

BMW65N075UC1

Super Junction Power MOSFET

650 V, 45 A, 75 mΩ

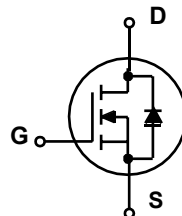
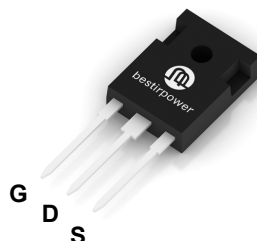
Description

BMW65N075UC1 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 $R_{DS(on)} \times Q_g$
- . 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	$V_{GS}=10V, (T_C=25^{\circ}C)$	45	A	Fig 1.2
		$V_{GS}=10V, (T_C=100^{\circ}C)$	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, $V_{DS} = 0...650V$		50	V/ns	
	Reverse Diode dv/dt (note 3)		50		
P_D	Power Dissipation	$(T_C=25^{\circ}C)$	312	W	
T_J, T_{STG}	Operating junction and storage temperature		-55 to 150	°C	
I_S	Continuous diode forward current	$(T_C=25^{\circ}C)$	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. $I_D = 10A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^{\circ}C$
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	0.4	°C/W
R_{thJA}	Thermal Resistance, Junction to Ambient	62	
T_{solder}	Soldering temperature, wavesoldering only allowed at leads	260	°C

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit	Note
Off Characteristics							
BV_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V	Fig.8
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=650V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	-	-	10	μA	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V$	-	-	± 100	nA	

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5	4	4.5	V	Fig.2
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS}=10V, I_D=22A, T_J=25^{\circ}\text{C}$	-	58	75	mΩ	Fig.3.7
		$V_{GS}=10V, I_D=22A, T_J=150^{\circ}\text{C}$		160	206		

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=100V, f=1\text{MHz}$	-	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	$f=1.0\text{MHz open drain}$	-	1	-	Ω	
$t_{d(on)}$	Turn-on Delay Time	$I_D=22A, V_{DD}=400V, R_G=25\Omega, V_{GS}=10V,$	-	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	$V_{GS}=0V, I_{SD}=22A, T_J=25^{\circ}\text{C}$	-	0.9	1.2	V	
t_{rr}	Reverse Recovery Time	$V_R=400V, I_S=22A, di_f/dt=100A/\mu s$	-	176	-	ns	
Q_{rr}	Reverse Recovery Charge		-	1.4	-	μC	
I_{rm}	Peak Reverse Recovery Current		-	16	-	A	

