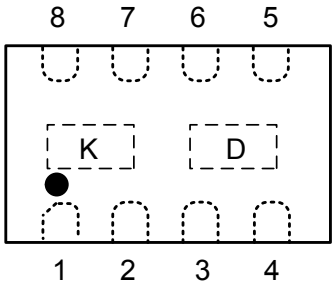
BYD Microelectronics Co., Ltd

BF9024SPD-M

P-Channel MOSFET and Schottky Diode

General Description

The BF9024SPD-M uses advanced trench technology to Provide excellent $R_{DS\ (ON)}$ and low gate charge.
This device is suitable for used as a load switch or in PWM applications.



1,2 Anode; 3 Source; 4 Gate
5,6 Drain; 7,8 Kathode
K: Kathode;D: Drain

Features

MOSFET

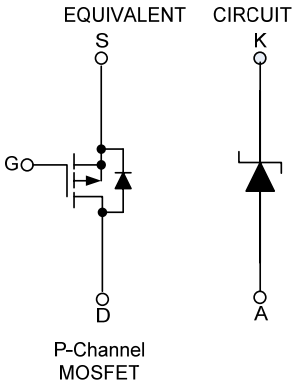
- V_{DS} (V) = -20V
- I_D = -2.7A
- Low on-state resistance
  $R_{DS\ (on)}$ < 90mΩ . (V_{GS} = -4.5V)
  $R_{DS\ (on)}$ < 120mΩ .(V_{GS} = -2.5V)

Schottky Diode

- V_F=0.42V

Absolute Maximum Ratings (Ta = 25℃)

Parameter	Symbol	Ratings	Unit
Mosfet			
Drain to Source Voltage (MOSFET and Schottky)	V_{DSS}	-20	V
Gate to Source Voltage	V_{GSS}	±8	V
Drain Current (DC)	$I_{D(DC)}$	-2.7	A
Drain Current (pulse)	$I_{D(pulse)}$	-10	A
Maximun Power Dissipation[a]	P_D	1.1	W
Channel Temperature	T_{ch}	150	℃
Storage Temperature	T_{stg}	-55~+150	℃
Schottky Diode			
Reverse Voltage	V_{KA}	20	V
Average Forward Current	I_F	1	A
Pulsed Forward Current	I_{FM}	7	A
Maximun Power Dissipation[a]	P_D	0.96	W
Storage Temperature	T_{stg}	-55~+150	℃



Note a. Mounted on FR4 Board of 1”x1”.

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

Ordering Information

- BF9024SPD-M
- DFNWB3*1.8-8L

Electrical Characteristics (T_C = 25℃)

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Mosfet						
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= -20V,V_{GS}=0V	–	–	-1	μA
Gate Leakage Current	I_{GSS}	V_{GS}= ± 8V,V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D= - 0.25mA	-0.45	–	-1	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS}= -10V, I_D= -2A	–	7	–	S
Drain to Source On-state Resistance	$R_{DS(on)}$	V_{GS}= -4.5V,I_D= -2A	–	73	90	mΩ
		V_{GS}= -2.5V,I_D= -2A	–	99	120	mΩ
Input Capacitance	C_{iss}	V_{DS}= -10V ,V_{GS} =0,f=1MHZ	–	427	–	pF
Output Capacitance	C_{oss}		–	72	–	pF
Reverse Transfer Capacitance	C_{rss}		–	50	–	pF
Turn-on Delay Time	$t_{d(on)}$	V_{DS}= -10V,	–	15	–	ns
Rise Time	t_r	I_D= -1A,	–	36	–	ns
Turn-off Delay Time	$t_{d(off)}$	V_{GS}= -4.5V,	–	36	–	ns
Fall Time	t_f	R_G=6Ω	–	30	–	ns
Total Gate Charge	Q_G	V_{DS}= -10V,	–	5	–	nC
Gate to Source Charge	Q_{GS}	V_{GS}= -4.5V,	–	1.5	–	nC
Gate to Drain Charge	Q_{GD}	I_D= -2A	–	1	–	nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F=-0.9A,V_{GS}=0V	–	-0.8	-1.2	V
Schottky Diode						
Forward Voltage Drop	V_F	I_F=0.5A	–	0.42	0.48	V
Maximum Reverse Leakage Current	I_{rm}	V_r=20V	–	0.002	0.1	mA
Junction Capacitance	C_T	V_r=10V	–	35	–	pF

