



# 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.

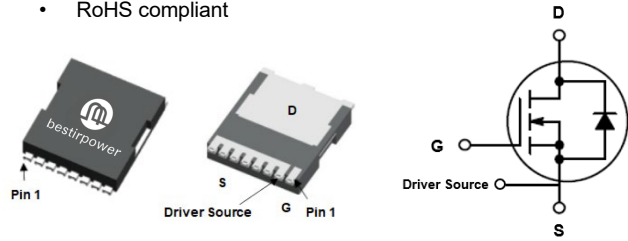
### Applications

- 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
- RoHS compliant



### 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	$\pm 30$	V
$I_D$	Drain Current	$V_{GS} = 10 \text{ V}, (T_C = 25^\circ\text{C})$	45
		$V_{GS} = 10 \text{ V}, (T_C = 100^\circ\text{C})$	28
$I_{DM}$	Drain Current (note1)	Pulsed ( $T_C = 25^\circ\text{C}$ )	135
$E_{AS}$	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 <sup>3)</sup> (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
$I_{S,pulse}$	Diode pulse current	$T_C = 25^\circ\text{C}$	135

### 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.	0.84	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62	
$T_{sold}$	Soldering temperature, wavesoldering only allowed at leads	260	°C

### Electrical Characteristics (T<sub>J</sub> = 25°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

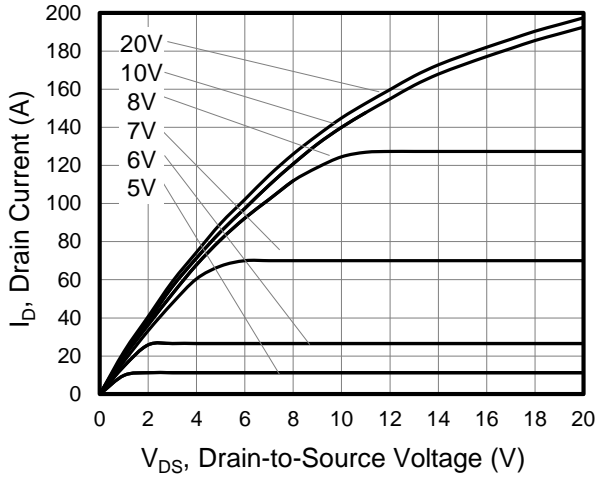
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 400\text{ V}, I_D = 22\text{ A}, V_{GS} = 10\text{ V}$	-	270	-	ns
$t_r$	Turn-On Rise Time		-	6.72	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	153	-	ns
$t_f$	Turn-Off Fall Time		-	12.4	-	ns

#### Source-Drain Diode Characteristics

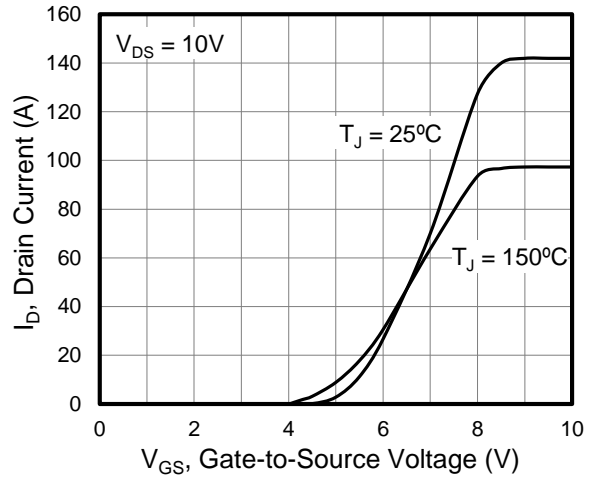
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_F = 22\text{ A}, T_J = 25^\circ\text{C}$	-	0.9	1.2	V
$t_{rr}$	Reverse Recovery Time	$V_R = 400\text{V}, I_S = 22\text{A}, di_F/dt = 100\text{A}/\mu\text{s}$	-	198	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	1.177	-	μC
$I_{rrm}$	Peak reverse recovery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

