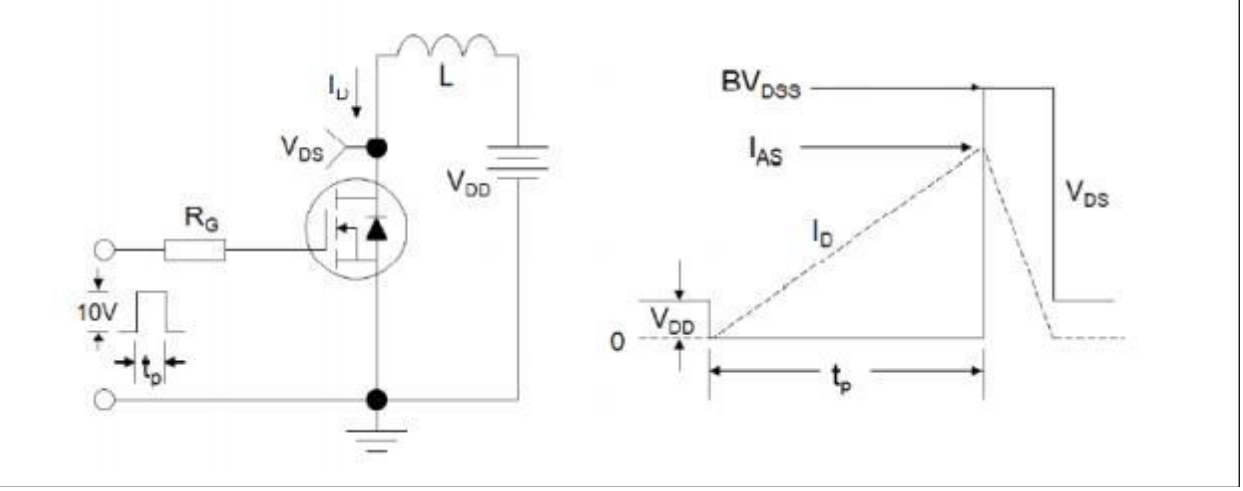
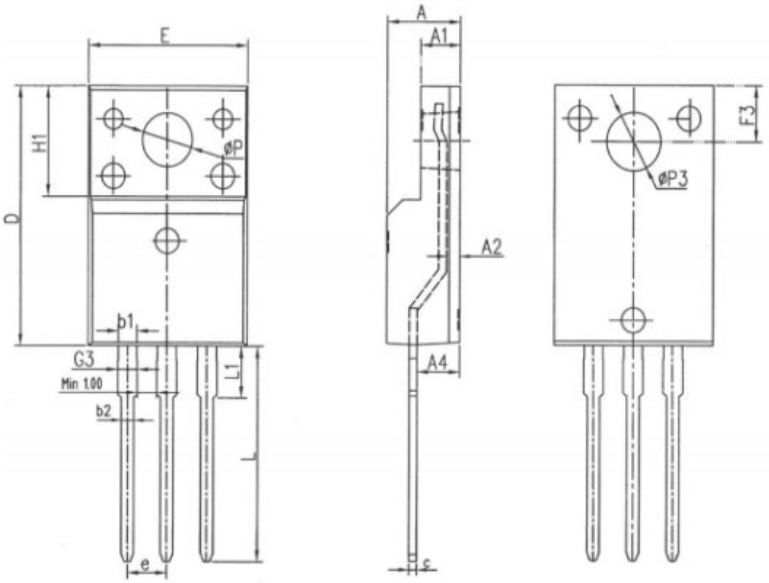


Figure 14：Unclamped Inductive Switching Test Circuit and Waveform



Package Outlines

TO-220F



COMMON DIMENSIONS

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

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMF65N075UC1	BMF65N075UC1	TO-220F	Tube	50 units

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