



bestirpower

BMT60N105E1

Super Junction Power MOSFET

600 V, 31 A, 105 mΩ

Description

BMT60N105E1 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.

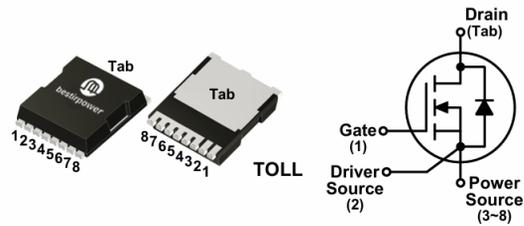
Applications

- PFC, Hard & Soft Switching Topologies
- Industrial & Consumer Power Supplies

Features

BV _{DSS} @ T _{J,max}	I _D	R _{DS(on),max}	Q _{g,typ}
650 V	31 A	105 mΩ	52 nC

- Reduced Switching & Conduction Losses
- Lower Gate Resistance
- 100% Avalanche Tested
- Pb-free, Halogen Free, RoHS and MSL1 Compliant



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

Symbol	Parameter	Value max	Unit
V _{DSS}	Drain to Source Voltage	600	V
V _{GSS}	Gate to Source Voltage	±30	V
I _D	Drain Current	Continuous(T _C = 25°C)	31
		Continuous(T _C = 100°C)	19.6
I _{DM}	Drain Current	Pulsed (1)	93
E _{AS}	Single Pulsed Avalanche Energy (2)	199	mJ
dv/dt	MOSFET dv/dt ruggedness	100	V/ns
	Peak Diode Recovery dv/dt (3)	20	
P _D	Power Dissipation	(T _C = 25°C)	260
		Derate above 25°C	2.08
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to 150	°C
I _S	Continuous diode forward current	31	A
I _{SM}	Diode pulse current	93	A

Thermal Characteristics

Symbol	Parameter	Value	Unit
R _{θJC}	Thermal Resistance, Junction to Case, Max.	0.48	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient, Max.(4)	43	
T _{sold}	Soldering temperature, wavesoldering only allowed at leads	260	°C

1. Repetitive rating: pulse-width limited by maximum junction temperature.
2. I_{AS} = 5.6 A, R_G = 25 Ω, starting T_J = 25 °C.
3. I_{SD} = 15.3 A, di/dt = 100 A/μs, V_{DD} = 400 V, starting T_J = 25 °C.
4. Device on 1.0 x 1.0 inch and 2-oz copper pad on 1.5 x 1.5 inch PCB FR4.

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV _{DSS}	Drain to Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}$	600	-	-	V
		$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}, T_J = 150^\circ\text{C}$	650	-	-	
I _{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 480\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$	-	2.1	-	
I _{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	-	-	±100	nA

On Characteristics

V _{GS(th)}	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.1\text{ mA}$	2.5	-	4.5	V
R _{DS(on)}	Static Drain to Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 15.3\text{ A}$	-	89	105	mΩ

Dynamic Characteristics

C _{iss}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}, f = 250\text{ kHz}$	-	2270	-	pF
C _{oss}	Output Capacitance		-	58	-	pF
C _{o(tr)}	Time Related Output Capacitance	$V_{DS} = 0\text{ to }400\text{ V}, V_{GS} = 0\text{ V}$	-	670	-	pF
C _{o(er)}	Energy Related Output Capacitance		-	92	-	pF
Q _{g(tot)}	Total Gate Charge at 10 V	$V_{DS} = 400\text{ V}, I_D = 15.3\text{ A}, V_{GS} = 10\text{ V}$	-	52	-	nC
Q _{gs}	Gate to Source Charge		-	12.7	-	nC
Q _{gd}	Gate to Drain "Miller" Charge		-	22.4	-	nC
R _G	Gate Resistance	$f = 1\text{ MHz}$	-	0.9	-	Ω
t _{d(on)}	Turn-On Delay Time	$V_{DS} = 400\text{ V}, I_D = 15.3\text{ A}, V_{GS} = 10\text{ V}, R_g = 10\text{ }\Omega$	-	18	-	ns
t _r	Turn-On Rise Time		-	9	-	ns
t _{d(off)}	Turn-Off Delay Time		-	83	-	ns
t _f	Turn-Off Fall Time		-	7	-	ns

