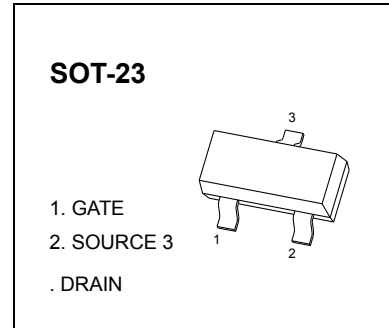


# SOT-23 Plastic-Encapsulate MOSFETs

## 2N7002K

MOSFET(N-Channel)

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
60V	2.3Ω@10V	300mA
	2.8Ω@4.5V	



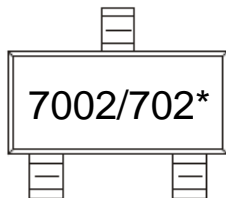
### FEATURE

- High density cell design for Low  $R_{DS(on)}$
- Voltage controlled small signal switch
- Rugged and reliable
- High saturation current capability
- ESD protected

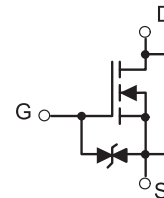
### APPLICATION

- Load Switch for Portable Devices
- DC/DC Converter

7002/702\*



### Equivalent circuit



### MOSFET MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source voltage	60	V
$V_{GS}$	Gate-Source voltage	±20	V
$I_D$	Drain Current	300	mA
$P_D$	Power Dissipation	0.35	W
$T_J$	Junction Temperature	150	°C
$T_{stg}$	Storage Temperature	-55~+150	°C
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	357	°C/W

# SOT-23 Plastic-Encapsulate MOSFETs

## 2N7002K

### MOSFET ELECTRICAL CHARACTERISTICS

$T_a=25\text{ }^\circ\text{C}$  unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0V, I_D = 250\mu A$	60			V
Gate Threshold Voltage*	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1mA$	1.1	1.6	2.1	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 48V, V_{GS} = 0V$			1	$\mu A$
Gate –Source leakage current	$I_{GSS1}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 10$	$\mu A$
	$I_{GSS2}$	$V_{GS} = \pm 10V, V_{DS} = 0V$			$\pm 200$	nA
	$I_{GSS3}$	$V_{GS} = \pm 5V, V_{DS} = 0V$			$\pm 100$	nA
Drain-Source On-Resistance*	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 250mA$		2.5	2.8	$\Omega$
		$V_{GS} = 10V, I_D = 250mA$		1.8	2.3	$\Omega$
Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_S = 100mA$			1.2	V
Recovered charge	$Q_r$	$V_{GS} = 0V, I_S = 300mA, V_R = 25V, di/dt = -100A/\mu S$		30		nC
<b>Dynamic Characteristics**</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$			40	pF
Output Capacitance	$C_{oss}$				30	pF
Reverse Transfer Capacitance	$C_{rss}$				10	pF
<b>Switching Characteristics**</b>						
Turn-On Delay 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 Delay Time	$t_{d(off)}$				15	ns
Reverse recovery Time	$t_{rr}$	$V_{GS} = 0V, I_S = 300mA, V_R = 25V, di/dt = -100A/\mu S$		30		ns
<b>GATE-SOURCE ZENER DIODE</b>						
Gate-Source Breakdown Voltage	$BV_{GSO}$	$I_{GS} = \pm 1mA$ (Open Drain)	$\pm 21.5$		$\pm 30$	V

