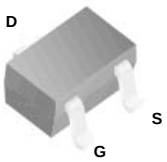
FAIRCHILD SEMICONDUCTOR®

October 2007

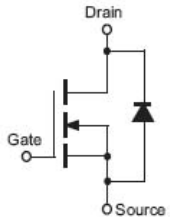
2N7002W
N-Channel Enhancement Mode Field Effect Transistor

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- Lead Free/RoHS Compliant



SOT − 323
Marking : 2N



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 — Continuous Pulsed	±20 ±40	V
I_D	Drain Current — Continuous Continuous @ 100°C Pulsed	115 73 800	mA
T_J , T_{STG}	Junction and 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	200 1.6	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient *	625	°C/W

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

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Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Condition	MIN	TYP	MAX	Units
Off Characteristics (Note1)						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}= 0V, I_D=10uA	60	78	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= 60V, V_{GS}= 0V V_{DS}= 60V, V_{GS}= 0V, @T_C = 125°C	-	0.001 7	1.0 500	uA
I_{GSS}	Gate-Body Leakage	V_{GS}= ±20V, V_{DS}= 0V	-	0.2	±10	nA
On Characteristics (Note1)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	1.0	1.76	2.0	V
$R_{DS(ON)}$	Satic Drain-Source On-Resistance	V_{GS} = 5V, I_D = 0.05A, V_{GS} = 10V, I_D = 0.5A, @T_j = 125°C	- -	1.6 2.53	7.5 13.5	Ω
$I_{D(ON)}$	On-State Drain Current	V_{GS} = 10V, V_{DS}= 7.5V	0.5	1.43	-	A
g_{FS}	Forward Transconductance	V_{DS} = 10V, I_D = 0.2A	80	356.5	-	mS
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS}= 0V, f = 1.0MHz	-	37.8	50	pF
C_{oss}	Output Capacitance		-	12.4	25	pF
C_{rss}	Reverse Transfer Capacitance		-	6.5	7.0	pF
Switching Characteristics						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD} = 30V, I_D = 0.2A, V_{GEN}= 10V R_L = 150Ω, R_{GEN} = 25Ω	-	5.85	20	ns
$t_{D(OFF)}$	Turn-Off Delay Time		-	12.5	20	

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

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Typical Performance Characteristics

