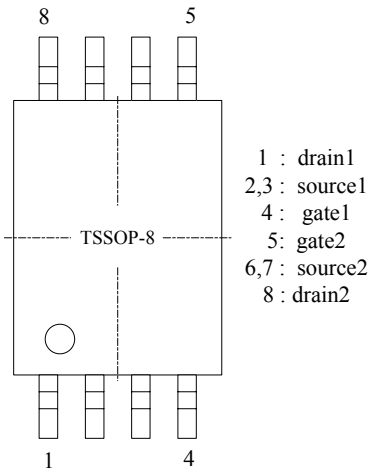
BYD Microelectronics Co., Ltd.

BF9028DNT

20V N-Channel MOSFET



General Description

The BF9028DNT 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.

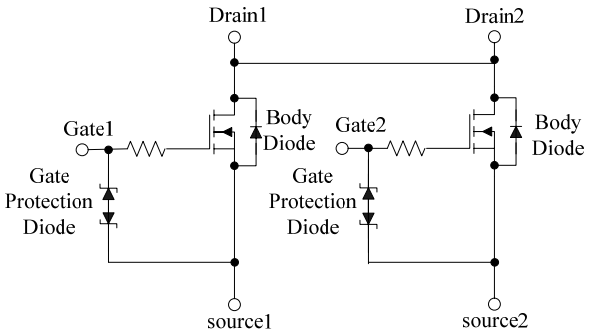
.

Features

- Can be driven by a 2.3 V power source
- Low on-state resistance

  $R_{DS(on)}$ = 16.0mΩ TYP(V_{GS} = 4.5V, I_D = 3.0A)
  $R_{DS(on)}$ = 17.5mΩ TYP(V_{GS} = 3.8V, I_D = 3.0A)
  $R_{DS(on)}$ = 22.0mΩ TYP(V_{GS} = 2.5V, I_D = 3.0A)
- Built-in G-S protection diode against ESD
- Lead Pb-free and Halogen-free

EQUIVALENT CIRCUIT



Absolute Maximum Ratings(T_C = 25℃)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	20	V
I_D	Drain Current(continuous)at Tc=25℃	6	A
I_{DM}	Drain Current (pulsed) (Note a)	24	A
V_{GS}	Gate-Source Voltage	±10	V
P_D	Power Dissipation T_C = 25°C	1.5	W
T_J,Tstg	Operating and Storage Temperature Range	-55 to +150	℃
T_L	Maximum Lead Temperature for Soldering Purpose	150	℃

Ordering Information

Part Number	Package	Packaging
BF9028DNT	TSSOP-8	3000pcs Tape&Reel

Electrical Characteristics (T_c = 25℃)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-source Breakdown Voltage	I_D=250uA,V_{GS}=0V	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =20V, V_{GS} =0V			10	uA
I_{GSS}	Gate-body Leakage Current	V_{GS}=±12V,V_{DS}=0V			±10	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=$V_{GS,}$ I_D=250uA	0.5	0.8	1.5	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS}=4.5V,I_D=3A		16	22	mΩ
		V_{GS}=3.8V, I_D=3A		17.5	24	
		V_{GS}=2.5V, I_D=3A		22	29	
C_{iss}	Input Capacitance	V_{DS}=15V,f=1MH$_Z$,V_{GS}=0V		800		pF
C_{oss}	Output Capacitance			150		pF
C_{rss}	Reverse Transfer Capacitance			20		pF
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=10V,I_D=3A,V_{GS}=4V, R_G=10Ω (Note b,c)		100		ns
t_r	Rise Time			200		ns
$t_{d(off)}$	Turn-off Delay Time			2500		ns
t_f	Fall Time			1200		ns
Q_g	Total Gate Charge	V_{DS}=16V,I_D=6A,V_{GS}=4.5V (Note b,c)		12		nC
Q_{gs}	Gate-source Charge			2.5		nC
Q_{gd}	Gate-Drain Charge			4		nC
V_{SD}(*)	Forward On Voltage	V_{GS}=0V,I_F=6A		0.7		V

Notes
a: Repetitive Rating : Pulse width limited by maximum junction temperature
b: Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
c: Essentially independent of operating temperature
(*)Pulsed:Pulse duration

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

Remark: The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

Typical characteristics (25℃ unless noted)

