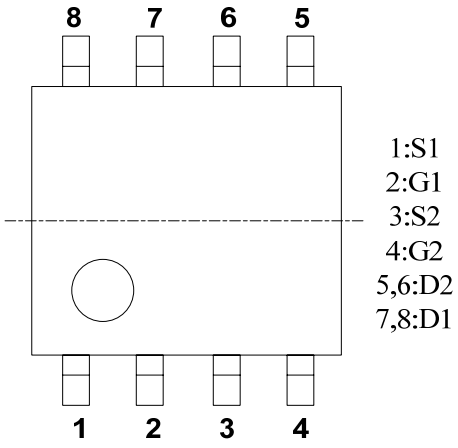
BYD Microelectronics Co., Ltd.

BF9038DNS-A

Dual N-Channel MOSFET

General Description

The BF9038DNS-A is a dual N-channel MOS Field Effect Transistor, which is applied to electronic systems as a power switch. This device has ESD-protection and low resistance characteristics.



Features

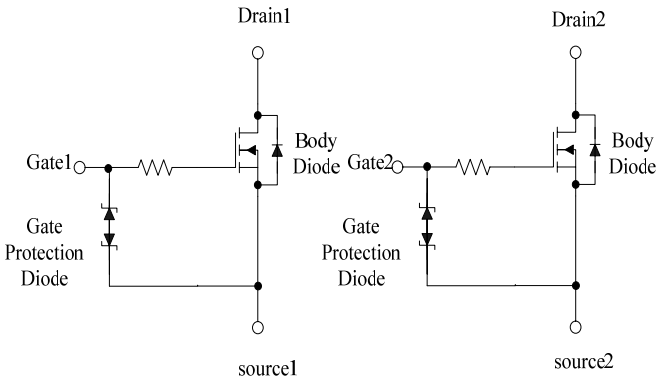
- V_{DS} (V) =30V
- Can be driven by a 2.5 V power source
- Low on-state resistance
  $R_{DS(on)}$ = **17 mΩ** TYP (V_{GS} = 4.5V, I_D =2.0A)
  $R_{DS(on)}$ = **22 mΩ** TYP (V_{GS} = 2.5V, I_D = 2.0A)
- Composite type, facilitating high-density mounting.

Absolute Maximum Ratings (Ta = 25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain to Source Voltage	V_{DSS}	30	V
Gate to Source Voltage	V_{GSS}	±10	V
Drain Current (DC)	$I_{D(DC)}$	8	A
Drain Current (pulse)[a]	$I_{D(pulse)}$	52	A
Total Power Dissipation[b]	P_T	3.0	W
Channel Temperature	T_{ch}	150	℃
Storage Temperature	T_{stg}	-55~+150	℃

Caution: These values must not be exceeded under any conditions.

EQUIVALENT CIRCUIT



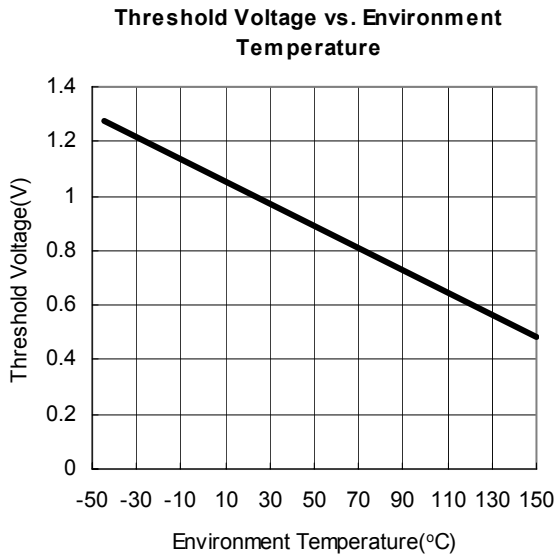
Ordering Information

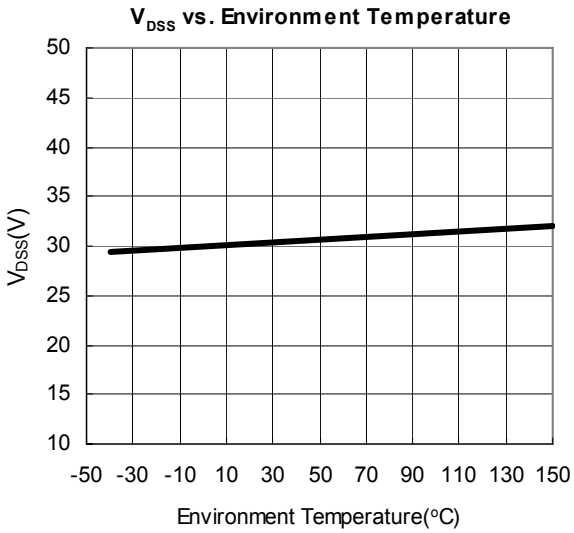
- Part Number: BF9038DNS-A
- Package: SOIC8

