BMW65N028UA1

Super Junction Power MOSFET

650 V, 90 A, 28 mΩ

bestirpower

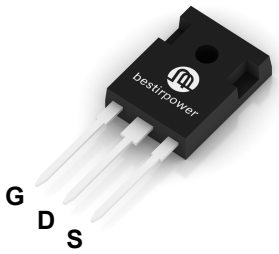
Description

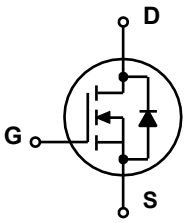
BMW65N028UA1 is power MOSFET using bestirpower's advanced super junction technology that can realize very low on resistance and gate charge.
It will provide much high efficiency by using optimized charge coupling technology. These user friendly devices give an advantage of Low EMI to designers as well as low switching loss.

BV_{DSS} @ $T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
700 V	90 A	28 mΩ	147 nC

Applications

ÅSwitch Mode Power Supply (SMPS)
ÅUninterruptible Power Supply (UPS)
ÅPower Factor Correction (PFC)
ÅLLC Half-bridge
ÅCharger





Features

ÅUltra-fast body diode
ÅVery low FOM RDS(on)×Qg
ÅEasy to use/drive
Å100% avalanche tested
ÅRoHS compliant

RoHS compliant

HF

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℃)	90	A	
		V_{GS} = 10V, (T_C = 100℃)	57	A	
I_{DM}	Drain Current	Pulsed (note 1)	270	A	
E_{AS}	Single Pulse Avalanche Energy (note 2)		1920	mJ	
dv/dt	MOSFET dv/dt Ruggedness, VDS = 0...650V		50	V/ns	
	Power Dissipation For TO-247		50		
P_D	Power Dissipation	(T_C = 25℃)	450	W	
T_J, T_{STG}	Operating junction and storage temperature		-55 to 150	℃	
I_S	Continuous diode forward current	(T_C = 25℃)	90	A	Fig 6
$I_{S,pulse}$	Diode pulse current (note 1)		270	A	
E_{AR}	Repetitive Avalanche Energy (note 2)		7.6	mJ	
I_{AS}	Avalanche Current		19.6	A	

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=10mH, V_{DD} = 70V, 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	0.28	℃/W
R_{thJA}	Thermal Resistance, Junction to Ambient	62	
T_{sold}	Soldering temperature, wave soldering only allowed at leads	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	3	3.8	5	V	Fig.2
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10V, I_D =40A T_J=25℃	-	24.5	28	mΩ	Fig.7
		V_{GS} = 10V, I_D =40A T_J=125℃	-	68	78		
Dynamic Characteristics							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=50V, f=1MHz	-	8172	-	pF	Fig.3
C_{oss}	Output Capacitance		-	434	-	pF	
C_{rss}	Reverse Transfer Capacitance		-	3.6	-	pF	
$Q_{g(tot)}$	Total Gate Charge at 10 V	V_{GS}=10V, V_{DD}=520V, I_D=40A	-	147	-	nC	Fig.5
Q_{gs}	Gate to Source Charge		-	50	-	nC	
Q_{gd}	Gate to Drain Charge		-	52	-	nC	
R_G	Gate Resistance	f = 1.0MHz open drain	-	1.05	-	Ω	
$t_{d(on)}$	Turn-on Delay Time	I_D=40A, V_{DD}=400V, R_g=2Ω, V_{GS}=10V,	-	68.5	-	ns	
t_r	Rise Time		-	207	-	ns	
$t_{d(off)}$	Turn-off Delay Time		-	94.7	-	ns	
t_f	Fall Time		-	4.5	-	ns	
Source-Drain Diode Characteristics							
V_{SD}	Diode Forward Voltage	V_{GS} = 0V,I_{SD}=50A , T_J=25℃	-	0.9	1.3	V	
t_{rr}	Reverse Recovery Time	V_R = 400V, I_S= 40A, di_F/dt = 100A/μs	-	153	-	ns	
Q_{rr}	Reverse Recovery Charge		-	1.21	-	μC	
I_{rrm}	Peak Reverse Recovery Current		-	13.8	-	A	