### Typical Performance Characteristics

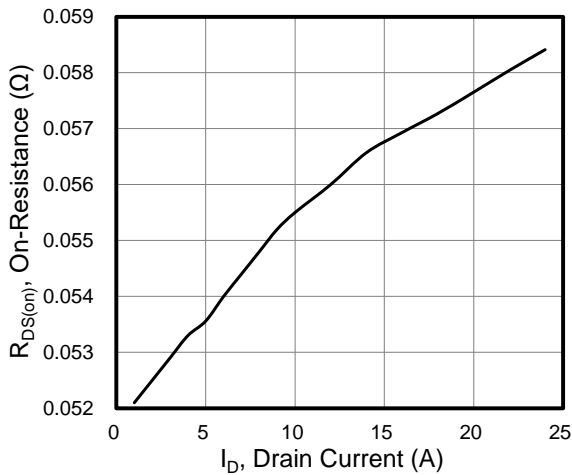
**Figure 1. Output Characteristics**



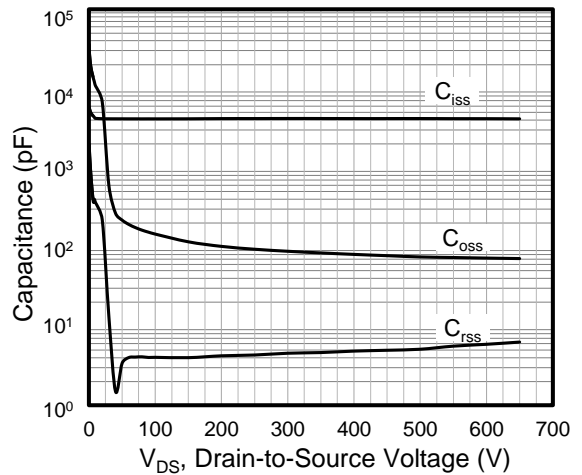
**Figure 2. Transfer Characteristics**



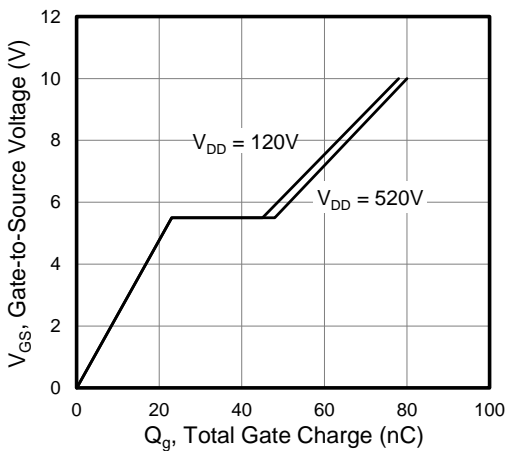
**Figure 3. On-Resistance vs. Drain Current**



