



BMW65N046UE1

Super Junction Power MOSFET

650 V, 76 A, 46 mΩ

Description

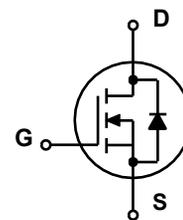
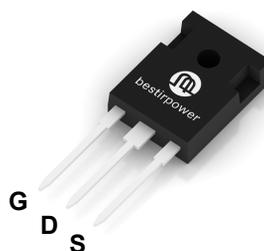
BMW65N046UE1 is power MOSFET using bestirpower's advanced super junction technology that can realize very low on resistance and gate charge.

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.

Features

BV _{DSS} @ T _{J,max}	I _D	R _{DS(on),max}	Q _{g,typ}
700 V	76 A	46 mΩ	138 nC

- Ultra-fast body diode
- Extremely low losses due to very low FOM R_{ds(on)*Q_g and E_{oss}}
- Very high commutation ruggedness



Applications

- PC power
- Server power supply
- Telecom
- Solar inverter
- Super charger for automobiles

Absolute Maximum Ratings (T_J = 25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V _{DSS}	Drain to Source Voltage ⁽¹⁾	650	V
V _{GSS}	Gate to Source Voltage	±30	V
I _D	Drain Current ⁽²⁾	V _{GS} = 10 V, (T _C = 25°C)	76
		V _{GS} = 10 V, (T _C = 100°C)	48
I _{DM}	Drain Current	Pulsed	242
E _{AS}	Single Pulsed Avalanche Energy ⁽³⁾	375	mJ
dv/dt	MOSFET dv/dt	120	V/ns
	Peak Diode Recovery dv/dt	70	
P _D	Power Dissipation	(T _C = 25°C)	500
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to 150	°C
I _S	Continuous diode forward current	76	A
I _{S Pulse}	Diode pulse current ⁽²⁾	242	A

1) Limited by T_J max. Maximum duty cycle D=0.75.

2) Pulse width t_p limited by T_{J,max}.

3) V_{DD}=100V, R_G=25Ω, Starting T_J=25°C.

Thermal Characteristics

Symbol	Parameter	Value	Unit
R _{θJC}	Thermal Resistance, Junction to Case.	0.25	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient.	26	
T _{sold}	Soldering temperature, wave soldering only allowed at leads.	260	°C

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650V 46mΩ Power MOSFET



Electrical Characteristics (T_J = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
B _V DSS	Drain to Source Breakdown Voltage	V _{GS} = 0 V, I _D = 1mA	650			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650 V, V _{GS} = 0 V, T _J = 25°C			10	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±30 V, V _{DS} = 0 V			± 100	nA

On Characteristics

V _{(GS)th}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 0.25 mA	2.0	3.0	4.0	V
R _{DS(on)}	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 15 A		41	46	mΩ

