

BMT65N075UC1

Super Junction Power MOSFET

650 V, 45 A, 75 mΩ

Description

BMT65N075UC1 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.

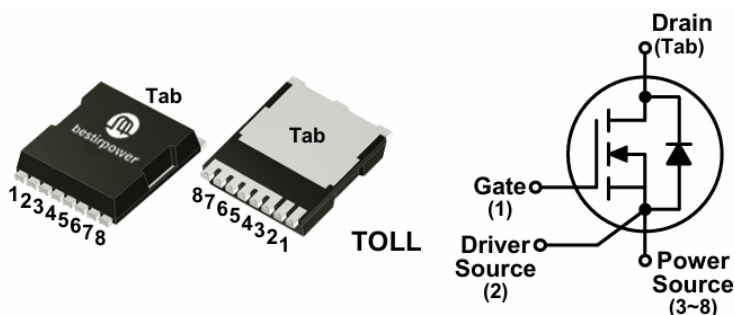
Applications

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

Features

$BV_{DSS} @ T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
700V	45 A	75 mΩ	72 nC

- Ultra-fast body diode
- Very low FOM $R_{DS(on)} \times Q_g$
- Easy to use/drive
- 100% avalanche tested



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

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		650	V
V_{GSS}	Gate to Source Voltage		± 30	V
I_D	Drain Current	$V_{GS} = 10\text{ V}, (T_C = 25^\circ\text{C})$	45	A
		$V_{GS} = 10\text{ V}, (T_C = 100^\circ\text{C})$	28	
I_{DM}	Drain Current (note1)	Pulsed ($T_C = 25^\circ\text{C}$)	135	A
E_{AS}	Single Pulsed Avalanche Energy (note2)		361	mJ
I_{AS}	Avalanche Current		8.5	A
dv/dt	MOSFET dv/dt		50	V/ns
	Peak Diode Recovery dv/dt (note3)		50	
P_{tot}	Power Dissipation	($T_C = 25^\circ\text{C}$)	312	W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to 150	$^\circ\text{C}$
I_S	Continuous diode forward current	$T_C = 25^\circ\text{C}$	45	A
$I_{S,pulse}$	Diode pulse current	$T_C = 25^\circ\text{C}$	135	A

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $L = 10\text{mH}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. 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.	0.4	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62	
T_{solder}	Soldering temperature, wavesoldering only allowed at leads	260	°C

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	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	650	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}, T_J = 25^{\circ}\text{C}$	-	-	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	-	-	± 100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	3.0	3.7	5.0	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 22\text{ A}, T_J = 25^{\circ}\text{C}$	-	55	75	mΩ
R_G	Gate resistance	$F=1\text{MHz}$, open drain	-	0.54	-	Ω

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 100\text{V},$ $f = 1.0\text{MHz}$	-	4253	-	pF
C_{oss}	Output Capacitance		-	144	-	pF
C_{rss}	Reverse transfer Capacitance		-	10	-	pF
$Q_{g(tot)}$	Total Gate Charge at 10 V	$V_{DD} = 400\text{ V}, I_D = 22\text{ A},$ $V_{GS} = 10\text{ V}$	-	72	-	nC
Q_{gs}	Gate to Source Charge		-	23.2	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	21.6	-	nC

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 400\text{ V}, I_D = 22\text{ A},$ $V_{GS} = 10\text{ V}$	-	270	-	ns
t_r	Turn-On Rise Time		-	6.72	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	153	-	ns
t_f	Turn-Off Fall Time		-	12.4	-	ns

Source-Drain Diode Characteristics

V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_F = 22\text{ A}, T_J = 25^{\circ}\text{C}$	-	0.9	1.2	V
t_{rr}	Reverse Recovery Time	$V_R = 400\text{V}, I_S = 22\text{A},$ $di_F/dt = 100\text{A}/\mu\text{s}$	-	198	-	ns
Q_{rr}	Reverse Recovery Charge		-	1.177	-	μC
I_{rrm}	Peak reverse recovery current		-	10.5	-	A