Figure 1 Output Characteristics

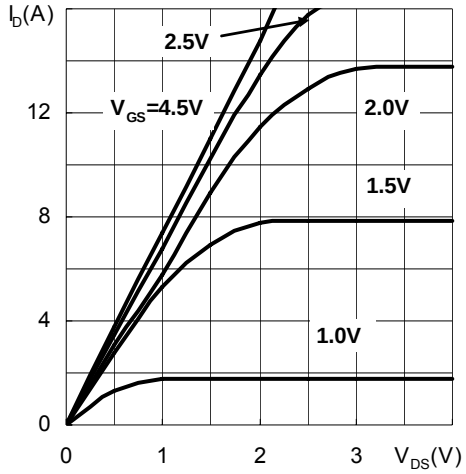


Figure 2 Transfer Characteristics

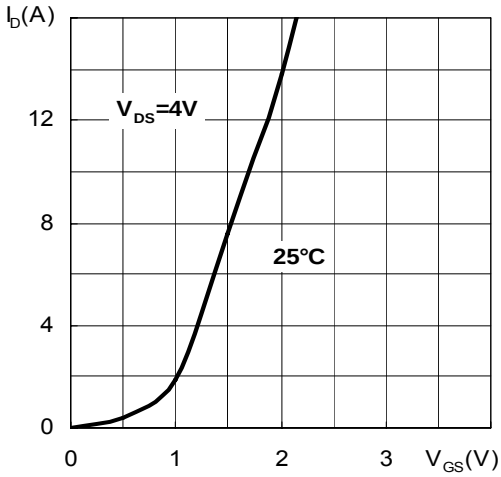


Figure 3 Normalized Vth vs. Temperature

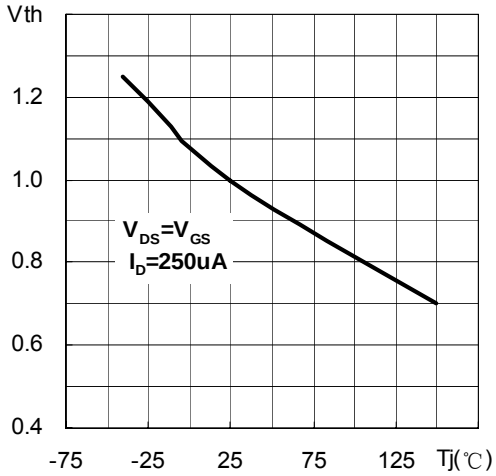


Figure 4 Normalized BV_{DSS} vs. Temperature

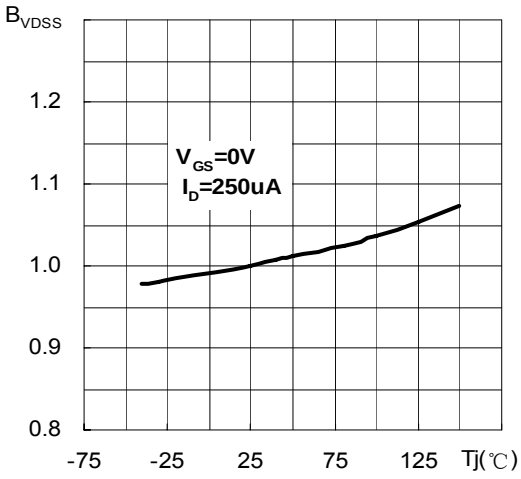


