BMW65N050UE1

Super Junction Power MOSFET

650 V, 75 A, 50 mΩ

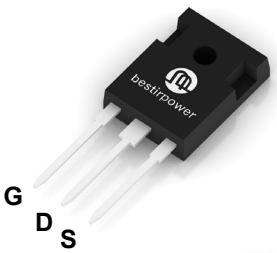
Description

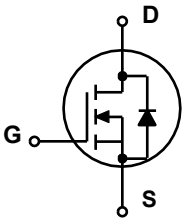
BMW65N050UE1 is power MOSFET using bestirpower's advanced super junction technology that can realize very low on resistance and gate charge.
It will provide much high efficiency by using optimized charge coupling technology. These user friendly devices give an advantage of Low EMI to designers as well as low switching loss.

Features

BV_{DSS} @ $T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
700 V	75 A	50 mΩ	125 nC

- Ultra-fast body diode.
- Extremely low losses due to very low FOM Rdson*Qg and Eoss.
- Very high commutation ruggedness





Applications

- PC power.
- Server power supply.
- Telecom.
- Solar invertor.
- Super charger for automobiiles

Absolute Maximum Ratings (T_J = 25℃ 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℃)	75	A
		V_{GS} = 10 V, (T_C = 100℃)	47	
I_{DM}	Drain Current	Pulsed	239	A
E_{AS}	Single Pulsed Avalanche Energy(3)		443	mJ
dv/dt	MOSFET dv/dt		120	V/ns
	Peak Diode Recovery dv/dt		70	
P_D	Power Dissipation	(T_C = 25℃)	568	W
T_J , T_{STG}	Operating and Storage Temperature Range		-55 to 150	℃
Is	Continuous diode forward current		75	A
Is Pulse	Diode pulse current(2)		239	A

1) Limited by Tj max. Maximum duty cycle D=0.75.
2) Pulse width tp limited by Tj,max.
3) VDD=100V, RG=25Ω, Starting Tj=25℃.
4) VDClink=400V; VDS,peak<V(BR)DSS; identical low side and high side switch with identical RG

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case.	0.22	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient.	26	
Tsold	Soldering temperature, wave soldering only allowed at leads	260	℃

Electrical Characteristics (T_J = 25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	V_{GS} = 0 V, I_D = 1 mA	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 = 2 mA	3.0	4.2	4.5	V
R_{DS}(on)	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D =25 A		40	50	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0 V,V_{DS} = 400 V, f = 1 MHz		5675		pF
C_{oss}	Output Capacitance			77		pF
C_{rss}	Reverse transfer capacitance			10		pF
$Q_{g(tot)}$	Total Gate Charge at 10 V	V_{DD} = 400 V, I_D = 25 A, V_{GS} =0 to 10 V		125		nC
Q_{gs}	Gate to Source Charge			32.5		nC
Q_{gd}	Gate to Drain “Miller” Charge			52.4		nC
R_G	Gate Resistance	V_{DD}= 0 V, V_{GS} = 0 V,f = 1 MHz		4		Ω
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 400 V, I_D = 25A, V_{GS} = 10 V		60		ns
t_r	Turn-On Rise Time			257		ns
$t_{d(off)}$	Turn-Off Delay Time			182		ns
t_f	Turn-Off Fall Time			14		ns
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V,I_F=25A T_J=25℃		0.94		V
t_{rr}	Reverse Recovery Time	V_R = 400 V, I_F= 25 A, di_F/dt = 100 A/μs		163		ns
Q_{rr}	Reverse Recovery Charge			1.2		μC
I_{mm}	Peak reverse recovery current			12.6		A

