BMW65N030UC1

N-Channel Power MOSFET

650 V, 100 A, 30 mΩ

bestirpower

Description

BMW65N030UC1 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.

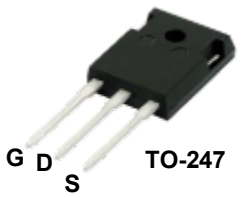
Features

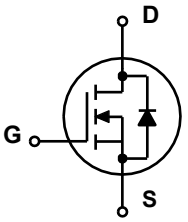
BV_{DSS} @ $T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
700 V	100 A	30 mΩ	145 nC

- Extremely low losses due to very low FOM Rdson*Qg and Eoss.
- Very high commutation ruggedness
- Robust design with better EAS performance.

Applications

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





Absolute Maximum Ratings (T_C = 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]	Continuous (T_C = 25℃)	100	A
		Continuous (T_C = 125℃)	45	
I_{DM}	Drain Current	Pulsed	350	A
E_{AS}	Single Pulsed Avalanche Energy[3]		2025	mJ
dv/dt	MOSFET dv/dt		50	V/ns
	Peak Diode Recovery dv/dt[4]		50	
P_D	Power Dissipation	(T_C = 25℃)	625	W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to 150	℃
Is	Continuous diode forward current		100	A
Is Pulse	Diode pulse current[2]		290	A

1) Limited by Tj max. Maximum duty cycle D=0.75.
2) Pulse width tp limited by Tj,max.
3) VDD=50V, RG=25Ω, Starting Tj=25° C.
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, Max.	0.2	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62	
Tsold	Soldering temperature, wavesoldering only allowed at leads	260	℃

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMW65N030UC1	BMW65N030UC1	TO247-3	Tube	30 units

Electrical Characteristics (T_C = 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	3.8	4.5	V
R_{DS}(on)	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D =40 A, T_j=25°C		26	30	mΩ
		V_{GS} = 10 V, I_D =40 A, T_j=125°C		60	70	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0 V,V_{DS} = 50 V, f = 250 KHz		7950		pF
C_{oss}	Output Capacitance			390		pF
C_{rss}	Reverse transfer capacitance			8.5		pF
$C_{o(tr)}$	Time Related Output Capacitance(2)	V_{DS} = 0 V to 400 V, V_{GS} = 0 V		1290		pF
$C_{o(er)}$	Energy Related Output Capacitance(1)			258		pF
$Q_{g(tot)}$	Total Gate Charge	V_{DD} = 480 V, I_D = 50 A, V_{GS} =0 to 10 V		145		nC
Q_{gs}	Gate to Source Charge			47		nC
Q_{gd}	Gate to Drain “Miller” Charge			43		nC
R_G	Gate Resistance	V_{DD}= 0 V, V_{GS} = 0 V, F = 1 MHz		2.5		Ω
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 400 V, I_D = 50A, V_{GS} = 10 V		25		ns
t_r	Turn-On Rise Time			18		ns
$t_{d(off)}$	Turn-Off Delay Time			55		ns
t_f	Turn-Off Fall Time			19		ns
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V,I_F=40A Tf=25℃		0.9		V
t_{rr}	Reverse Recovery Time	V_R = 400 V, I_F= 50 A, di_F/dt = 150 A/μs		170		ns
Q_{rr}	Reverse Recovery Charge			1.1		μC
I_{mm}	Peak reverse recovery current			12		A

1) *C*o(er) is a fixed capacitance that gives the same stored energy as *C*oss while *V*DS is rising from 0 to 400V.
2) *C*o(tr) is a fixed capacitance that gives the same charging time as *C*oss while *V*DS is rising from 0 to 400V.