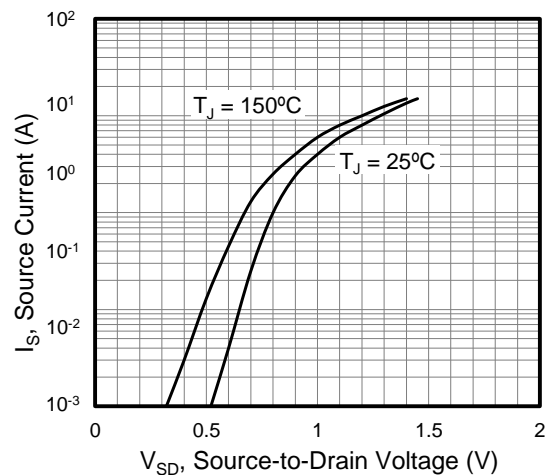
**Figure 4. Capacitance**



**Figure 5. Gate Charge**

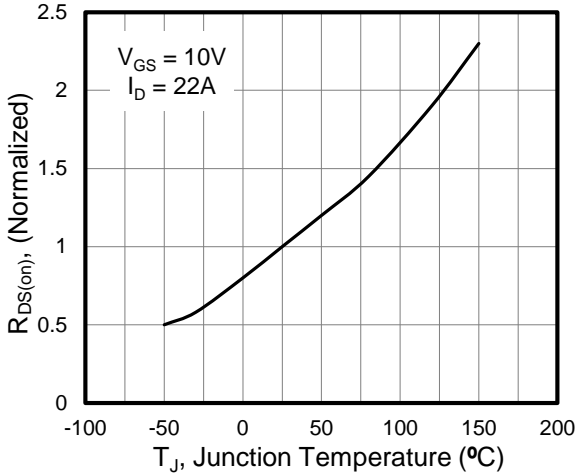


**Figure 6. Body Diode Forward Voltage**

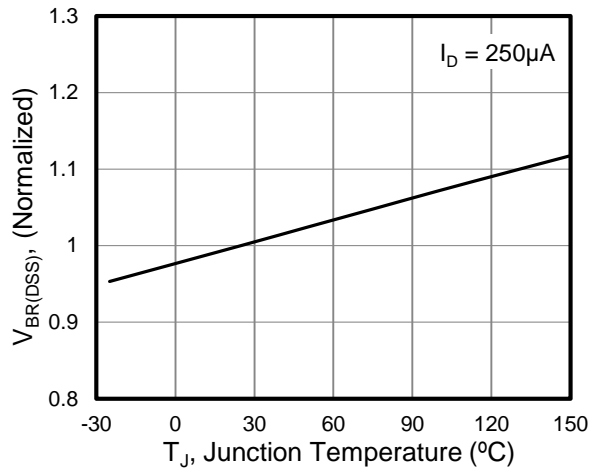


### Typical Performance Characteristics

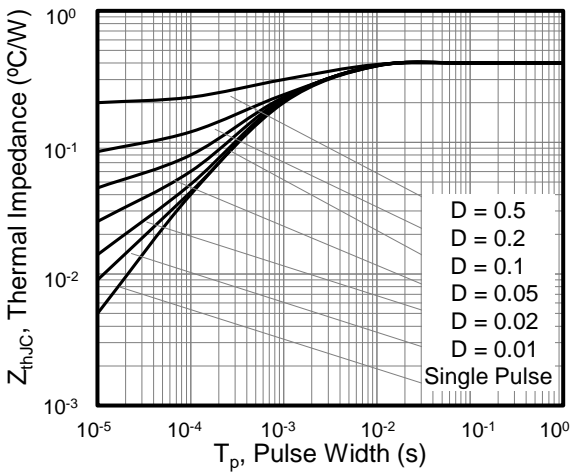
**Figure 7. On-Resistance vs. Junction Temperature**



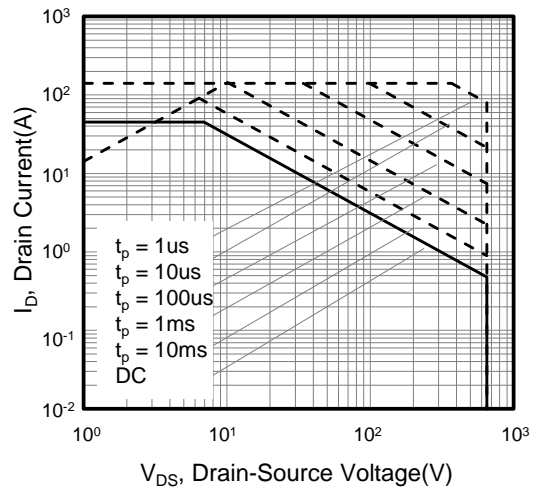
**Figure 8. Breakdown voltage vs. Junction Temperature**



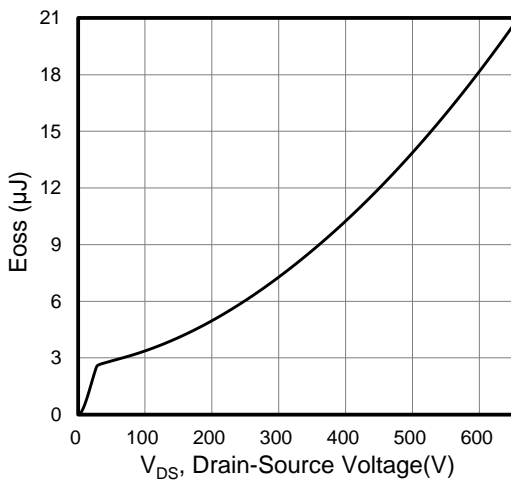
**Figure 9. Transient Thermal Impedance**