Typical Performance Characteristics

Figure 1. Power dissipation

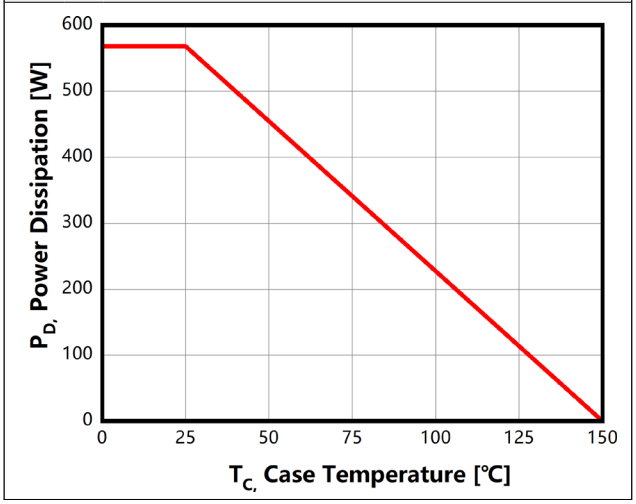


Figure 2. MAX.transient thermal impedance

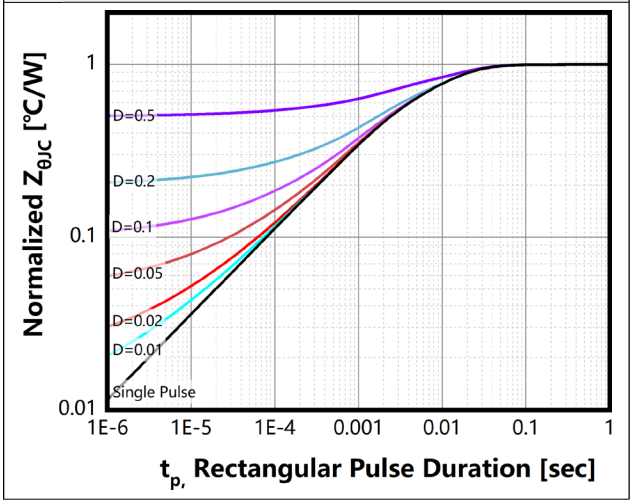


Figure 3. Safe operating area

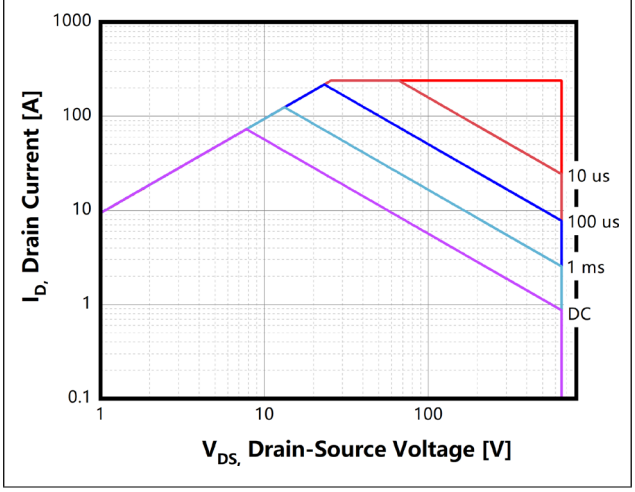


Figure 4. Typ. output characteristics

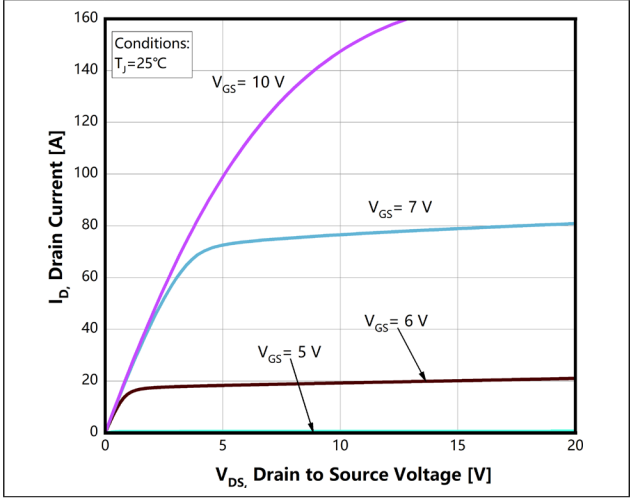


Figure 5. Typ. output characteristics

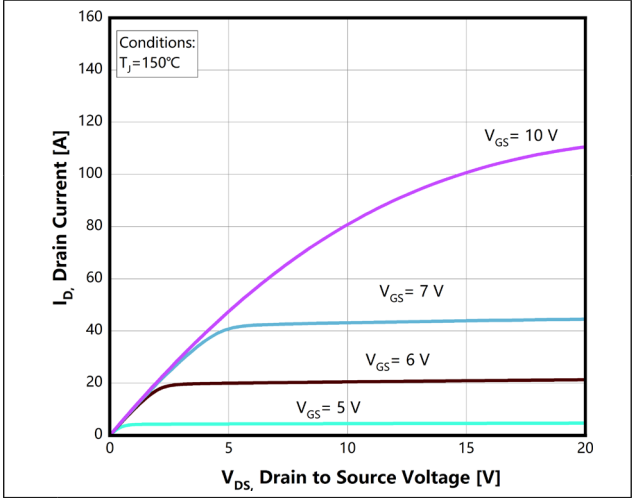
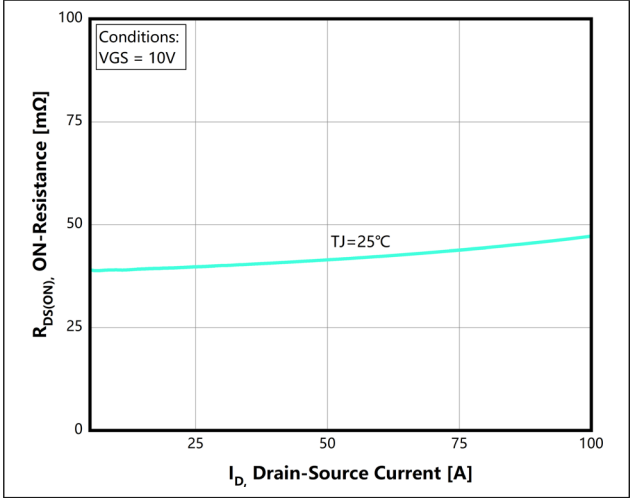