Typical Performance Characteristics

Figure 1. Output Characteristics

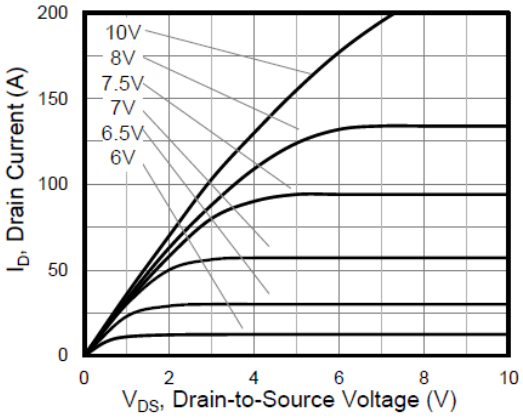


Figure 2. Transfer Characteristics

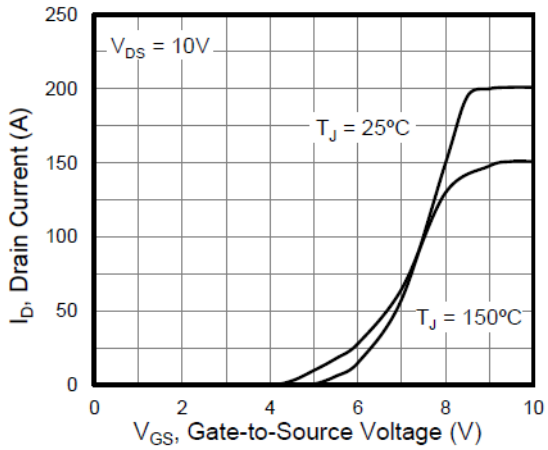


Figure 3. Capacitance

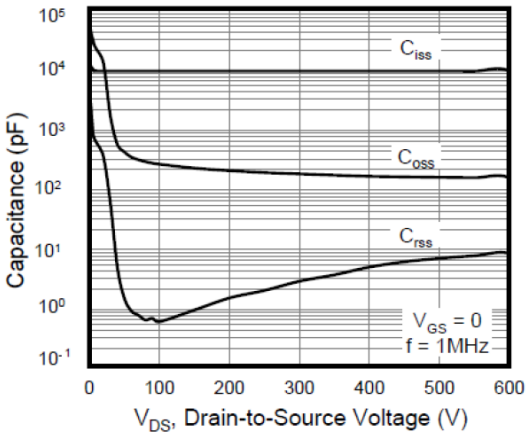


Figure 4. Typ. Coss Stored Energy

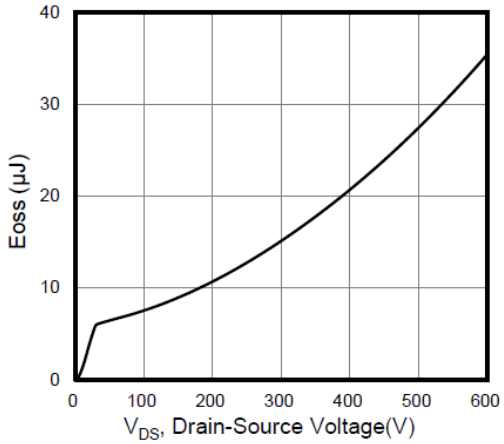


Figure 5. Gate Charge

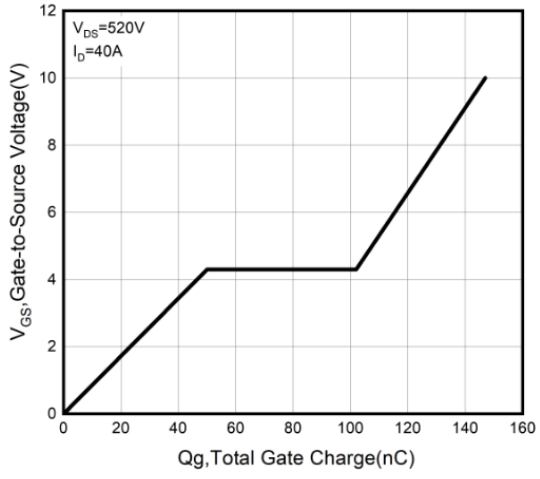
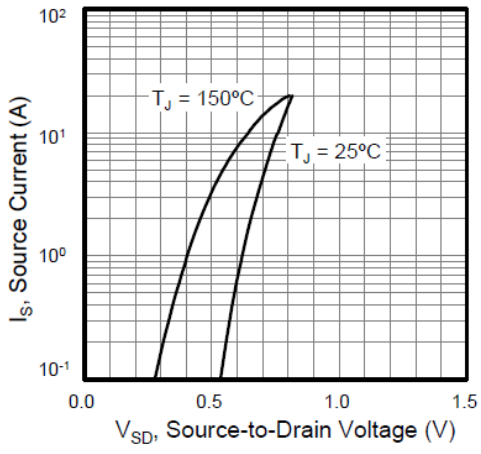