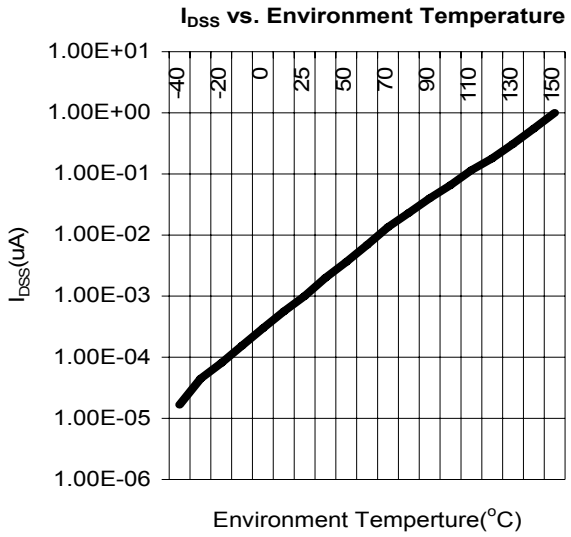
Electrical Characteristics (T_A = 25℃)

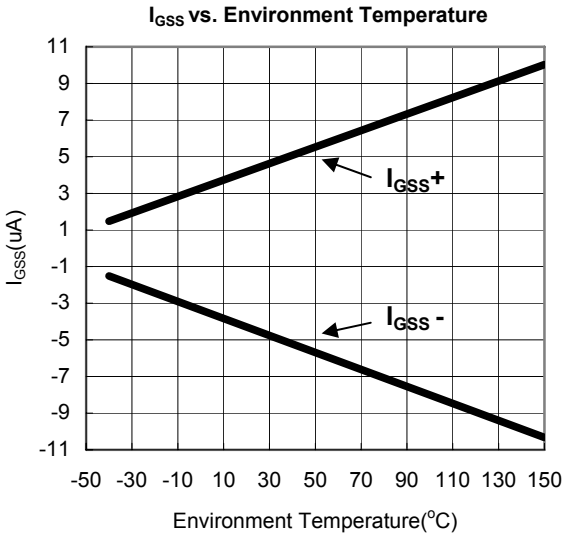
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V			10	μA
Gate Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V			±10	μA
Gate Cut-off Voltage	$V_{GSS(off)}$	V_{DS}=V_{GS},I_D=250uA	0.5		1.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS}=10V,I_D=8A		13		S
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS}=4.5V,I_D=2A		**17**	**23**	mΩ
	$R_{DS(on)4}$	V_{GS}=2.5V,I_D=2A		**22**	**32**	mΩ
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V f=1MHz		1400		pF
Output Capacitance	C_{oss}			180		pF
Reverse Transfer Capacitance	C_{rss}			35		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V, I_D=3A, V_{GS}=4V, R_G=10Ω		90		ns
Rise Time	t_r			190		ns
Turn-off Delay Time	$t_{d(off)}$			695		ns
Fall Time	t_f			420		ns
Total Gate Charge	Q_G	V_{DS}=10V, V_{GS}=4V, I_D=8A		14		nC
Gate to Source Charge	Q_{GS}			3		nC
Gate to Drain Charge	Q_{GD}			4.5		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F=8A,V_{GS}=0V		0.85	1.2	V

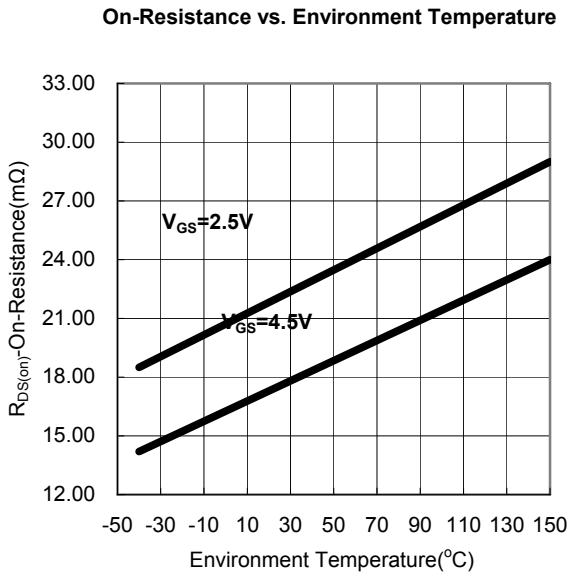
Typical characteristics (25℃ unless noted)