Figure 6. Typ. drain-source on-state resistance



Typical Performance Characteristics

Figure 7. Drain-source on-state resistance

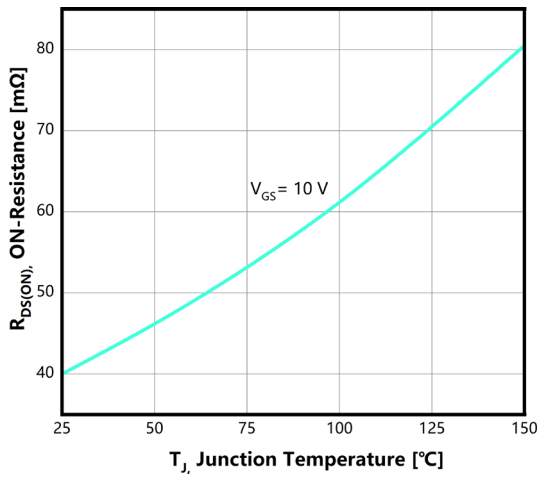


Figure 8. Typ. transfer characteristics

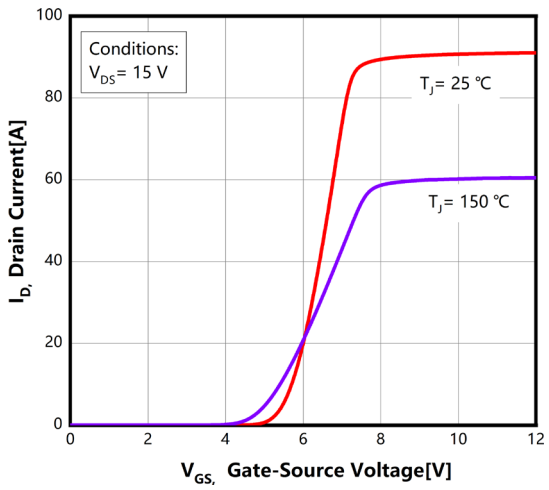


Figure 9. Typ.gate charge

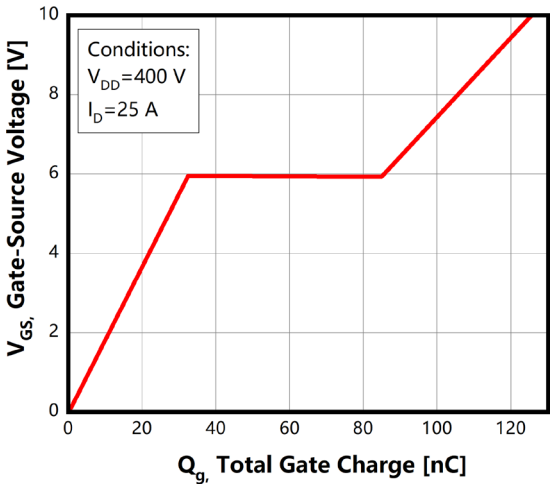