Source-Drain Diode Characteristics

V _{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 15.3\text{ A}$	-	-	1.2	V
t _{rr}	Reverse Recovery Time	$V_R = 400\text{ V}, I_S = 15.3\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}$	-	346	-	ns
Q _{rr}	Reverse Recovery Charge		-	5.1	-	μC

Typical Performance Characteristics

Figure 1: On-Region Characteristics

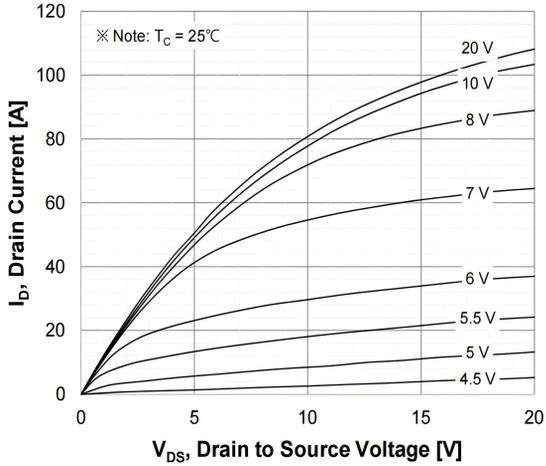


Figure 2: Transfer Characteristics

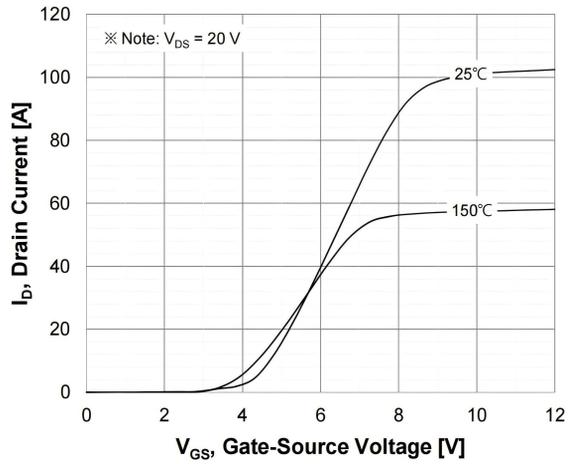


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

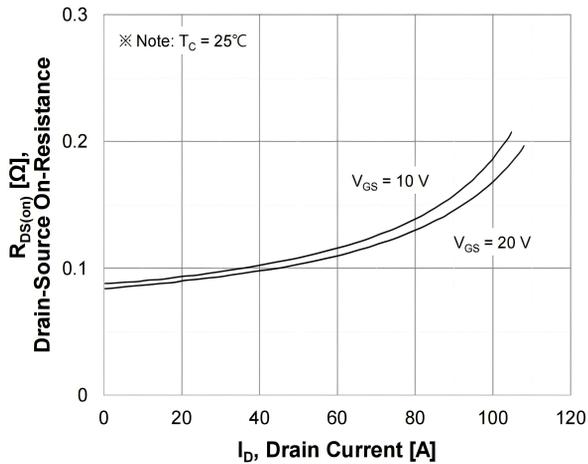


Figure 4: Diode Forward Voltage vs. Source-Drain Current and Temperature

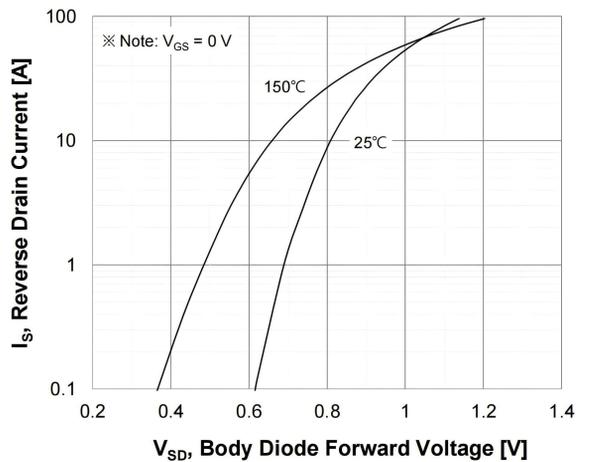


Figure 5: Capacitance Characteristics

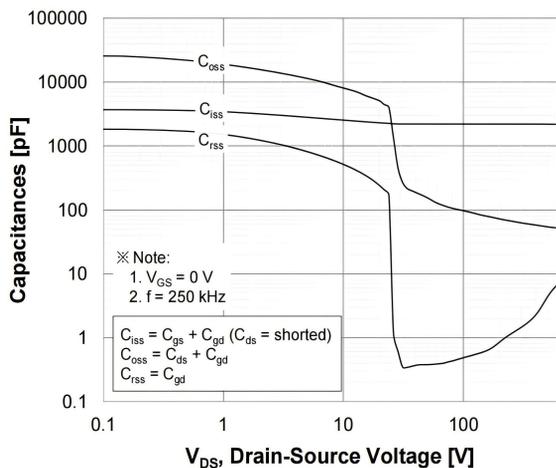
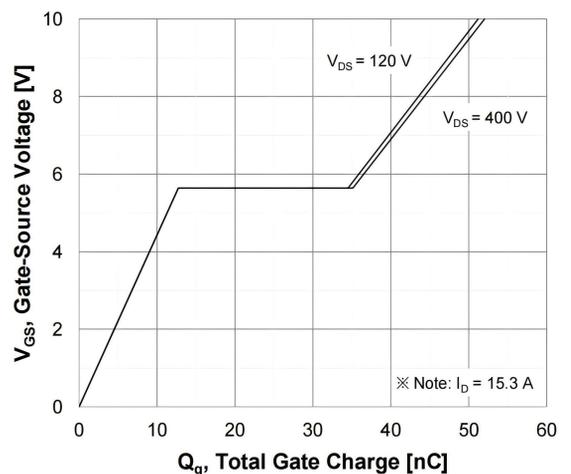


