



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 use as a load switch or in PWM applications.

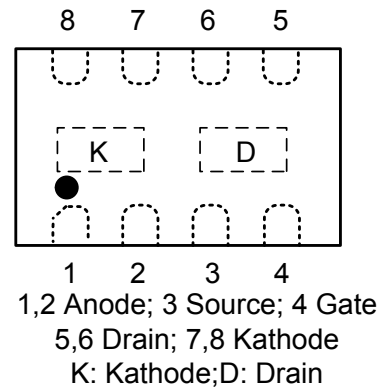
### Features

#### MOSFET

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

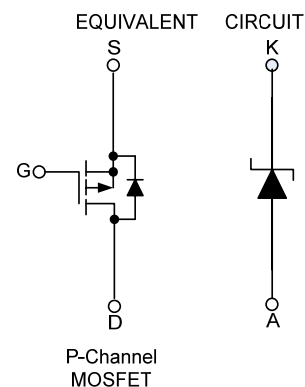
#### Schottky Diode

- $V_F=0.42V$



### Absolute Maximum Ratings (Ta = 25°C)

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



**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 ( $T_C = 25^\circ\text{C}$ )

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

Typical characteristics ( $25^\circ\text{C}$  unless noted)

## MOSFET

Figure 1 Threshold Voltage vs. Temperature

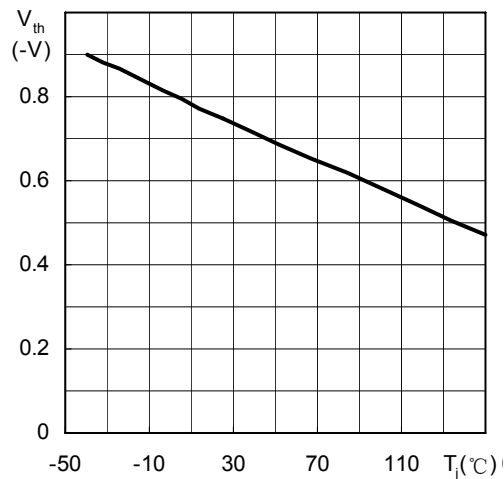
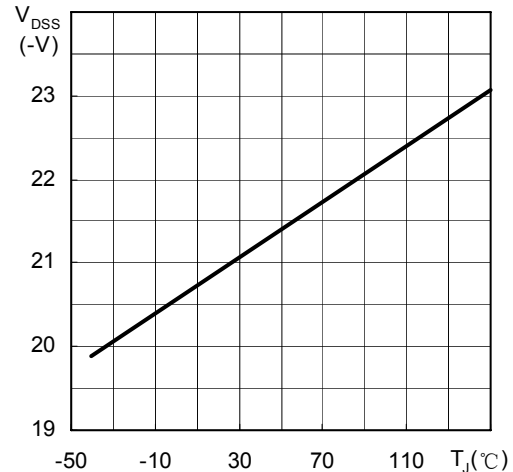
Figure 2  $V_{DSS}$  vs. Temperature