Figure 10. Body-Diode Character

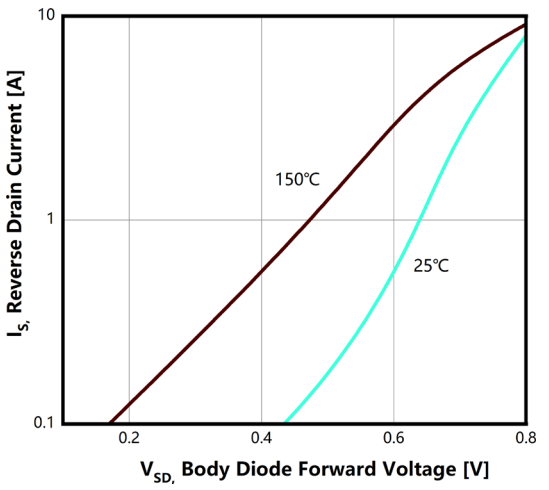


Figure 11. Maximum Drain Current

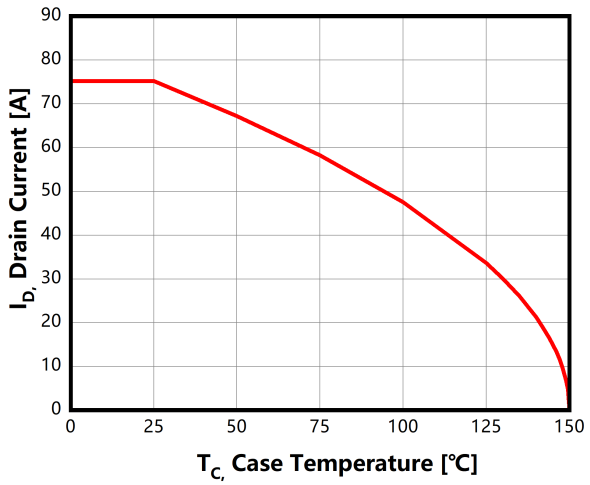


Figure 12. Typ. capacitances

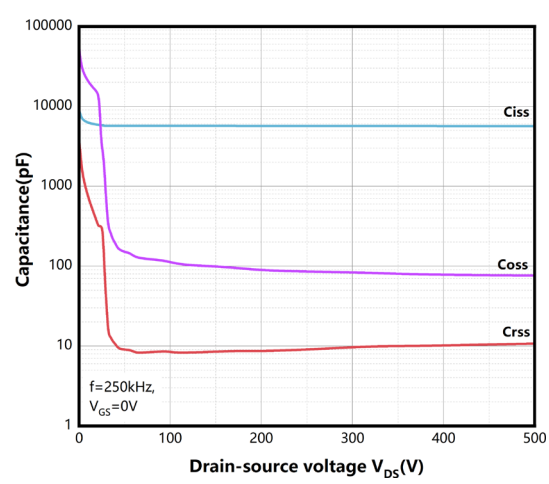


Figure 13. Typ. Coss stored energy

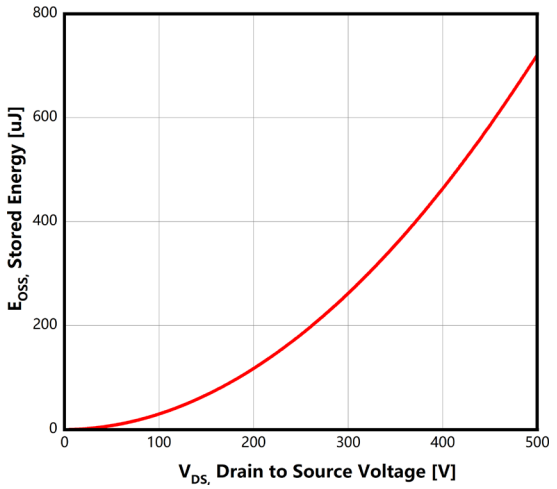
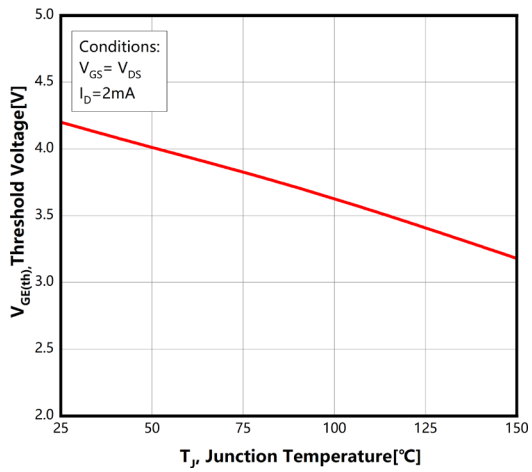