Typical Performance Characteristics

Figure 1. Output Characteristics

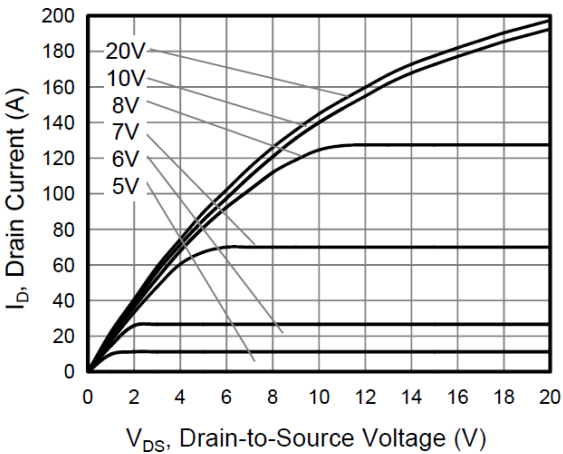


Figure 2. Transfer Characteristics

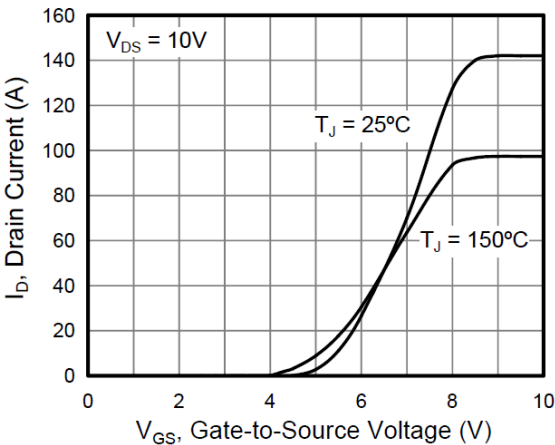


Figure 3. On-Resistance vs. Drain Current

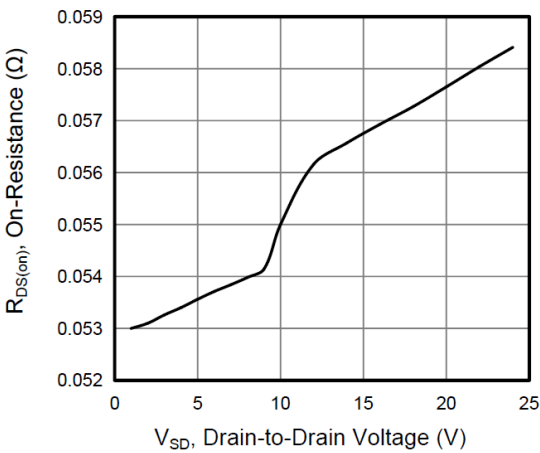


Figure 4. Capacitance

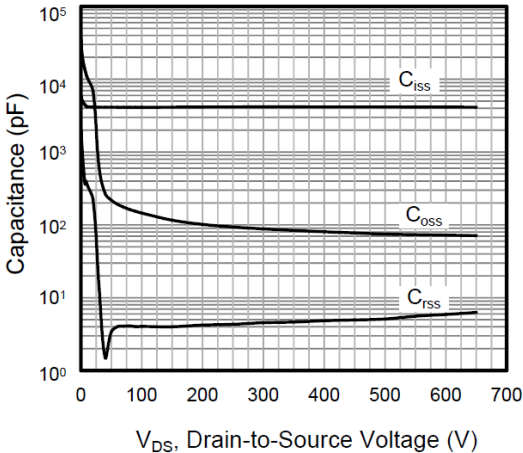


Figure 5. Gate Charge

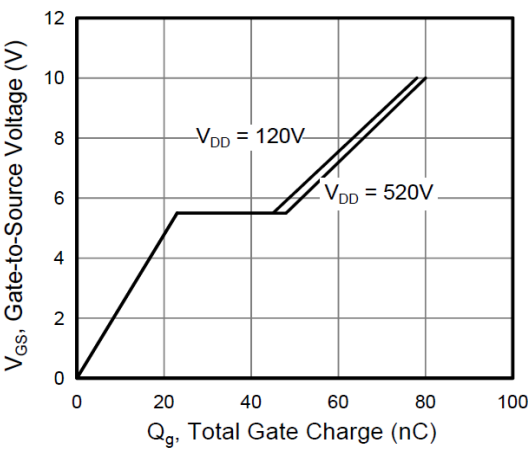
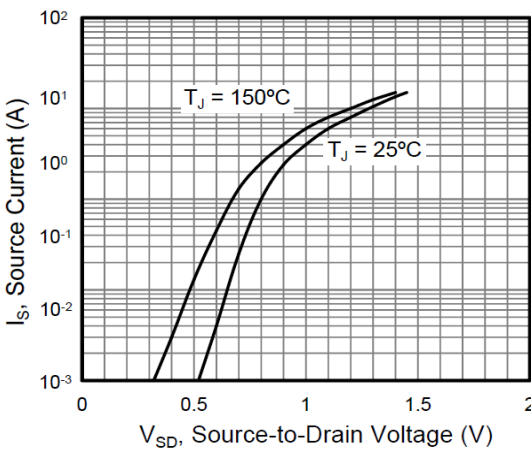