Dynamic Characteristics

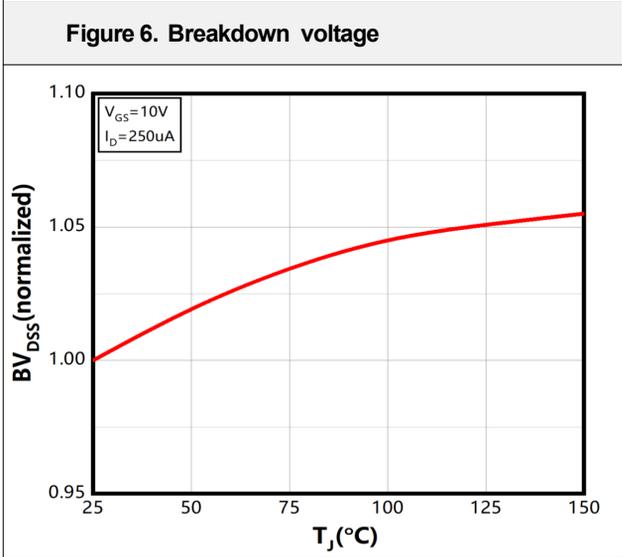
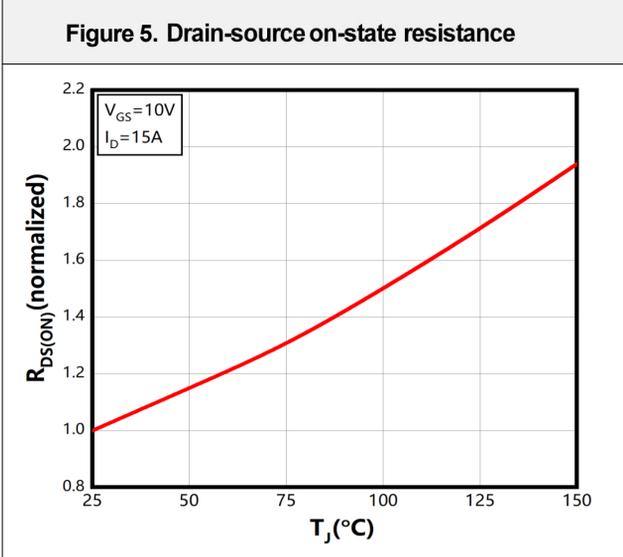
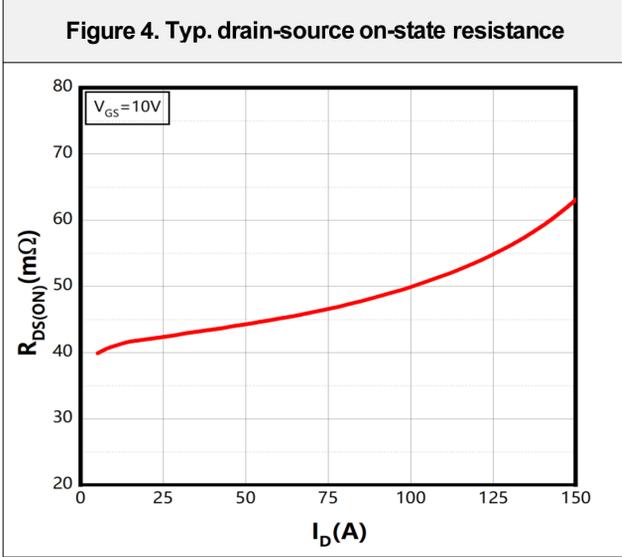
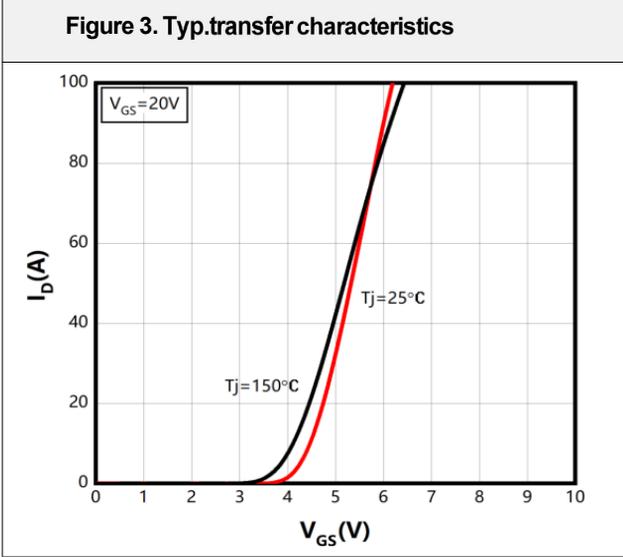
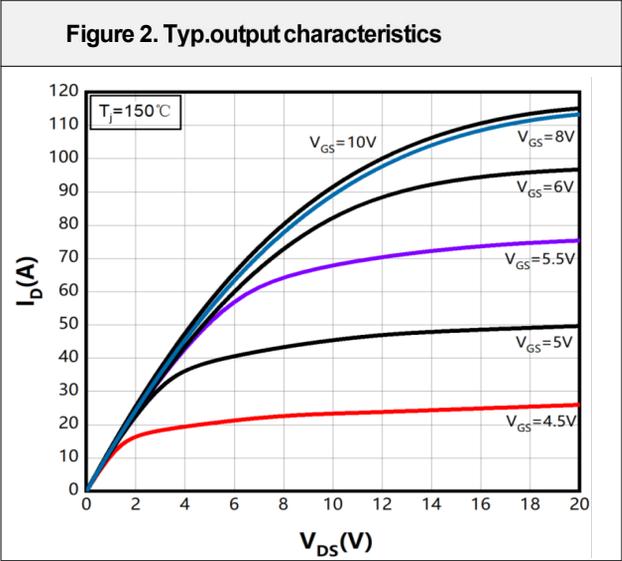
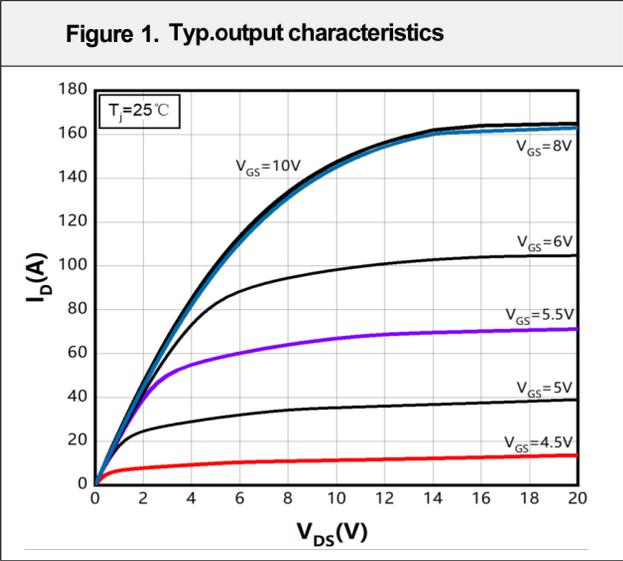
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 100 V, f = 1 MHz		5233		pF
C _{oss}	Output Capacitance			112		pF
C _{rss}	Reverse transfer capacitance			3.2		pF
Q _{g(tot)}	Total Gate Charge at 10 V	V _{DD} = 480 V, I _D = 15 A, V _{GS} = 0 to 10 V		138		nC
Q _{gs}	Gate to Source Charge			33.7		nC
Q _{gd}	Gate to Drain "Miller" Charge			52.3		nC
R _G	Gate Resistance	V _{DD} = 0 V, V _{GS} = 0 V, f = 1 MHz		3.9		Ω
t _{d(on)}	Turn-On Delay Time	V _{DD} = 300 V, I _D = 15 A, V _{GS} = 10 V		152		ns
t _r	Turn-On Rise Time			6		ns
t _{d(off)}	Turn-Off Delay Time			483		ns
t _f	Turn-Off Fall Time			25		ns

