

BSP06NH026SW1

N-Channel Power MOSFET

60 V, 227 A, 2.6 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.

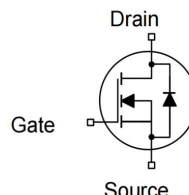
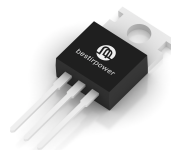
Features

BV_{DSS}	I_D	$R_{DS(on),max}$	$Q_{rr,typ}$
60 V	227 A	2.6 mΩ	39 nC

- $R_{DS(on),MAX}=2.6m\Omega@V_{GS}=10V$
- Low gate Charge (typical 64.7nC)
- Low C_{rss} (typical 4.7pF)
- Low On-Resistance
- Excellent FoM(figure of merit)
- 100% UIS and Rg tested

Applications

- DC/DC Converter
- Motor Driver
- Uninterruptible Power Supplies



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⁾		227	A
	Continuous Drain Current, Silicon Limited ($T_C = 100^\circ\text{C}$) ¹⁾		144	
I_{DM}	Drain Current (2)	Pulsed	1305	A
E_{AS}	Single Pulsed Avalanche Energy (3)		1559	mJ
P_D	Power Dissipation	($T_C = 25^\circ\text{C}$)	135	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, Max.	0.92	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max	40	

Notes

- 1) Limited by maximum junction temperature.
- 2) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 3) $L=0.5\text{mH}$, $R_G=3.3\Omega$, $V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, Start $T_J=25^\circ\text{C}$.

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	$V_{GS} = +20\text{ V}$	-	-	100	nA
		$V_{GS} = -20\text{ V}$	-	-	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	2.0	3.0	4.0	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$	-	2.6	3.4	mΩ

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V},$ $f = 100\text{ KHz}$	-	3680	-	pF
C_{oss}	Output Capacitance		-	2320	-	pF
C_{rss}	Reverse transfer capacitance		-	4.7	-	pF
$Q_{g(tot)}$	Total Gate Charge at 10 V	$V_{GS} = 0\sim 10\text{ V}, V_{DS} = 30\text{ V}, I_D = 30\text{ A}$	-	64.7	-	nC
Q_{gs}	Gate to Source Charge		-	15.2	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	21.2	-	nC
R_G	Gate Resistance	$f = 1\text{ MHz}$	-	3.3	-	Ω

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 0\sim 10\text{ V}, V_{DS} = 30\text{ V}, R_G = 3\Omega,$ $I_D = 100\text{ A}$	-	12.7	-	ns
t_r	Turn-On Rise Time		-	85	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	24	-	ns
t_f	Turn-Off Fall Time		-	32	-	ns

Source-Drain Diode Characteristics

V_{SD}	Diode Forward Voltage	$T_J = 25^\circ\text{C}, I_F = 30\text{ A}, V_{GS} = 0\text{ V}$	-	0.8	-	V
t_{rr}	Reverse Recovery Time	$I_F = 30\text{ A}, diF/dt = 100\text{ A/us}$	-	44	-	ns
Q_{rr}	Reverse Recovery Charge		-	39	-	nC

