

BSLT06NH007SW1

N-Channel Power MOSFET

60 V, 560 A, 0.7 mΩ

Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency. It has been optimized for low gate charge, low $R_{DS(on)}$, fast switching speed.

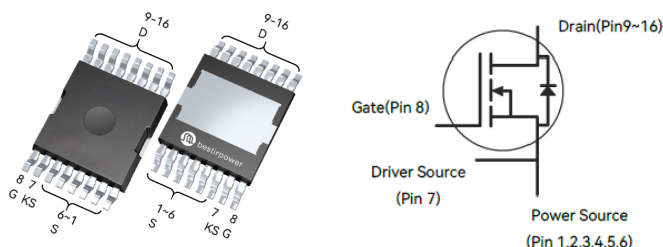
Features

BV_{DSS}	I_D	$R_{DS(on),max}$	$Q_{rr,typ}$
60 V	560 A	0.7 mΩ	123 nC

- $R_{DS(on),MAX}=0.7m\Omega@V_{GS}=10V$
- Low gate Charge (typical 224nC)
- Low C_{rss} (typical 86pF)
- Low On-Resistance
- Excellent FoM(figure of merit)
- 100% UIS and Rg tested

Applications

- Motor Driver
- DC/DC Converter
- Battery Management System



Absolute Maximum Ratings ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		60	V
V_{GSS}	Gate to Source Voltage		± 20	V
I_D	Continuous Drain Current, Silicon Limited($T_C = 25^\circ\text{C}$) ⁽¹⁾		560	A
	Continuous Drain Current, Silicon Limited($T_C = 100^\circ\text{C}$) ⁽¹⁾		350	
I_{DM}	Drain Current (2)	Pulsed	2240	A
E_{AS}	Single Pulsed Avalanche Energy (3)		6.5	J
P_D	Power Dissipation	($T_C = 25^\circ\text{C}$)	278	W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.45	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	45	

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 25^\circ\text{C}$	-	-	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	2.5	3.0	3.5	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$	-	0.6	0.7	mΩ

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V},$ $f = 100\text{ kHz}$	-	17.4	-	nF
C_{oss}	Output Capacitance		-	4780	-	pF
C_{rss}	Reverse transfer capacitance		-	86	-	pF
$Q_{g(tot)}$	Total Gate Charge at 10 V	$V_{GS} = 10\text{ V}, V_{DD} = 30\text{ V}$ $I_D = 100\text{ A}$	-	224	-	nC
Q_{gs}	Gate to Source Charge		-	75	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	36	-	nC
R_G	Gate Resistance	$f = 1\text{ MHz}$	-	1.3	-	Ω

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{ V}, V_{DD} = 30\text{ V}$ $R_G = 3\text{ }\Omega, I_D = 100\text{ A}$	-	40.9	-	ns
t_r	Turn-On Rise Time		-	109	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	91	-	ns
t_f	Turn-Off Fall Time		-	46	-	ns

Source-Drain Diode Characteristics

I_S	Continuous Diode Forward Current		-	560	-	A
$I_{S\text{ pulse}}$	Diode Pulsed Current ²⁾		-	2240	-	
V_{SD}	Diode Forward Voltage	$T_J = 25^\circ\text{C}, I_S = 30\text{ A}, V_{GS} = 0\text{ V}$	-	0.75	1.4	V
t_{rr}	Reverse Recovery Time	$I_F = 100\text{ A}, diF/dt = 100\text{ A/us}$	-	82	-	ns
Q_{rr}	Reverse Recovery Charge		-	123	-	nC

Notes

- 1) Limited by maximum junction temperature.
- 2) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 3) $L = 1.0\text{ mH}, R_G = 1.06\text{ }\Omega, V_{GS} = 10\text{ V}, V_{DD} = 100\text{ V}, \text{Start } T_J = 25^\circ\text{C}$.