Source-Drain Diode Characteristics

V _{SD}	Diode Forward Voltage	V _{GS} = 0 V, I _F = 15 A, T _J = 25 °C		0.97		V
t _{rr}	Reverse Recovery Time	V _R = 50 V, I _F = 15 A, di _F /dt = 100 A/μs		163		ns
Q _{rr}	Reverse Recovery Charge			0.9		μC
I _{rrm}	Peak reverse recovery current			8.6		A



Typical Performance Characteristics



Typical Performance Characteristics

Figure 7. Threshold voltage

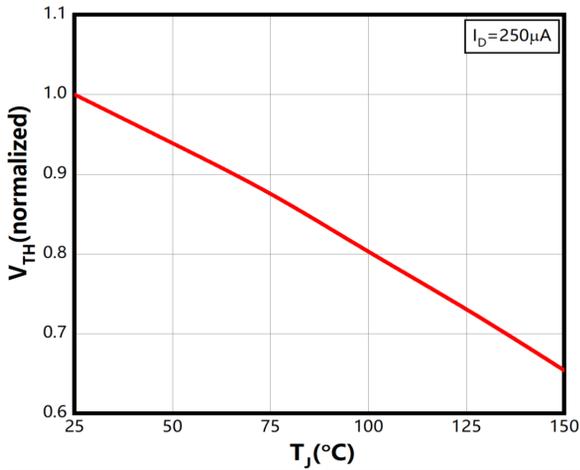


Figure 8. Typ. capacitances

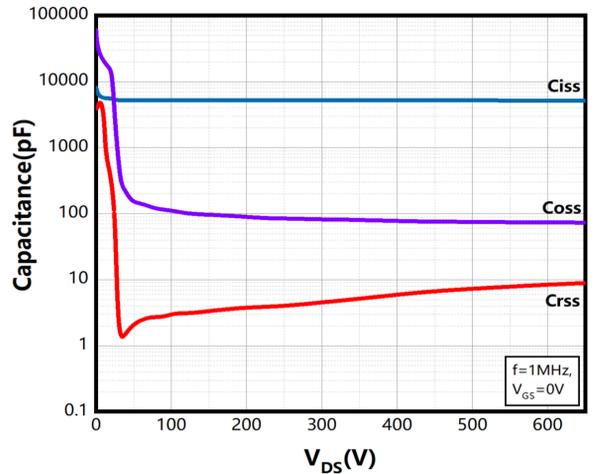


Figure 9. Typ. gate charge

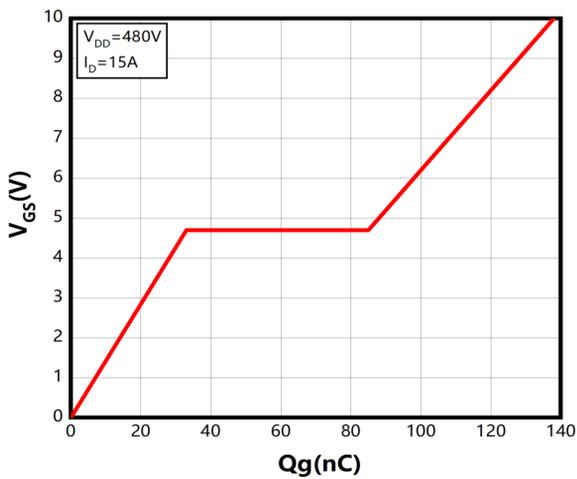


Figure 10. Body-Diode Character

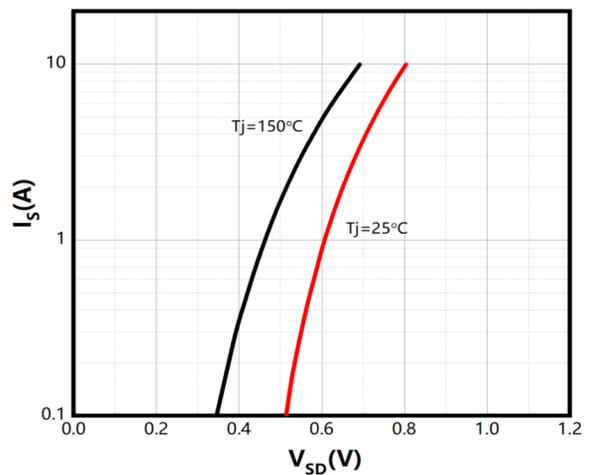


Figure 11. Power dissipation

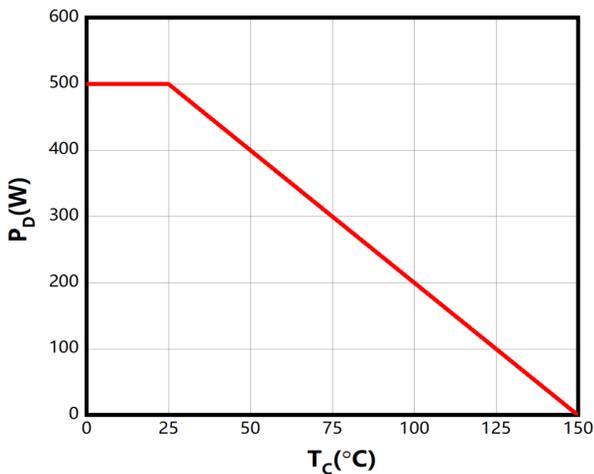
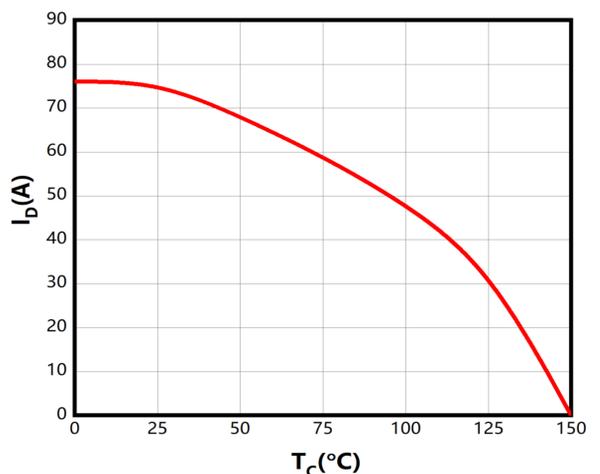