**Notes :**

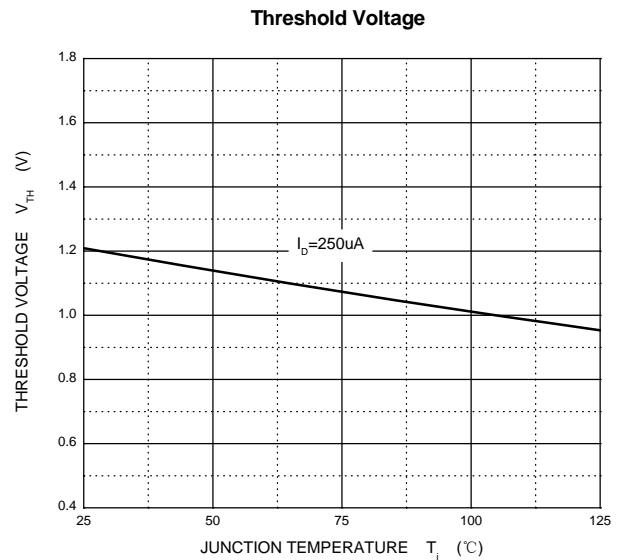
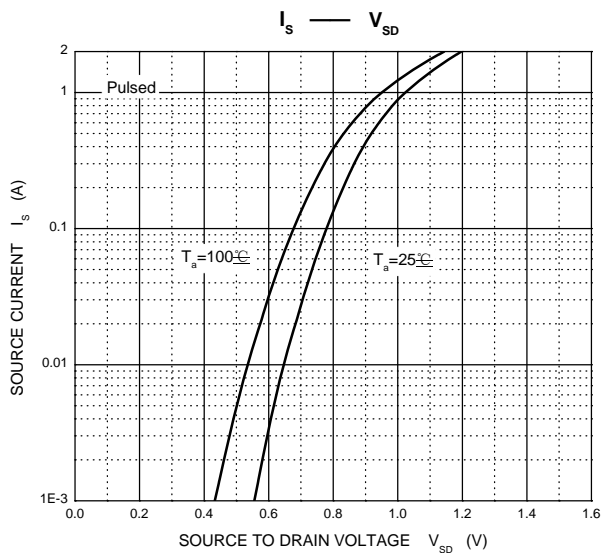
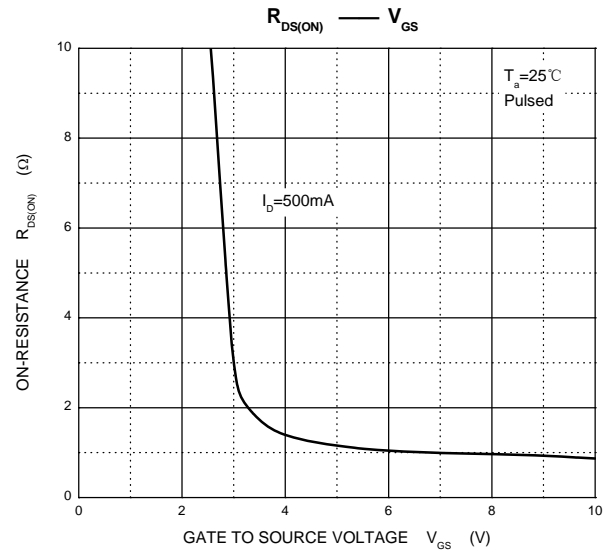
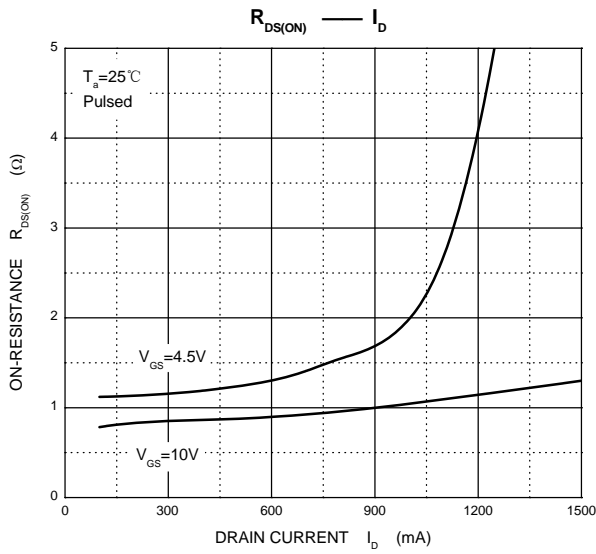
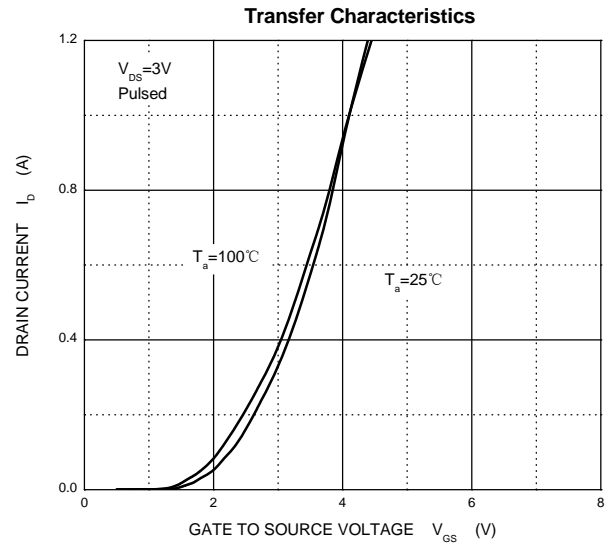
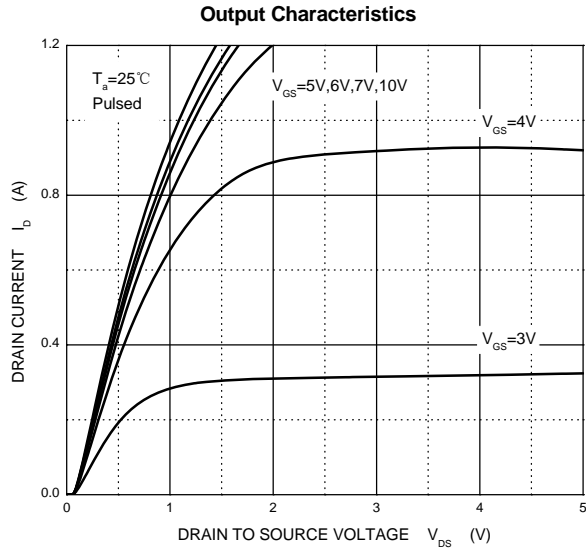
\*Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