Typical Performance Characteristics

Figure 1. Transient Thermal Impedance

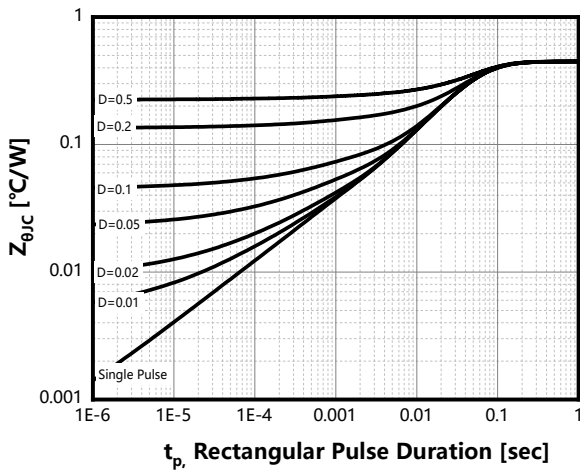


Figure 2. Safe Operation Area

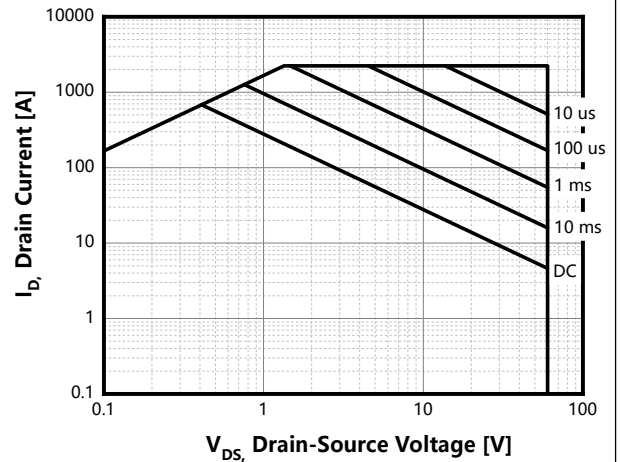


Figure 3. Output Characteristics

