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May 2011

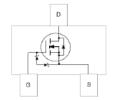
2N7002KW

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=1000V as per JESD22 A114 and ESD CDM=1500V as per JESD22 C101





Marking: 7KW

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

Symbol	Parameter	Value	Units
V _{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	±20	V
I _D	Maximum Drain Current - Continuous	310	mA
	$T_J = 100$ °C	195	mA
	- Pulsed	1.2	Α
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	300 2.4	mW mW/°C	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient *	410	°C/W	

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

Electrical Characteristics $T_A = 25^{\circ}C$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Тур.	Max.	Units
Off Char	acteristics			•	•	•
BV _{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 10\mu A$	60			V
I _{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 60V, V_{GS} = 0V$ $V_{DS} = 60V, V_{GS} = 0V, T_{J} = 125^{\circ}C$			1.0 0.5	μA mA
I _{GSS}	Gate-Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$			±10	μΑ
On Char	acteristics (Note1)					
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	1.1		2.1	V
R _{DS(ON)}	Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 500mA$ $V_{GS} = 10V, I_D = 500mA, T_J = 100^{\circ}C$ $V_{GS} = 5V, I_D = 50mA$ $V_{GS} = 5V, I_D = 50mA, T_J = 100^{\circ}C$			1.6 2.4 2 3	Ω Ω Ω
V _{DS(ON)}	Drain-Source On-Voltage	$V_{GS} = 10V, I_D = 500mA$ $V_{GS} = 5V, I_D = 50mA$			3.75 1.5	V
I _{D(ON)}	On-State Drain Current	V _{GS} = 10V, V _{DS} = 2V	500			mA
9 _{FS}	Forward Transconductance	$V_{DS} = 2V, I_{D} = 0.2A$	80			mS
Dynamic	Characteristics					
C _{iss}	Input Capacitance				50	pF
C _{oss}	Output Capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$			25	pF
C _{rss}	Reverse Transfer Capacitance				5	pF
Switchir	ng Characteristics					
t _{D(ON)}	Turn-On Delay Time	$V_{DD} = 30V, R_L = 150\Omega, V_{GS} = 10V,$			20	ns
t _{D(OFF)}	Turn-Off Delay Time	$I_D = 200 \text{mA}, R_{GEN} = 25 \Omega$			60	ns
Drain-Sc	ource Diode Characteristics a	nd Maximum Ratings				•
I _S	Maximum Continuous Drain-Source Diode Forward Current				115	mA
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current				0.8	Α
V _{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V$, $I_S = 115$ mA			1.1	V

Note1 : 1. Pulse Test: Pulse Width < 300 μ s, Duty Cycle < 2.0%.

Typical Performance Characteristics

Figure 1. On-Region Characteristics.

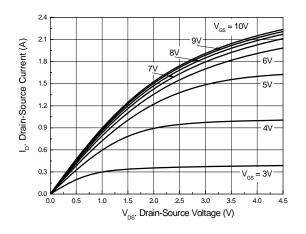


Figure 3. On-Resistance Variation with Gate Voltage and Drain Current.

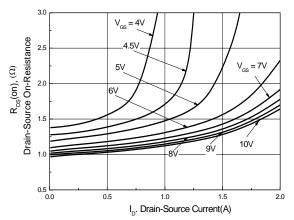


Figure 5. Transfer Characteristics

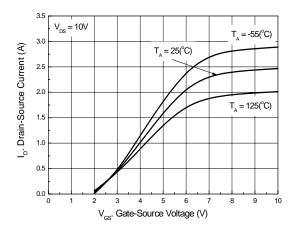


Figure 2. On-Resistance Variation with Temperature.

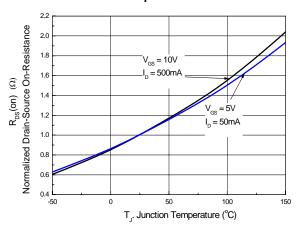


Figure 4. On-Resistance Variation with Drain Current and Temperature.

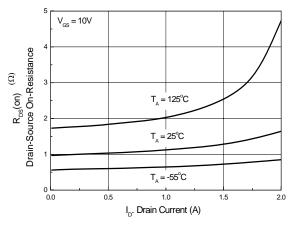
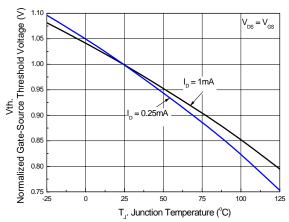


Figure 6. Gate Threshold Variation with Temperature.



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation with Temperature

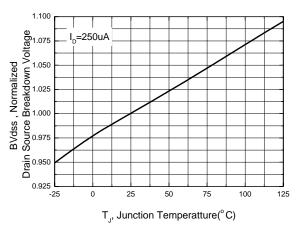


Figure 8. Body Diode Forward Voltage Variation with Source Current and Temperature.

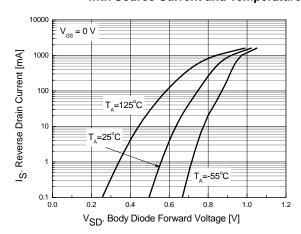


Figure 9. Capacitance Characteristics.

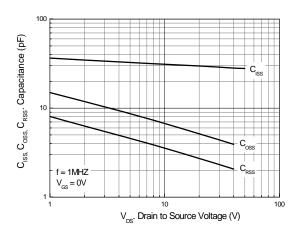


Figure 10. Gate Charge Characteristics.

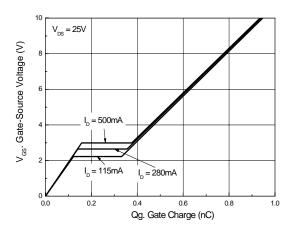


Figure 11. Maximum Safe Operating Area.

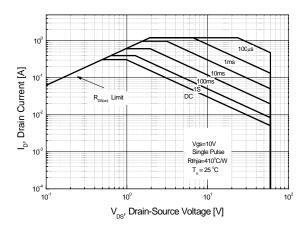
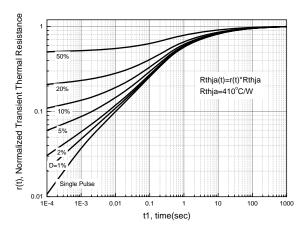
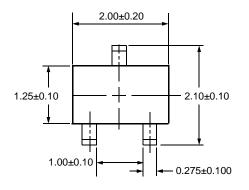


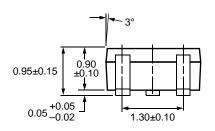
Figure 12. Transient Thermal Response Curve.

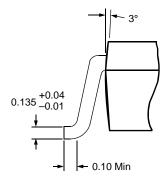


Physical Dimensions

SOT-323







Dimensions in Millimeters





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Definition of Term

Definition of Terms				
Datasheet Identification	Product Status	Definition		
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