

BMBF65N050UE1

Super Junction Power MOSFET

650 V, 75 A, 50 mΩ



Description

BMBF65N050UE1 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.

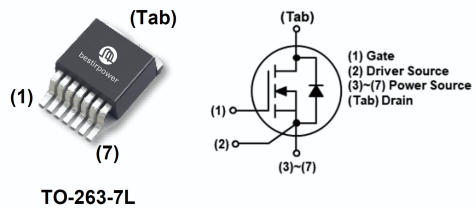
Features

$BV_{DSS} @ T_{J,max}$	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 $R_{dson} \cdot Q_g$ and E_{oss} .
- Very high commutation ruggedness

Applications

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



Absolute Maximum Ratings ($T_J = 25^\circ\text{C}$ 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)	$V_{GS} = 10 \text{ V}, (T_C = 25^\circ\text{C})$	75
		$V_{GS} = 10 \text{ V}, (T_C = 100^\circ\text{C})$	47
I_{DM}	Drain Current	Pulsed	239
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	($T_C = 25^\circ\text{C}$)	568
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
I_S	Continuous diode forward current	75	A
$I_{S \text{ Pulse}}$	Diode pulse current(2)	239	A

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

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

3) $V_{DD}=100\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.

4) $V_{DClink}=400\text{V}$; $V_{DS,peak} < V(BR)_{DSS}$; identical low side and high side switch with identical R_G

Thermal Characteristics

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

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Electrical Characteristics (T_J = 25°C 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 = 25 A, 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 = 25 A, T _J = 25°C		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