Typical Performance Characteristics

Figure 1. Output Characteristics

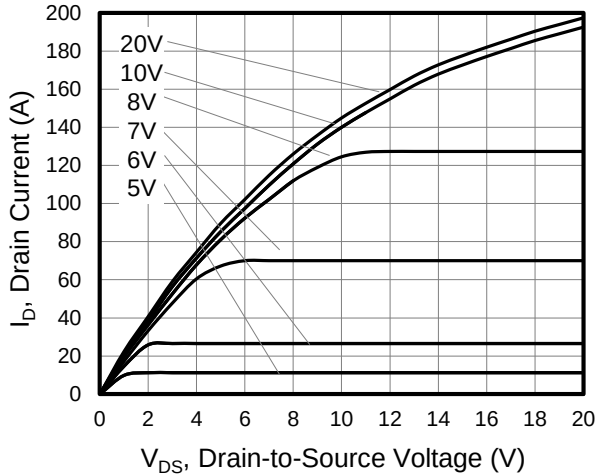


Figure 2. Transfer Characteristics

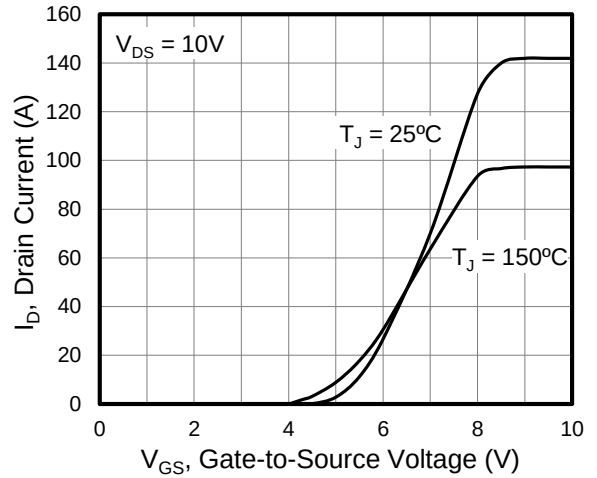


Figure 3. On-Resistance vs. Drain Current

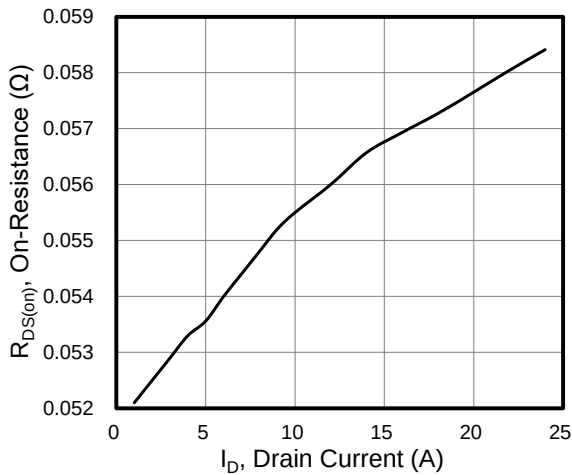


Figure 4. Capacitance

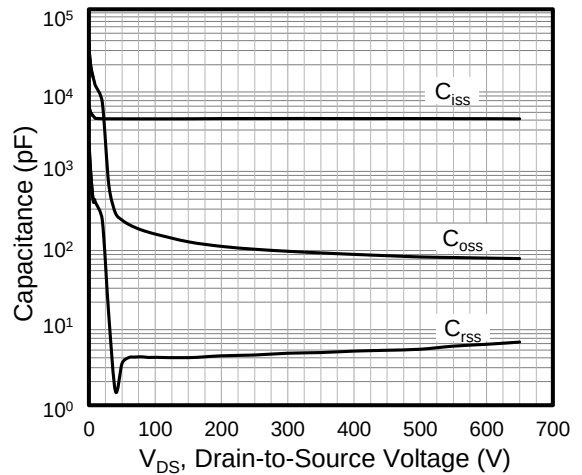


Figure 5. Gate Charge

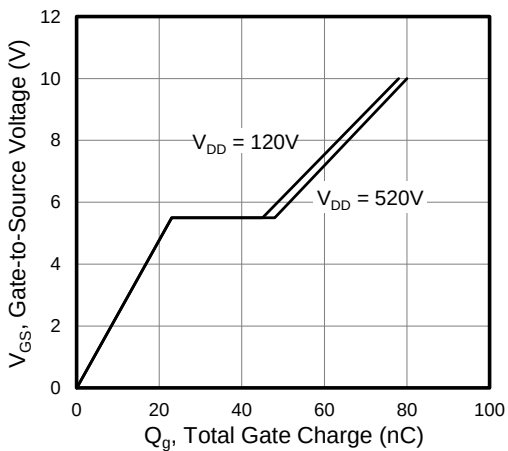
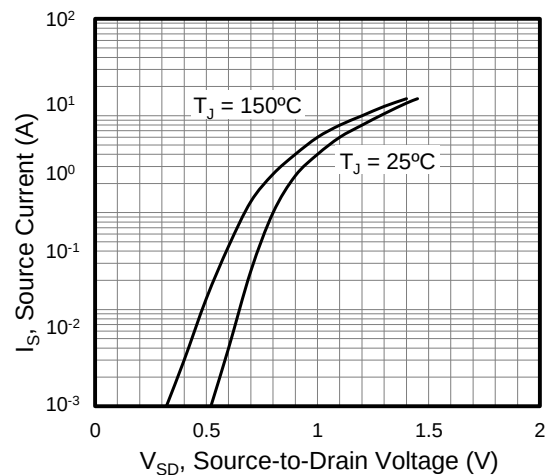


