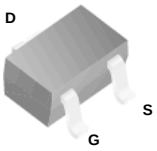
FAIRCHILD SEMICONDUCTOR®

March 2010

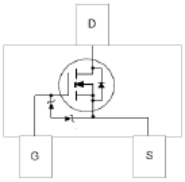
2N7002K
N-Channel Enhancement Mode Field Effect Transistor

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- Pb Free/RoHS Compliant
- ESD HBM=2000V (Typical:3000V) as per JESD22 A114 and ESD CDM=2000V as per JESD22 C101



SOT−23
Marking : 7K



Absolute Maximum Ratings * T_A = 25°C unless otherwise noted

Symbol	Parameter		Value	Units
V_{DSS}	Drain-Source Voltage		60	V
V_{DGR}	Drain-Gate Voltage $R_{GS} \leq 1.0M\Omega$		60	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Drain Current	Continuous Pulsed	300 800	mA
T_J	Operating Junction Temperature Range		-55 to +150	°C
T_{STG}	Storage Temperature Range		-55 to +150	°C

* These ratings are limiting values above which the serviceability of any semiconductor device may by impaired.

Thermal Characteristics

Symbol	Parameter	Value	Units
P_D	Total Device Dissipation Derating above T_A = 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient *	350	°C/W

* Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch. Minimum land pad size

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Condition	MIN	MAX	Units
Off Characteristics (Note1)					
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}= 0V, I_D=10uA	60		V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= 60V, V_{GS}= 0V V_{DS}= 60V, V_{GS}= 0V, @T_C = 125°C		1.0 500	μA
I_{GSS}	Gate-Body Leakage	V_{GS}= ±20V, V_{DS}= 0V		±10	μA
On Characteristics (Note1)					
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	1.0	2.5	V
$R_{DS(ON)}$	Satic Drain-Source On-Resistance	V_{GS} = 10V, I_D = 0.5A V_{GS} = 4.5V, I_D = 200mA		2 4	Ω
$I_{D(ON)}$	On-State Drain Current	V_{GS} = 10V, V_{DS}= 7.5V V_{GS} = 4.5V, V_{DS}= 10V	1.5 1.2		A
g_{FS}	Forward Transconductance	V_{DS} = 10V, I_D = 0.2A	200		mS
Dynamic Characteristics					
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS}= 0V, f = 1.0MHz		50	pF
C_{oss}	Output Capacitance			15	pF
C_{rss}	Reverse Transfer Capacitance			6	pF
Switching Characteristics					
$t_{D(ON)}$	Turn-On Delay Time	V_{DD} = 30V, I_{DSS} = 200mA, R_G = 10Ω, V_{GS}= 10V		5	ns
$t_{D(OFF)}$	Turn-Off Delay Time			30	

Note1 : Short duration test pulse used to minimize self-heating effect.