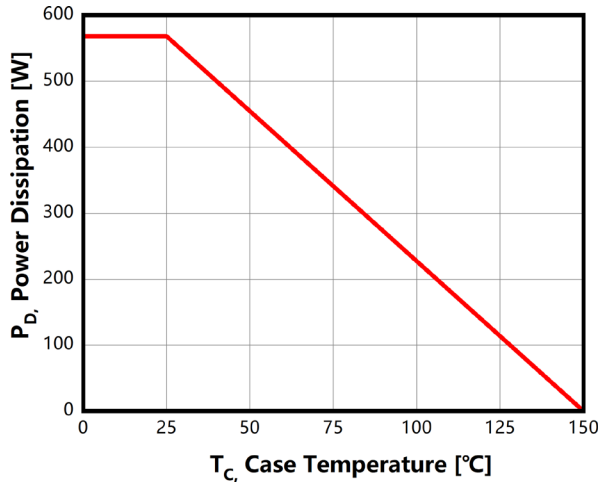


Figure 2. MAX.transient thermal impedance

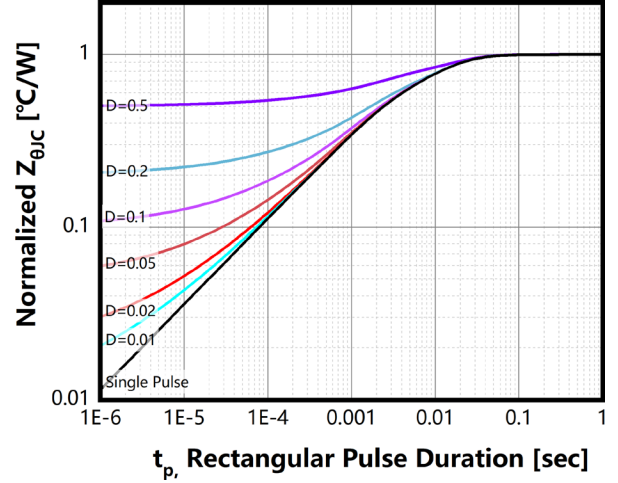


Figure 3. Safe operating area

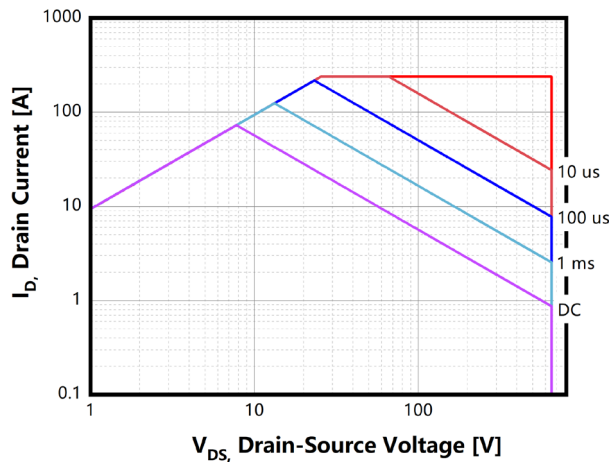


Figure 4. Typ. output characteristics

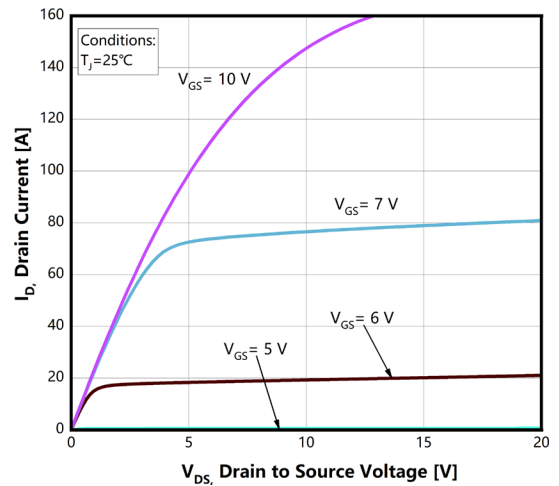


Figure 5. Typ. output characteristics

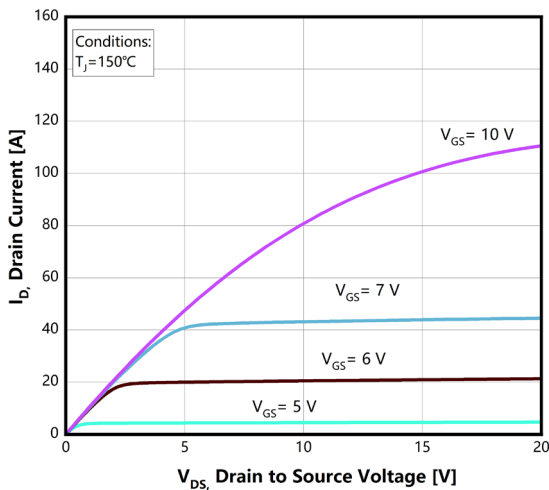
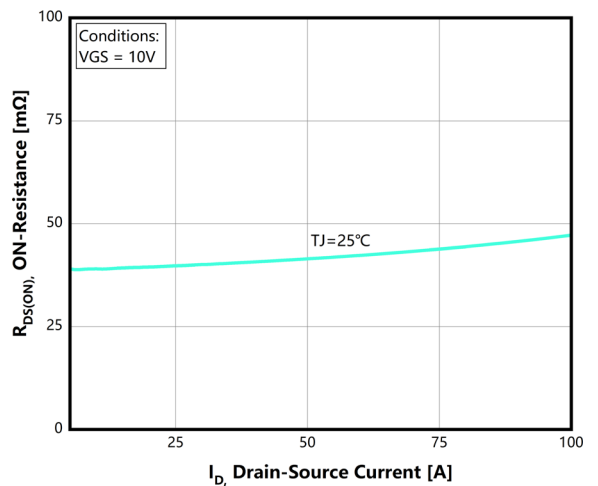