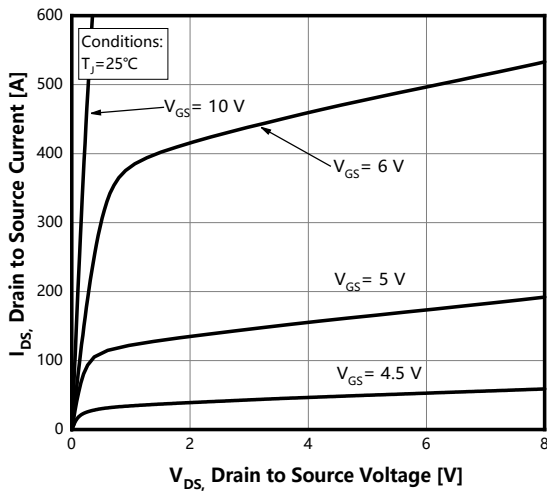


Figure 4. Transfer Characteristics

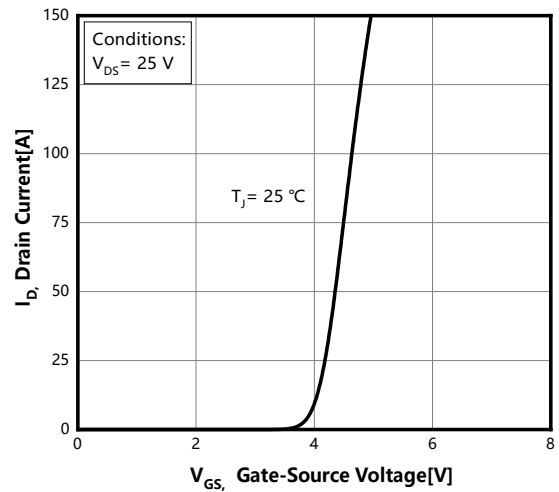


Figure 5. On-Resistance vs Drain Current

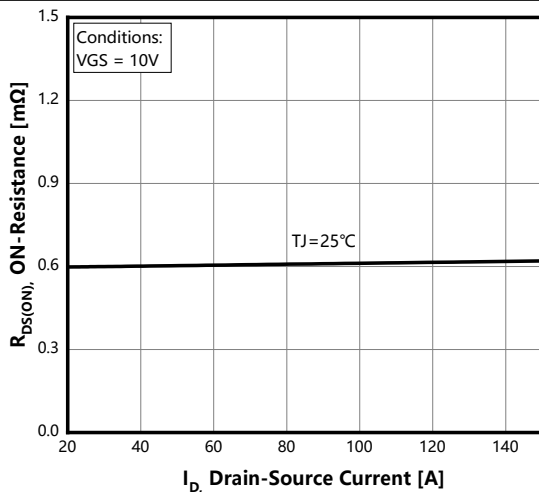
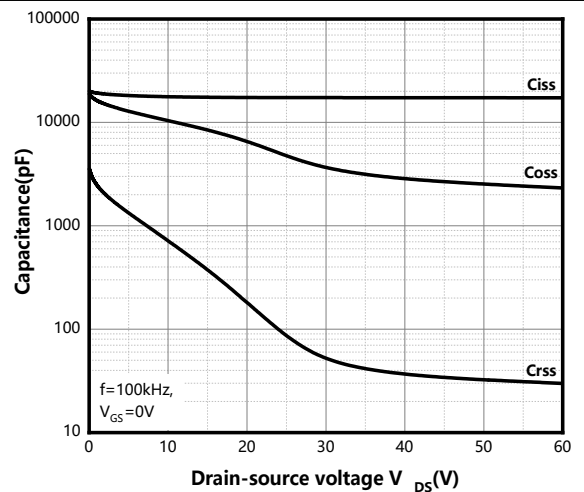