Figure 6: Gate Charge Characteristics



Typical Performance Characteristics

Figure 7: Breakdown Voltage vs. Temperature

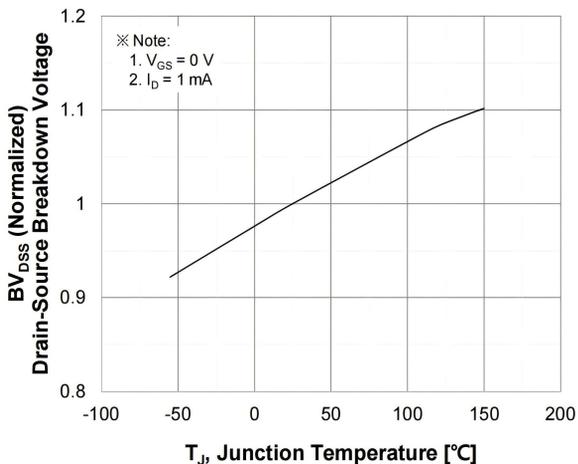


Figure 8: On-Resistance vs. Temperature

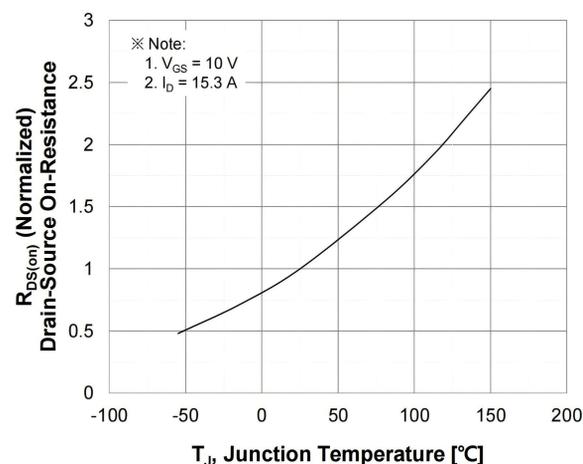


Figure 9: Maximum Safe Operating Area

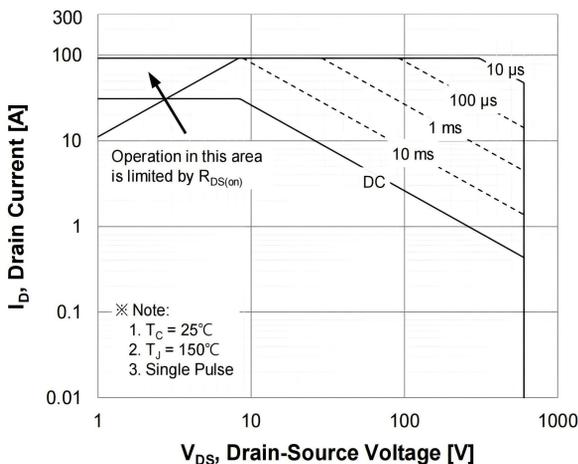


Figure 10: Drain Current vs. Case Temperature

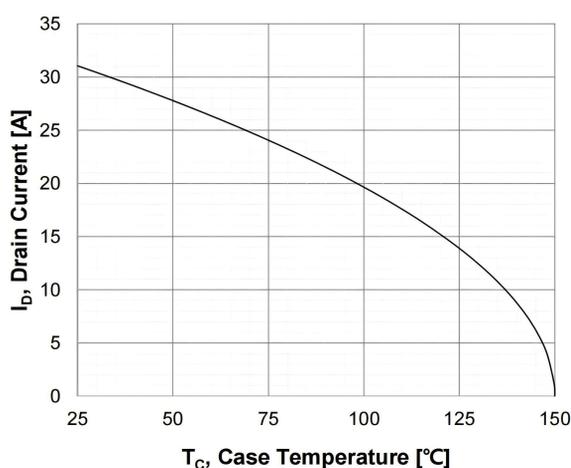


Figure 11: E_{OSS} vs. Drain to Source Voltage

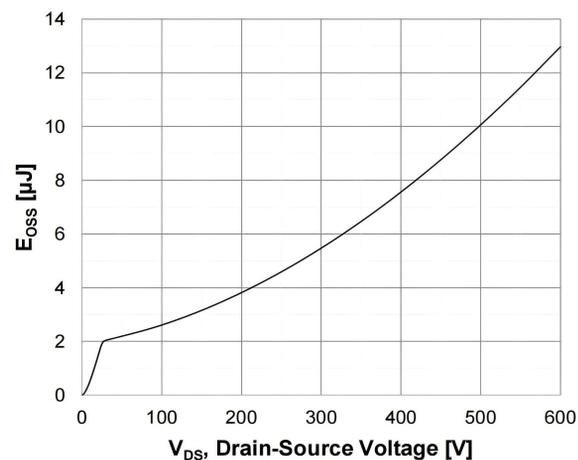
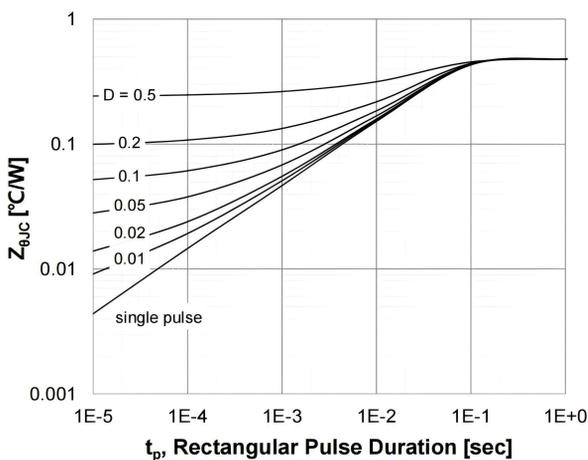