Figure 6. Typ. drain-source on-state resistance



Typical Performance Characteristics

Figure 7. Drain-source on-state resistance

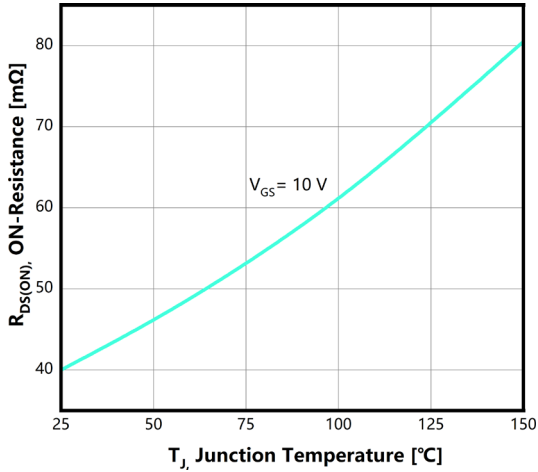


Figure 8. Typ. transfer characteristics

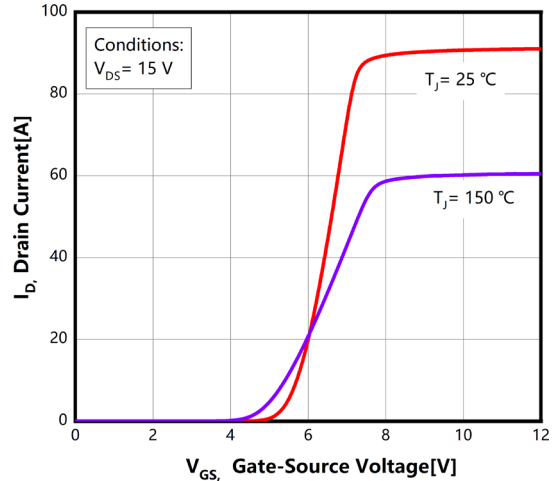


Figure 9. Typ.gate charge

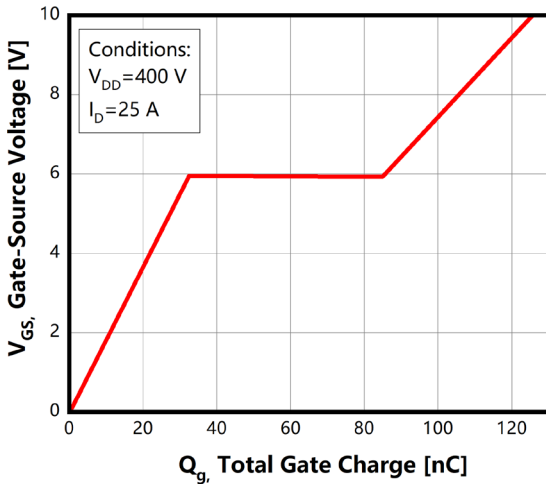


