

BPD3090A

N-Channel Trench MOS

30 V, 90 A, 4 mΩ

Description

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

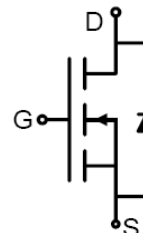
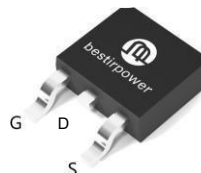
Features

BV_{DSS}	I_D	$R_{DS(on),typ}$
30 V	90 A	4mΩ

- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handling capability
- Lead free product is acquired

Applications

- Load switch
- PWM applications
- Power management



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

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		30	V
V_{GSS}	Gate to Source Voltage		± 20	V
I_D	Continuous Drain Current, ($T_C = 25^\circ\text{C}$)		90	A
	Continuous Drain Current, ($T_C = 100^\circ\text{C}$)		57	
I_{DM}	Drain Current (1)	Pulsed	360	A
E_{AS}	Single Pulsed Avalanche Energy (2)		169	mJ
P_D	Power Dissipation	($T_C = 25^\circ\text{C}$)	66	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	1.9	$^\circ\text{C/W}$

Electrical Characteristics (T_J = 25°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 V, I _D = 250 μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 30V, V _{GS} = 0V, T _J = 25°C	-	-	1	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±20 V	-	-	±100	nA

On Characteristics

V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 250 μA	1	1.47	2.5	V
R _{DS(on)}	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 15 A, T _J = 25°C	-	4	5.1	mΩ
R _{DS(on)}	Static Drain to Source On Resistance	V _{GS} = 4.5 V, I _D = 10 A, T _J = 25°C	-	5.5	7.3	mΩ

Dynamic Characteristics

C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 15V, f = 1.0MHz	-	1627	-	pF
C _{oss}	Output Capacitance		-	191	-	pF
C _{rss}	Reverse transfer capacitance		-	180	-	pF
Q _{g(tot)}	Total Gate Charge at 10 V	V _{GS} = 10V, V _{DS} = 15V I _D = 15A	-	33	-	nC
Q _{gs}	Gate to Source Charge		-	4.5	-	nC
Q _{gd}	Gate to Drain "Miller" Charge		-	7	-	nC

Switching Characteristics

t _{d(on)}	Turn-On Delay Time	V _{GS} = 10V, V _{DD} = 15V R _L = 1Ω, R _{GEN} = 6Ω	-	10	-	ns
t _r	Turn-On Rise Time		-	148	-	ns
t _{d(off)}	Turn-Off Delay Time		-	40	-	ns
t _f	Turn-Off Fall Time		-	18	-	ns

Source-Drain Diode Characteristics

I _S	Source-Drain Current (Body Diode)		-	-	90	A
V _{SD}	Diode Forward Voltage (3)	I _S = 15A, V _{GS} = 0V	-	-	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 15A, diF/dt = 100A/us	-	20.5	-	ns
Q _{rr}	Reverse Recovery Charge		-	12.5	-	nC

Notes

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.EAS condition: T_J=25°C, V_{DD}=30V, V_G=10V, R_g=25Ω, L=0.5mH.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Performance Characteristics