Figure 6. Body Diode Forward Voltage



Typical Performance Characteristics

Figure 7. On-Resistance vs. Temperature

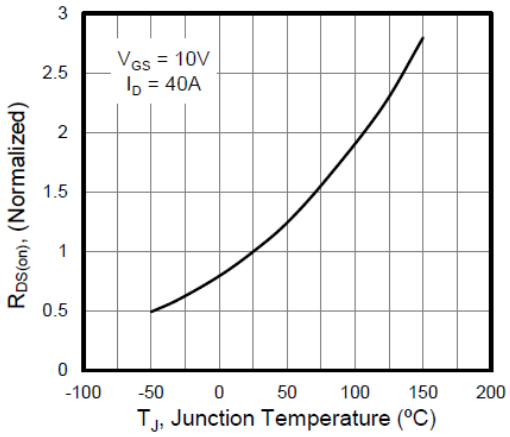


Figure 8. Breakdown voltage vs. Junction Temperature

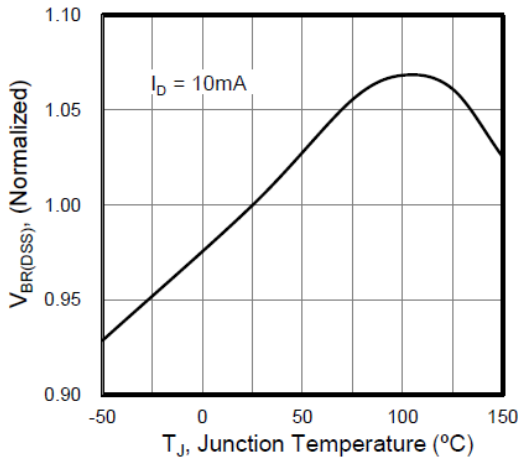


Figure 9. Transient Thermal Impedance

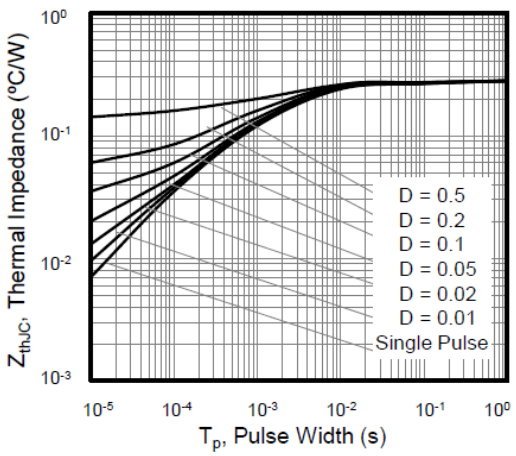
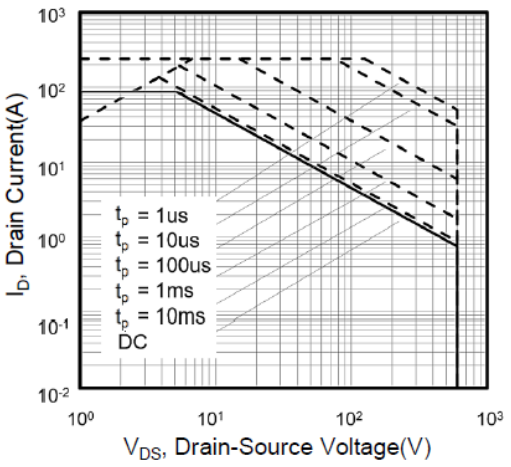


