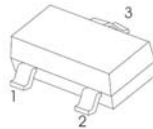


### FEATURE

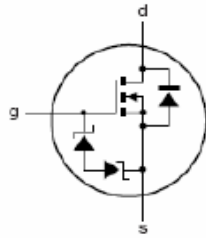
- High density cell design for low  $R_{DS(ON)}$
- Voltage controlled small signal switch
- Rugged and reliable
- High saturation current capability

### SOT-23

1. GATE
2. SOURCE
3. DRAIN

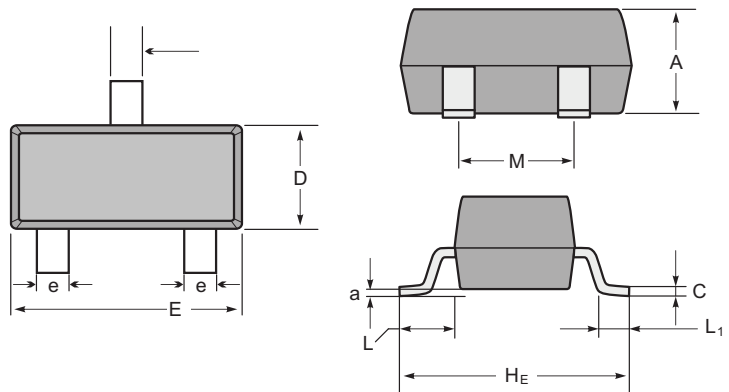


### Equivalent Circuit



### Marking

Type number	Marking code
2N7002K	7002



SOT-23 mechanical data

UNIT	A	C	D	E	H <sub>E</sub>	e	M	L	L <sub>1</sub>	a	
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

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

Symbol	Parameter	Value	Units
$V_{DS}$	Drain-Source voltage	60	V
$V_{GS}$	Gate-Source voltage	20	V
$I_D$	Drain Current	340	mA
$P_D$	Power Dissipation	0.35	W
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{stg}$	Storage Temperature	-55-150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	357	$^\circ\text{C} / \text{W}$

2N7002K

**MOSFET ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	60			V
Gate Threshold Voltage*	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =1mA	1		2.5	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =48V, V <sub>GS</sub> = 0V			1	μA
Gate –Source leakage current	I <sub>GSS1</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> = 0V			±10	μA
	I <sub>GSS2</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> = 0V			±200	nA
	I <sub>GSS3</sub>	V <sub>GS</sub> =±5V, V <sub>DS</sub> = 0V			±100	nA
Drain-Source On-Resistance*	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> =200mA		1.7	5.3	Ω
		V <sub>GS</sub> =10V, I <sub>D</sub> =500mA			5	Ω
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =300mA			1.5	V
Recovered charge	Q <sub>r</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =300mA, V <sub>R</sub> =25V, dI <sub>S</sub> /dt=-100A/μS		30		nC
<b>Dynamic Characteristics**</b>						
Input Capacitance	C <sub>iSS</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f =1MHz			40	pF
Output Capacitance	C <sub>oSS</sub>				30	pF
Reverse Transfer Capacitance	C <sub>rSS</sub>				10	pF
<b>Switching Characteristics**</b>						
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, R <sub>G</sub> =50Ω, R <sub>GS</sub> =50Ω, R <sub>L</sub> =250Ω			10	ns
Turn-Off Delay Time	t <sub>d(off)</sub>				15	ns
Reverse recovery Time	t <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =300mA, V <sub>R</sub> =25V, dI <sub>S</sub> /dt=-100A/μS		30		ns
<b>GATE-SOURCE ZENER DIODE</b>						
Gate-Source Breakdown Voltage	BV <sub>GSO</sub>	I <sub>GS</sub> =±1mA (Open Drain)	±21.5		±30	V

## RATING AND CHARACTERISTIC CURVES (2N7002K)