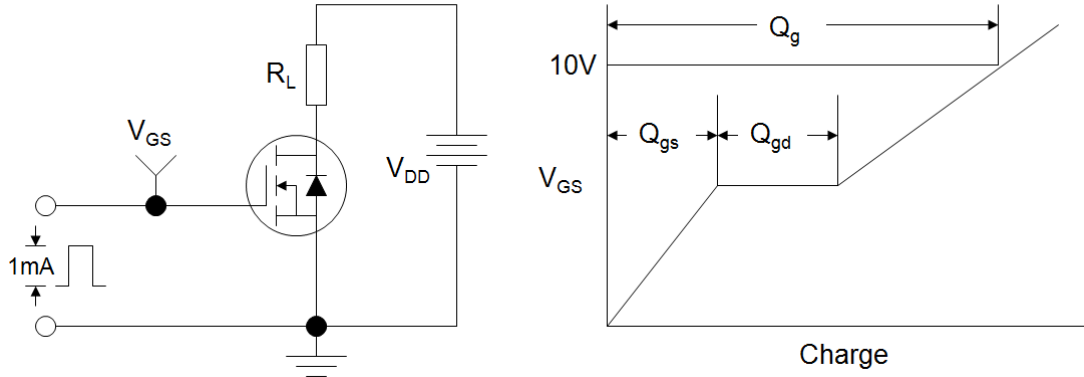
**Figure 10. Safe Operation Area**



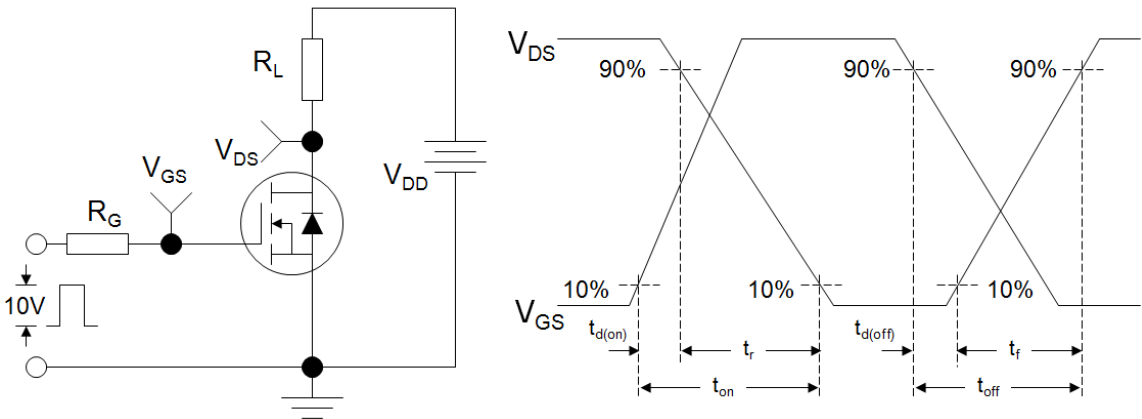
**Figure 11. Typ. Coss Stored Energy**



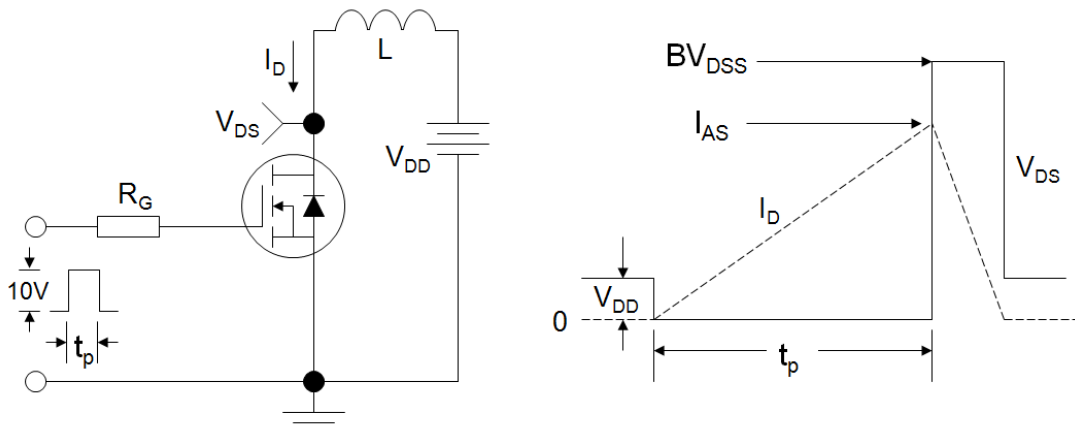
**Figure 12. Gate Charge Test Circuit and Waveform**



**Figure 13. Resistive Switching Test Circuit and Waveform**

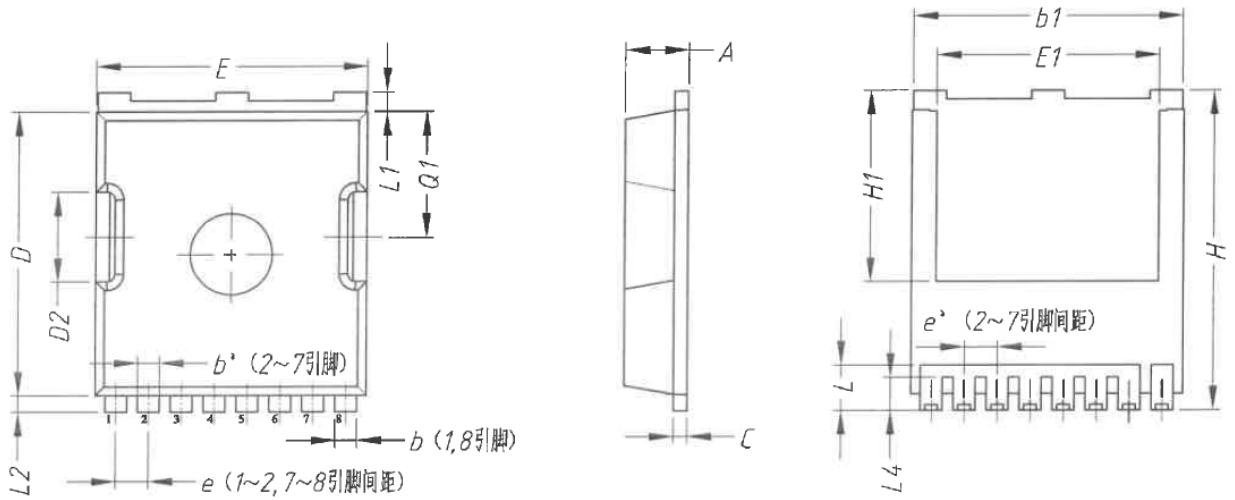


**Figure 14. Unclamped Inductive Switching Test Circuit and Waveform**



**Package Outlines**

**TOLL**



SYMBOL	MM		
	MIN	NOM	MAX
A	2.15	2.30	2.45
b	0.75	0.75	0.85
b'	0.70	0.70	0.80
b1	9.65	9.80	9.95
C	0.45	0.50	0.60
D	10.18	10.38	10.58
D2	3.15	3.30	3.45
E	9.70	9.90	10.10
E1	7.95	8.10	8.25
e	BSC 1.225		
e'	BSC 1.20		
Q1	4.40	4.55	4.70
H	11.48	11.68	11.88
H1	6.80	6.95	7.10
L	1.60	1.80	2.00
L1	0.50	0.70	0.90
L2	0.48	0.60	0.72
L4	1.00	1.15	1.30

\* Dimensions in millimeters

**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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