Figure 10. Safe Operation Area



Test Circuits

Figure 11: Gate Charge Test Circuit and Waveform

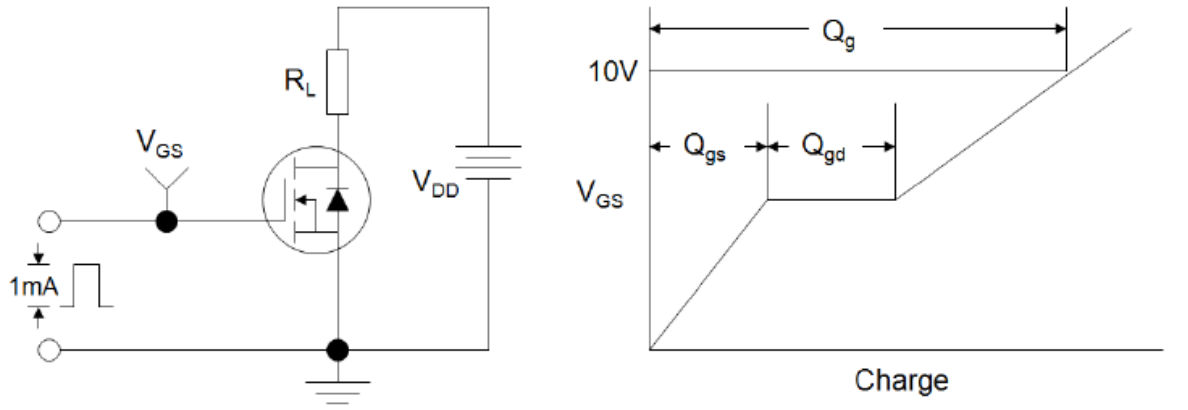


Figure 12: Resistive Switching Test Circuit and Waveform

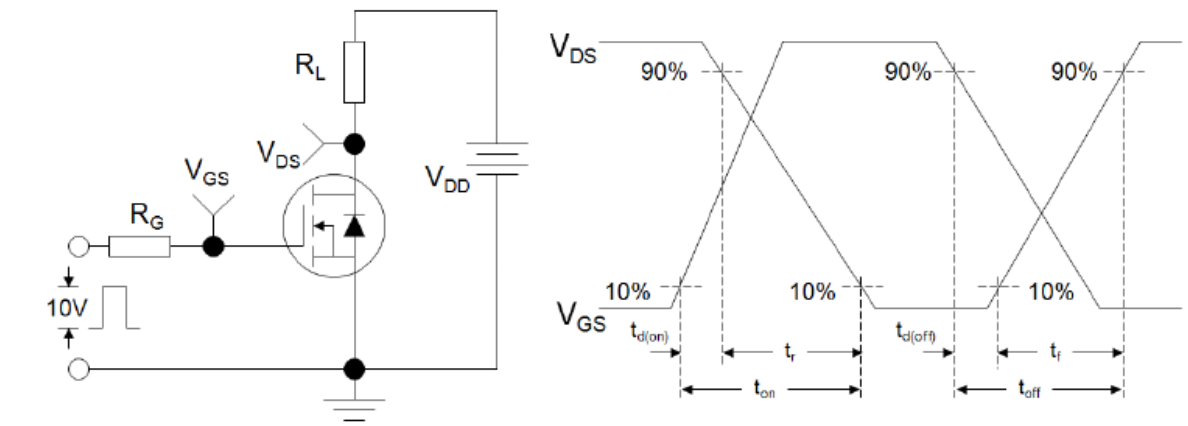
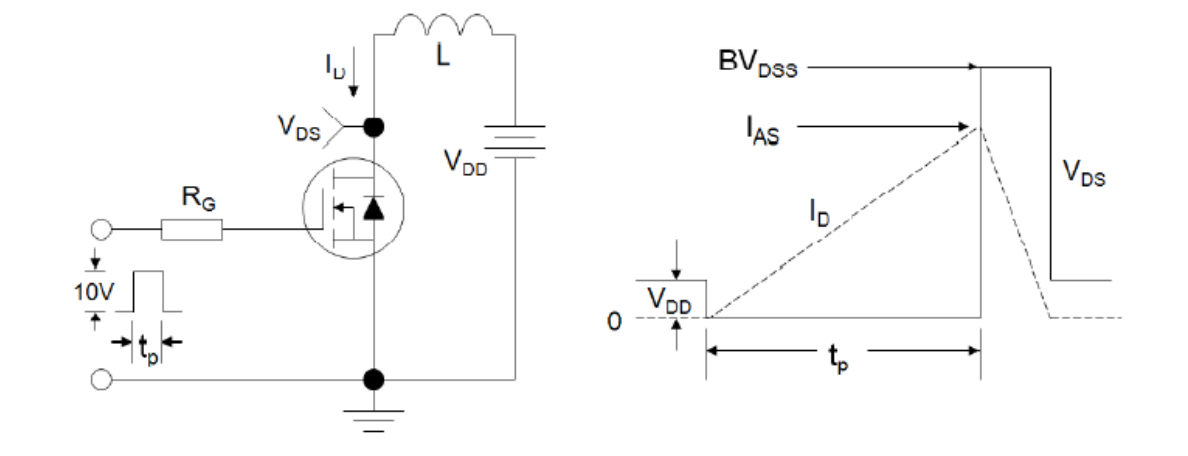