Figure 14. Threshold Voltage vs. Temperature



Test Circuits

Figure 15. Diode Characteristics

Test circuit for diode characteristics and Diode recovery waveform

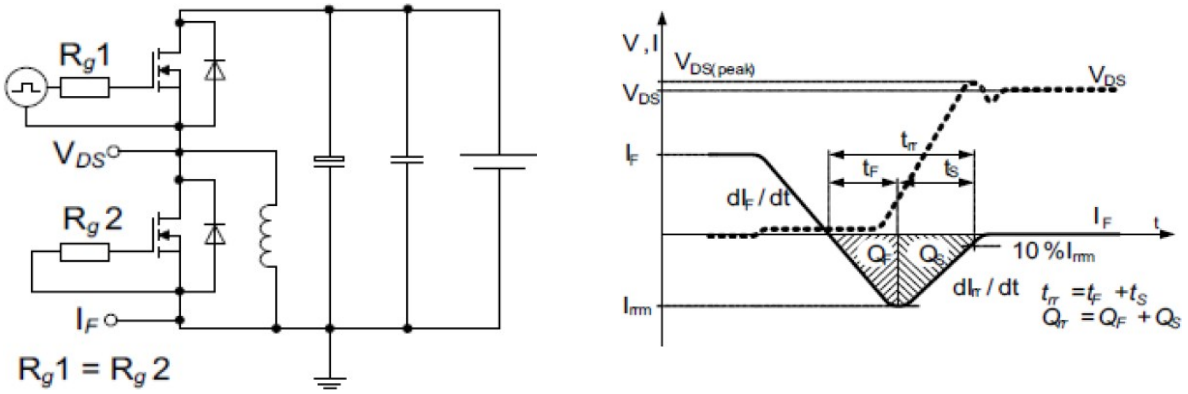


Figure 16. Switching Times

Switching times test circuit for inductive load and Switching times waveform

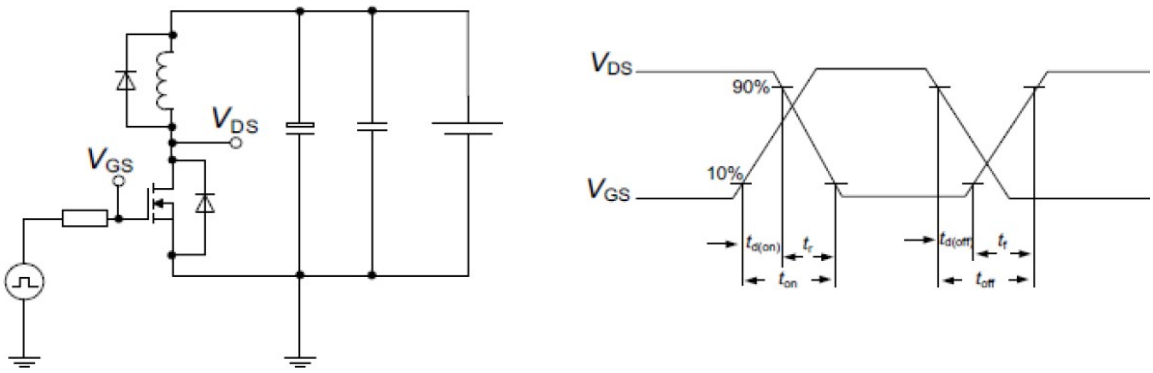
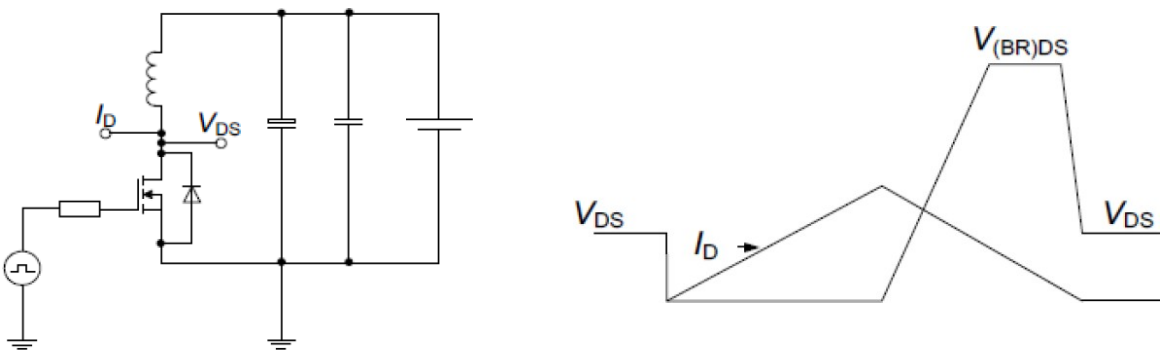