Figure 6. Body Diode Forward Voltage



Typical Performance Characteristics

Figure 7. On-Resistance vs. Temperature

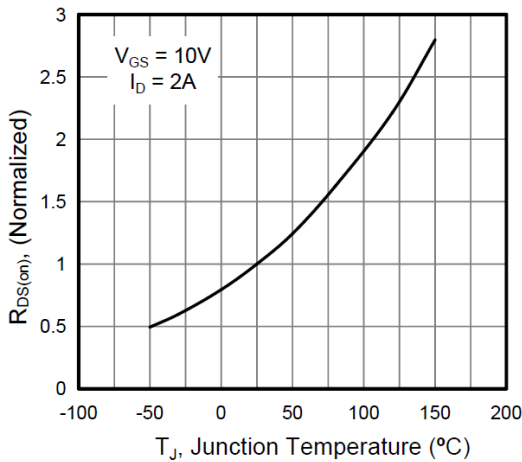


Figure 8. Breakdown voltage vs. Junction Temperature

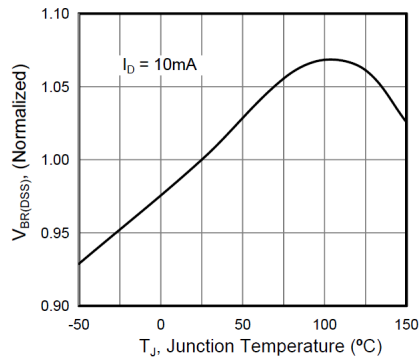


Figure 9. Transient Thermal Impedance

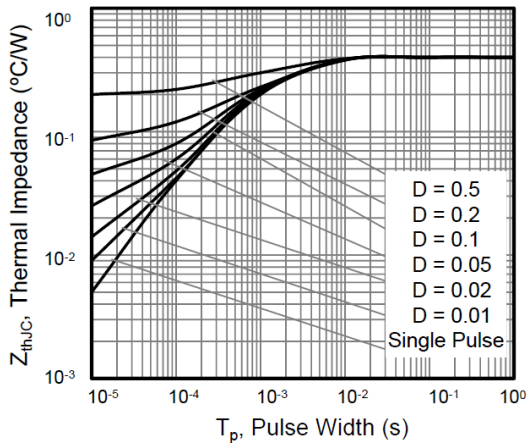


Figure 10. Safe Operation Area

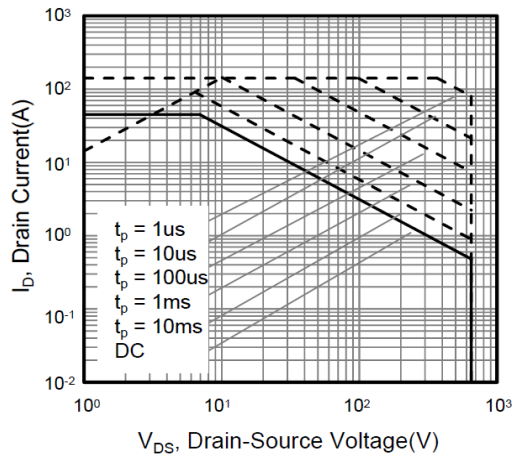
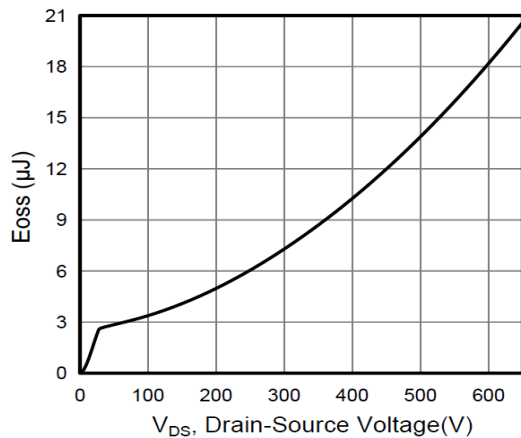