Figure 3  $I_{DSS}$  vs. Temperature

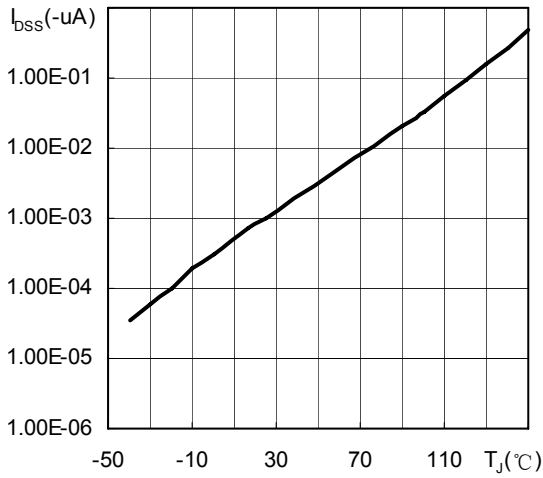


Figure 4  $I_{GSS}$  vs. Temperature

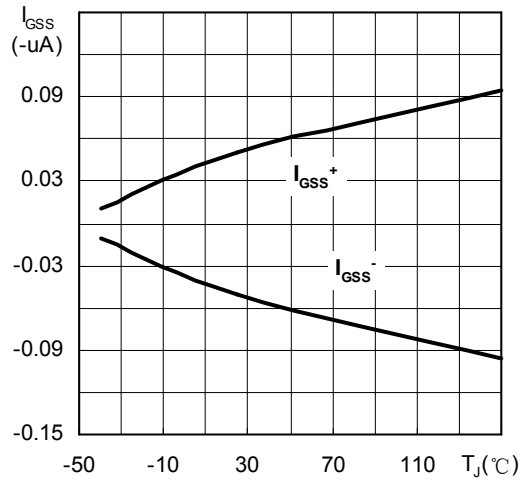


Figure 5 On-Resistance vs. Temperature

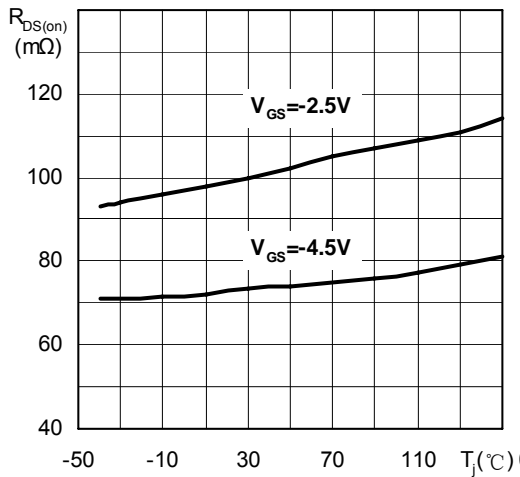


Figure 6 On-Resistance vs. Drain Current

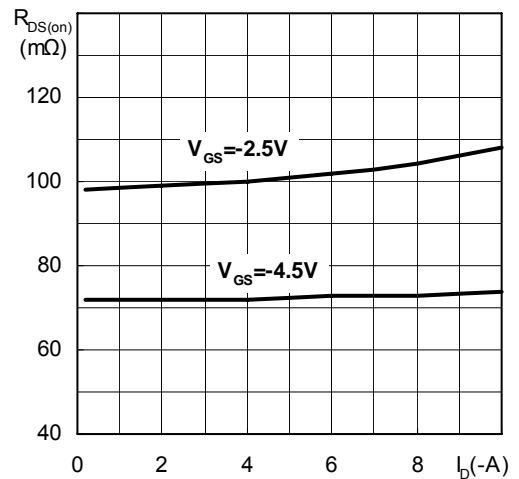


Figure 7 On-Resistance vs. Gate-to-Source Voltage

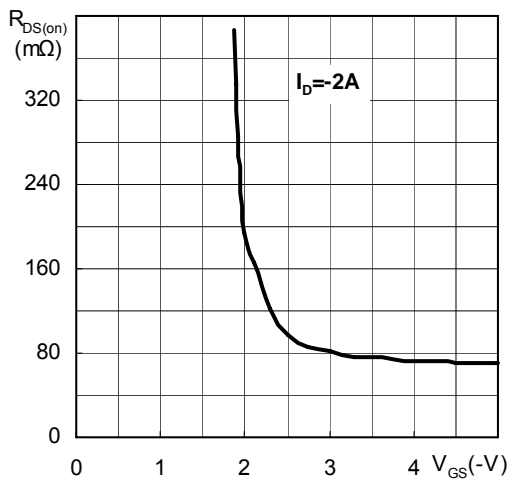


Figure 8 Drain to Source Voltage vs. Drain Current

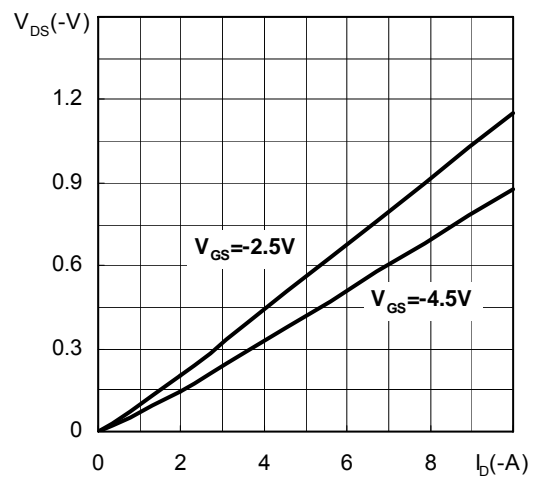




Figure 9 Gate Charge

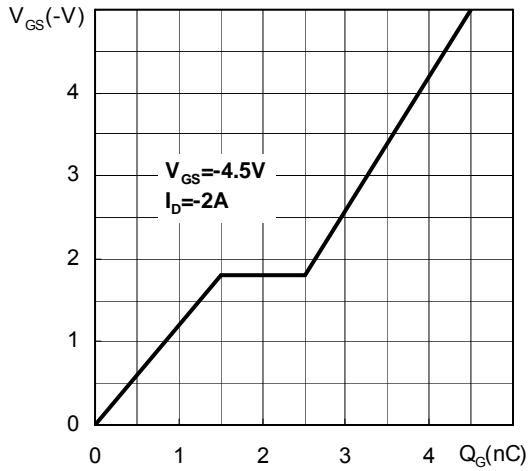
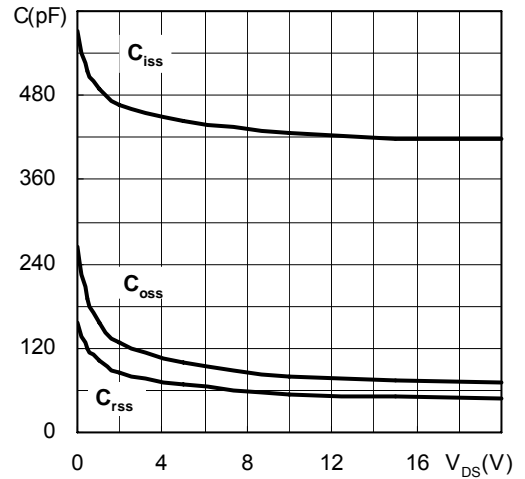