Typical Performance Characteristics

Figure 1. Power dissipation

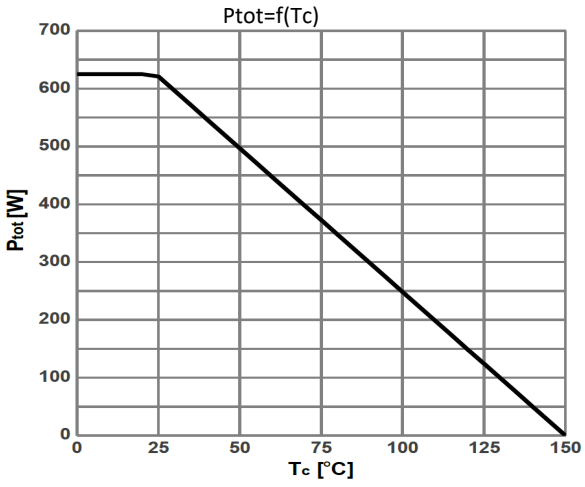


Figure 2. MAX.transient thermal impedance

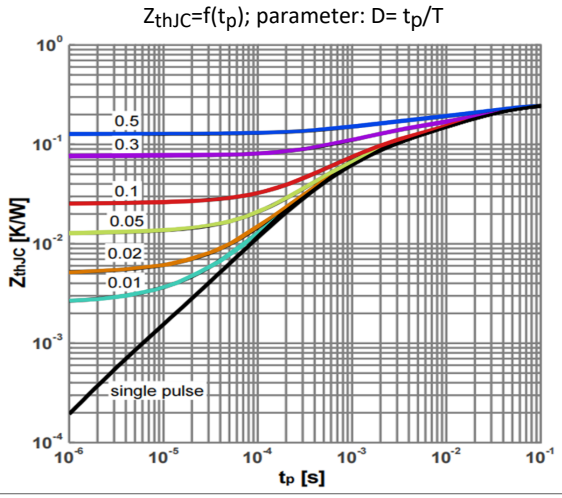


Figure 3. Safe operating area

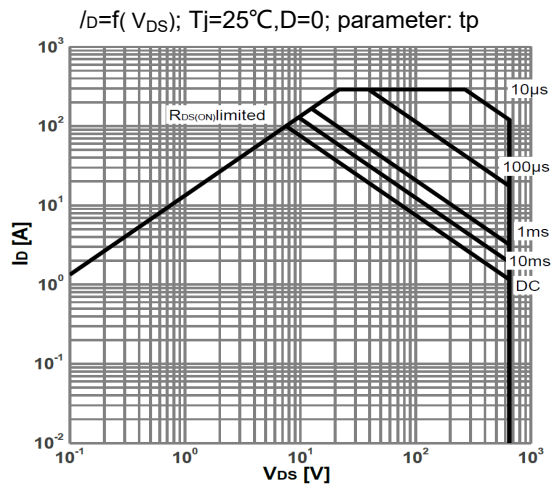


Figure 4. Typ. output characteristics

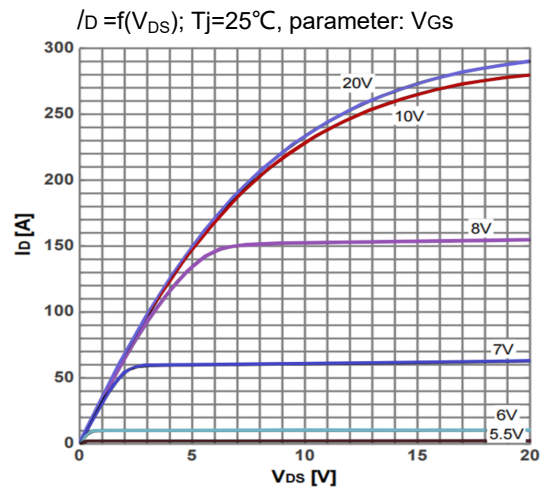


Figure 5. Typ. output characteristics

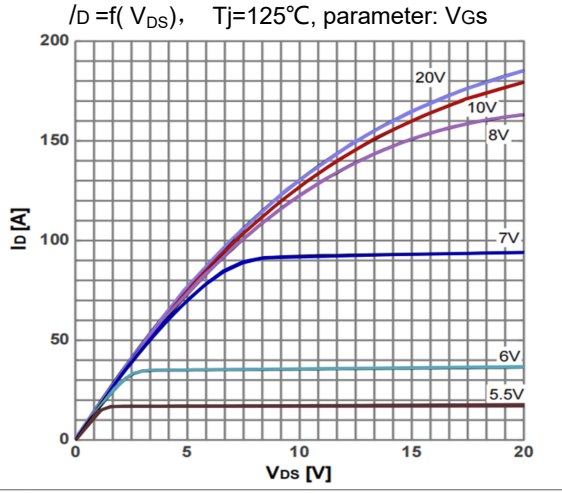
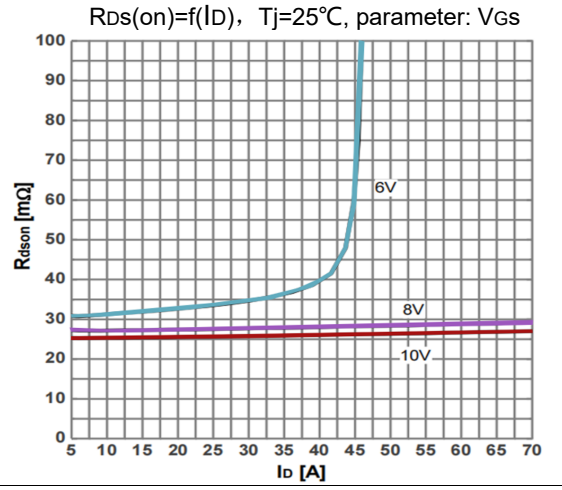