Figure 12. Drain Current



Typical Performance Characteristics

Figure 13. Safe operating area

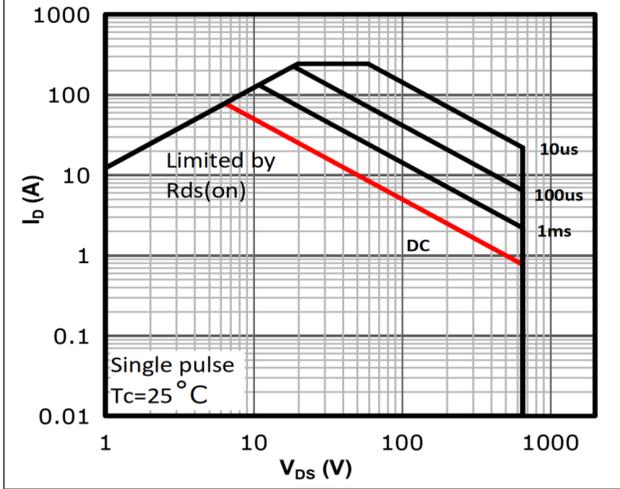
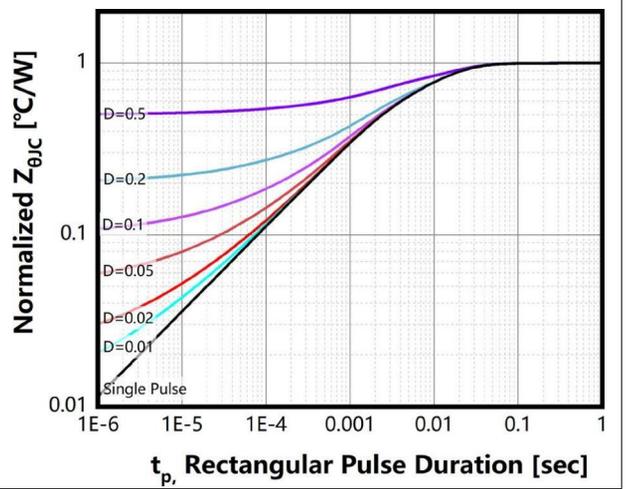


Figure 14. Max transient thermal impedance



Test Circuits

Figure 15. Diode Characteristics

Test circuit for diode characteristics and Diode recovery waveform

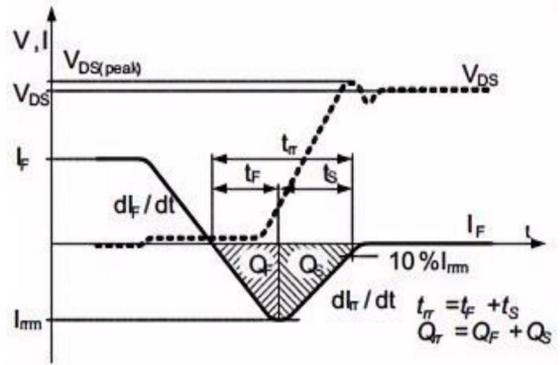
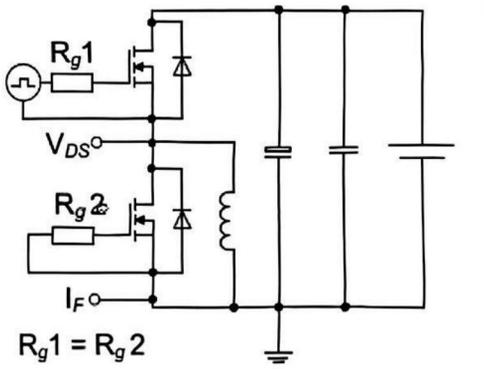


