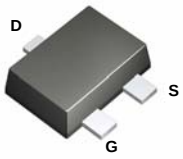
FAIRCHILD SEMICONDUCTOR®

October 2007

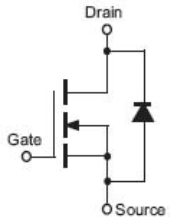
2N7002T
N-Channel Enhancement Mode Field Effect Transistor

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 − 523F
Marking : AA



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	Junction Temperature	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	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,

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.

Typical Performance Characteristics

Figure 1. On-Region Characteristics

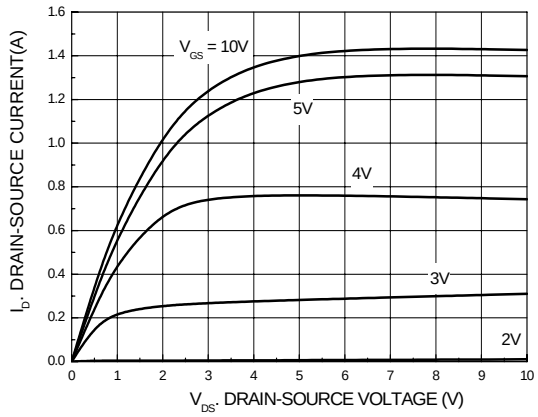


Figure 2. On-Resistance Variation with Gate Voltage and Drain Current

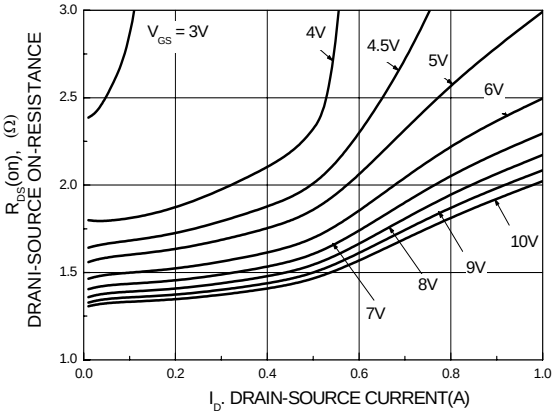


Figure 3. On-Resistance Variation with Temperature

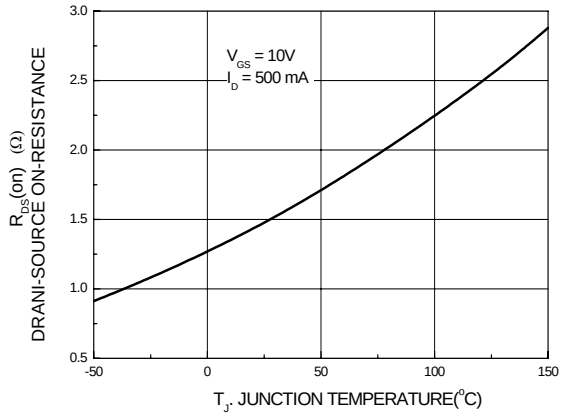


Figure 4. On-Resistance Variation with Gate-Source Voltage

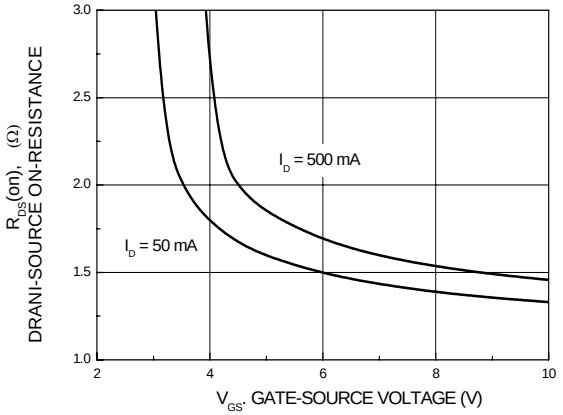


Figure 5. Transfer Characteristics

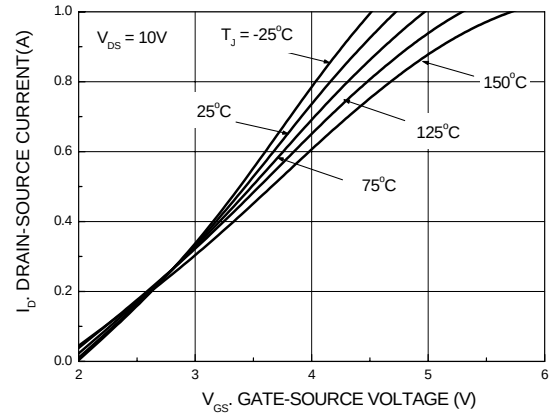
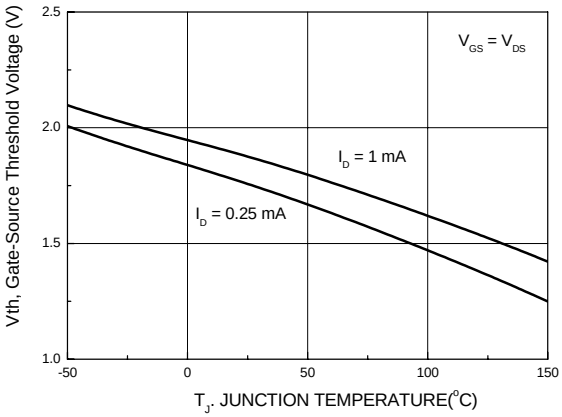