Figure 6. Typ. drain-source on-state resistance



Typical Performance Characteristics

Figure 7. Drain-source on-state resistance

Ros(on)=f(Tj); /D=40A; VGS=10V

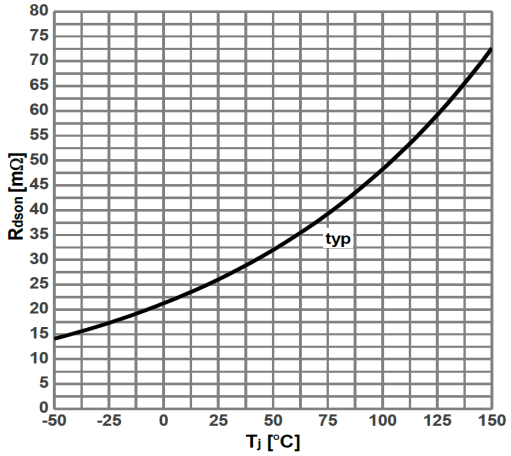


Figure 8. Typ. transfer characteristics

/D=f(VGS); VDS=20V; parameter: Tj

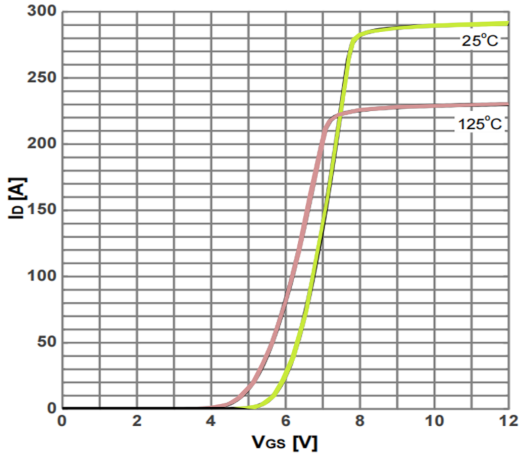


Figure 9. Typ.gate charge

VGS=f(Qgate); /D=50A pulsed; VDS=480V