\*\*These parameters have no way to verify.

# SOT-23 Plastic-Encapsulate MOSFETs

## 2N7002K

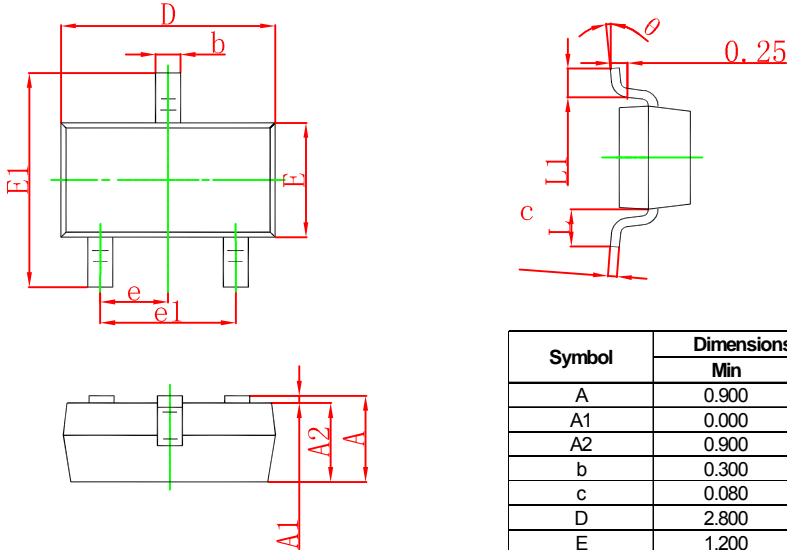
### Typical Characteristics



# SOT-23 Plastic-Encapsulate MOSFETs

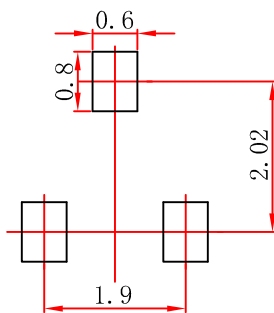
## 2N7002K

### SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

### SOT-23 Suggested Pad Layout



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05$  mm.
3. The pad layout is for reference purposes only.