Figure 10. Body-Diode Character

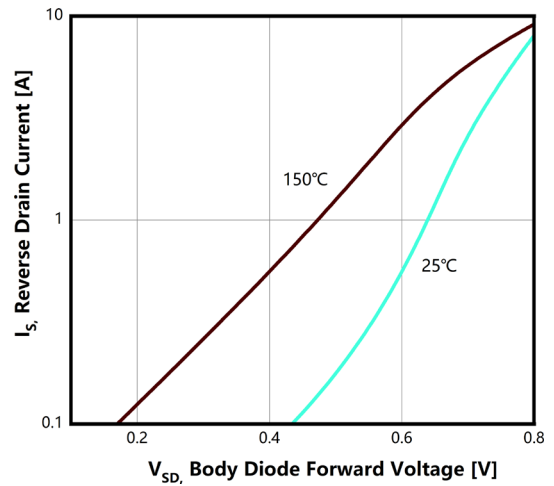


Figure 11. Maximum Drain Current

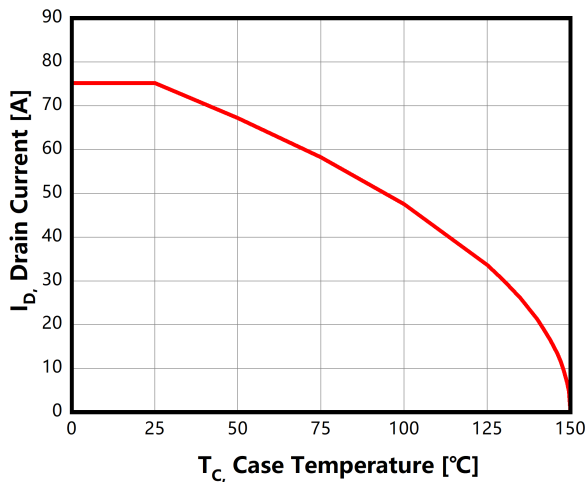


Figure 12. Typ. capacitances

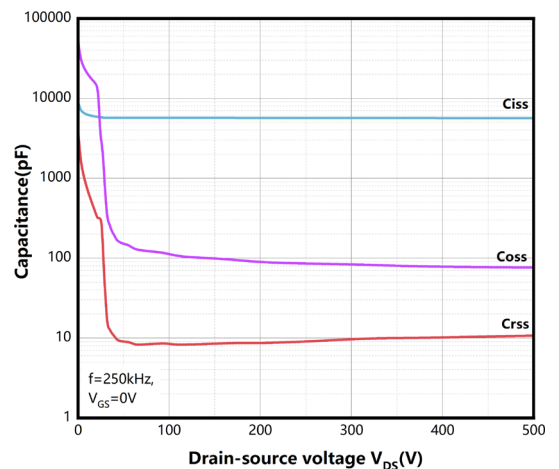


Figure 13. Typ. Coss stored energy

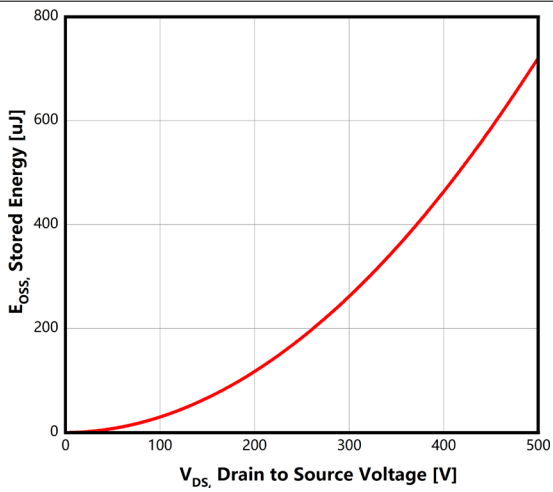
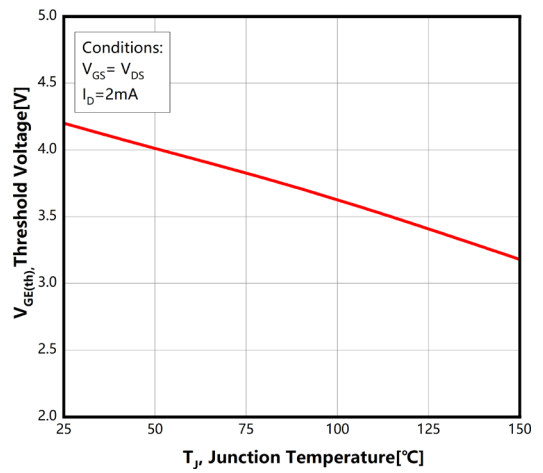