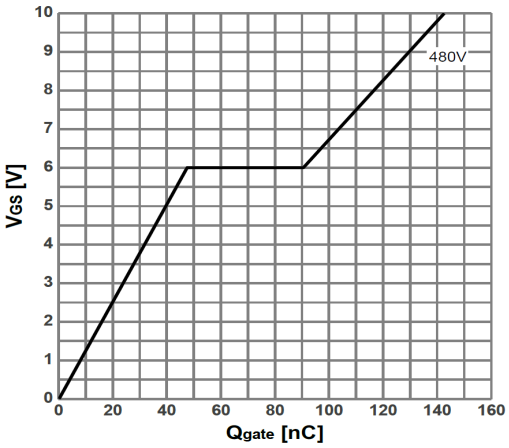


Figure 10. Forward characteristics of reverse diode

/F=f(VSD); parameter: Tj

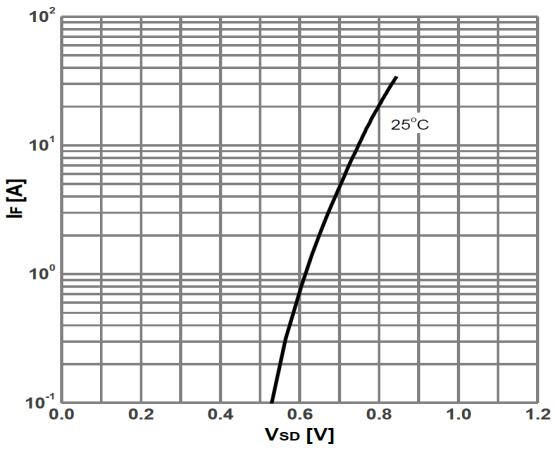


Figure 11. Drain-source breakdown voltage

VBR(Dss)=f(Tj);/D=1mA

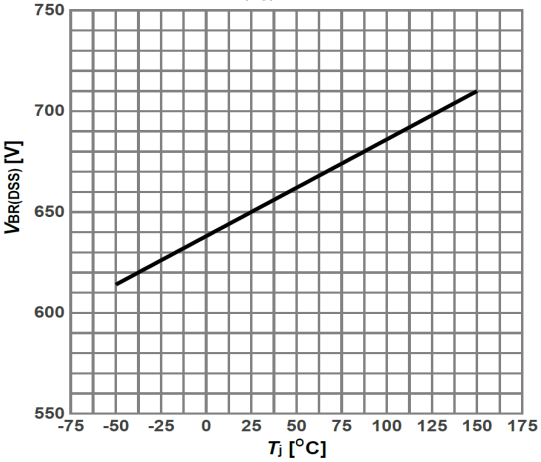


Figure 12. Typ. capacitances

C=f(VDS); VGS=0V; f=250KHZ

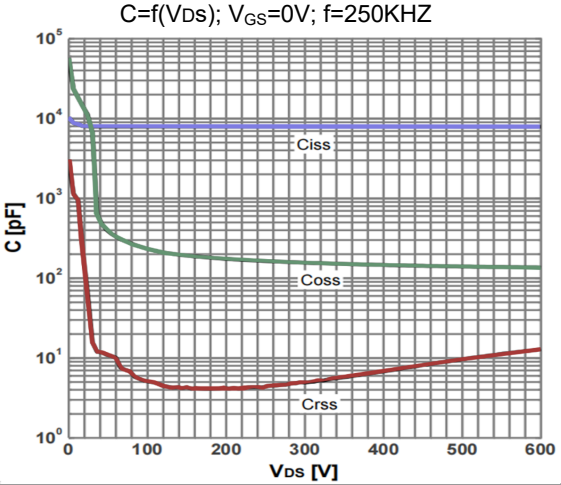
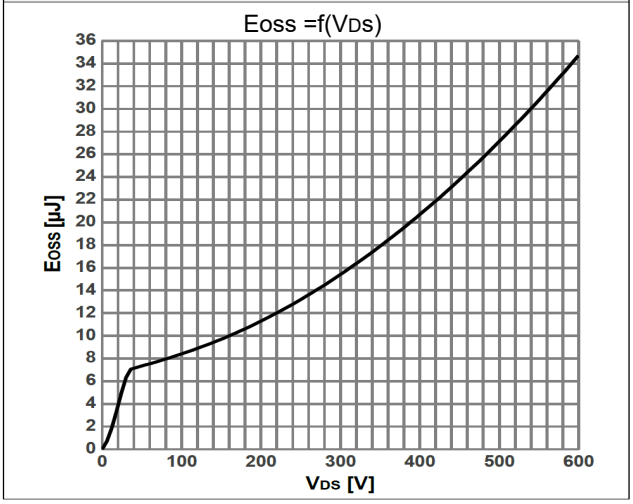