Figure 5 R_{DSON} vs. Temperature

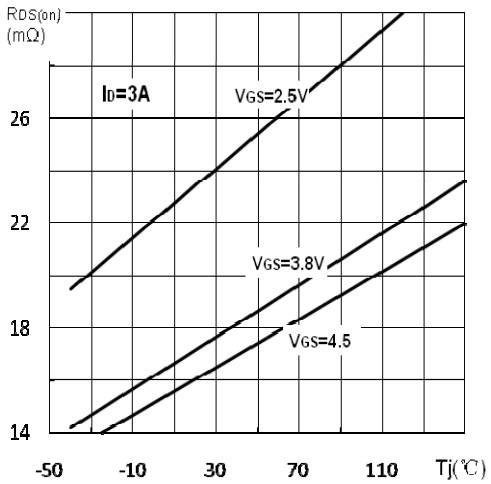


Figure 6 I_{GSS} vs Environment Temperature

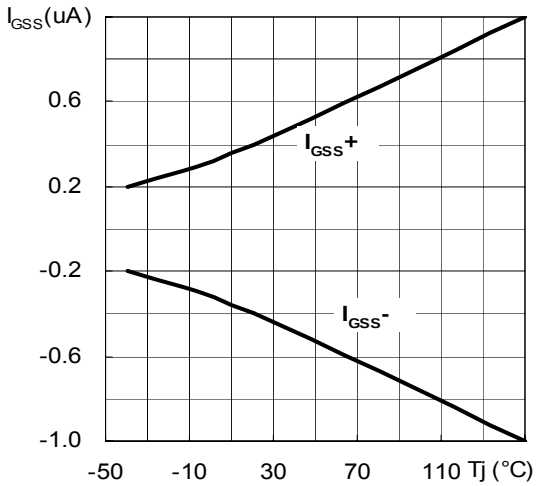


Figure 7 Capacitance

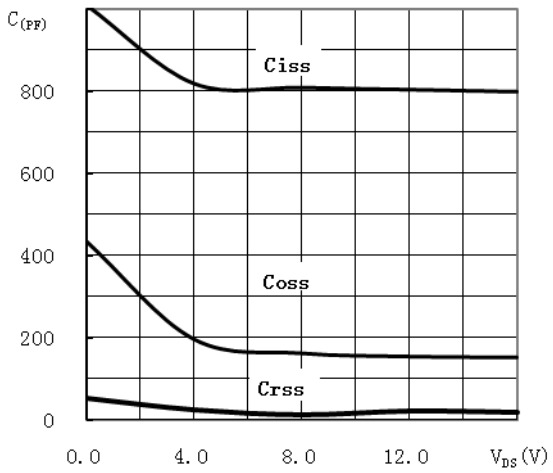


Figure 8 Gate Charge

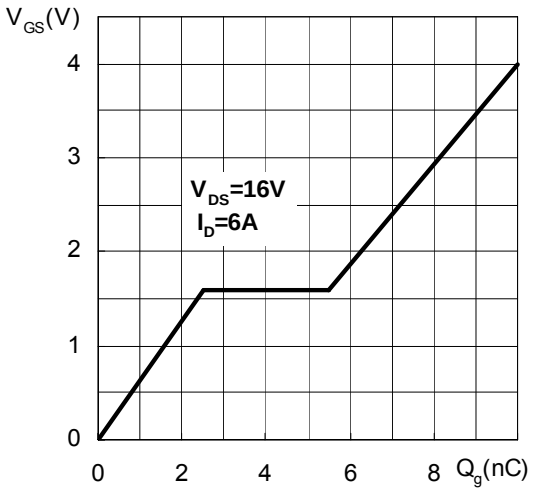


Figure 9 Safe Operating Area

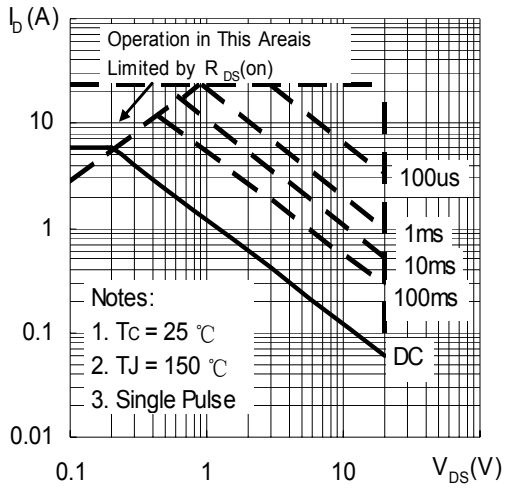


