BMD65N360Z1

N-Channel Power MOSFET

650 V, 11 A, 360 mΩ

bestirpower

Description

BMD65N360Z1 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.

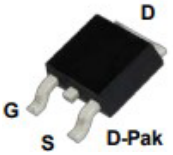
Features

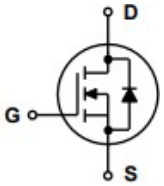
BV_{DSS} @ $T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
700V	11 A	360 mΩ	17.5 nC

- Extremely low losses due to very low FOM Rdson*Qg and Eoss.
- Very high commutation ruggedness.
- RoHS compliant

Applications

- PFC.
- SPWM.
- LCD TV.
- Lighting.
- UPS.





Absolute Maximum Ratings (T_C = 25℃ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		650	V
V_{GSS}	Gate to Source Voltage		±30	V
I_D	Drain Current[1]	Continuous (T_C = 25℃)	11	A
		Continuous (T_C = 125℃)	6.6	
I_{DM}	Drain Current[2]	Pulsed	33	A
P_D	Power Dissipation		134	W
E_{AS}	Single Pulsed Avalanche Energy[3]		135	mJ
dv/dt	MOSFET dv/dt ruggedness		50	V/ns
	Diode Recovery dv/dt ruggedness[4]		15	
T_{STG}	Storage Temperature Range		-55 to 150	℃
T_J	Maximum Operating Junction Temperature		150	℃
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 10 Seconds		260	℃

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}=50V, I_{AS}=3A, L=50mH, R_G=25Ω, Starting T_j=25°C.
4) V_{DClink}=400V; $V_{DS,peak}$<$V_{(BR)DSS}$; 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 T_C = 25°C	0.93	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient T_C = 25°C	104.8	

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Reel Size	Tape Width	Quantity
BMD65N360Z1	BMD65N360Z1	D-Pak	Tape & Reel	330 mm	16 mm	2500 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 = 250μA	650	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 650 V, V_{GS} = 0 V Tj=25°C	-	-	1	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 = 250μA	2.5	3.5	4.5	V
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 3A Tj=25°C	-	290	360	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=50V, f=1MHz	-	571	-	pF
C_{oss}	Output Capacitance		-	45	-	pF
C_{rss}	Reverse Transfer Capacitance		-	5.46	-	pF
$C_{o(tr)}$	Time Related Output Capacitance	V_{DS} = 0 to 400 V, V_{GS} = 0 V	-	136	-	pF
$C_{o(er)}$	Energy Related Output Capacitance		-	26.8	-	pF
Q_g	Total Gate Charge	V_{GS} = 10V, V_{DD} =400V, I_D = 5.5A	-	17.5	-	nC
Q_{gs}	Gate to Source Charge		-	4.6	-	nC
Q_{gd}	Gate to Drain “Miller” Charge		-	8.4	-	nC
R_G	Gate Resistance	V_{GS} = 0V, f = 1.0MHz	-	21	-	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 400V, I_D=5.5A , V_{GS} = 10V, R_G=25Ω	-	26	-	ns
t_r	Turn-On Rise Time		-	44	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	65	-	ns
t_f	Turn-Off Fall Time		-	24	-	ns
Reverse Diode Characteristics						
I_{SD}	Continuous Diode Forward Current	T_C=25°C	-	-	11	A
V_{SD}	Diode Forward Voltage	V_{GS} = 0V, I_F = 11A,	-	0.846	-	V
t_{rr}	Reverse Recovery Time	V_R=400V, I_F=7A di_F/dt = 100A/μs	-	238	-	ns
Q_{rr}	Reverse Recovery Charge		-	2310	-	nC
I_{rrm}	Reverse Recovery Current		-	21.7	-	A