Figure 6. Gate Threshold Variation with Temperature



Typical Performance Characteristics

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

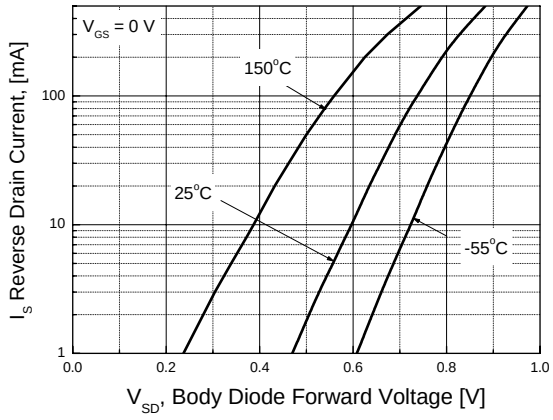
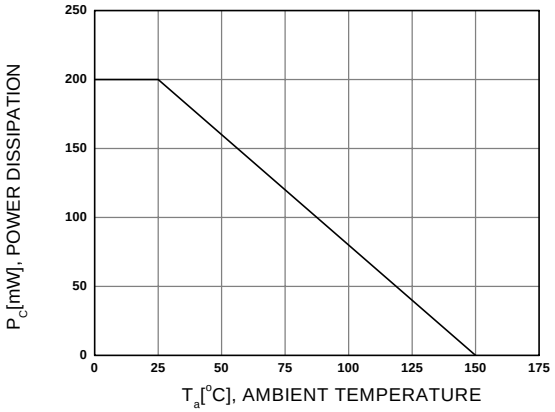
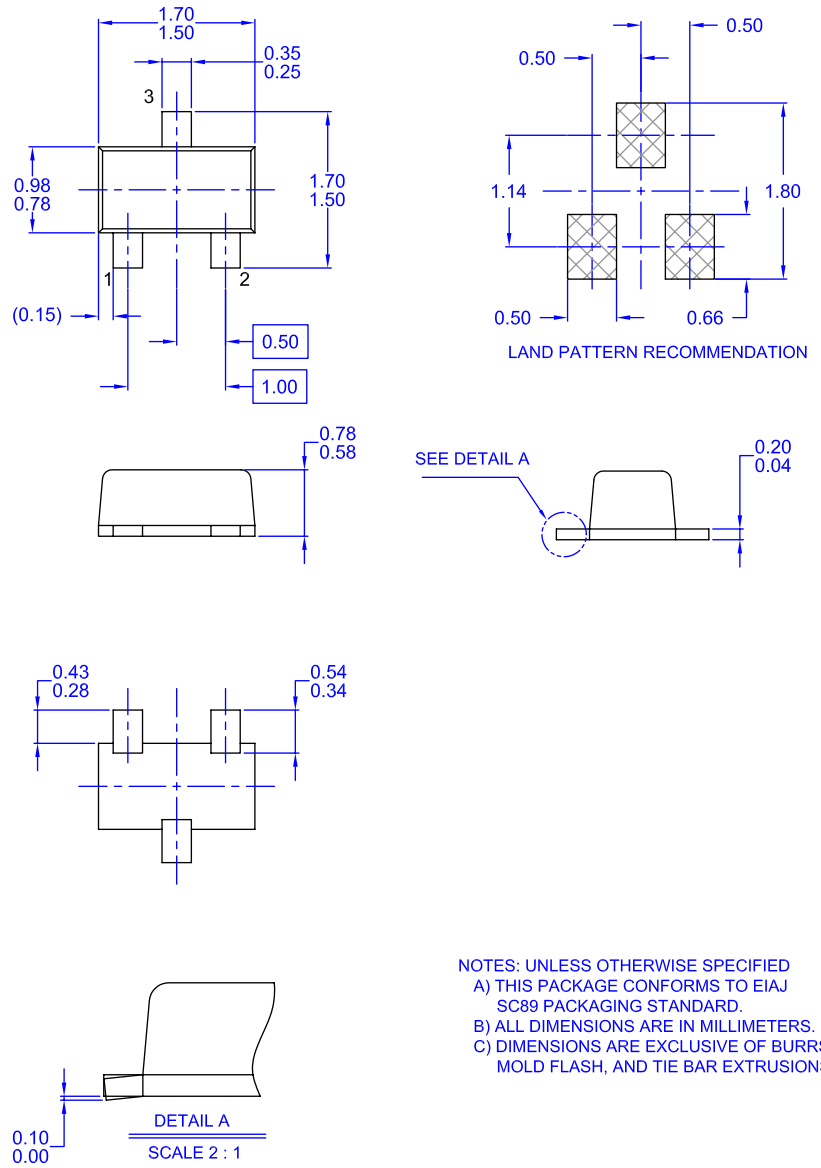


Figure 8. Power Derating



Package Dimensions

SOT-523F



NOTES: UNLESS OTHERWISE SPECIFIED
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B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

Dimensions in Millimeters

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