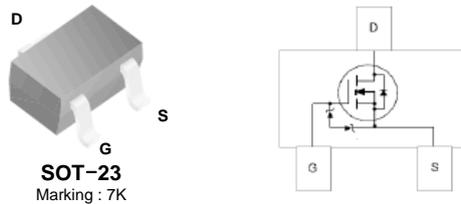


2N7002K

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	300
		Pulsed	800
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	mW
		2.8	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

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.

Typical Performance Characteristics

Figure 1. On-Region Characteristics

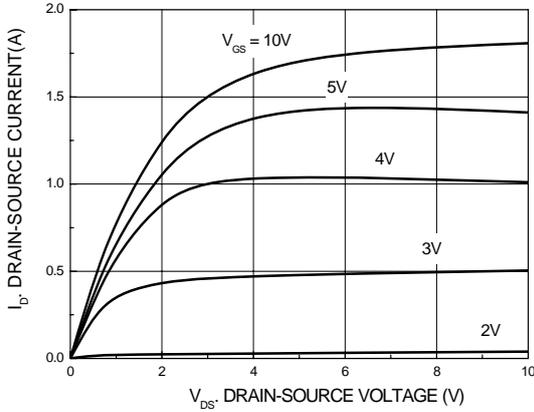


Figure 2. On-Resistance Variation with Gate Voltage and Drain Current

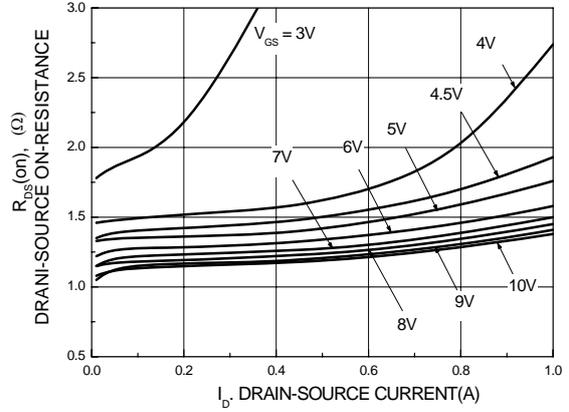


Figure 3. On-Resistance Variation with Temperature

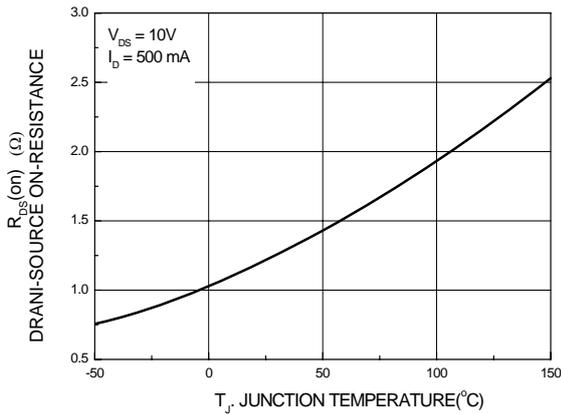


Figure 4. On-Resistance Variation with Gate-Source Voltage

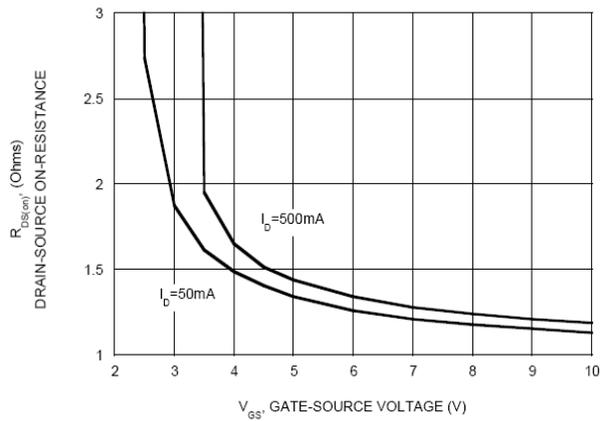