Typical Performance Characteristics

Figure 1. BV_{DSS} vs. Junction Temperature

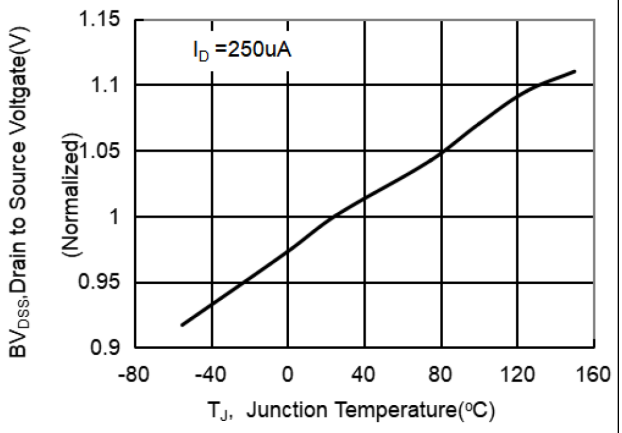


Figure 2. $V_{GS(th)}$ vs. Junction Temperature

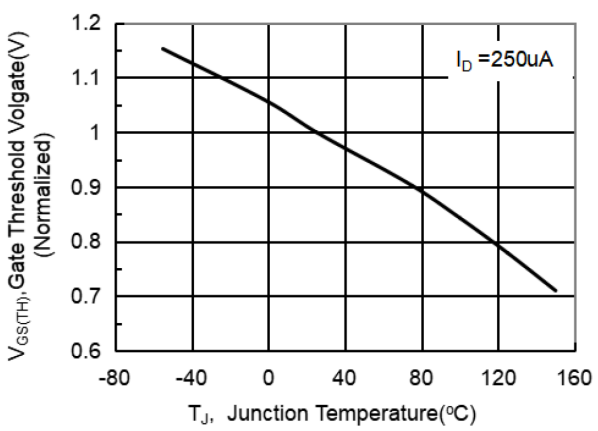


Figure 3: $R_{DS(ON)}$ vs. Junction Temperature

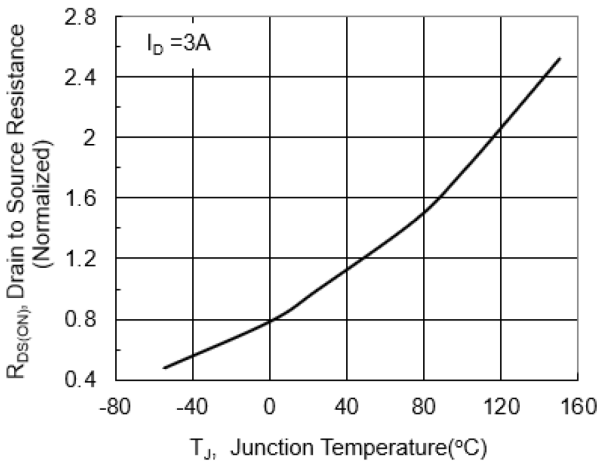


Figure 4: Typ. drain-source on-state resistance

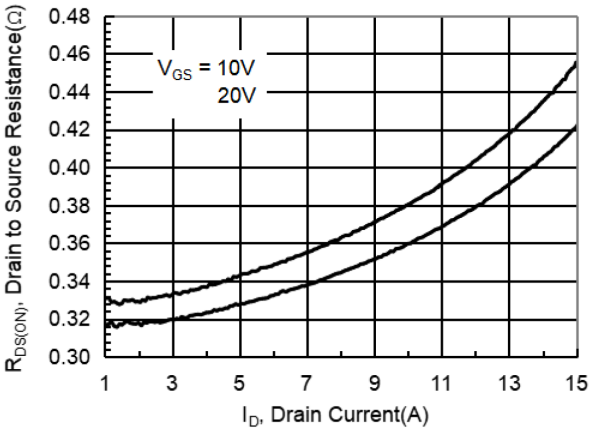


Figure 5: Drain current

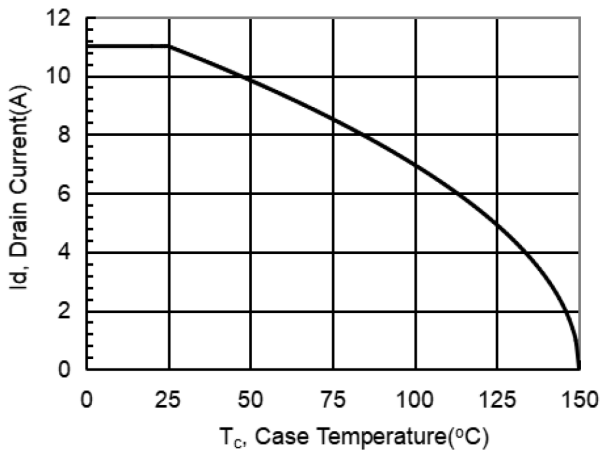
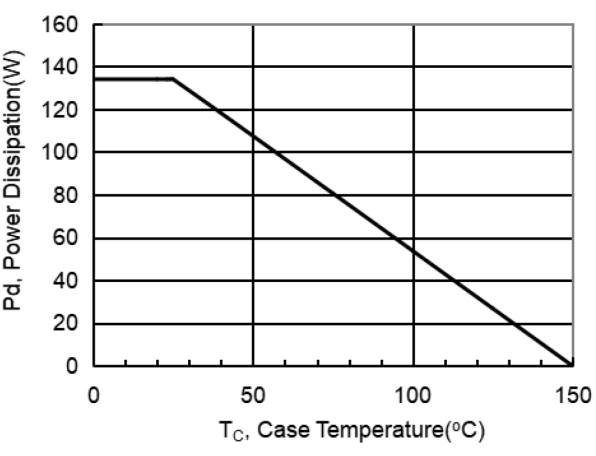