Figure 1. On-Region Characteristics

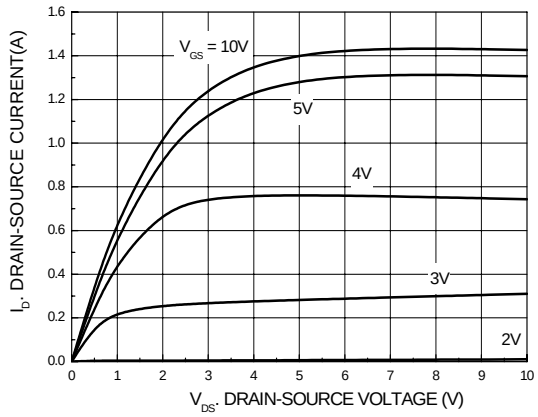


Figure 2. On-Resistance Variation with Gate Voltage and Drain Current

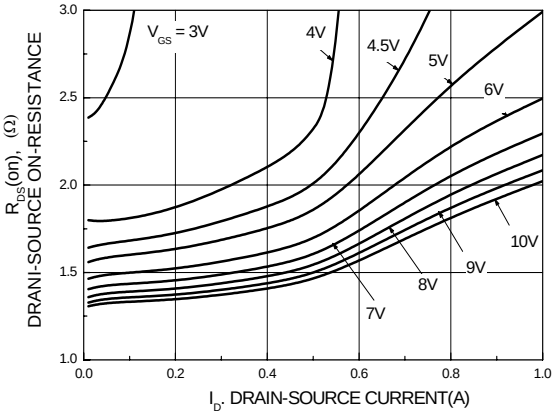


Figure 3. On-Resistance Variation with Temperature

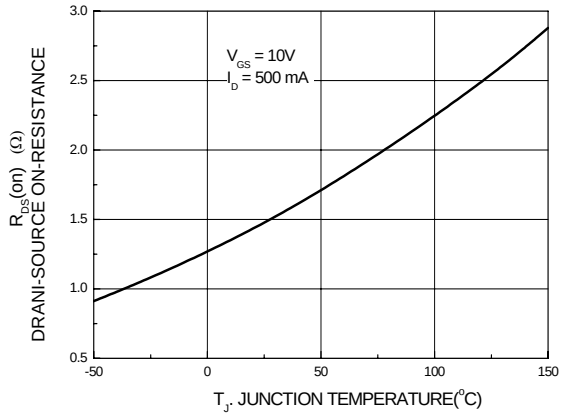


Figure 4. On-Resistance Variation with Gate-Source Voltage

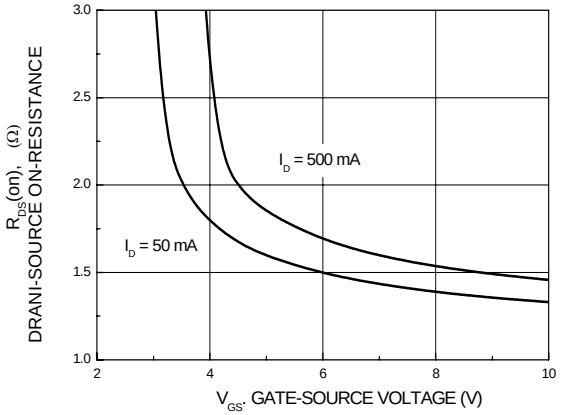


Figure 5. Transfer Characteristics

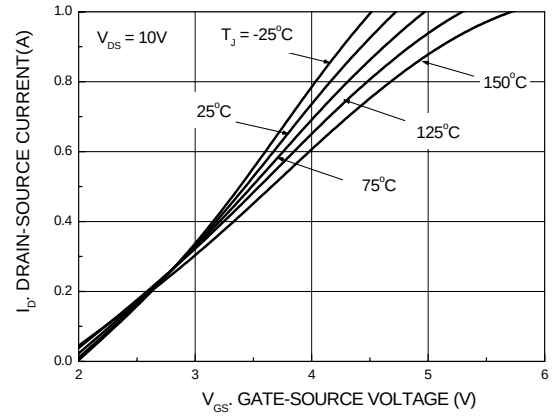
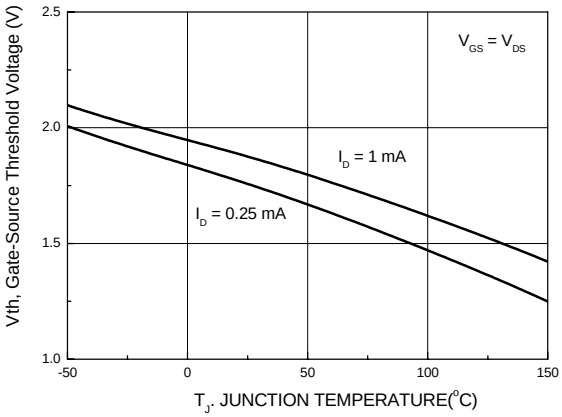


Figure 6. Gate Threshold Variation with Temperature



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Typical Performance Characteristics

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

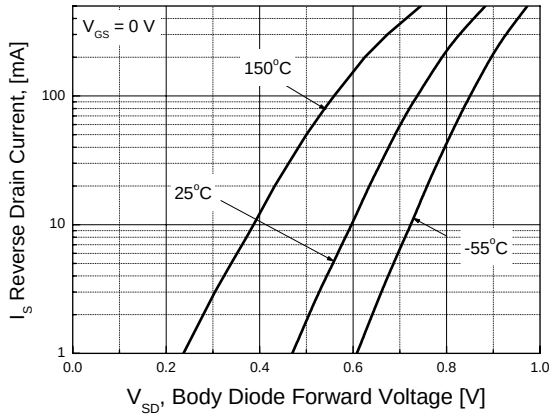
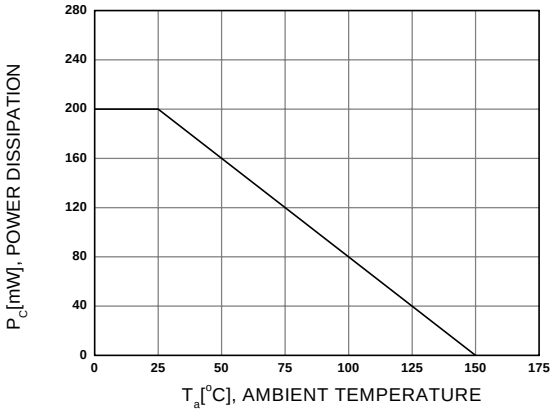