Figure 10 Maximum I_{DSS} vs. Case Temperature

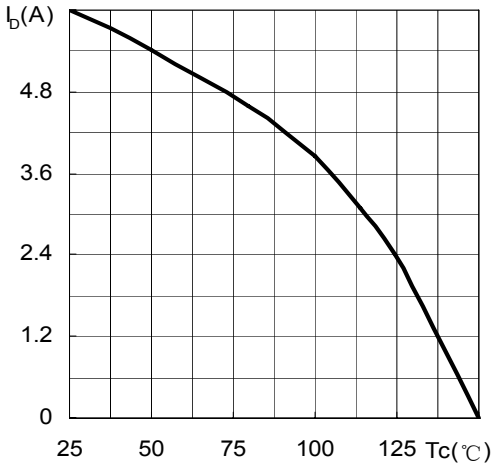


Figure 11 Rdson vs. V_{GS}

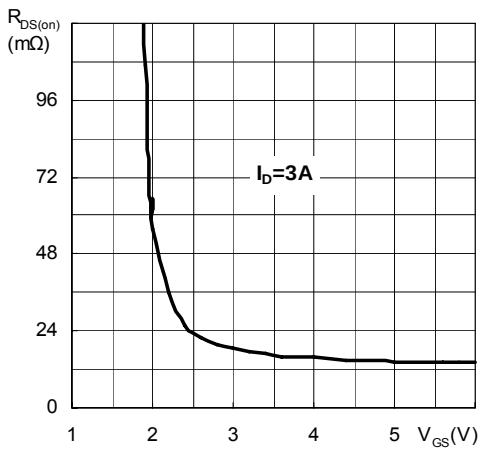


Figure 12 Gate-Current vs.Gate-Source Voltage

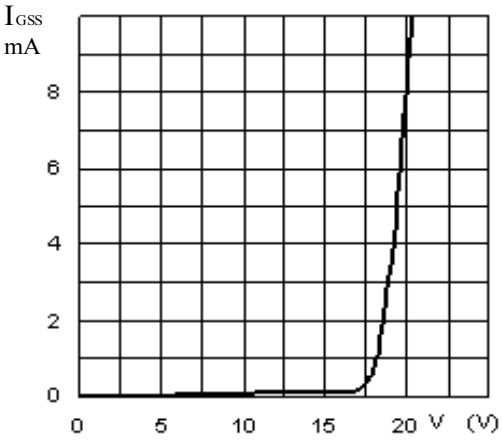
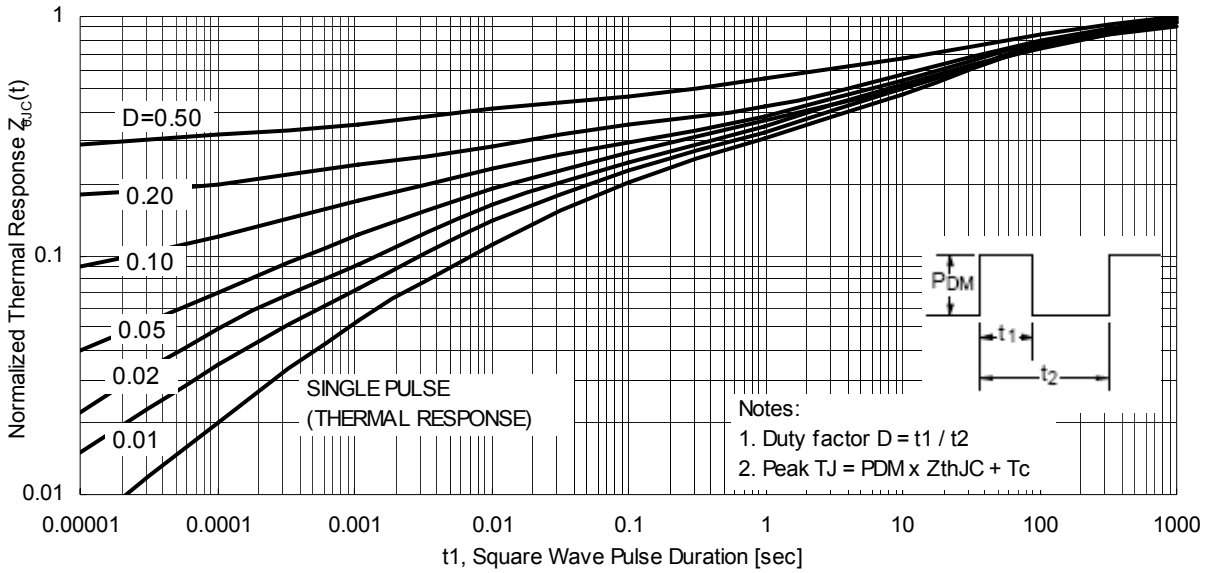
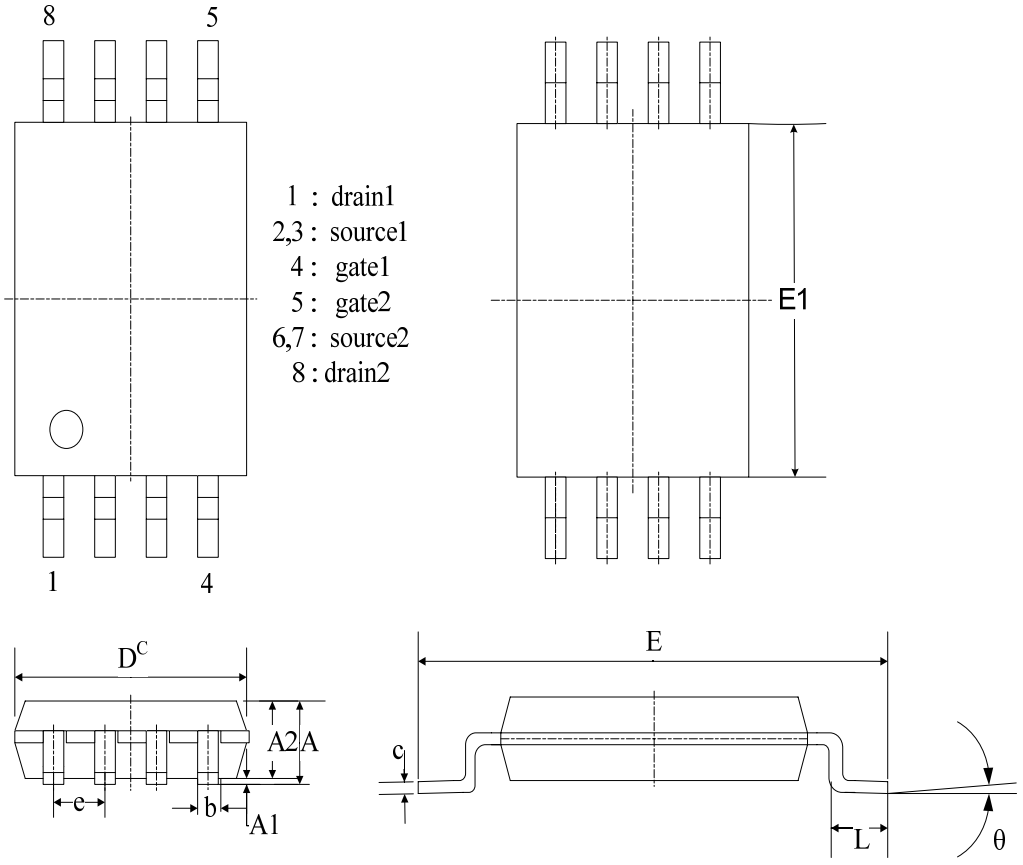