Figure 6: Power dissipation



Typical Performance Characteristics

Figure 7: Typ. capacitances

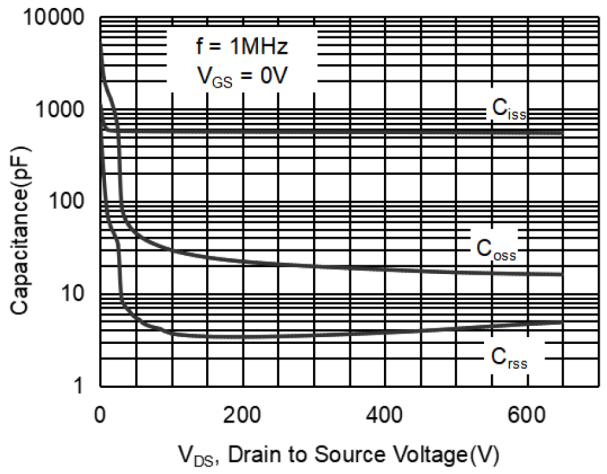


Figure 8: Typ. transfer characteristics

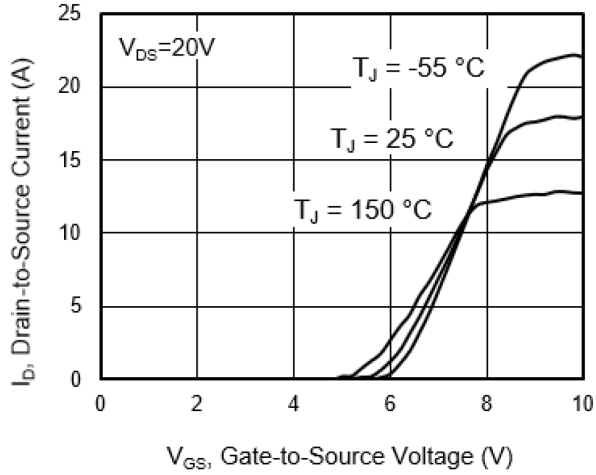


Figure 9: Output capacitances T_J = 25℃