Figure 1. Output Characteristics

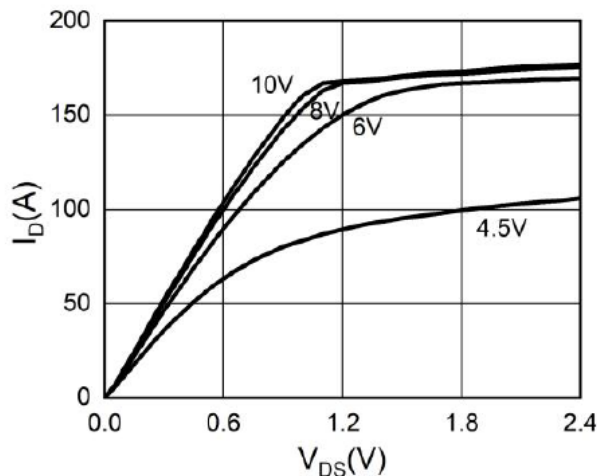


Figure 2. Transfer Characteristics

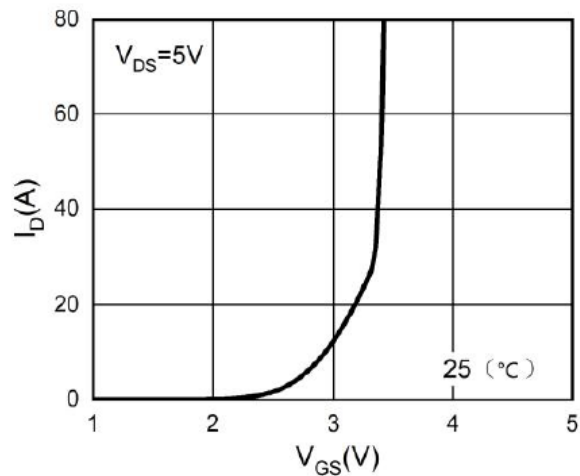


Figure 3. Power Dissipation

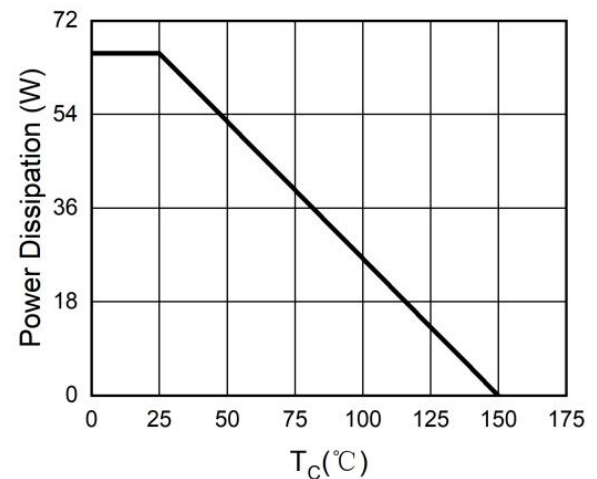


Figure 4. Drain Current

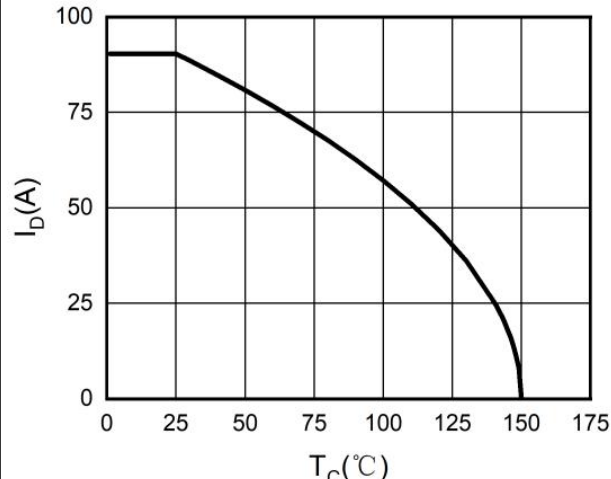


Figure 5. BVDSS vs Junction Temperature

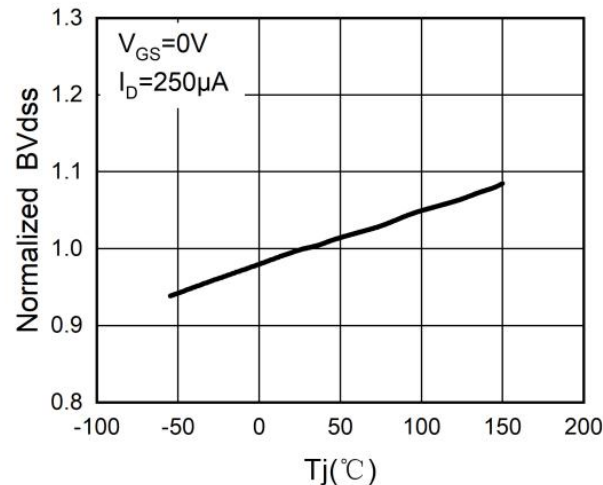
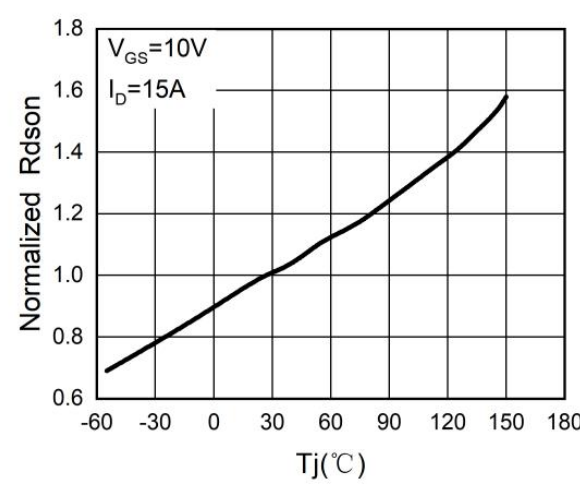