Figure 6. Body Diode Forward Voltage



Typical Performance Characteristics

Figure 7. On-Resistance vs. Junction Temperature

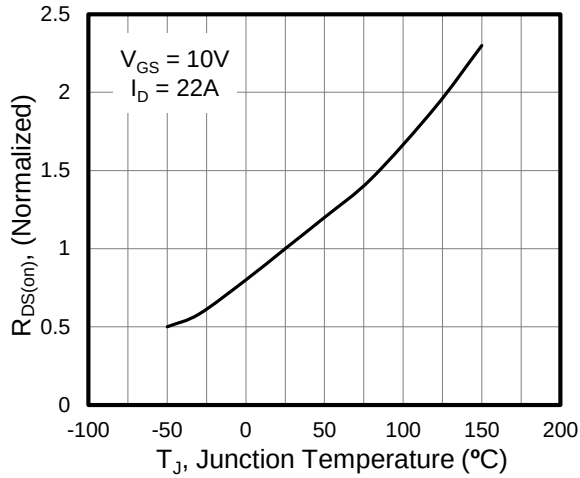


Figure 8. Breakdown voltage vs. Junction Temperature

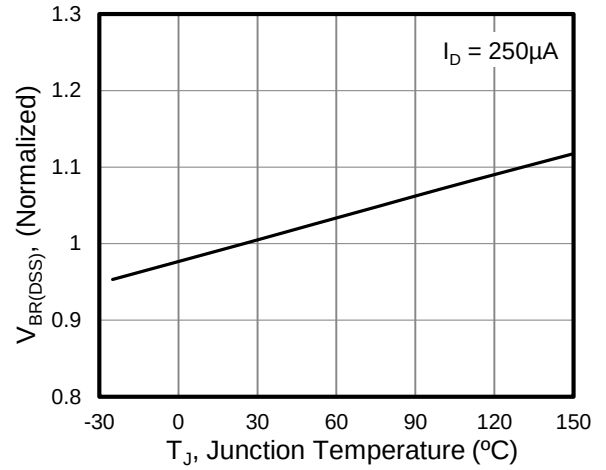


Figure 9. Transient Thermal Impedance

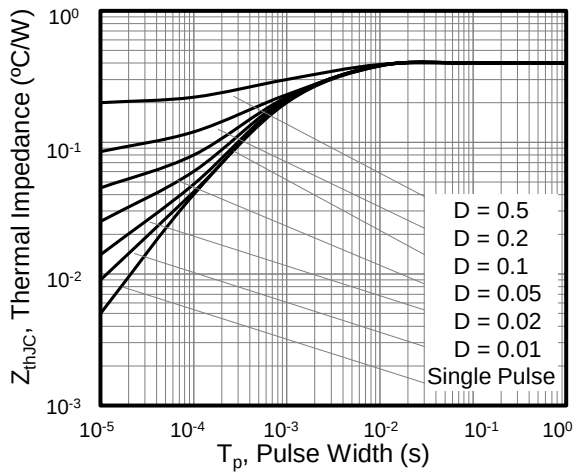


Figure 10. Safe Operation Area

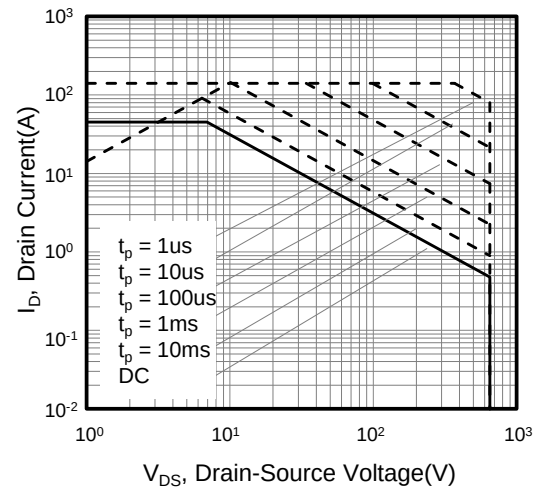


Figure 11. Typ. Coss Stored Energy

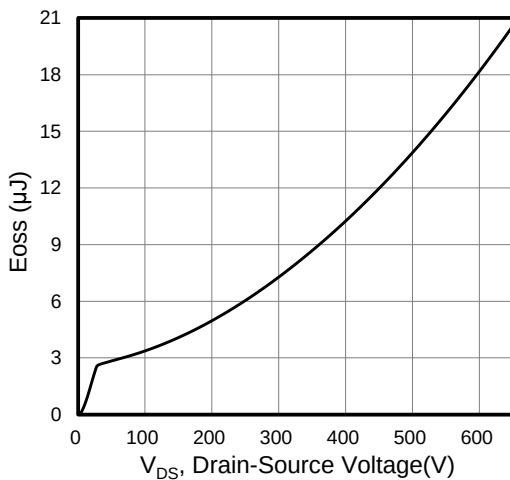