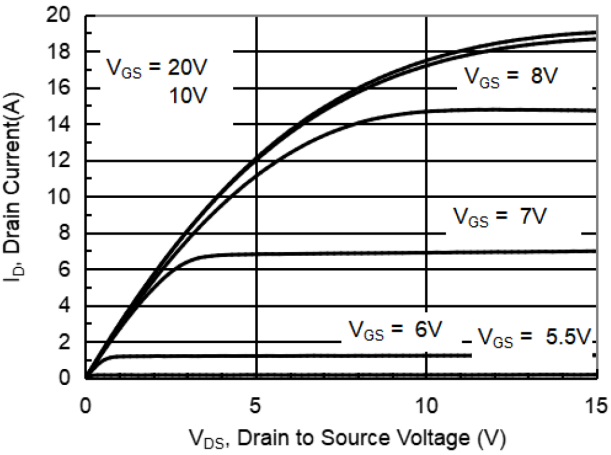


Figure 10: Output capacitances T_J = 100℃

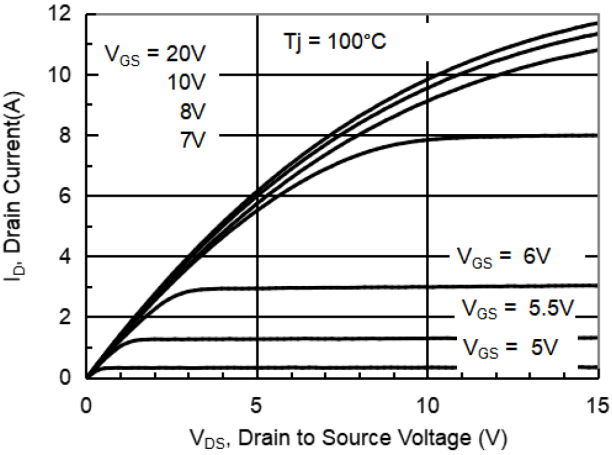


Figure 11: Forward characteristics of reverse diode

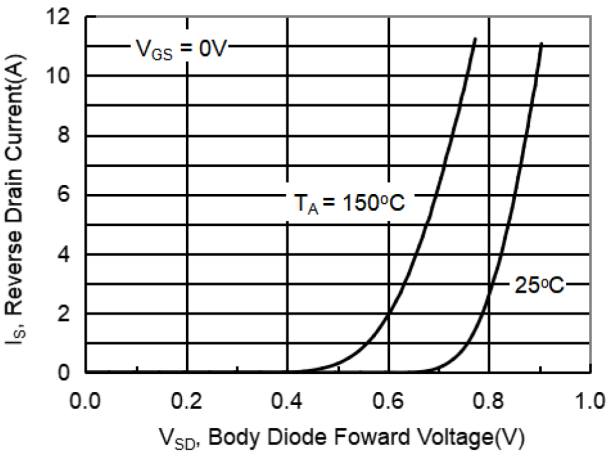
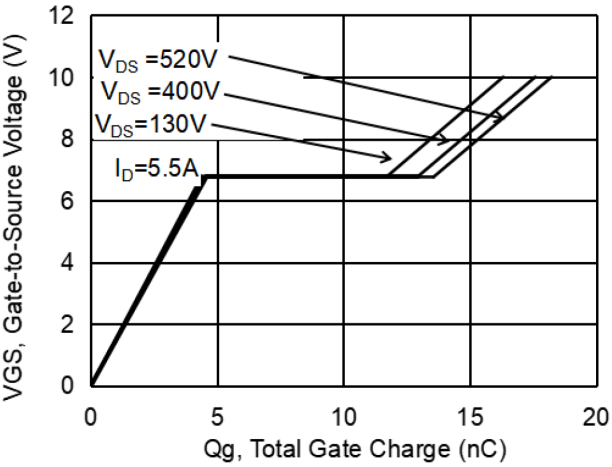