Typical characteristics (25℃ unless noted) MOSFET

Figure 1 Threshold Voltage vs. Temperature

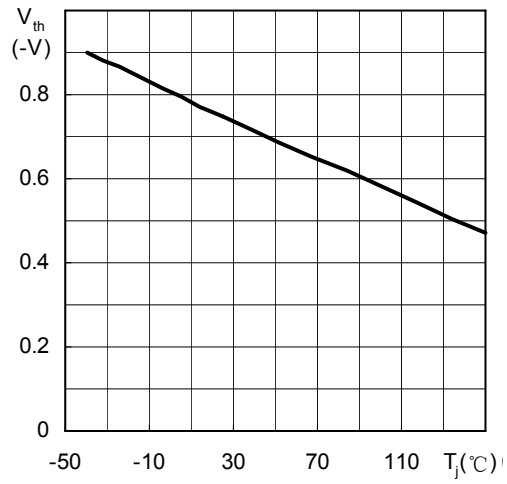


Figure 2 V_{DSS} vs. Temperature

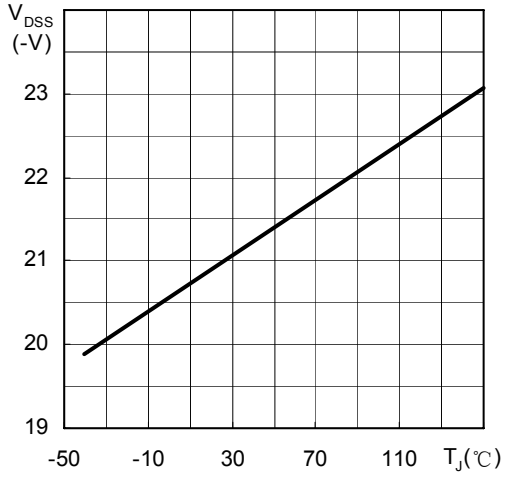


Figure 3 I_{DSS} vs. Temperature

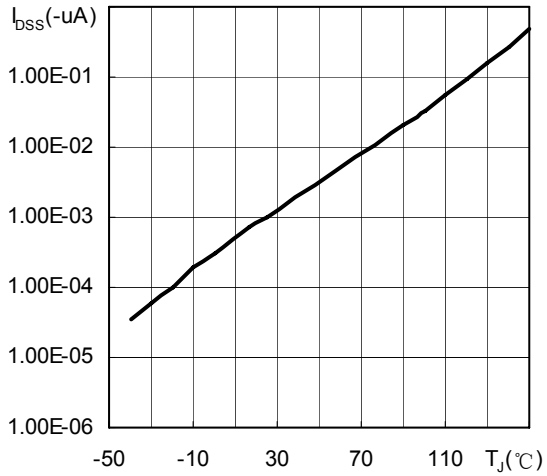


Figure 4 I_{GSS} vs. Temperature

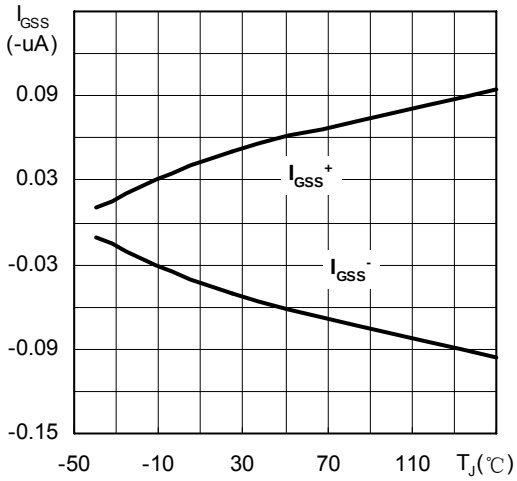


Figure 5 On-Resistance vs. Temperature

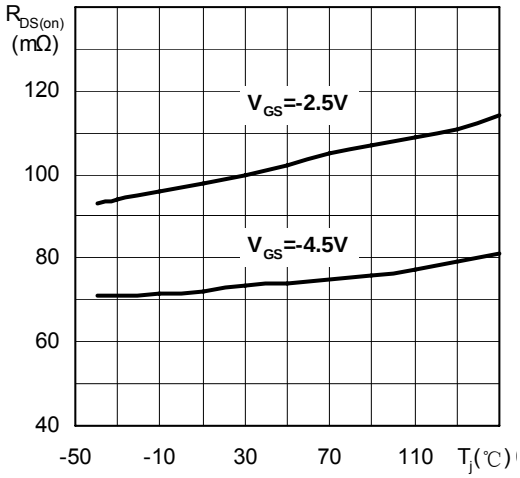