Typical Performance Characteristics

Figure 1. Transient Thermal Impedance

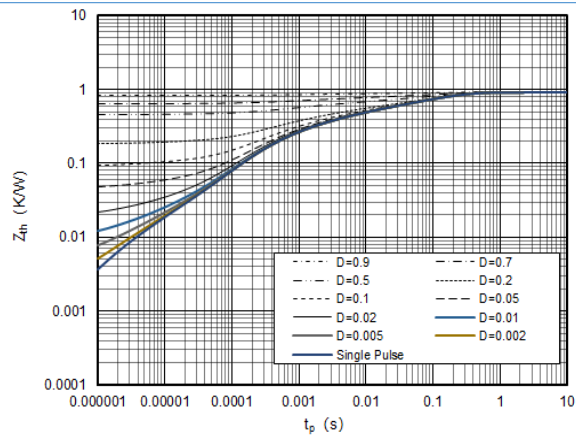


Figure 2 . Safe Operation Area

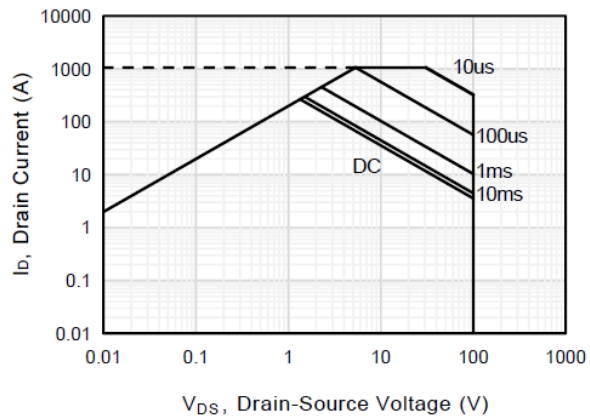


Figure 3 . Output Characteristics

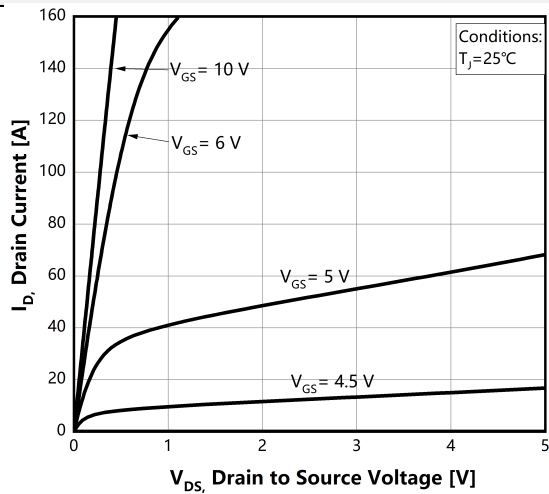


Figure 4 . Output Characteristics

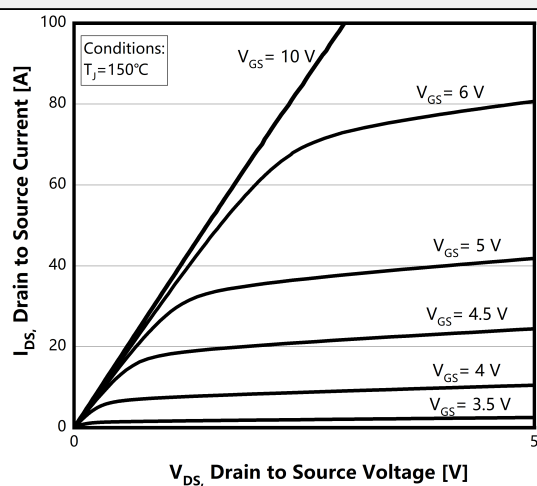


Figure 5 . On-Resistance vs Drain Current

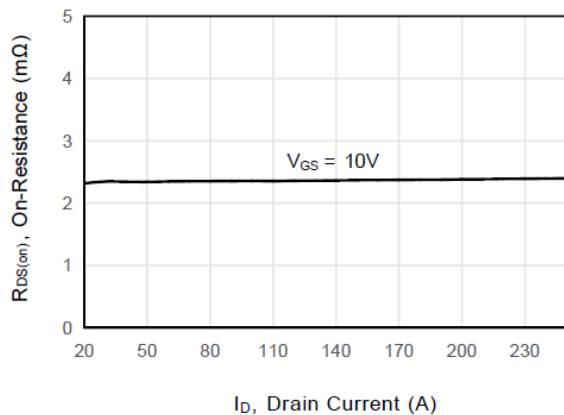
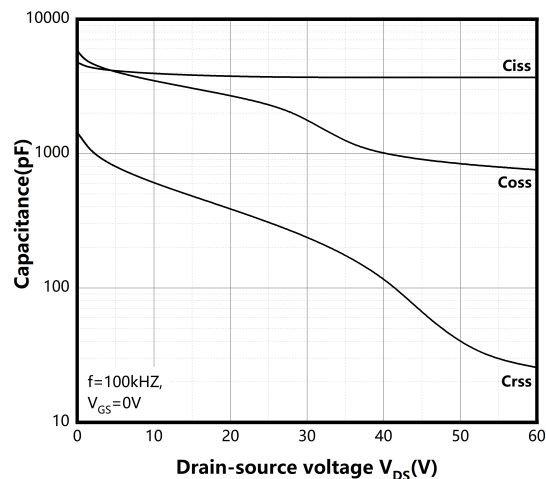