Figure 12: Gate charge capacitances



Typical Performance Characteristics

Figure 13: Q_{oss} vs. Drain-source voltage

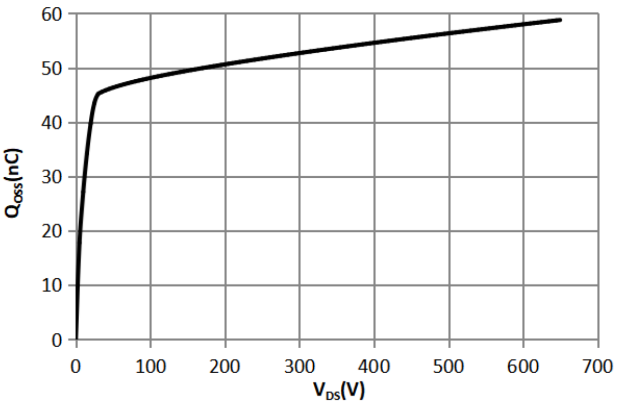


Figure 14: E_{oss} vs. Drain-source voltage

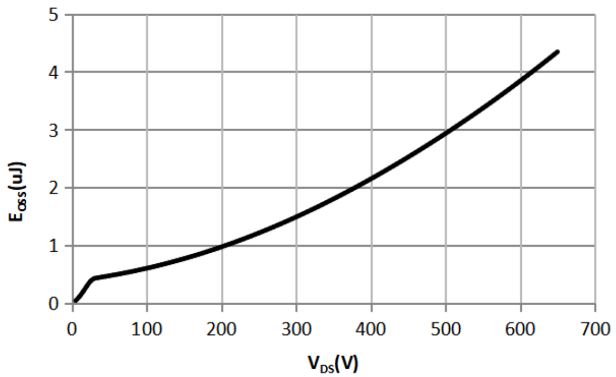


Figure 15: Safe operating area

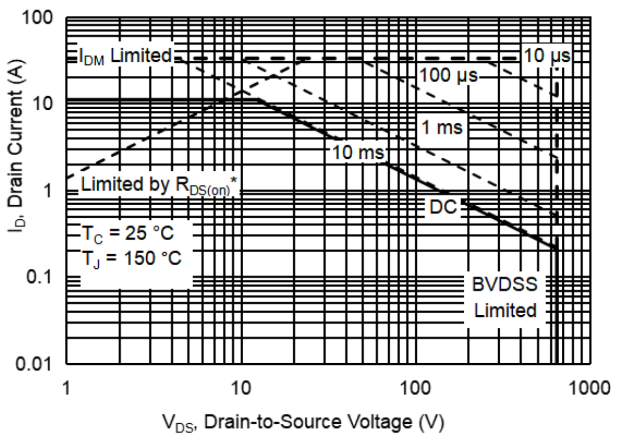
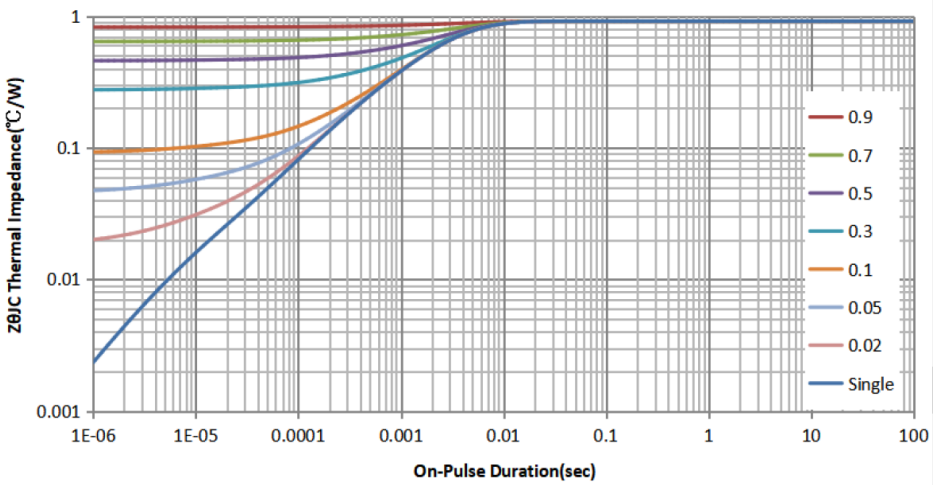