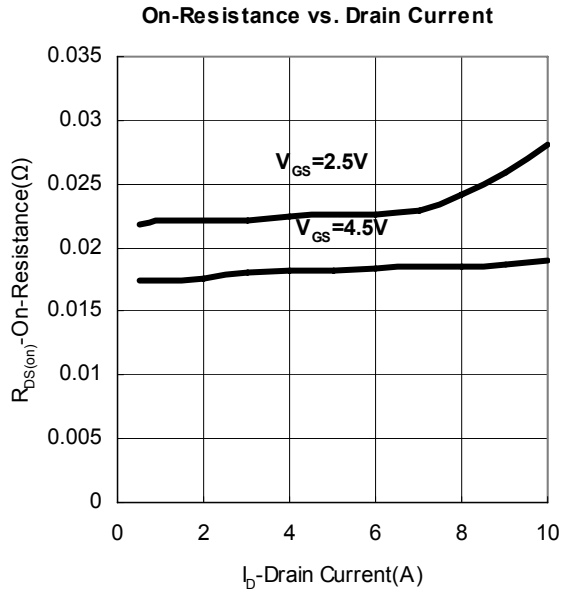




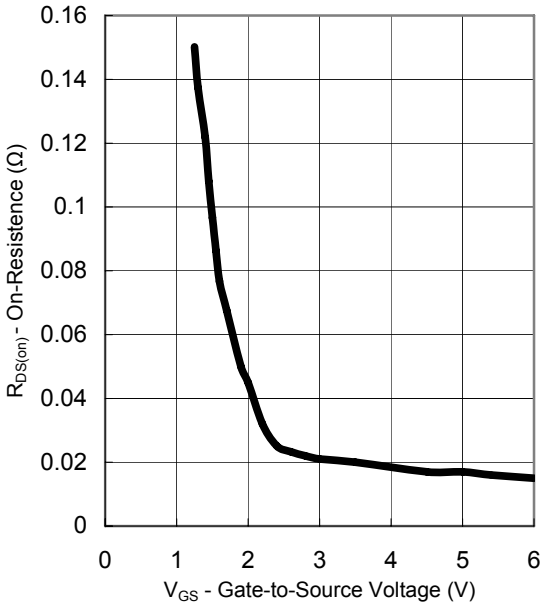

I_{DSS} vs. Environment Temperature
1.00E+01
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1.00E-05
1.00E-06
I_{DSS}(uA)
-40
-20
0
25
50
70
90
110
130
150
Environment Temperture(°C)


I_{GSS} vs. Environment Temperature
11
9
7
5
3
1
-1
-3
-5
-7
-9
-11
I_{GSS}(uA)
I_{GSS}+
I_{GSS} -
-50 -30 -10 10 30 50 70 90 110 130 150
Environment Temperature(°C)

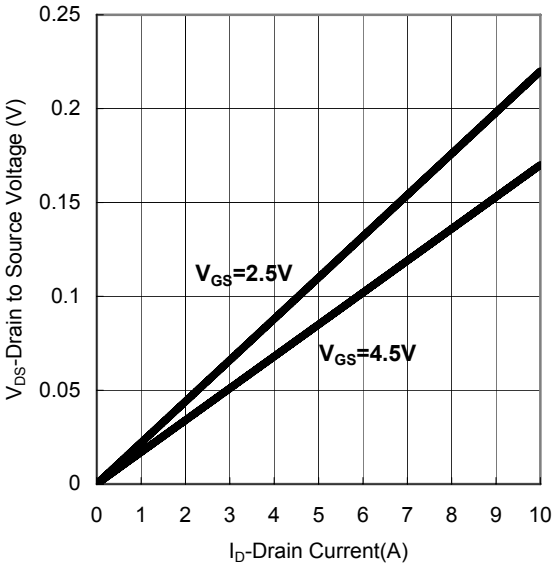

On-Resistance vs. Environment Temperature
33.00
30.00
27.00
24.00
21.00
18.00
15.00
12.00
$R_{DS(on)}$-On-Resistance(mΩ)
V_{GS}=2.5V
V_{GS}=4.5V
-50 -30 -10 10 30 50 70 90 110 130 150
Environment Temperature(°C)


On-Resistance vs. Drain Current
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
$R_{DS(on)}$-On-Resistance(Ω)
V_{GS}=2.5V
V_{GS}=4.5V
0 2 4 6 8 10
I_D-Drain Current(A)

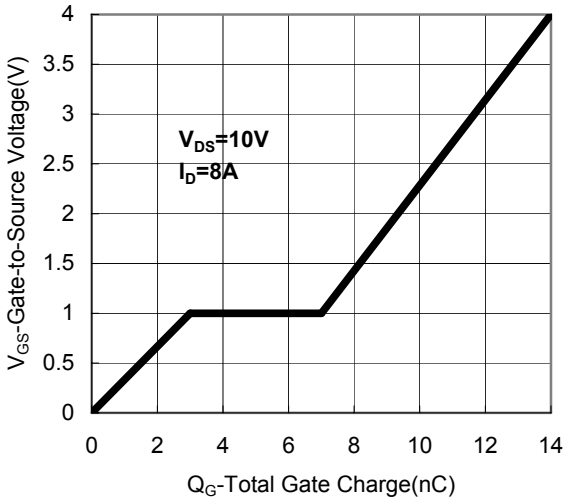
On-Resistance vs. Gate-to-Source Voltage