Figure 6 On-Resistance vs. Drain Current

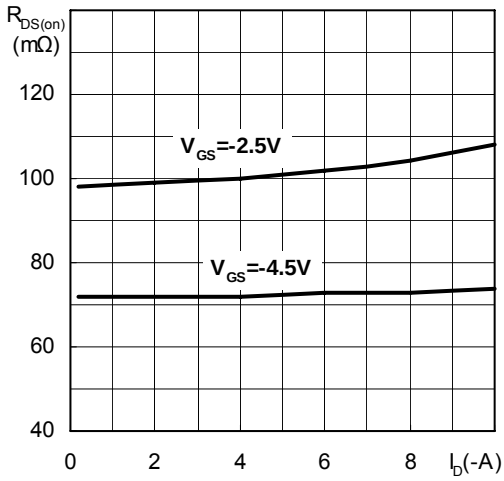


Figure 7 On-Resistance vs. Gate-to-Source Voltage

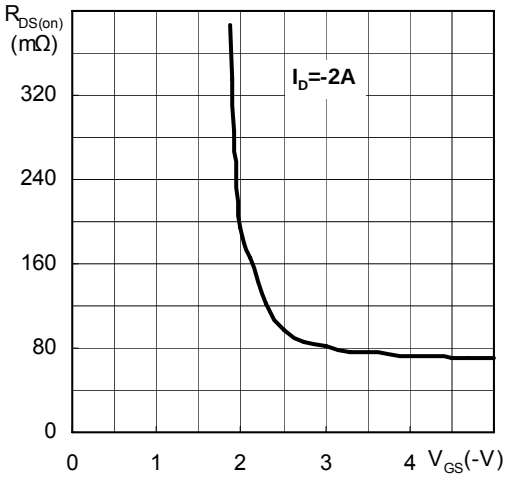


Figure 8 Drain to Source Voltage vs. Drain Current

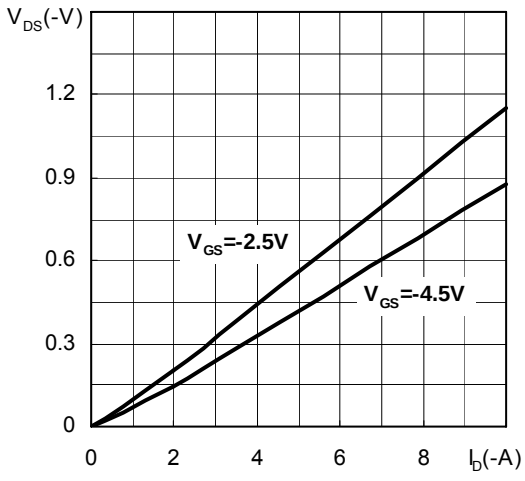


Figure 9 Gate Charge

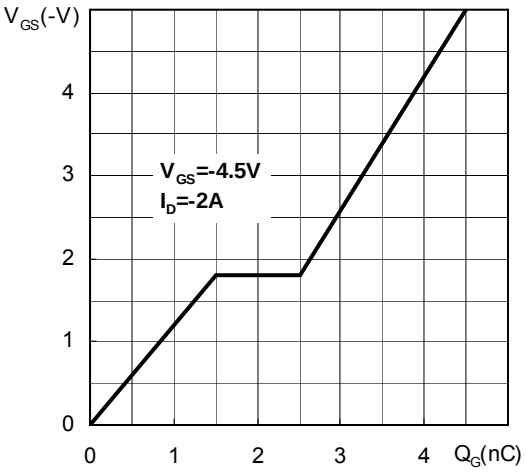
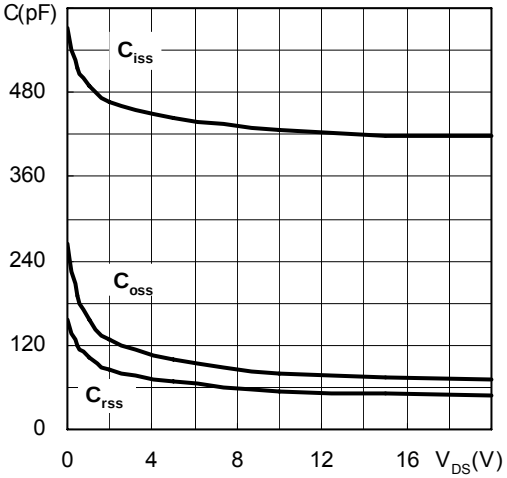


Figure 10 Capacitance



Typical characteristics (25℃ unless noted)