Figure 13 Normalized Maximum Transient Thermal Impedance



Package Drawing:

PACKAGE DRAWING （Unit：mm）

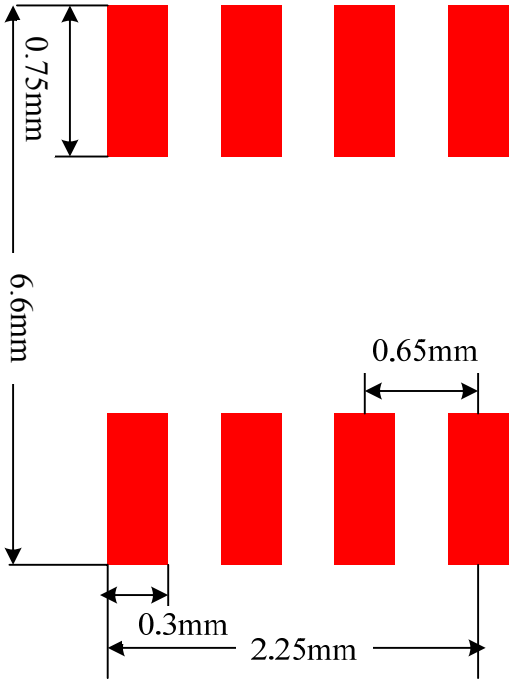


Dimensions

DIM.		A	A1	A2	b	c	D[C]	E	E1	e	L	θ
mm	MIN.	0.820	0.020	0.800	0.170	0.090	2.900	6.200	4.300	0.650 BSC	0.450	0°
	NOM.	–	–	–	–	–	–	6.400	4.400		0.600	4°
	MAX.	1.200	0.150	1.050	0.300	0.200	3.100	6.600	4.500		0.750	8°

Note c. Dimension 'D' does not include mold flash, protrusions or gate burrs. Mold flash, protrusions or gate burrs shall not exceed 0.15 per side.

PCB Layout Guide



RESTRICTIONS ON PRODUCT USE

- The information contained herein is subject to change without notice.
- BYD Microelectronics Co., Ltd. (short for BME) exerts the greatest possible effort to ensure high quality and reliability. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing BME products, to comply with the standards of safety in making a safe design for the entire system, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue. In developing your designs, please ensure that BME products are used within specified operating ranges as set forth in the most recent BME products specifications.
- The BME products listed in this document are intended for usage in general electronics applications (personal equipment, office equipment, domestic appliances, etc.). These BME products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of BME products listed in this document shall be made at the customer’s own risk.
- BME is not responsible for any problems caused by circuits or diagrams described herein whose related industrial properties, patents, or other rights belong to third parties. The application circuit examples explain typical applications of the products, and do not guarantee the success of any specific mass-production design.