Figure 6 . Capacitance



Typical Performance Characteristics

Figure 7 . Gate Charge

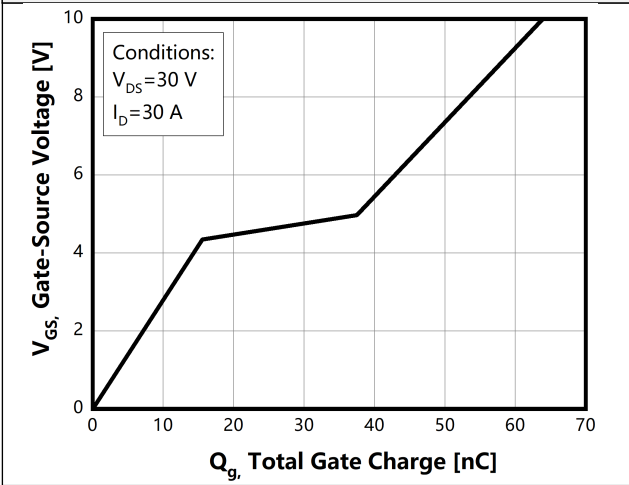


Figure 8 . Body Diode Forward Voltage

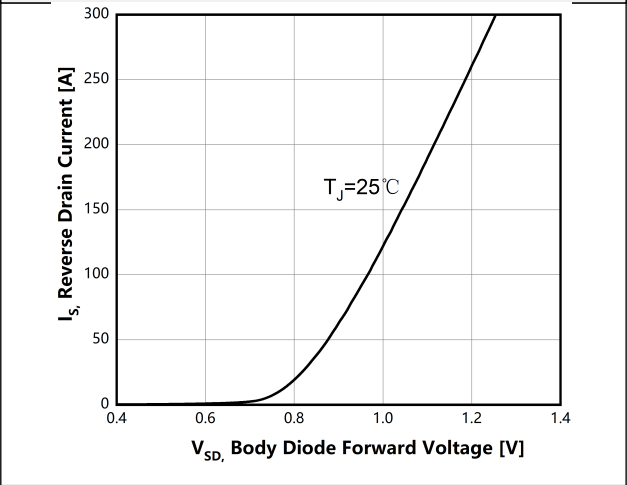


Figure 9 . Breakdown Voltage vs Junction Temperature

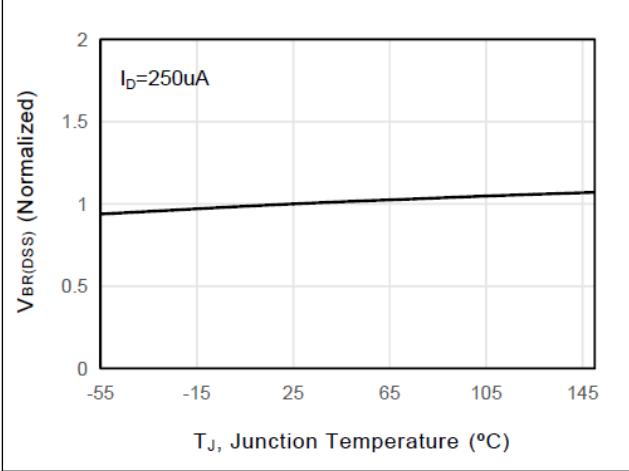