Figure 12. Gate Charge Test Circuit and Waveform

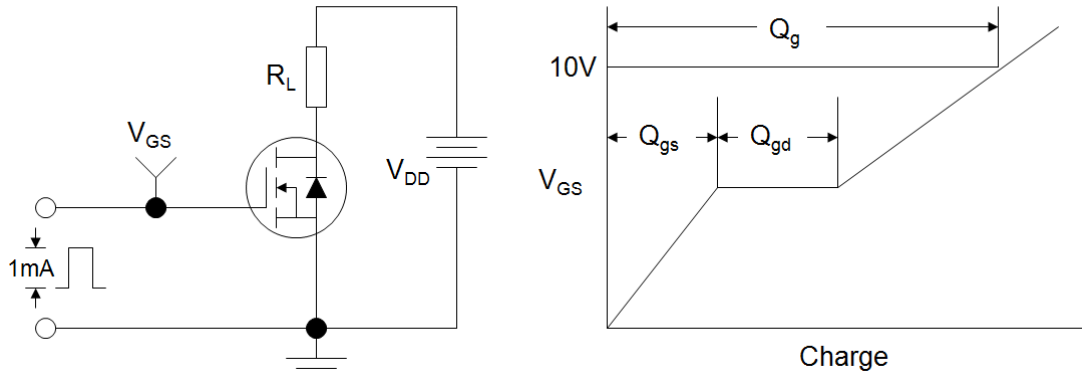


Figure 13. Resistive Switching Test Circuit and Waveform

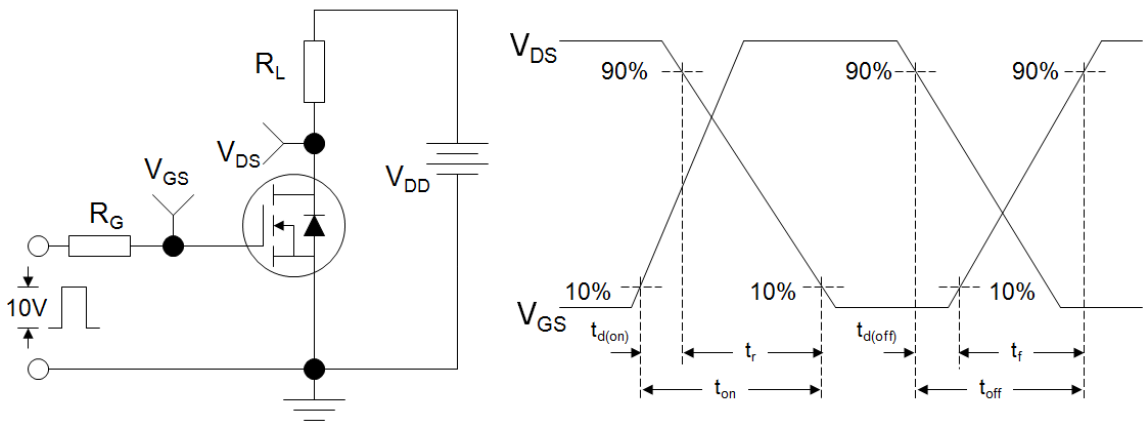
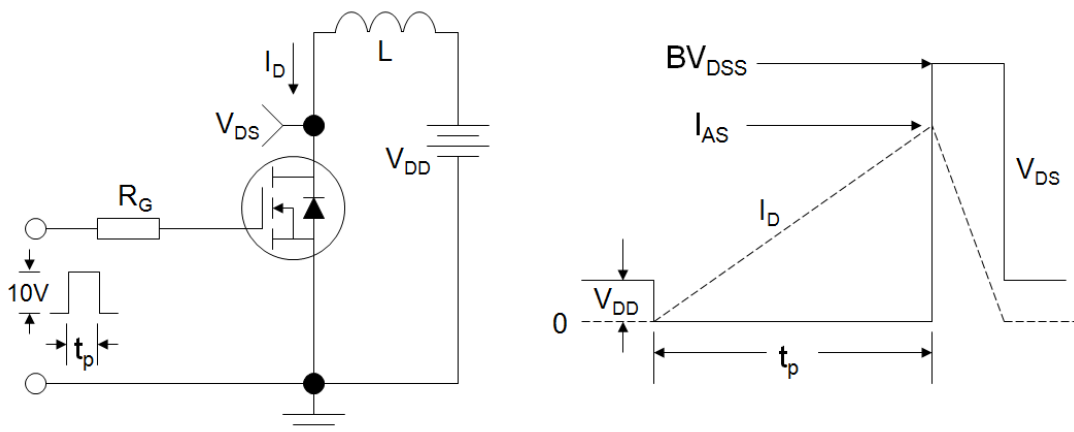
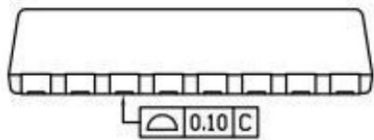
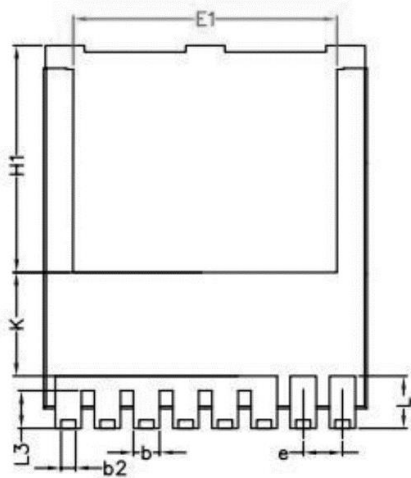
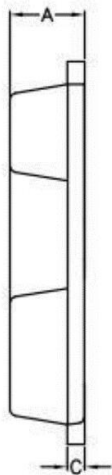
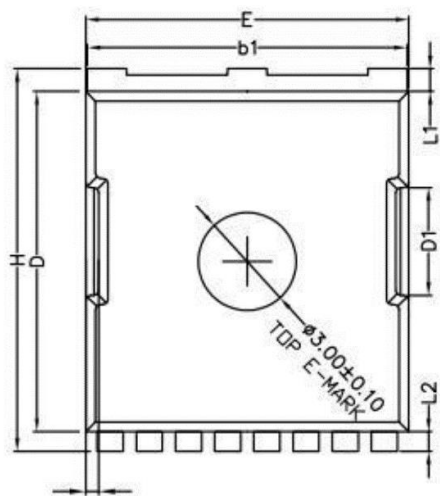


Figure 14. Unclamped Inductive Switching Test Circuit and Waveform



Package Outlines

TOLL



SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.40	0.45	0.50
c	0.40	0.50	0.60
D	10.28	10.43	10.58
D1	3.15	3.30	3.45
E	9.70	9.90	10.10
E1	7.90	8.10	8.30
e	1.10	1.20	1.30
H	11.48	11.73	11.88
H1	6.75	6.95	7.15
K	3.03	3.18	3.33
L	1.50	1.60	1.70
L1	0.55	0.70	0.85
L2	0.45	0.60	0.75
L3	1.00	1.15	1.30
L4	0.55	0.60	0.65

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMT65N075UC1	BMT65N075UC1	TOLL	Tape and Reel	1200 Units

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