Figure 6. Capacitance



Typical Performance Characteristics

Figure 7. Gate Charge

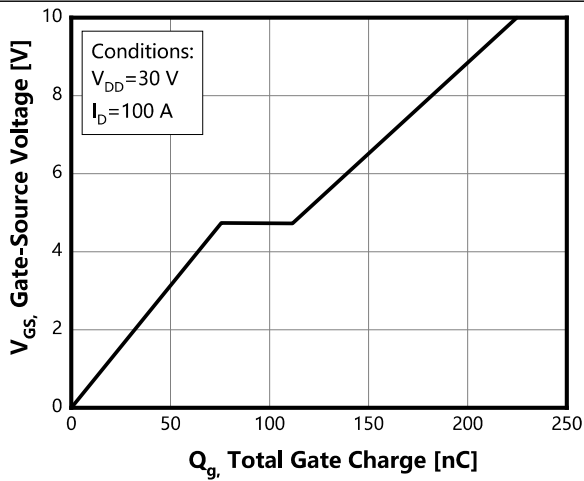


Figure 8. Body Diode Forward Voltage

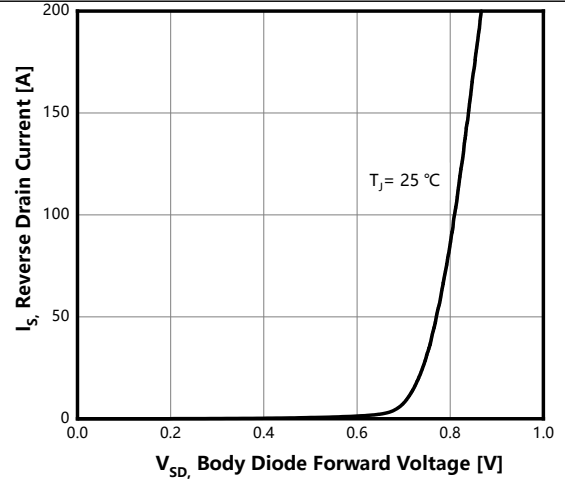


Figure 9. Breakdown Voltage vs Junction Temperature

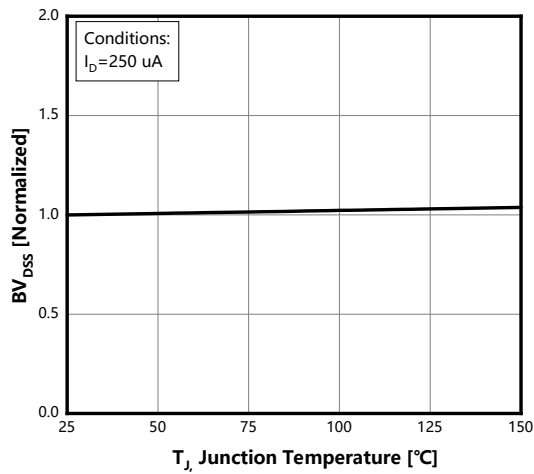


Figure 10. On-Resistance vs Temperature

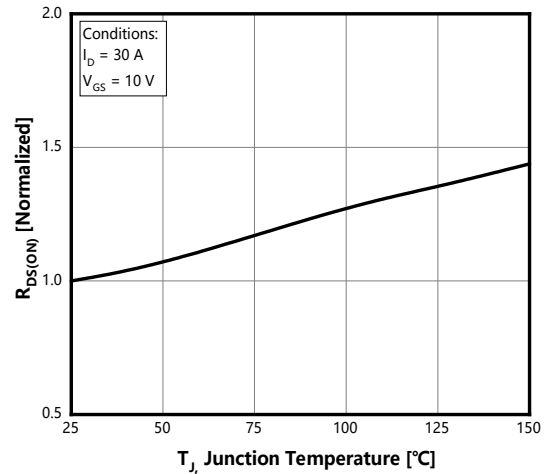
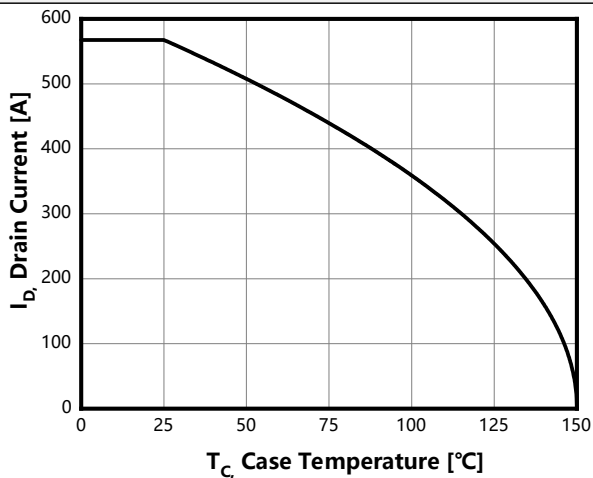