Figure 13. Typ. Coss stored energy



Test Circuits

Figure 15. Diode Characteristics

Test circuit for diode characteristics and Diode recovery waveform

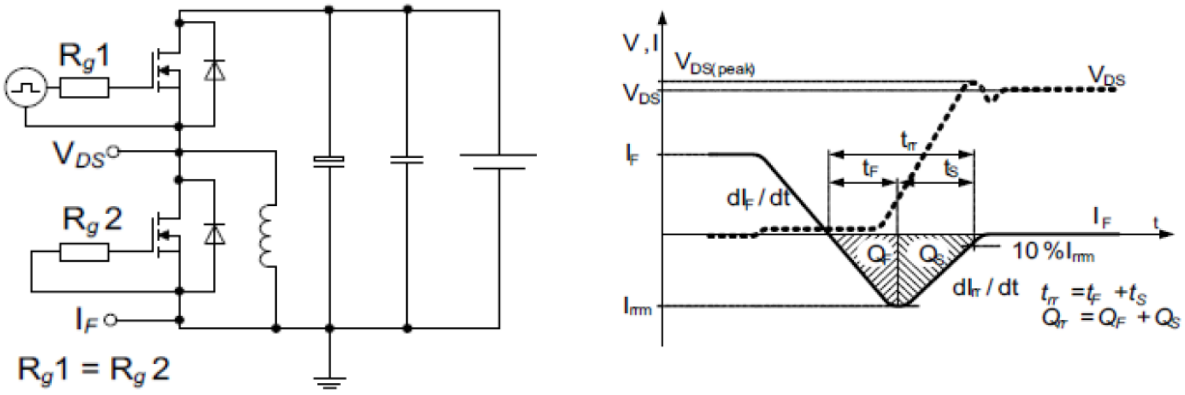


Figure 16. Switching Times

Switching times test circuit for inductive load and Switching times waveform

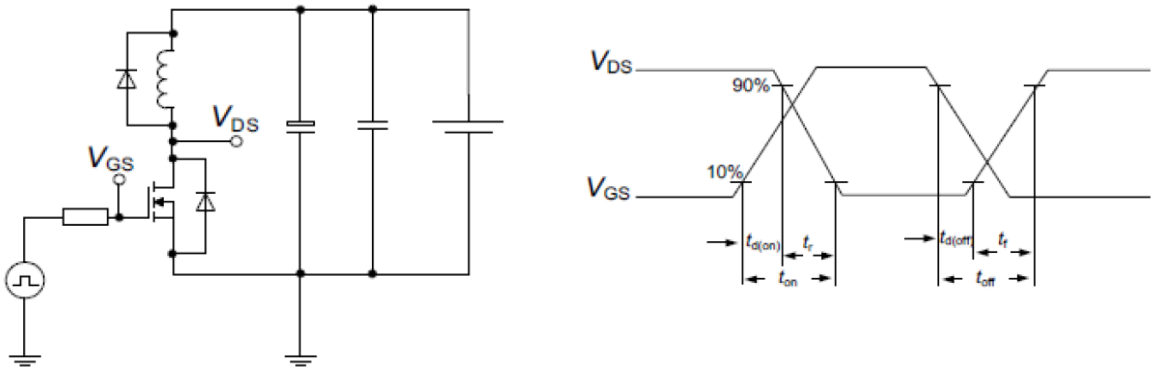
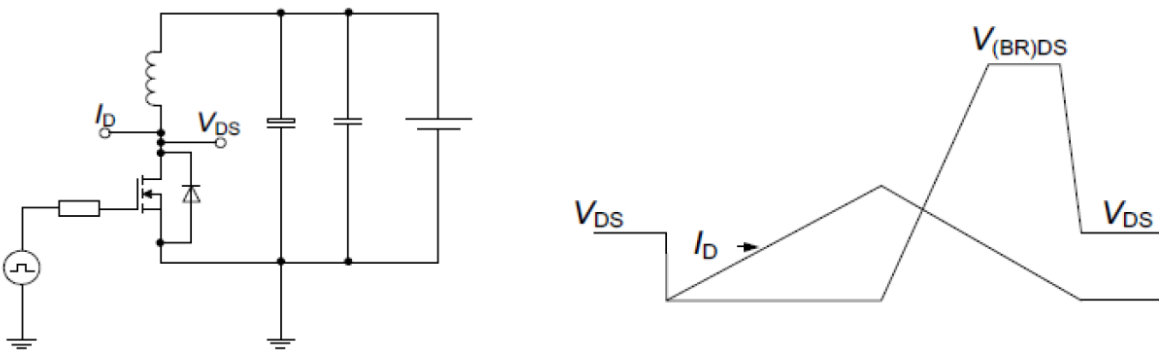