Figure 16: Transient thermal impedance



Test Circuits

Figure 17: Gate charge test and waveform

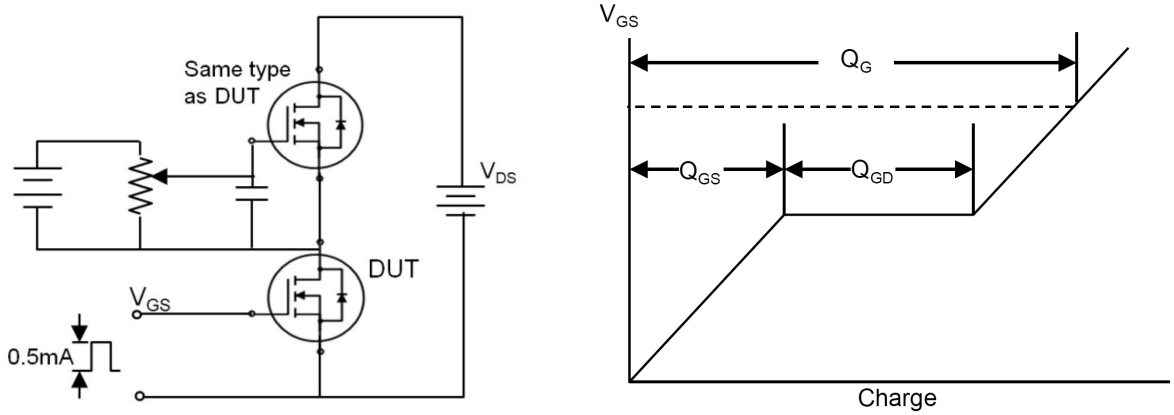


Figure 18: Switching Times test and waveform

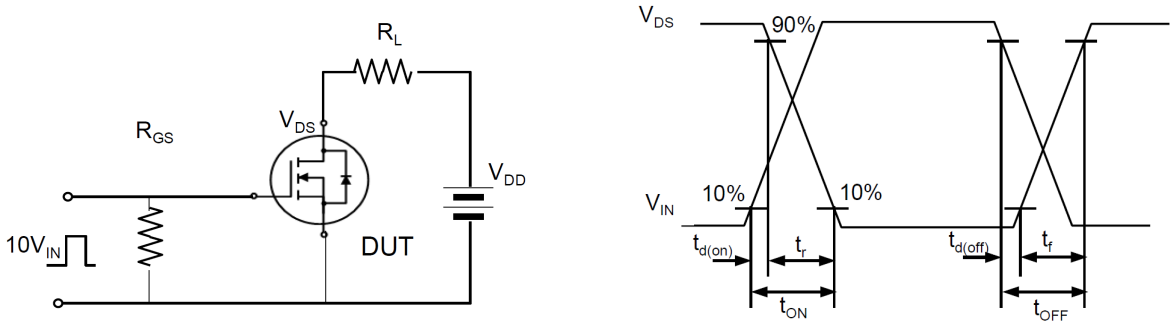
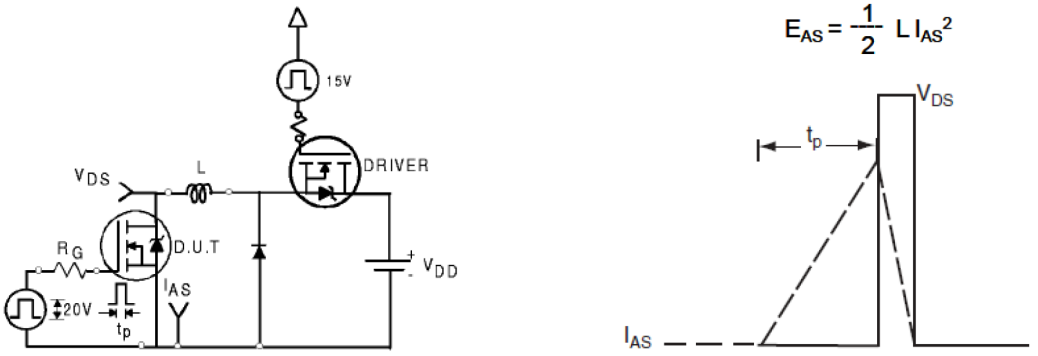
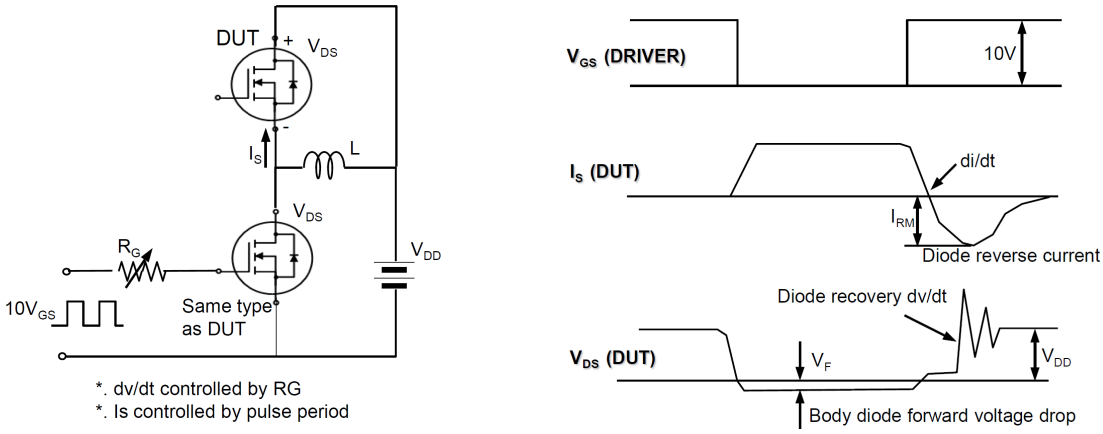


