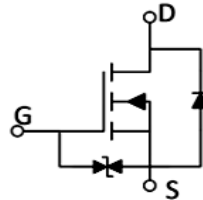


## N-Channel MOSFET

## 2N7002K



SOT-23



**SOT-23**  
**Surface Mount**  
**Plastic Package**  
**RoHS compliant**

Marking : **702**

### FEATURES:

1. High density cell design for low  $R_{DS(ON)}$
2. Voltage controlled small signal switch
3. Rugged and reliable
4. High saturation current capability
5. ESD protected up to 2KV

**APPLICATION:** Designed for High Speed Pulse Amplifier and Drive Application

### ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C Unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNIT
Drain-Source voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current	$I_D$	340	mA
Power Dissipation	$P_D$	350	mW
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	357	°C/W
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-55 to +150	°C



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## ELECTRICAL CHARACTERISTICS at (Ta = 25 °C Unless otherwise specified)

### Off Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60	--	--	V
Gate-Threshold Voltage <sup>(1)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.5	2.0	V
Gate –Source leakage current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$	--	--	$\pm 5.0$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 48V, V_{GS} = 0V.$	--	--	1.0	$\mu A$
Drain-Source On-Resistance <sup>(1)</sup>	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 200mA$	--	1.3	2.0	$\Omega$
		$V_{GS} = 10V, I_D = 500mA$	--	0.9	1.9	
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_S = 300mA$	--	--	1.5	V
Recovered charge	$Q_r$	$V_{GS} = 0V, I_S = 300mA, V_R = 25V, dI_S/dt = -100A/\mu S$	--	30	--	nC

### Dynamic Characteristics <sup>(2)</sup>

Input Capacitance <sup>(1)</sup>	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 10V, f = 1.0MHz$	--	--	40	pF
Output Capacitance <sup>(1)</sup>	$C_{oss}$		--	--	30	
Reverse Transfer Capacitance <sup>(1)</sup>	$C_{rss}$		--	--	10	

### Switching Characteristics <sup>(2)</sup>

Turn-On Time	$t_{d(ON)}$	$V_{GS}=10V, V_{DD}=50V, R_G=50\Omega, R_{GS}=50\Omega, R_L=250\Omega$	--	--	10	ns
Turn-Off Time	$t_{d(OFF)}$		--	--	15	
Reverse Recovery Time	$t_{rr}$	$V_{GS}=0V, I_S=300mA, V_R=25V, dI_S/dt=-100A/\mu S$		30	--	ns
Gate-Source Breakdown Voltage	$BV_{GSO}$	$I_{gs} = \pm 1mA$ (Open Drain)	$\pm 21.5$	--	$\pm 30$	V

### NOTES:

1. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
2. These parameters have no way to verify