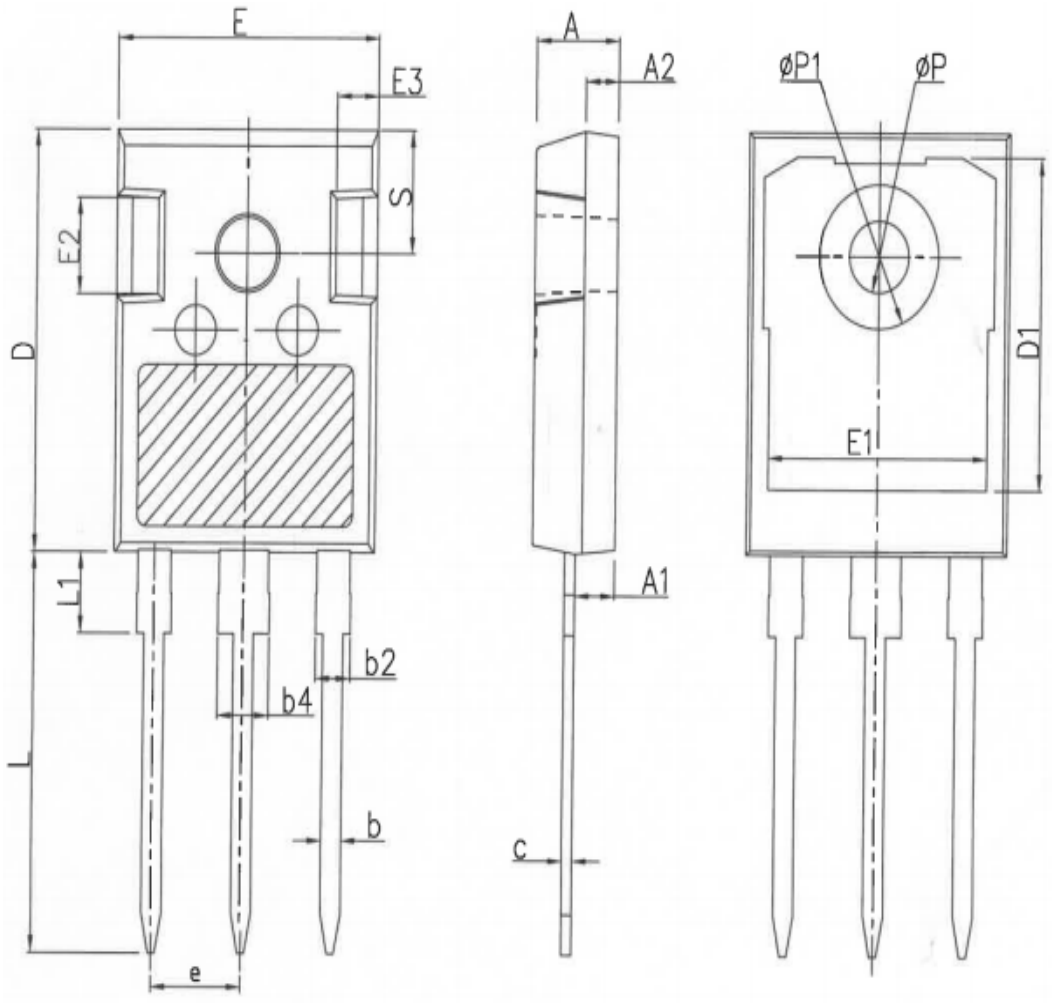


Figure 13: Unclamped Inductive Switching Test Circuit and Waveform



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
BMW65N028UA1	BMW65N028UA1	TO247-3L	Tube	30 units

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