Figure 11. Typ. Coss Stored Energy



Test Circuits

Figure 12 : Gate Charge Test Circuit and Waveform

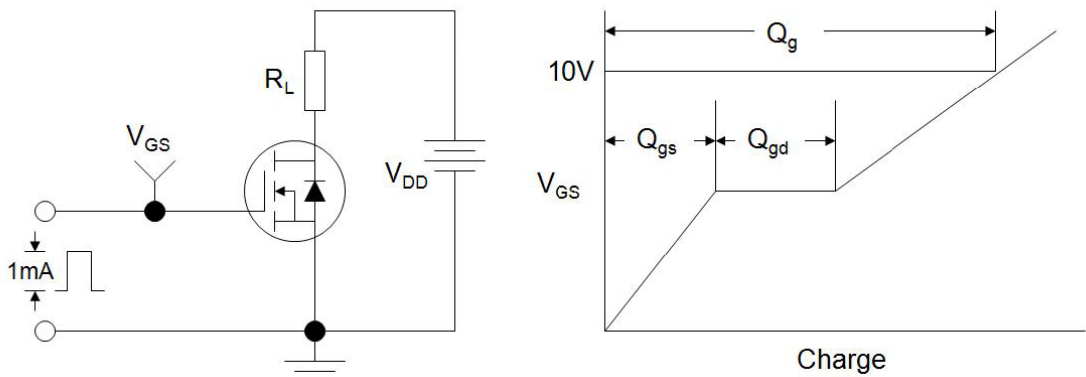


Figure 13 : Resistive Switching Test Circuit and Waveform

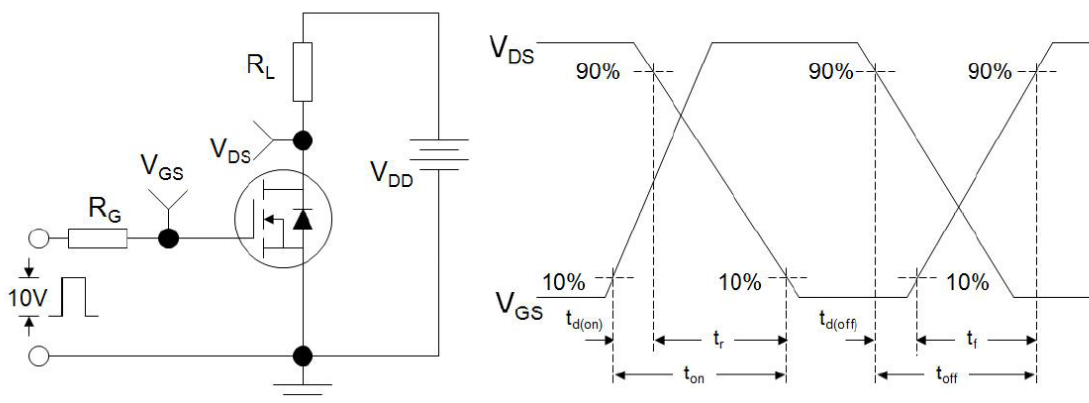
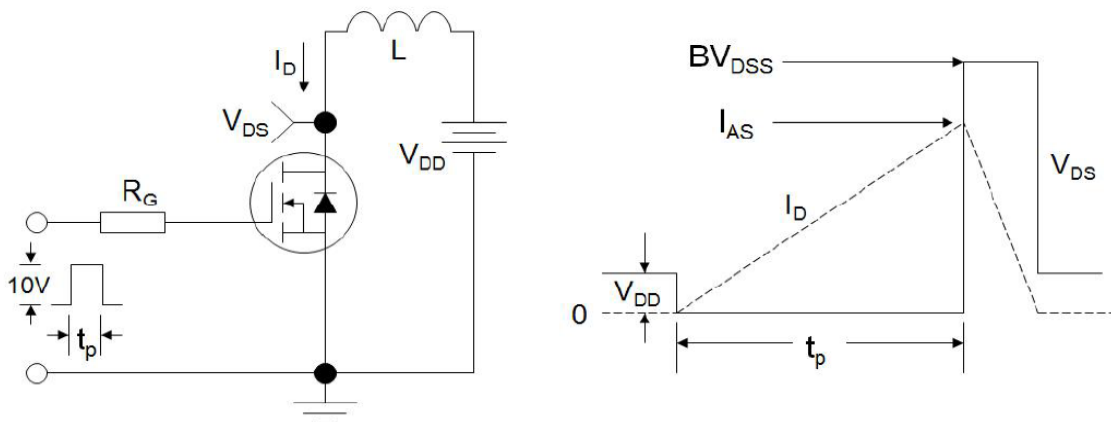
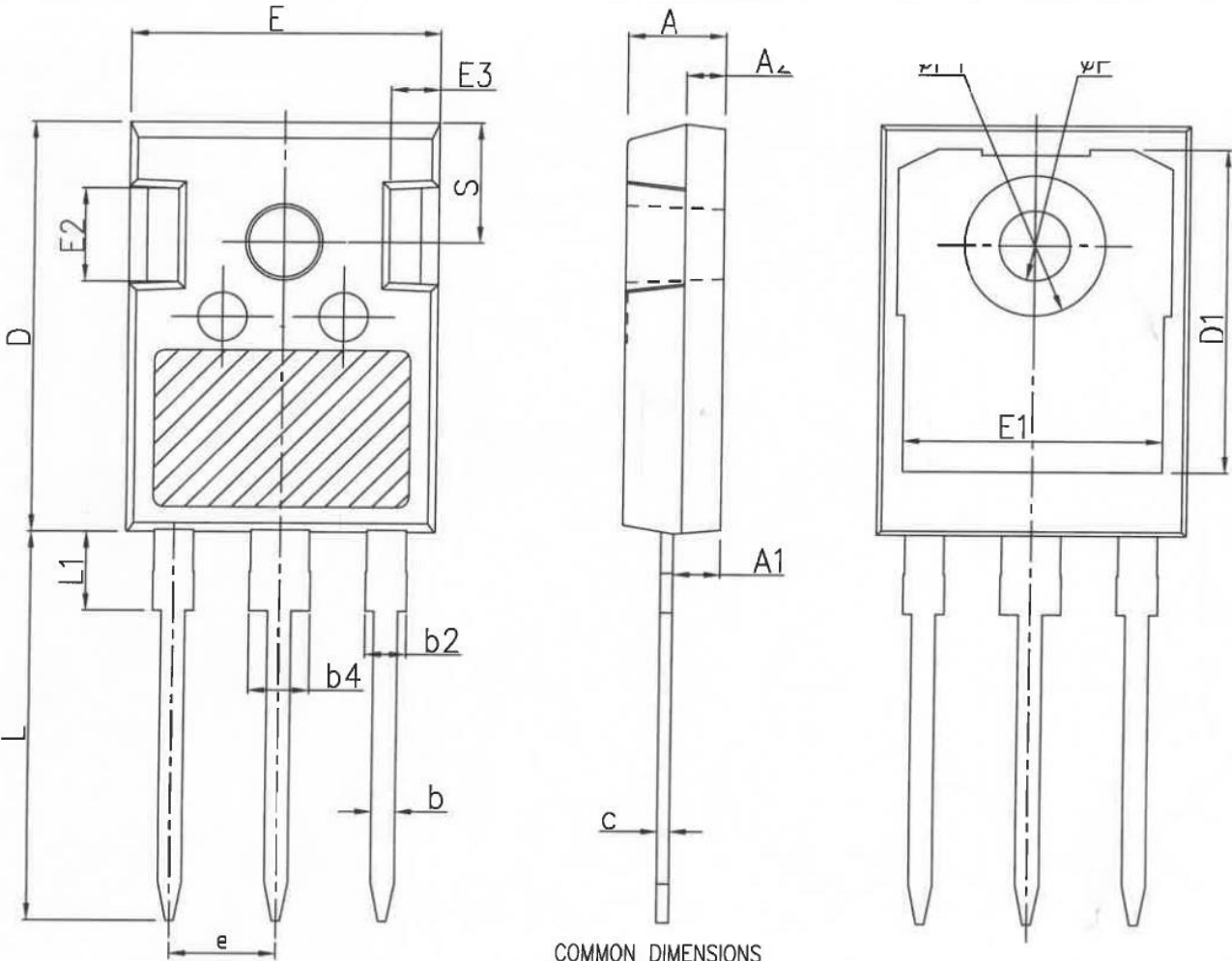


Figure 14 : Unclamped Inductive Switching Test Circuit and Waveform



Package Outlines

TO247-3L



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15BSC		

* Dimensions in millimeters

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMW65N075UC1	BMW65N075UC1	TO247-3L	Tube	30 units

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