Figure 19: Unclamped Inductive switching test circuit and waveform



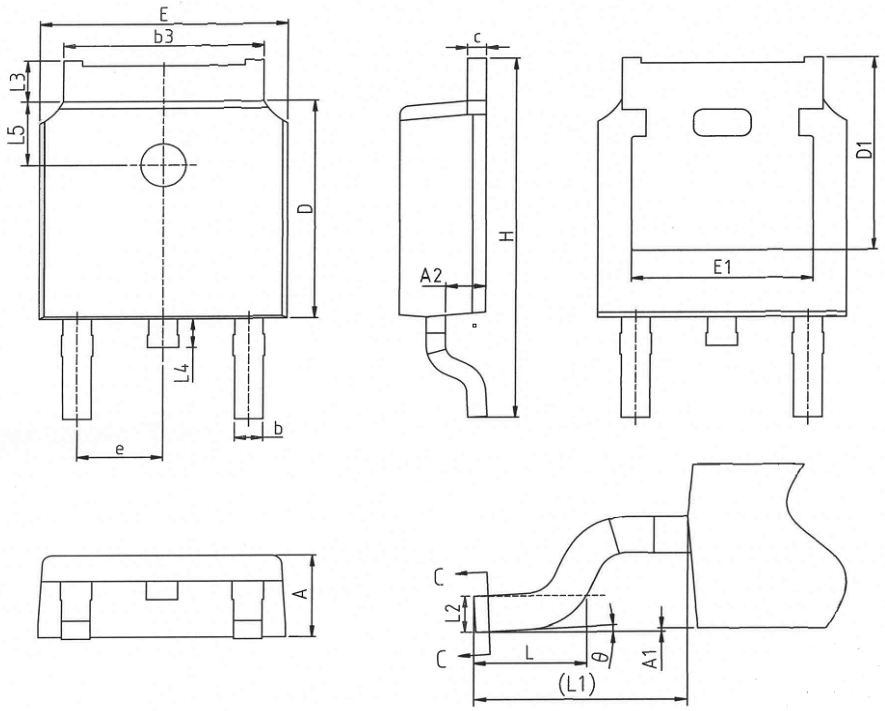
Test Circuits

Figure 20: Peak diode recovery dv/dt test and waveform



Package Outlines

D-Pak



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.12
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.73
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°

* Dimensions in millimeters

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