Figure 10. On-Resistance vs Temperature

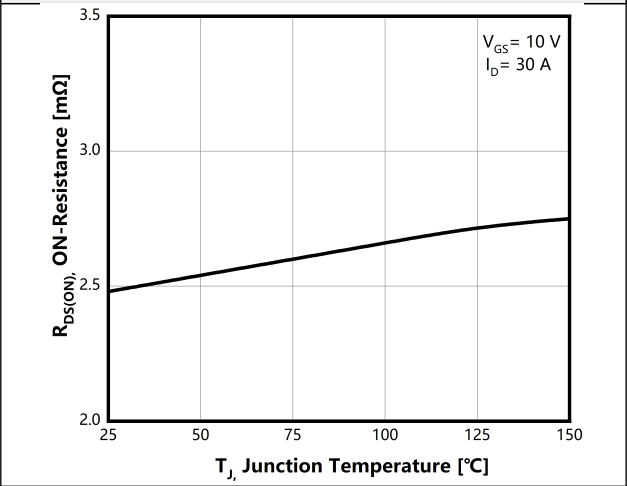


Figure 11. $V_{GS(th)}$ vs Junction Temperature

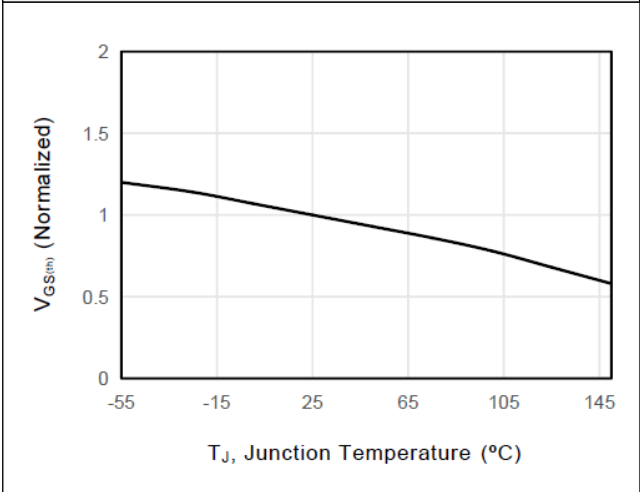


Figure 12 . Transfer Characteristics

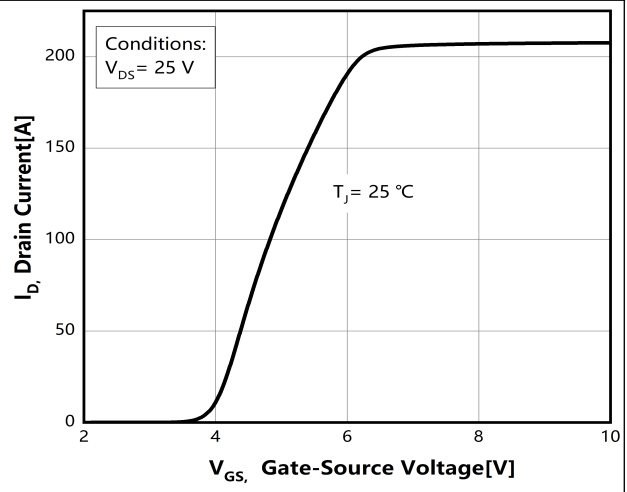
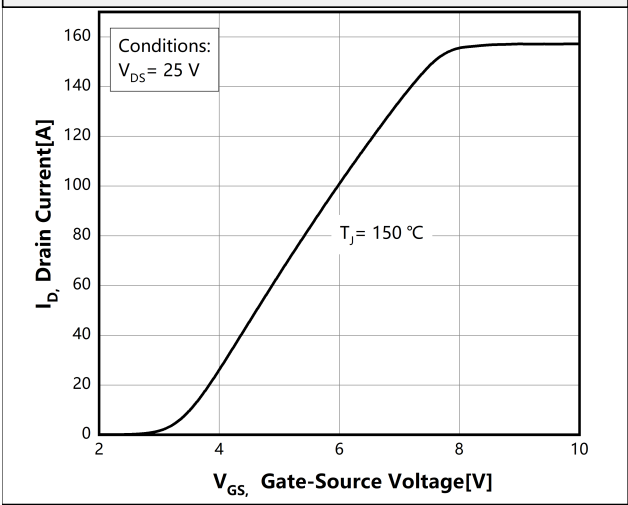