Typical Performance Characteristics

Figure 1. On-Region Characteristics

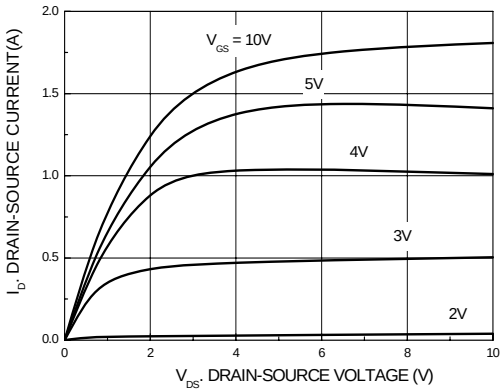


Figure 2. On-Resistance Variation with Gate Voltage and Drain Current

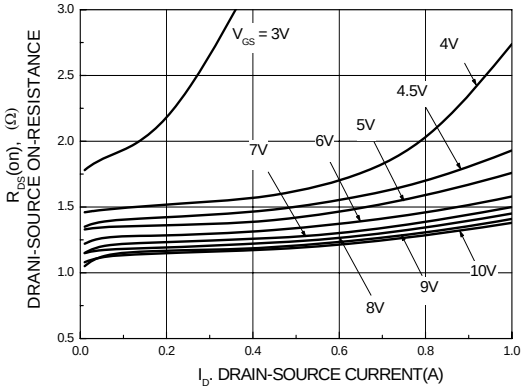


Figure 3. On-Resistance Variation with Temperature

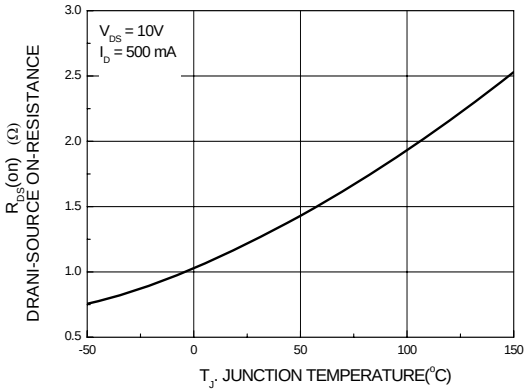


Figure 4. On-Resistance Variation with Gate-Source Voltage

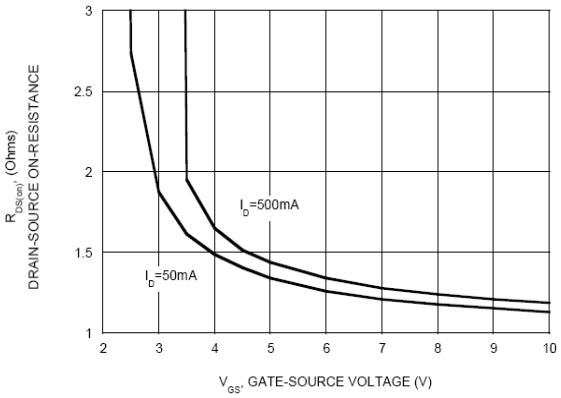


Figure 5. Transfer Characteristics

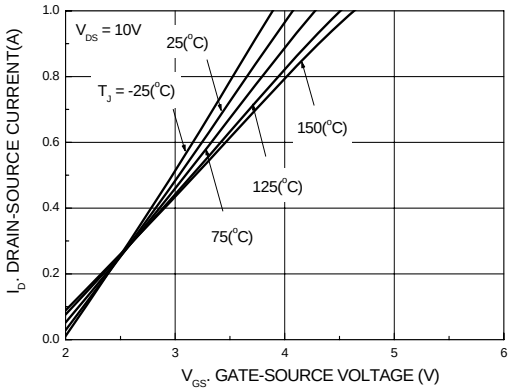
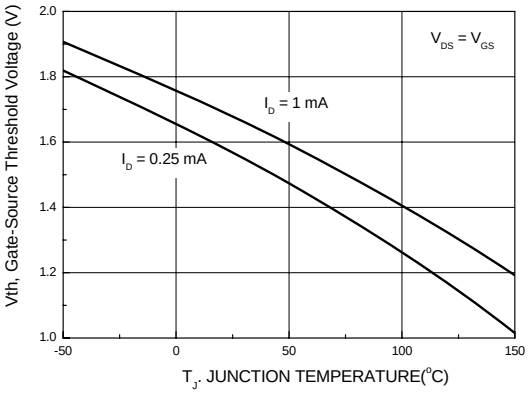
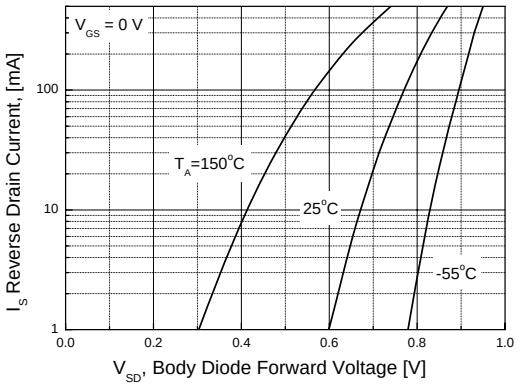


Figure 6. Gate Threshold Variation with Temperature



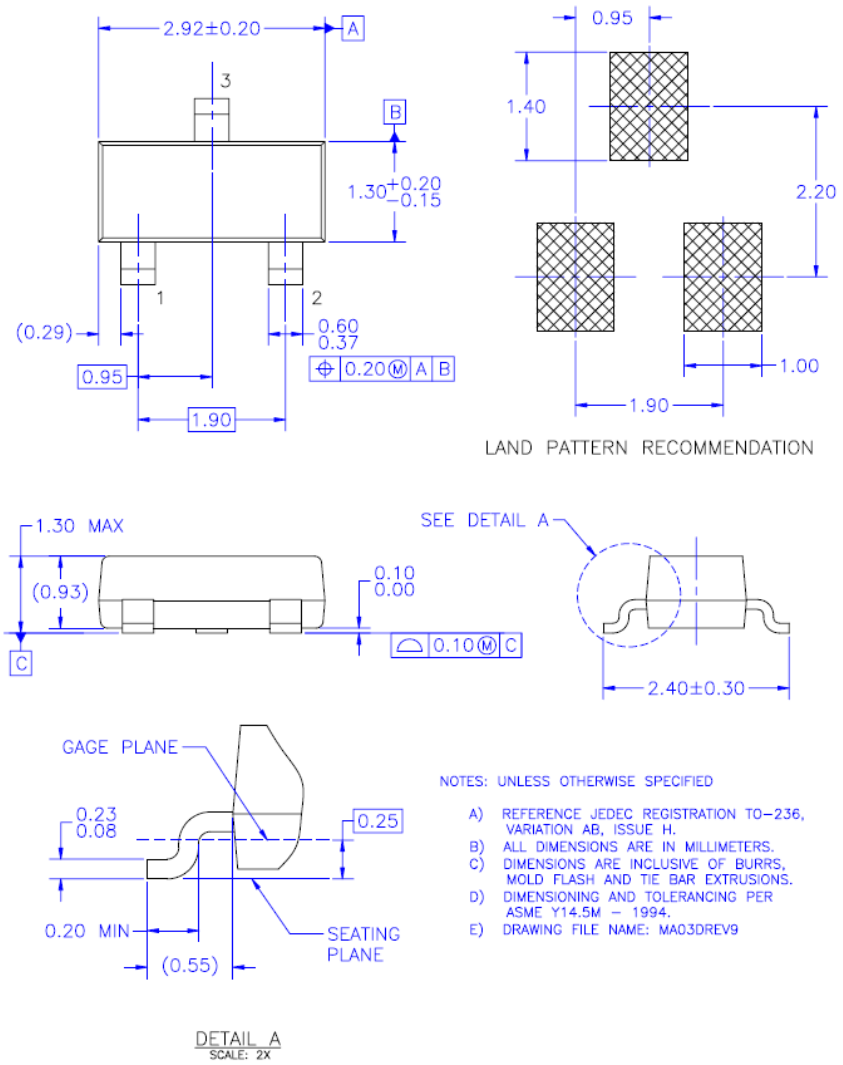
Typical Performance Characteristics (Continue)

Figure 7. Reverse Drain Current Variation with Diode Forward Voltage and Temperature



Physical Dimensions

SOT-23



Dimensions in Millimeters

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