Figure 6. RDS(ON) vs Junction Temperature



Typical Performance Characteristics

Figure 7. Gate Charge Waveforms

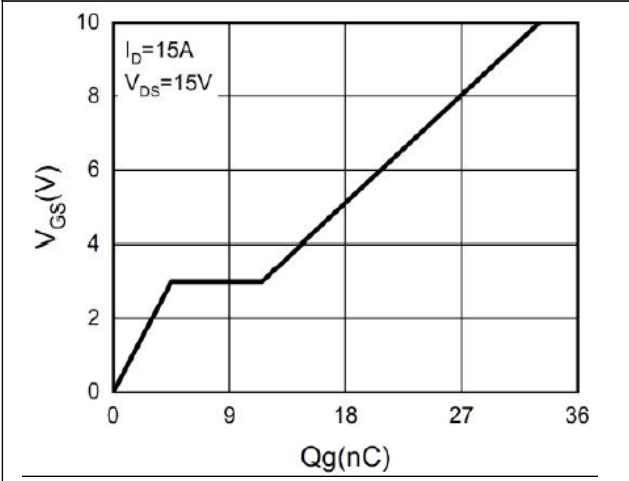


Figure 8. Capacitance

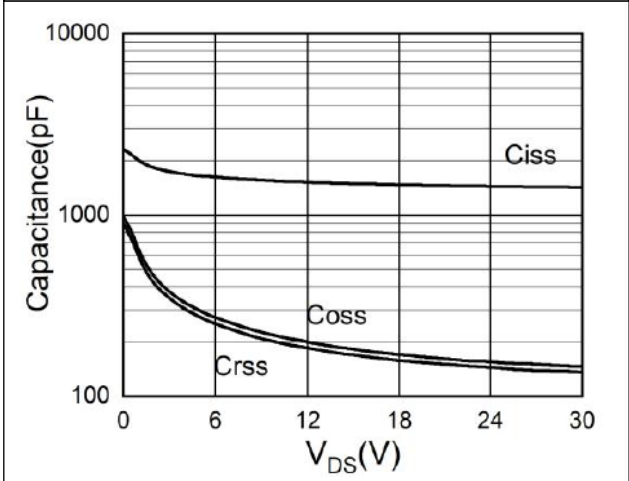


Figure 9. Body-Diode Characteristics

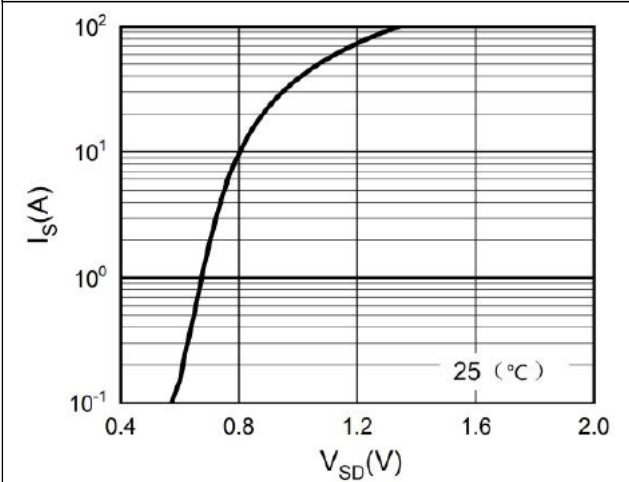
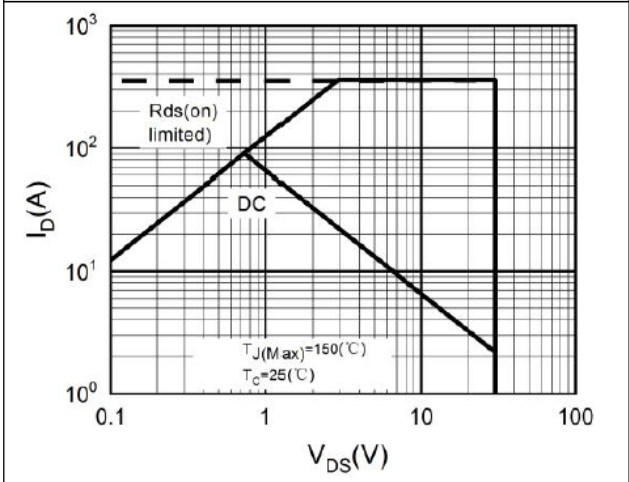
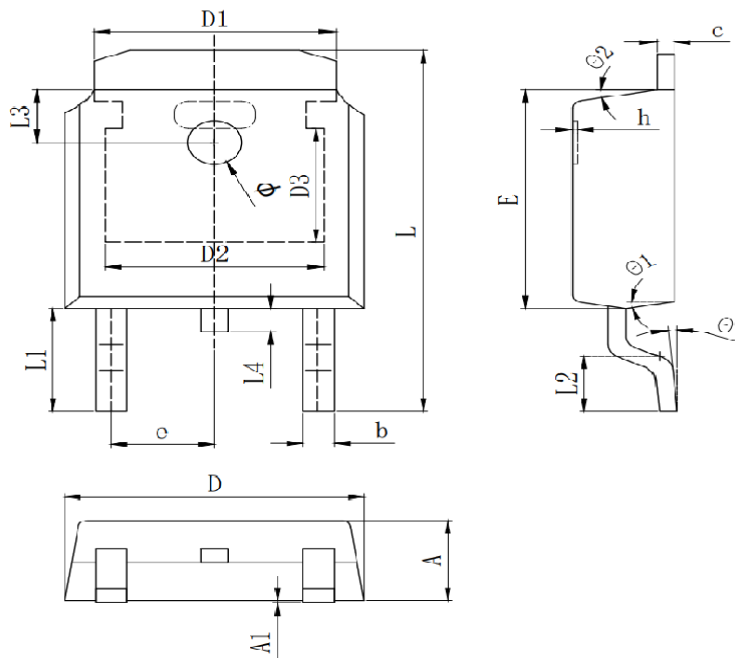


Figure 10. Maximum Safe Operating Area



Package Outlines

D-Pak



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c(电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
Φ	1.100	1.200	1.300
θ	0°		8°
θ1	9° TYP		
θ2	9° TYP		

* Dimensions in millimeters

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BPD3090A	BPD3090A	D PAK	Tape & Reel	2500 units

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