## TYPICAL CHARACTERISTICS CURVES

Fig 1: Output Characteristics

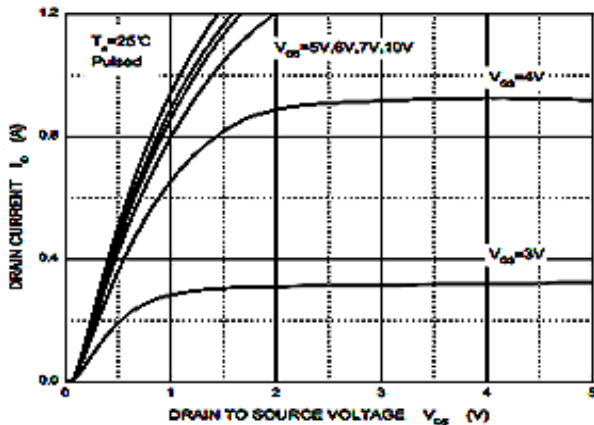


Fig 2: Transfer Characteristics

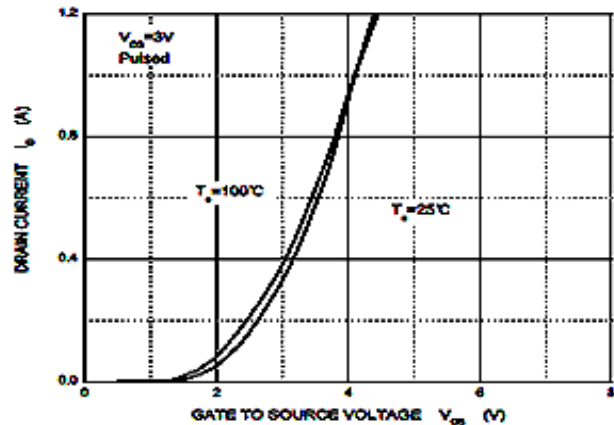


Fig 3:  $R_{DS(ON)}$  vs.  $I_D$

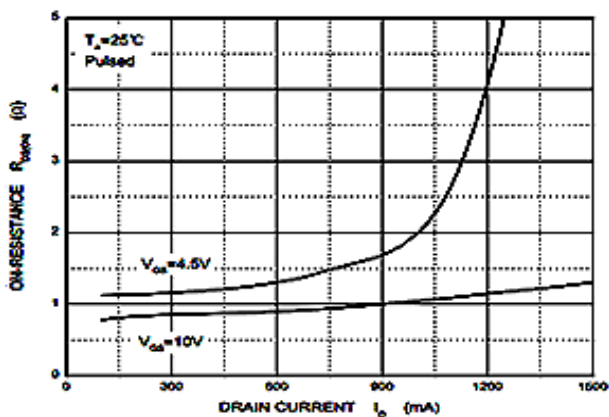


Fig 4:  $R_{DS(ON)}$  vs.  $V_{GS}$

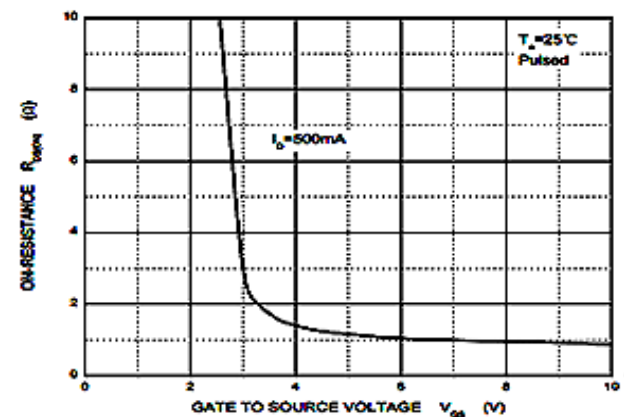


Fig 5:  $I_S$  vs.  $V_{SD}$

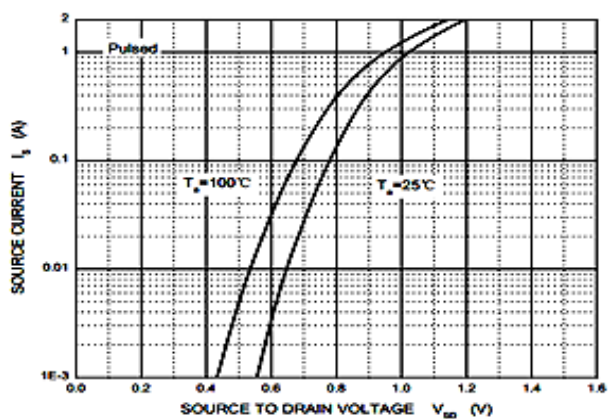
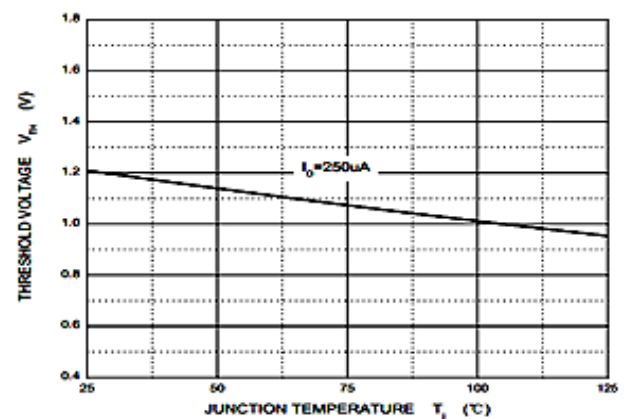
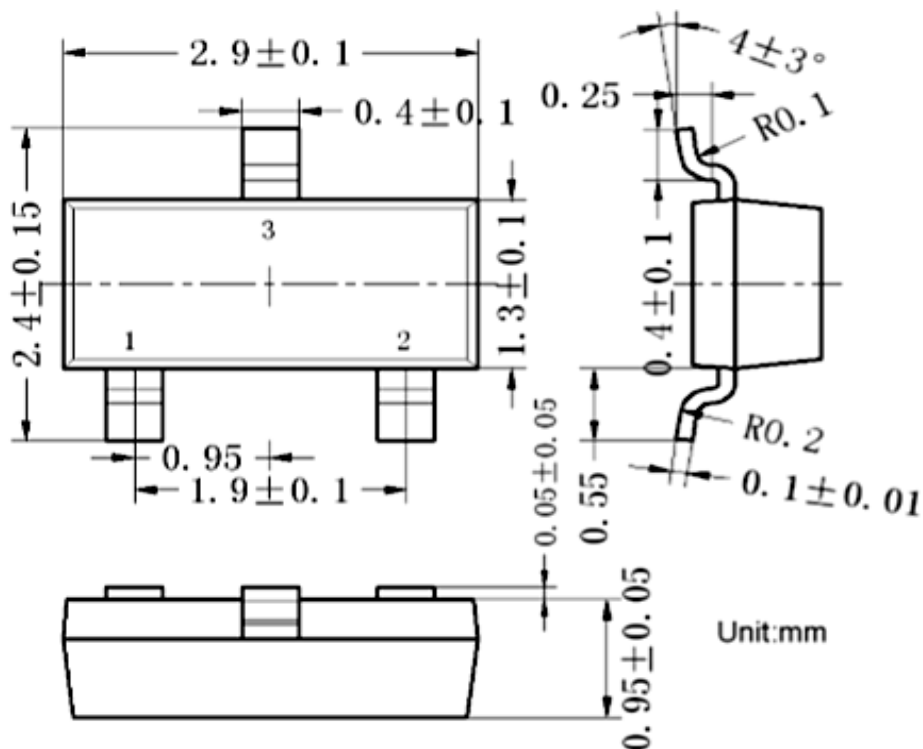


Fig 6: Threshold Voltage



## PACKAGE DETAILS

### SOT-23 Surface Mount Plastic Package



### Pin Configuration

1. Gate
2. Drain
3. Source



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### **Recommended Product Storage Environment for Discrete Semiconductor Devices**

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

### **Shelf Life of CDIL Products**

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.

If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.

The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

### **Floor Life of CDIL Products and MSL Level**

When the products are opened from the original packing, the floor life will start.

For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	Time	Condition
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH

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## Customer Notes

### Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

### Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.



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