Figure 14. Threshold Voltage vs. Temperature



Test Circuits

Figure 15. Diode Characteristics

Test circuit for diode characteristics and Diode recovery waveform

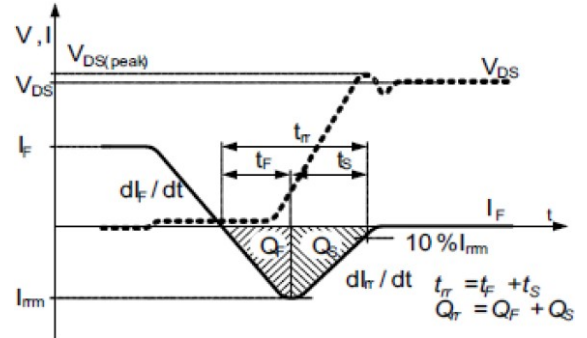
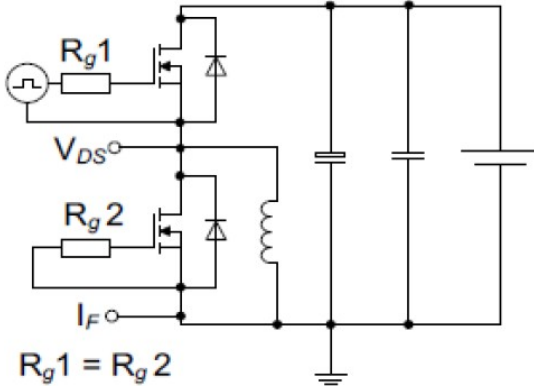


Figure 16. Switching Times

Switching times test circuit for inductive load and Switching times waveform

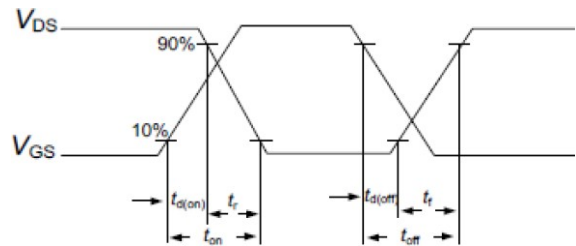
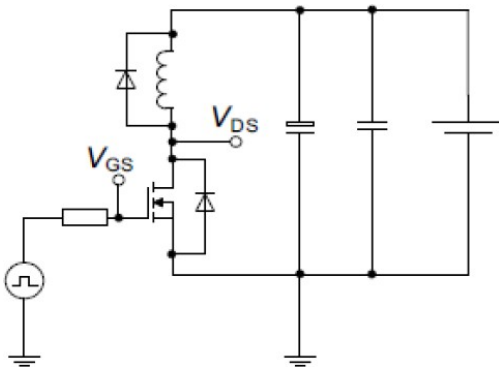
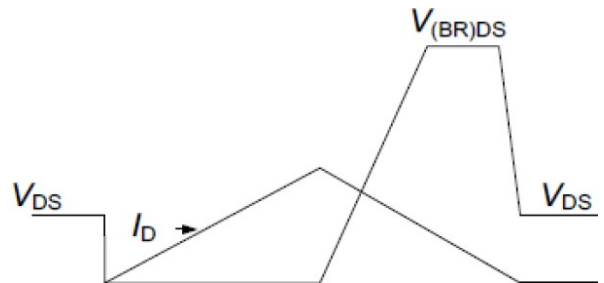
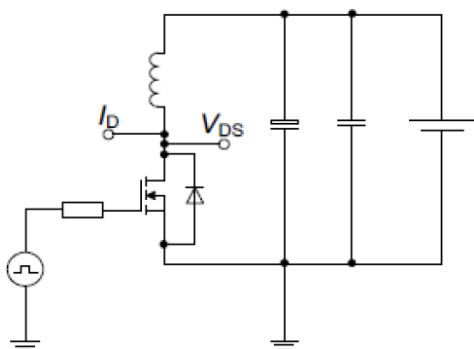