Figure 13 . Transfer Characteristics



Test Circuits

Figure 12: Gate Charge Test Circuit and Waveform

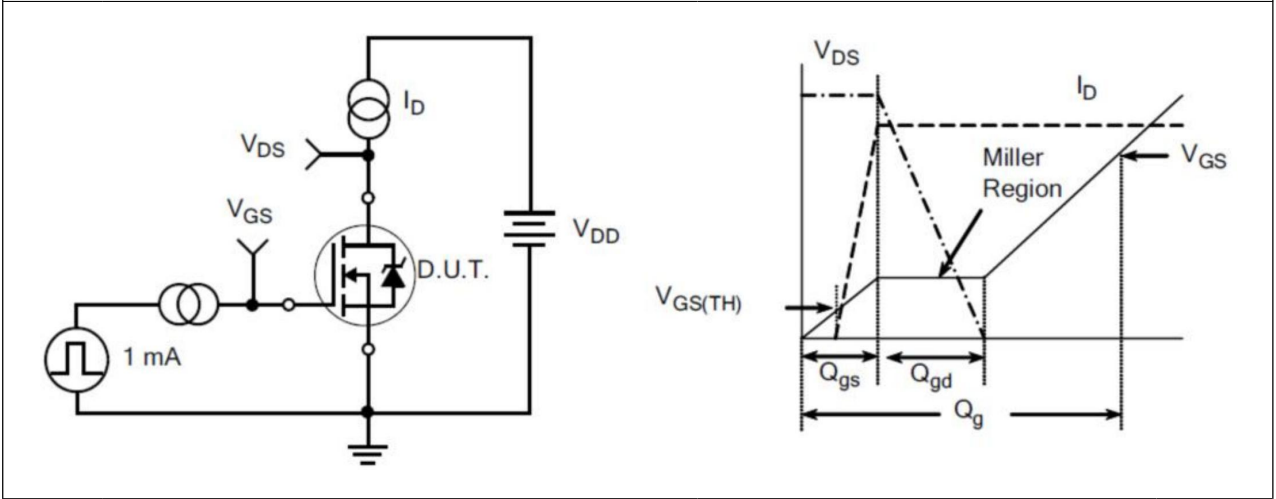


Figure 13: Resistive Switching Test Circuit and Waveform

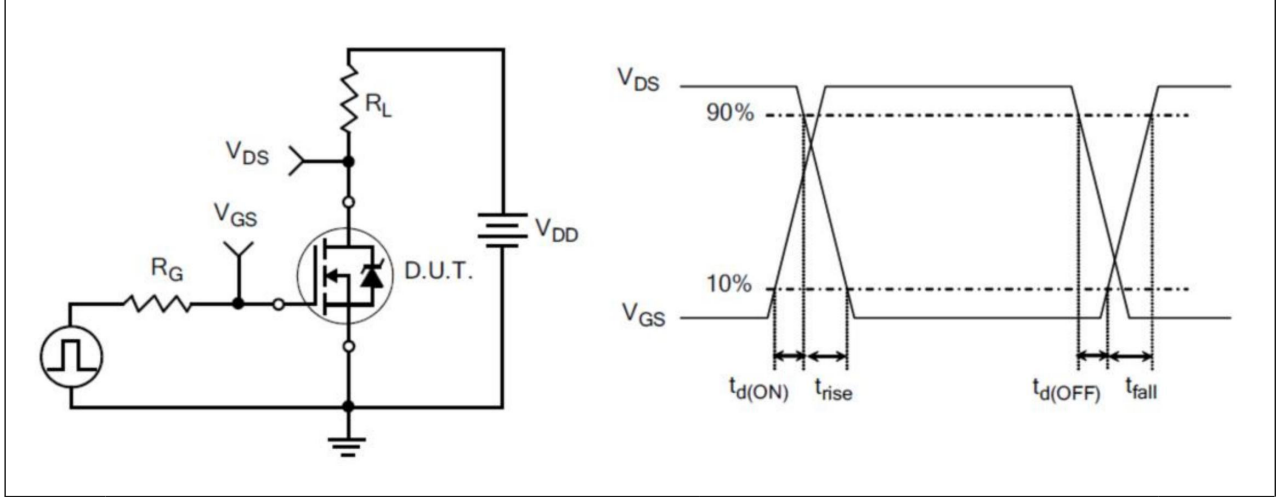
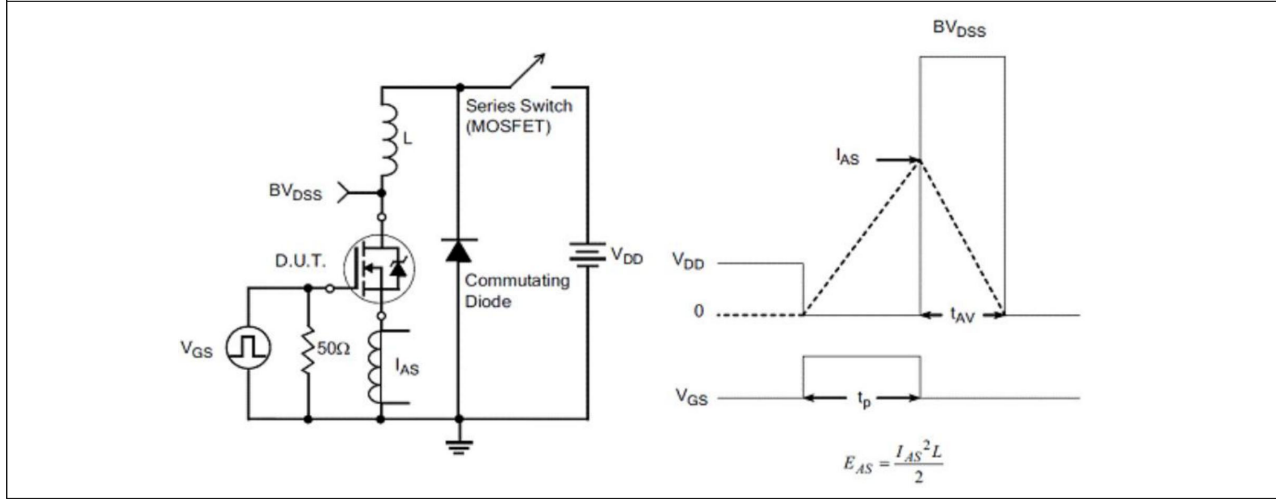
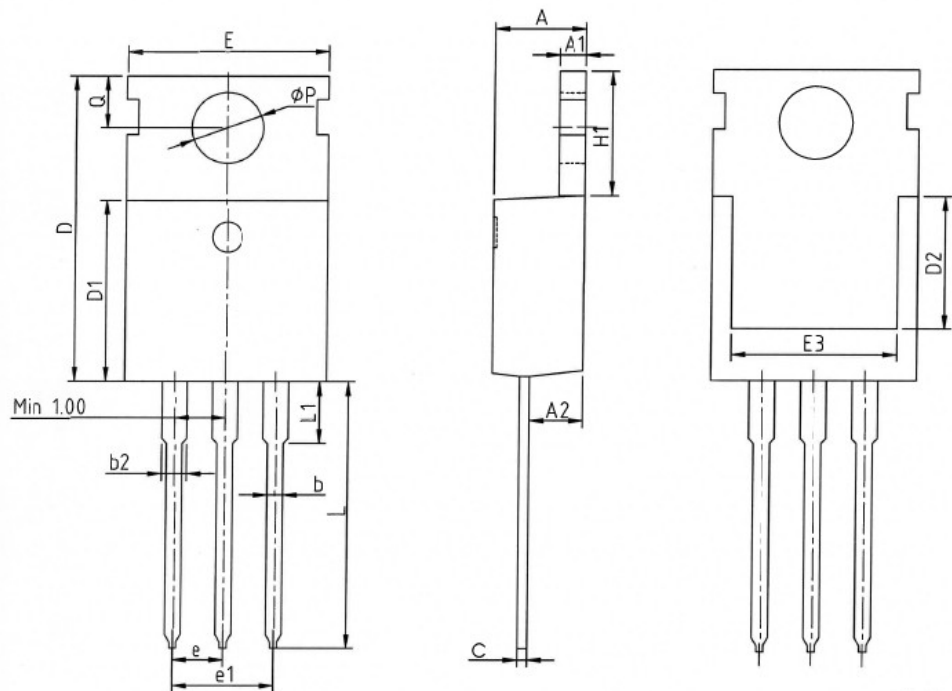


Figure 14: Unclamped Inductive Switching Test Circuit and Waveform



Package Outlines

TO-220-3



SYMBOL	MIN	NOM	MAX
A	4.37	4.57	4.70
A1	1.25	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.45	0.50	0.60
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	6.30	7.10
E	9.70	10.00	10.30
E3	7.00	7.80	8.60
e	2.54 BSC		
e1	5.08 BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
ΦP	3.40	3.60	3.80
Q	2.60	2.80	3.00

* Dimensions in millimeters

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BSP06NH026SW1	BSP06NH026SW1	TO-220-3	Tube	50units

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