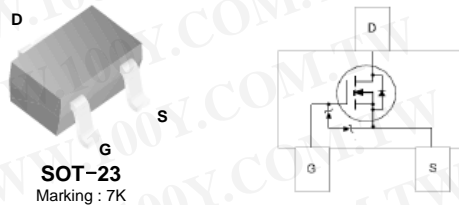


2N7002K

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



Absolute Maximum Ratings * $T_A = 25^\circ\text{C}$ 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	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-55 to +150	$^\circ\text{C}$	

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

Thermal Characteristics

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

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

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

Symbol	Parameter	Test Condition	MIN	MAX	Units
Off Characteristics (Note1)					
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 10\mu A$	60		V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 60V, V_{GS} = 0V$ $V_{DS} = 60V, V_{GS} = 0V, @T_C=125^\circ\text{C}$		1.0 500	μA
I_{GSS}	Gate-Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$		± 10	μA
On Characteristics (Note1)					
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	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	$V_{GS} = 10V, V_{DS} = 7.5V$	1.5		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	$V_{DD} = 30V, I_{DSS} = 200mA,$ $R_G = 10\Omega, V_{GS} = 10V$		5	ns
$t_{D(OFF)}$	Turn-Off Delay Time			30	

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

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Typical Performance Characteristics

Figure 1. On-Region Characteristics

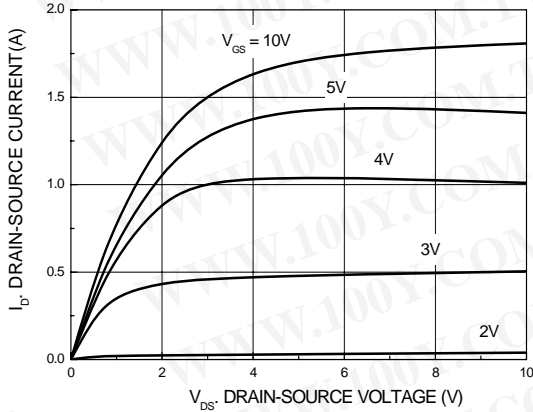


Figure 2. On-Resistance Variation with Gate Voltage and Drain Current

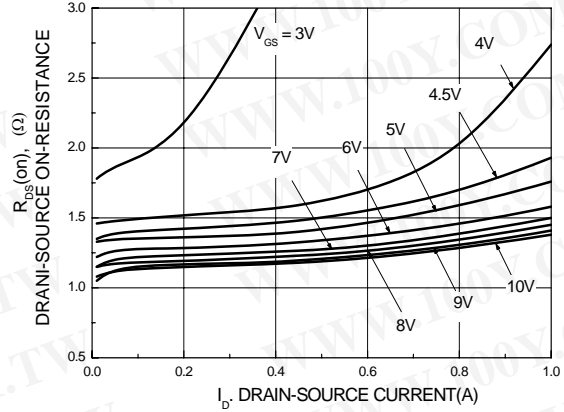


Figure 3. On-Resistance Variation with Temperature

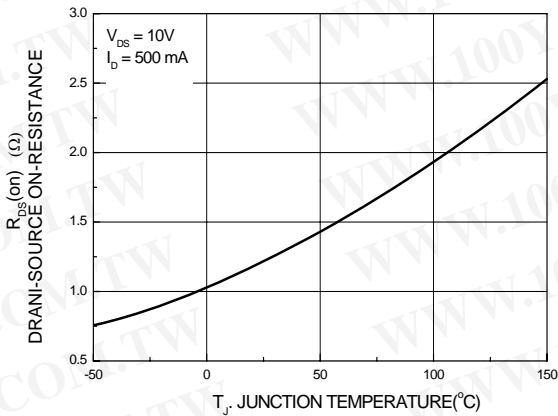


Figure 4. On-Resistance Variation with Gate-Source Voltage

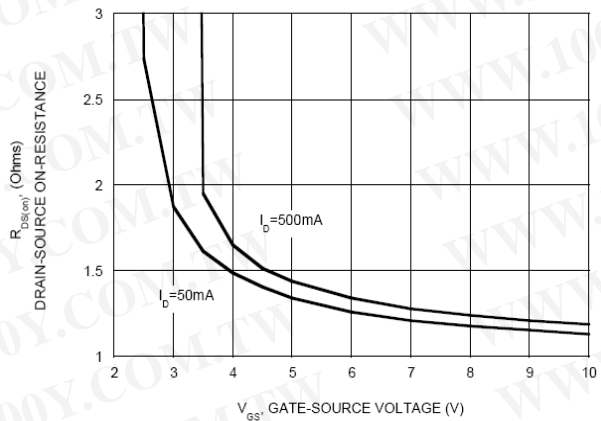


Figure 5. Transfer Characteristics

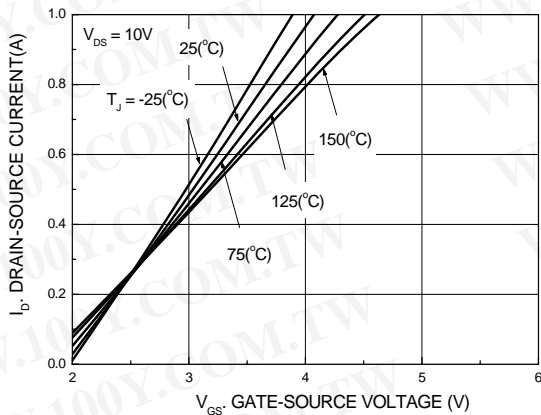
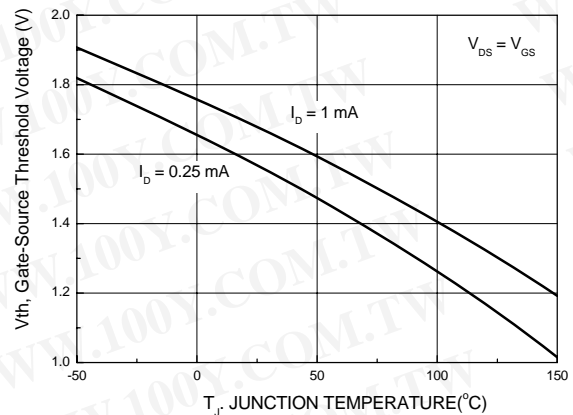
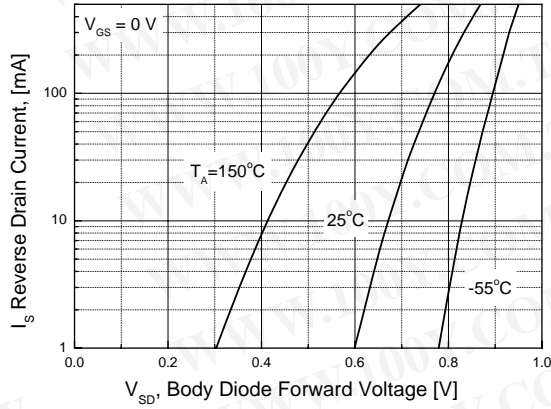


Figure 6. Gate Threshold Variation with Temperature



Typical Performance Characteristics (Continue)

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

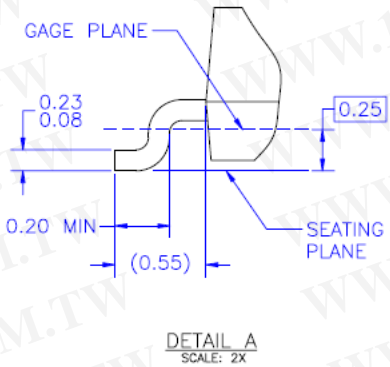
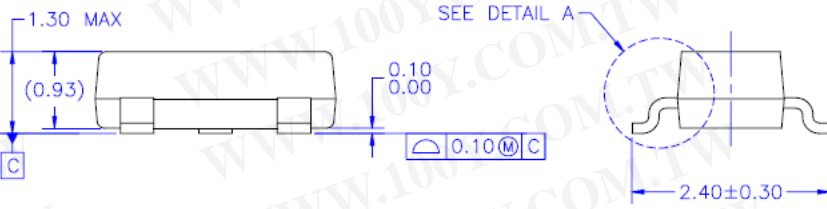
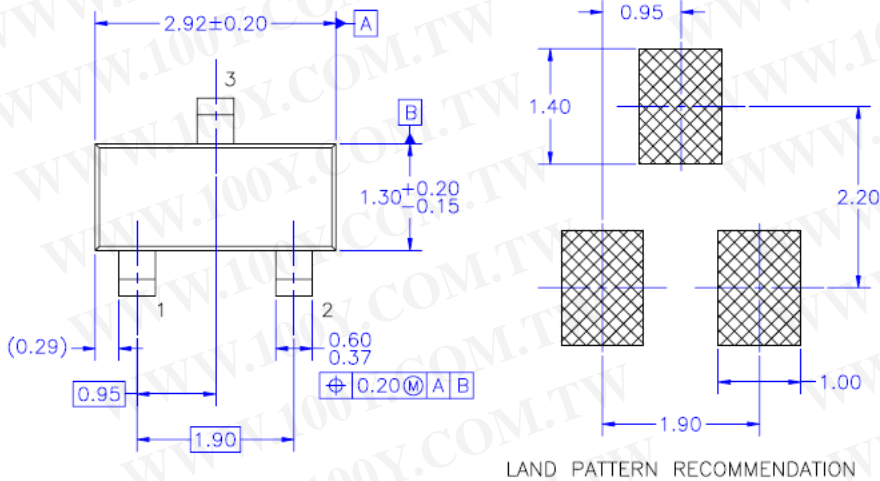


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Physical Dimensions

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 - E) DRAWING FILE NAME: MA03DREV9

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