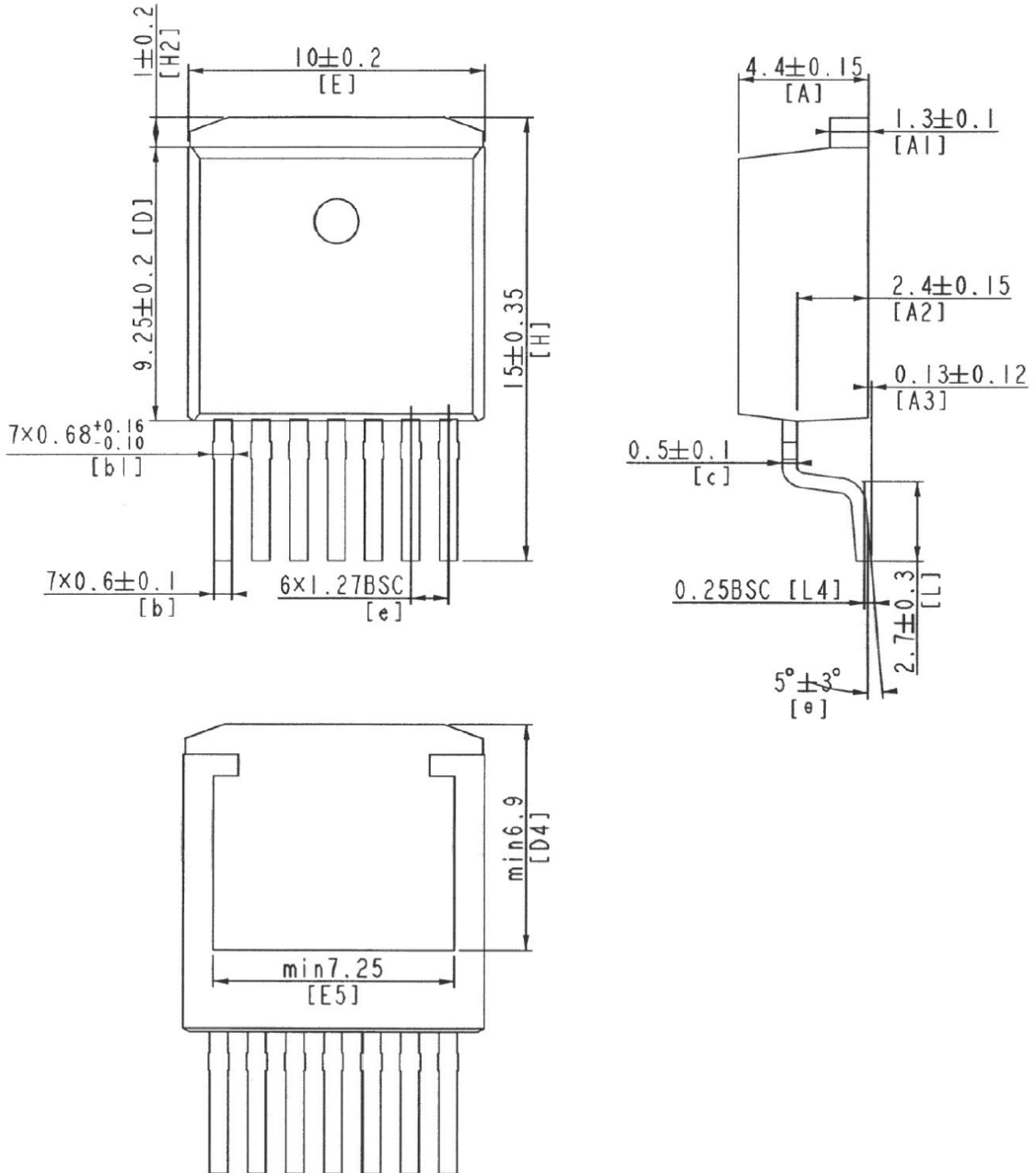
Figure 17. Unclamped Inductive Load

Unclamped inductive load test circuit and Unclamped inductive waveform



Package Outlines

TO263-7L



BMBF65N050UE1

650 V 50 mΩ Power MOSFET



Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMBF65N050UE1	BMBF65N050UE1	TO263-7L	Tape & Reel	800 units

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