Drain to Source Voltage vs. Drain Current



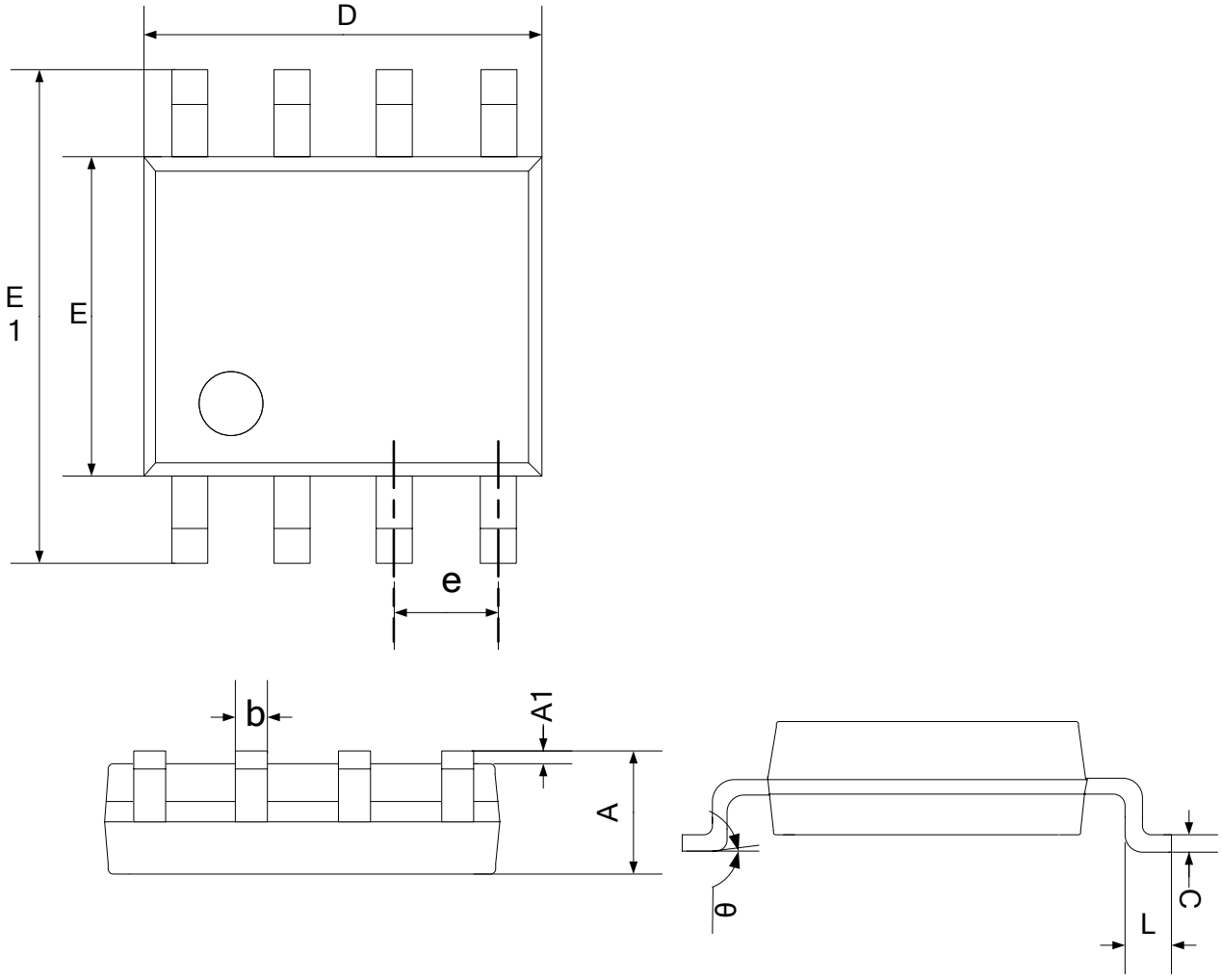
Gate Charge



Package Drawing

SOIC8

UNIT (mm)



Dimensions

	D	E	A	E1	A1	C	L	b	e	θ
Min.	4.80	3.80	1.35	5.80	0.100	0.19	0.500	0.380	1.27 BSC	0°
Nom.	4.90	3.90	1.55	6.00	0.175	0.22	0.715	0.445		4°
Max.	5.00	4.00	1.75	6.20	0.250	0.25	0.930	0.510		8°