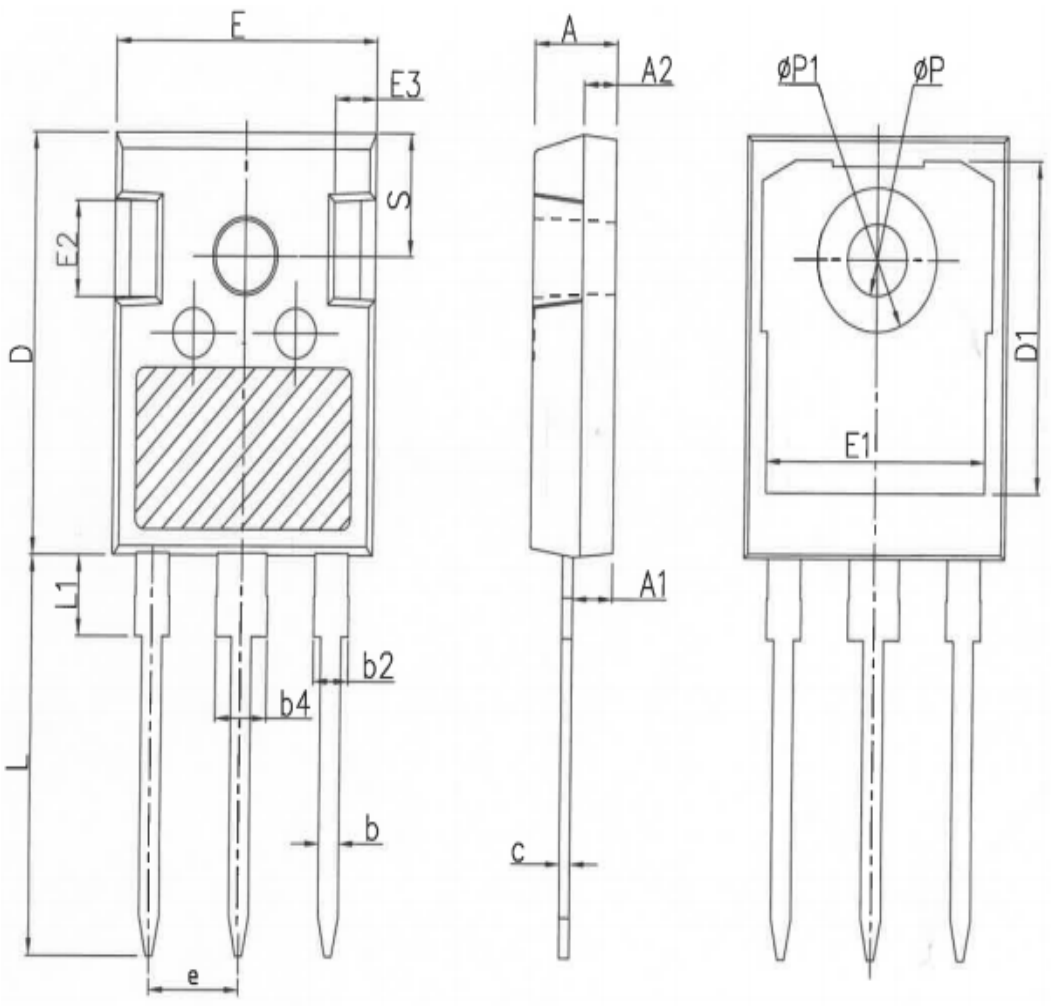
Figure 17Unclamped Inductive Load

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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