Schottky Diode

Figure 11 Reverse Current vs. Junction Temperature

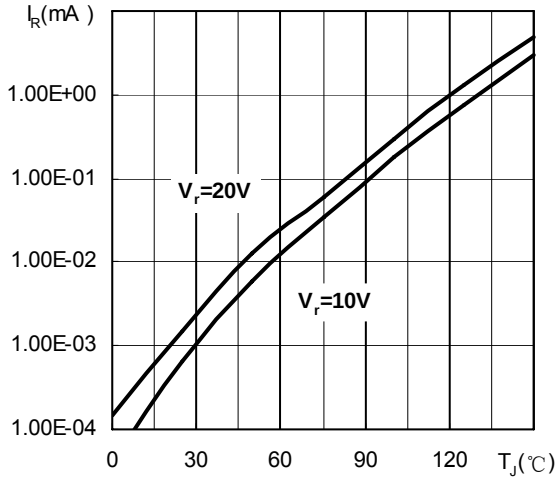


Figure 12 Forward Voltage Diode

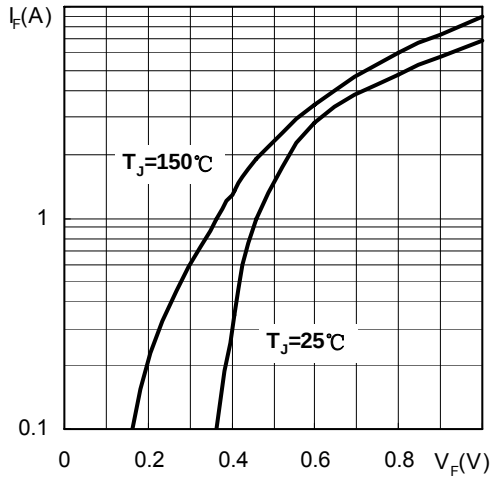
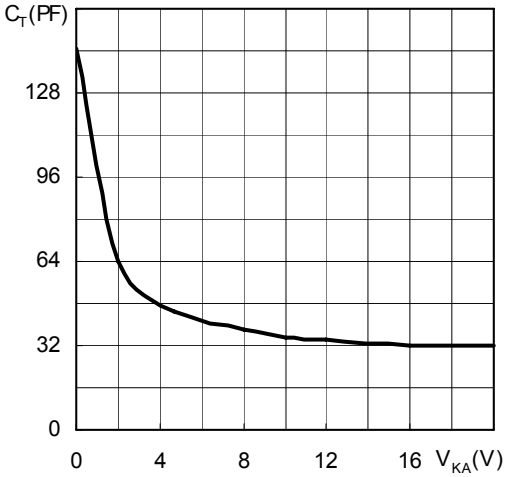
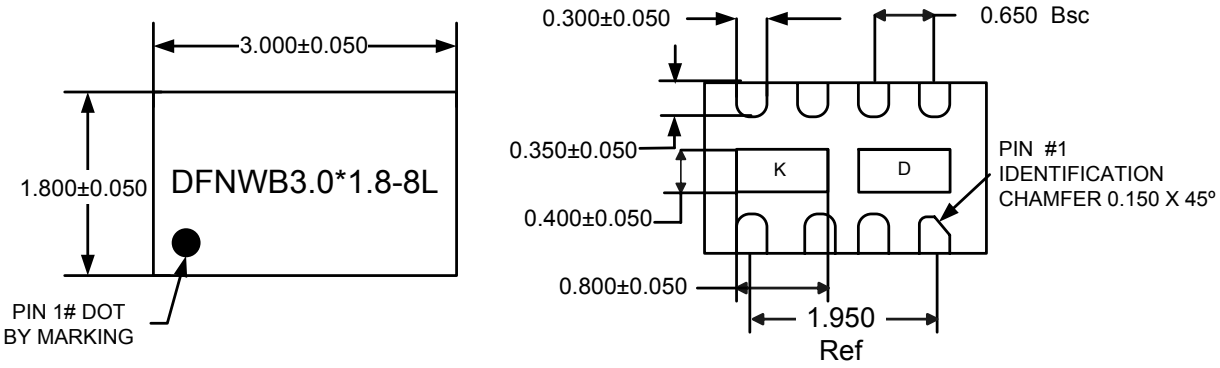


Figure 13 Capacitance



Package Drawing

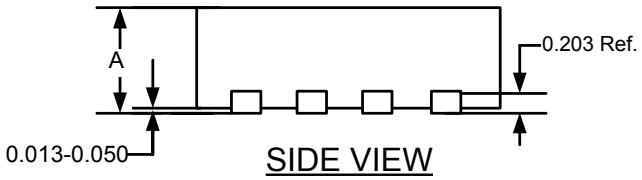


TOP VIEW

BOTTOM VIEW

UNIT:MM

A	MAX	0.800
	NDM	0.750
	MIN	0.700



SIDE VIEW

NOTE:

1) Lead Plating Thickness: 0-0.050mm.

2） Package body sizes exclude mold flash, protrusion or gate burrs.
Mold flash, protrusion or gate burrs shall not exceed 0.10mm per side.

3） The size of the zone ”D” is the same as the “K”.

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.