Figure 11. Continuous Drain Current Derating vs. Case Temperature



Test Circuits

Figure 12: Gate Charge Test Circuit and Waveform

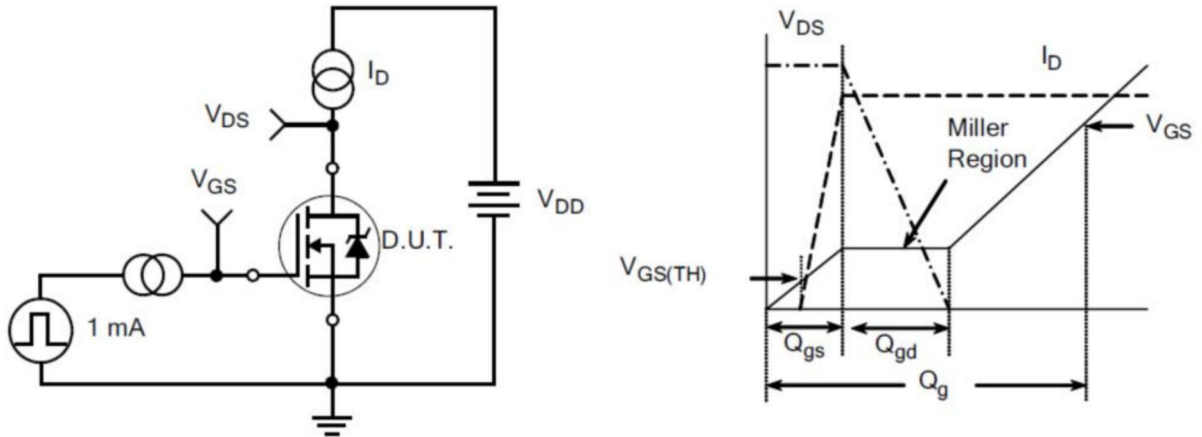


Figure 13: Resistive Switching Test Circuit and Waveform

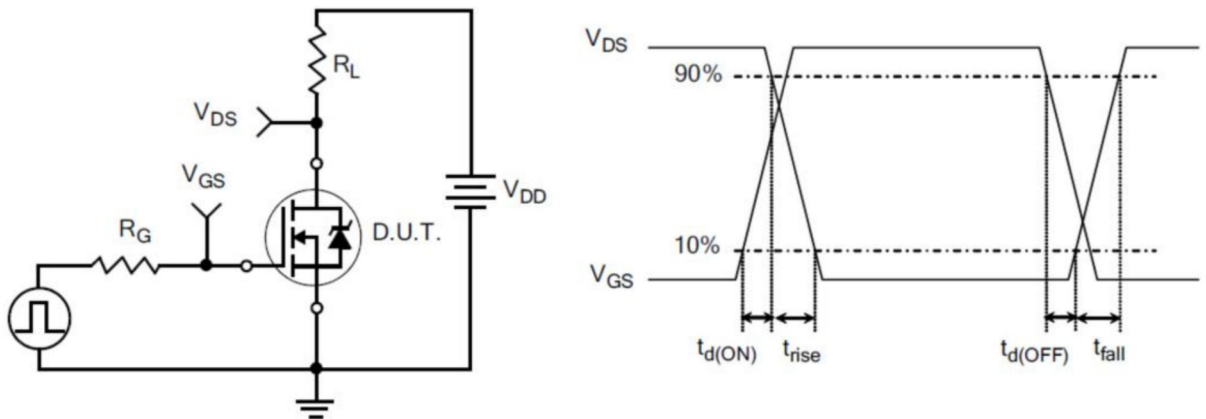
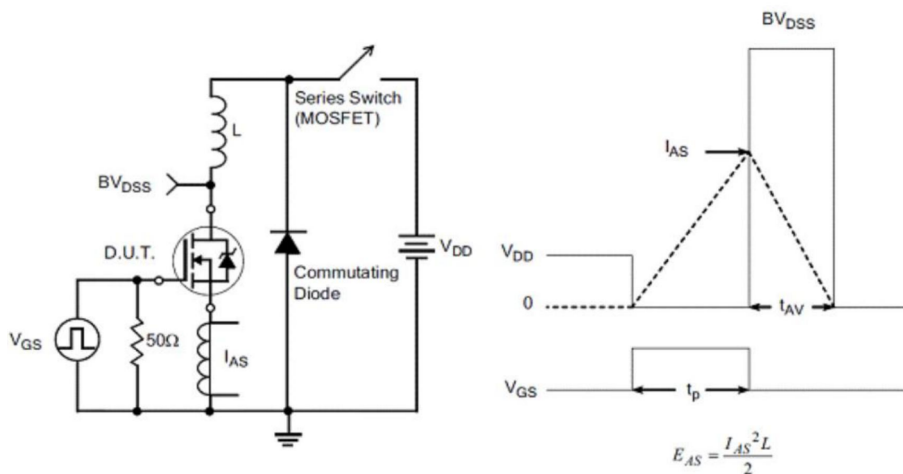
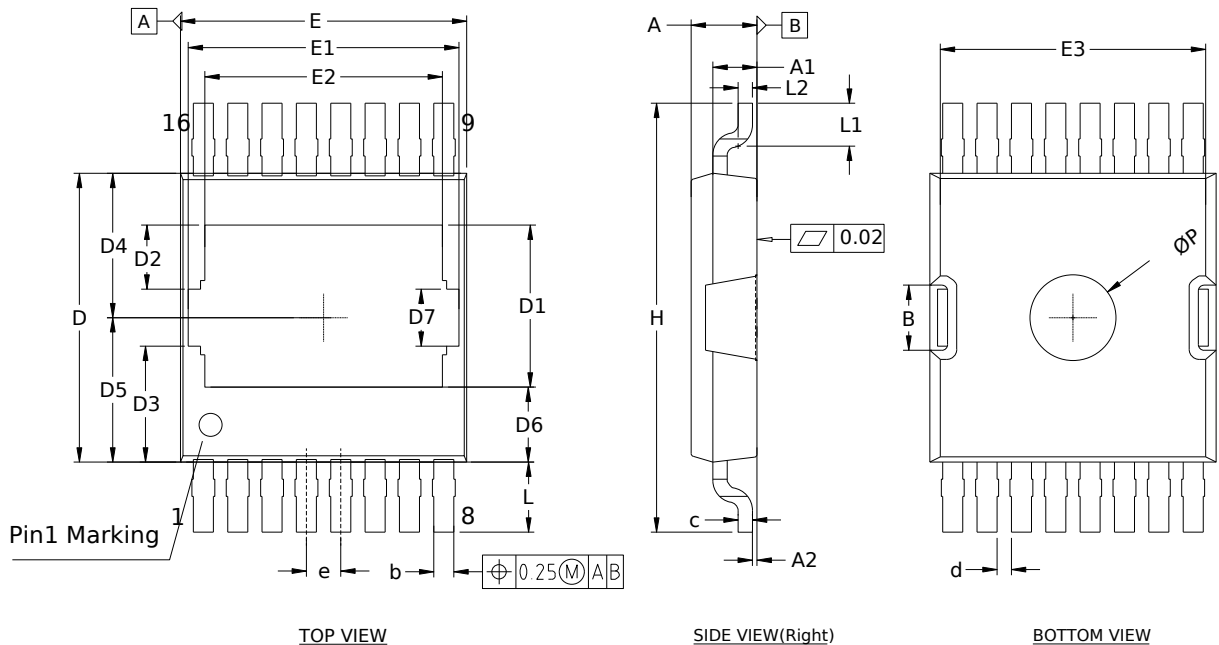


Figure 14: Unclamped Inductive Switching Test Circuit and Waveform



Package Outlines

TOLT



DIM SYMBOL	MIN.	NOM.	MAX.
A	2.250	2.300	2.350
A1	1.440	1.540	1.640
A2	0.010	---	0.100
b	0.600	0.700	0.800
c	0.400	0.500	0.600
d	0.400	0.500	0.600
e	1.200 BSC		
D	10.00	10.100	10.300
D1	5.470	5.670	5.870
D2	2.040	2.240	2.440
D3	4.050 REF.		
D4	5.050 REF.		
D5	5.050 REF.		
D6	2.620 REF.		
D7	2.000 REF.		
E	9.700	10.000	10.100
E1	9.460 REF.		
E2	8.100	8.300	8.500
E3	9.07	9.270	9.470
H	14.800	15.000	15.200
L	2.250	2.450	2.650
L1	1.350	1.500	1.650
L2	0.500 BSC		
ØP	2.900	3.000	3.100
B	2.180	2.280	2.380

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BSLT06NH007SW1	BSLT06NH007SW1	TOLT	Tape & Reel	1800 units

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