Figure 5. Transfer Characteristics

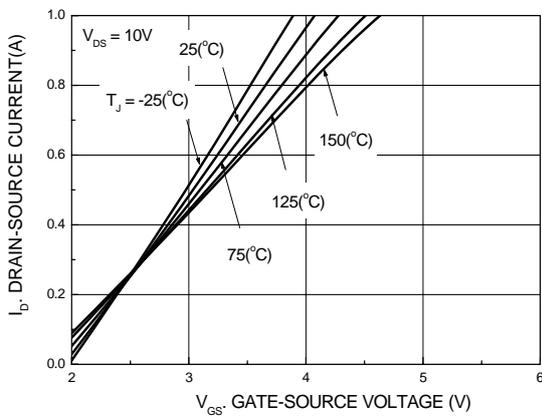
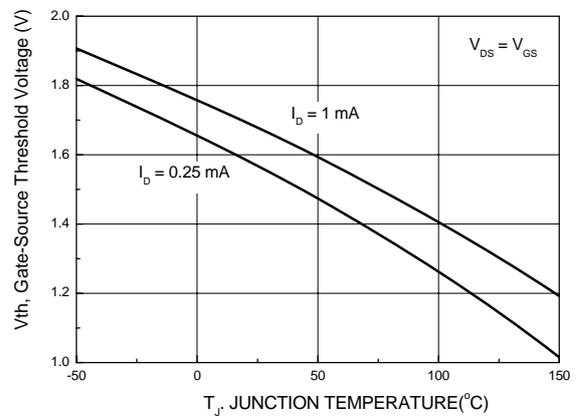
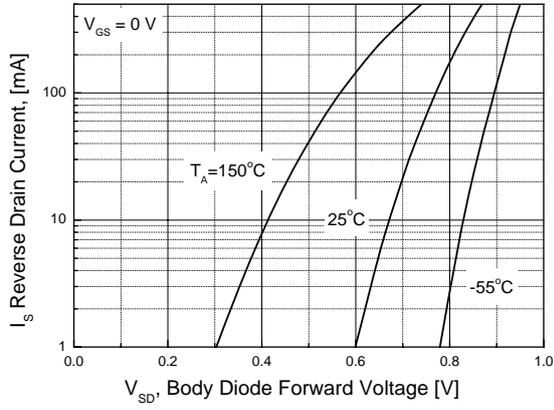


Figure 6. Gate Threshold Variation with Temperature



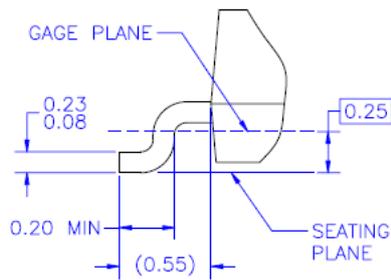
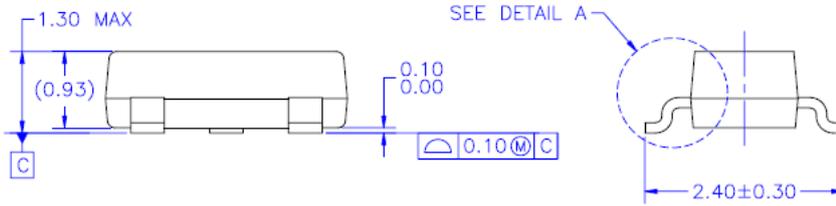
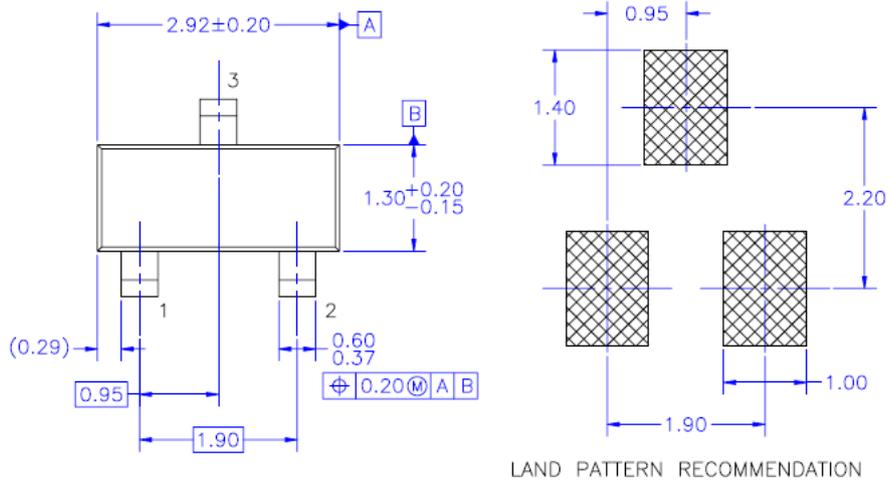
Typical Performance Characteristics (Continue)

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



Physical Dimensions

SOT-23



DETAIL A
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

- A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 1994.
- E) DRAWING FILE NAME: MA03DREV9

Dimensions in Millimeters



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