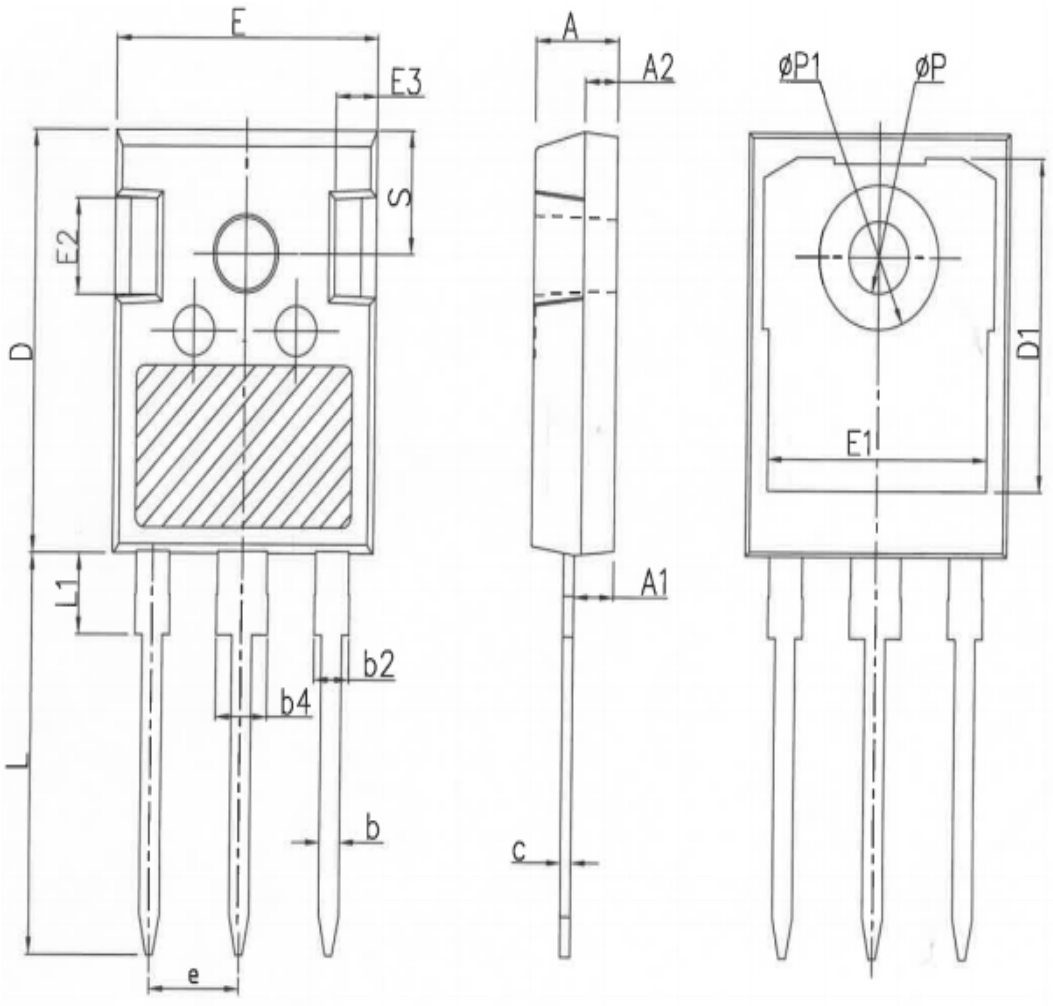
Figure 17.Unclamped Inductive Load

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

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMW65N050UE1	BMW65N050UE1	TO247-3	Tube	30 units

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