Figure 16. Switching Times

Switching times test circuit for inductive load and Switching times waveform

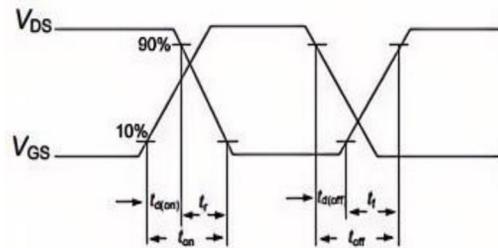
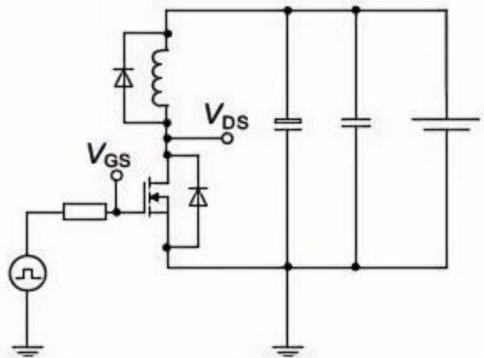
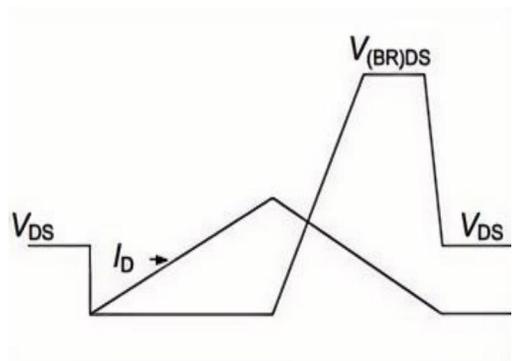
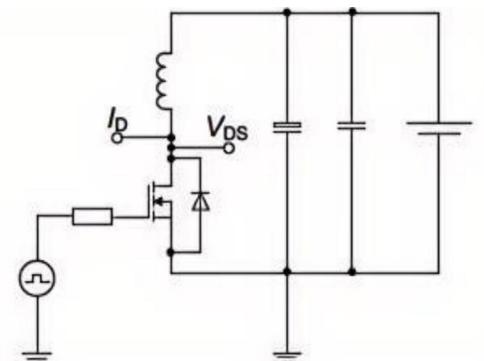


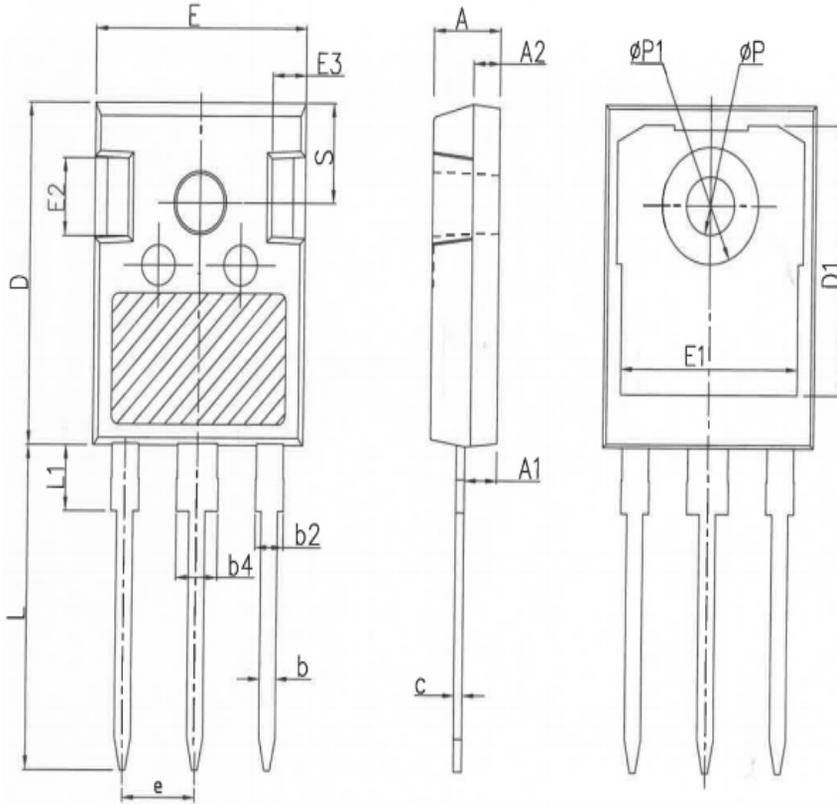
Figure 17. Unclamped Inductive Load

Unclamped inductive load test circuit and Unclamped inductive waveform



Package Outlines

TO247-3



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

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Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMW65N046UE1	BMW65N046UE1	TO247-3	Tube	30 units

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