Figure 12: Transient Thermal Response Curve



Test Circuits

Figure 13. Peak Diode Recovery dv/dt Test Circuit and Waveforms

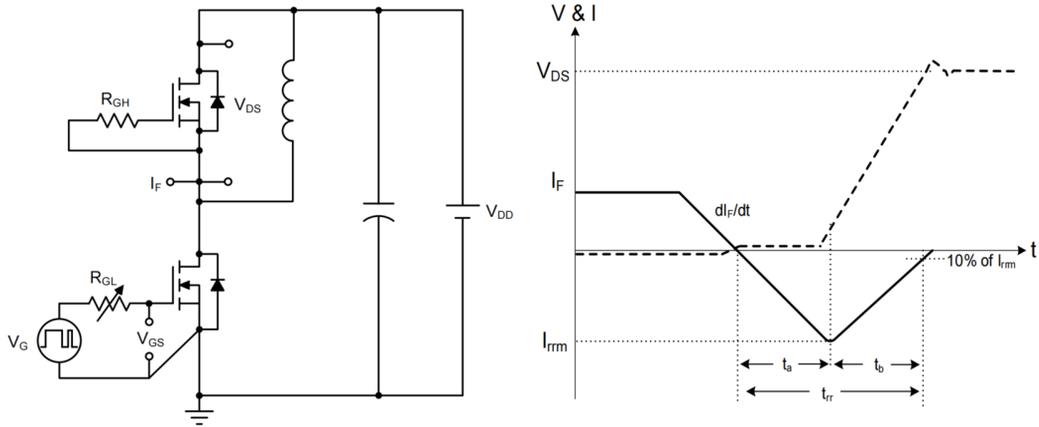


Figure 14. Inductive Load Switching Test Circuit and Waveforms

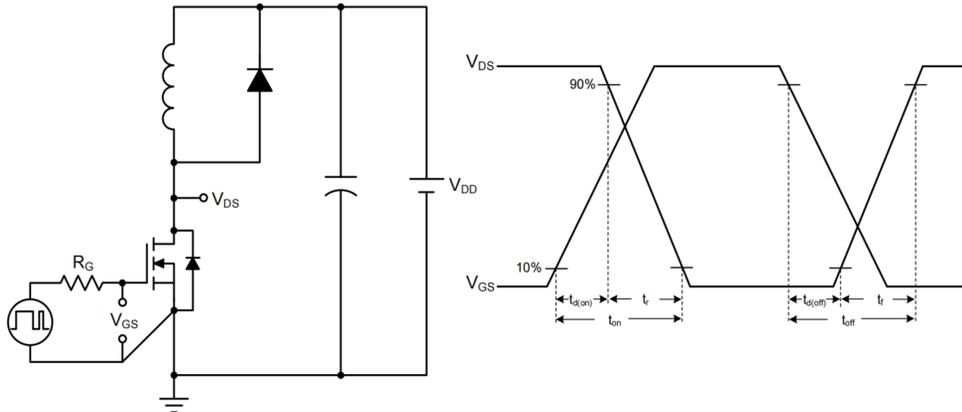
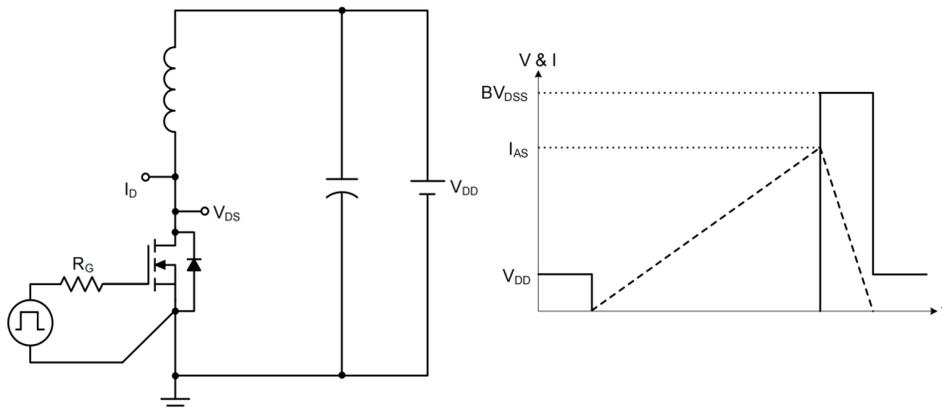
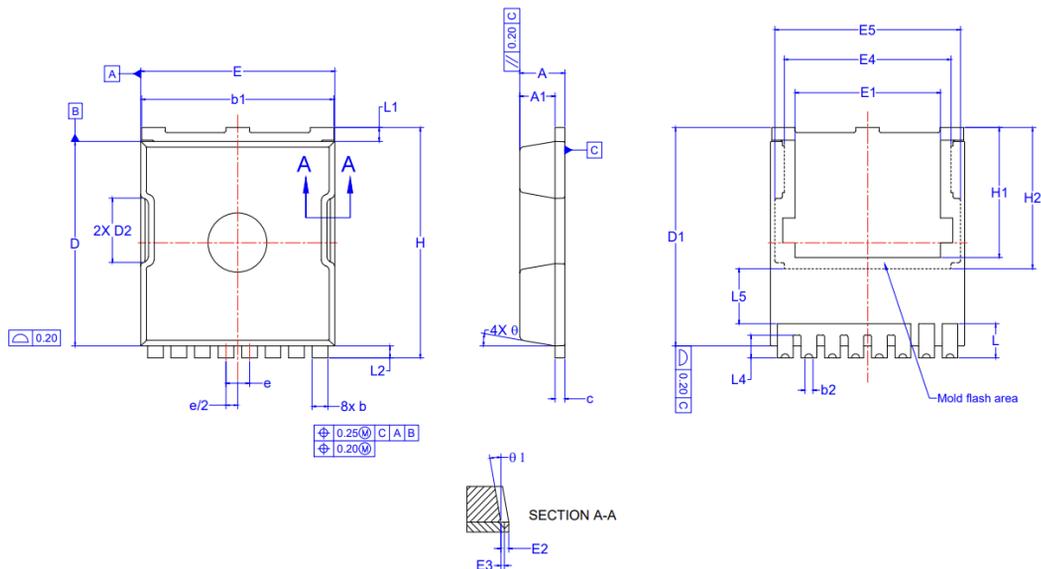


Figure 15. Unclamped Inductive Switching Test Circuit and Waveforms



Package Outlines

TOLL



SYMBOL	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
A1	1.70	1.80	1.90
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.36	0.41	0.51
c	0.40	0.50	0.60
D	10.28	10.38	10.48
D1	10.98	11.08	11.18
D2	3.30		
E	9.80	9.90	10.00
E1	7.32	7.42	7.52
E2	0.30	0.40	0.50
E3	0.15	0.18	0.21
E4	8.50		
E5	9.46		
e	1.20 BASIC		
H	11.58	11.68	11.78
H1	6.55	6.65	6.75
H2	7.05	7.15	7.25
L	1.63	1.73	1.83
L1	0.60	0.70	0.80
L2	0.50	0.60	0.70
L4	1.00	1.15	1.30
L5	2.70	2.80	2.90
N	8		
θ	10° REF.		
θ1	10° REF.		

* Dimensions in millimeters

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BMT60N105E1	BMT60N105E1	TOLL	Tape and Reel	1000 Units

Disclaimer

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