Figure 10 Capacitance



Typical characteristics (25°C unless noted)

Schottky Diode

Figure 11 Reverse Current vs. Junction Temperature

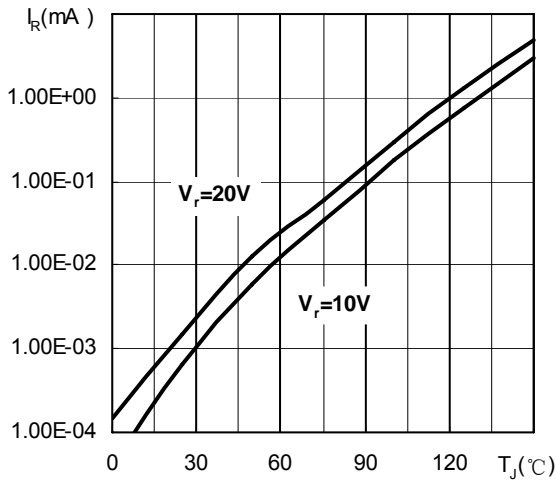


Figure 12 Forward Voltage Diode

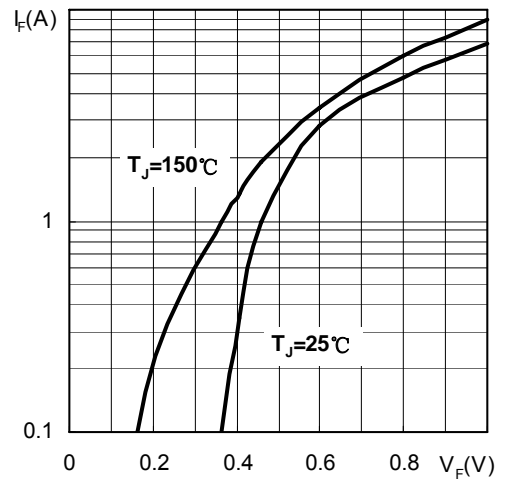
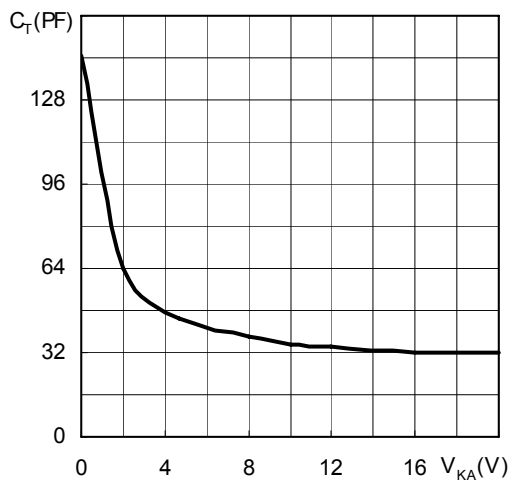
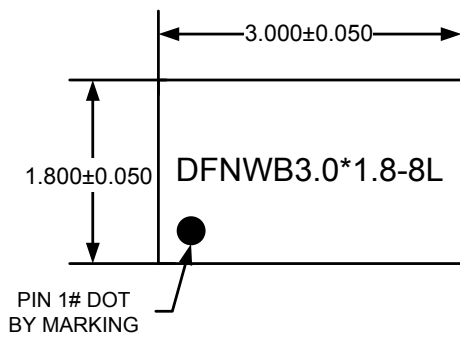


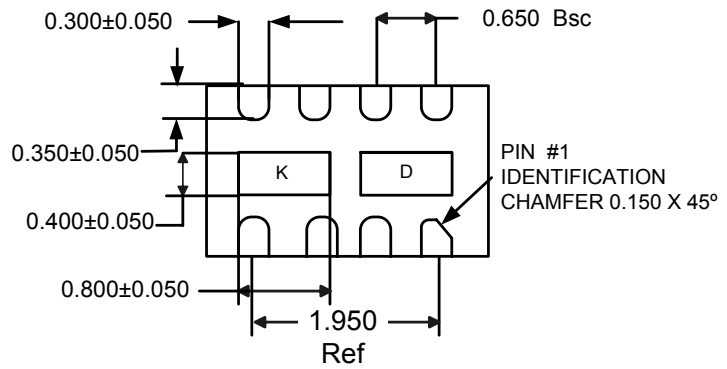
Figure 13 Capacitance



### Package Drawing



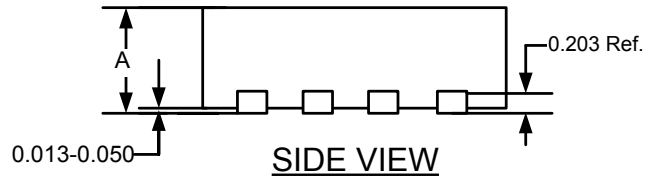
TOP VIEW



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".



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