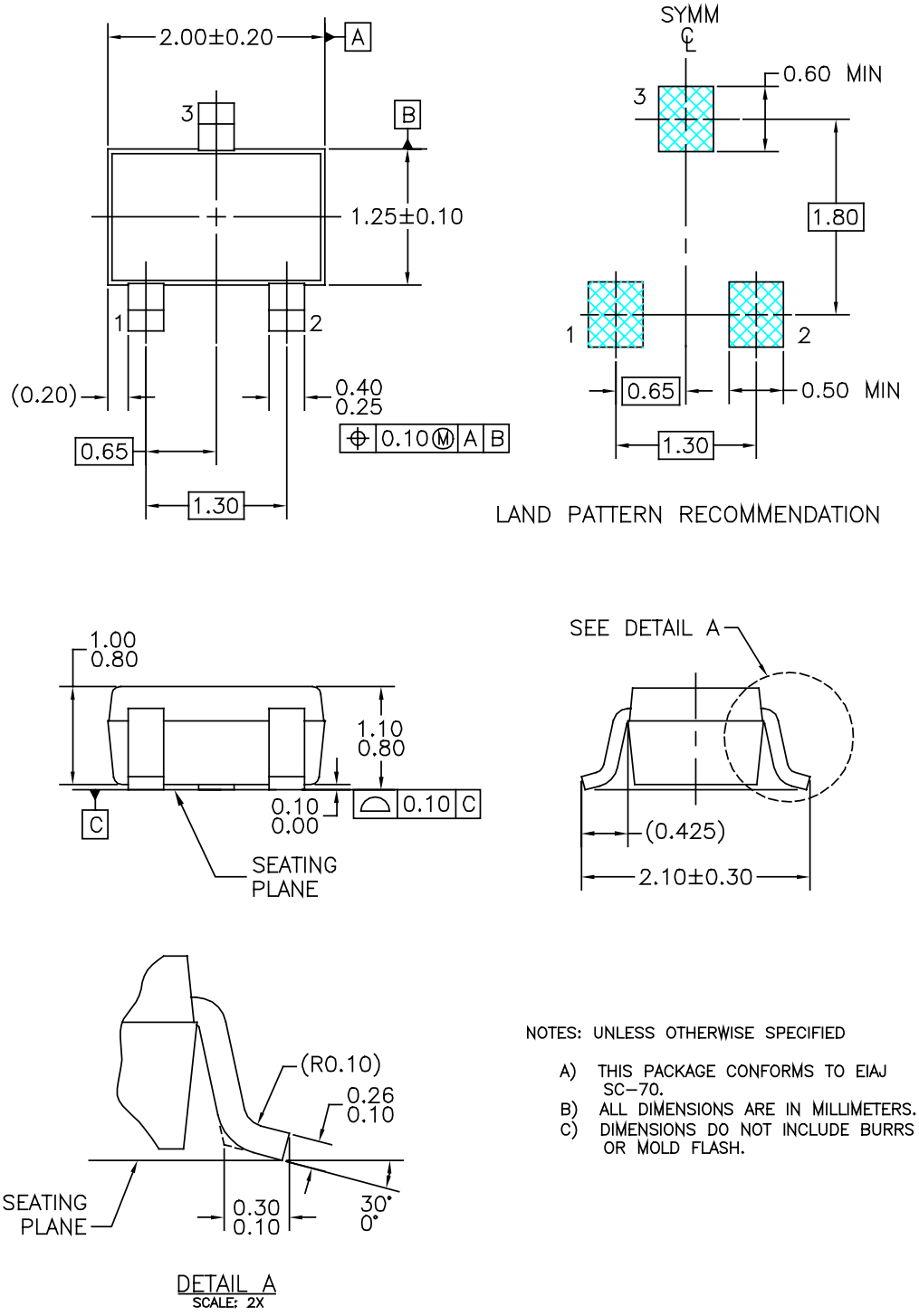
Figure 8. Power Derating



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Package Dimensions

SOT323



NOTES: UNLESS OTHERWISE SPECIFIED

A) THIS PACKAGE CONFORMS TO EIAJ SC–70.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH.

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