

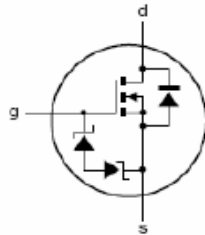
FEATURE

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

SOT-23

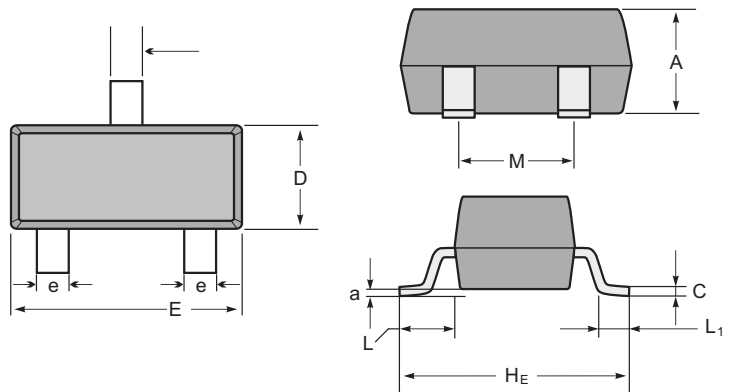
1. GATE
2. SOURCE
3. DRAIN

Equivalent Circuit



Marking

Type number	Marking code
2N7002	72k



SOT-23 mechanical data

UNIT		A	C	D	E	H _E	e	M	L	L ₁	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	$^\circ\text{C} / \text{W}$

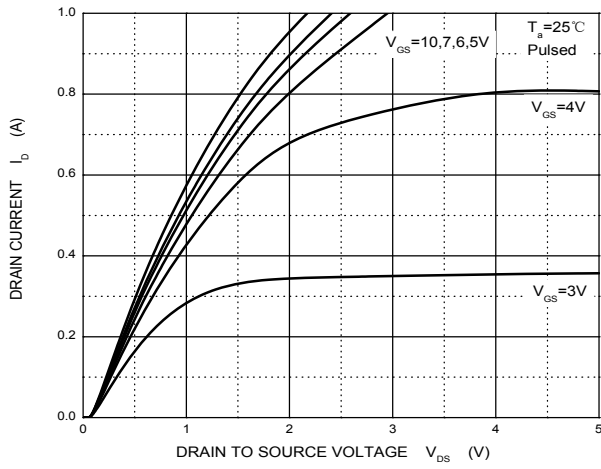
2N7002K

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

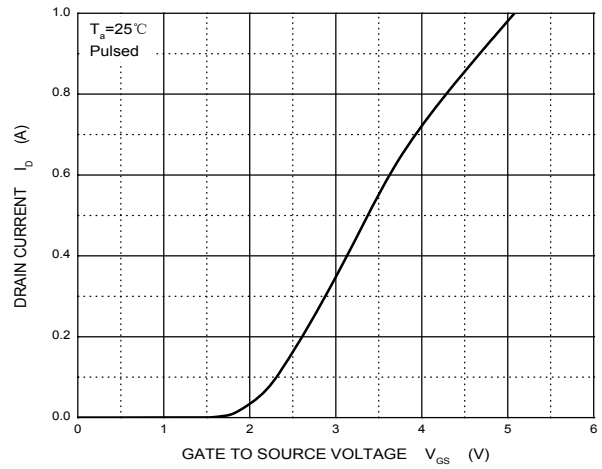
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0V, I _D =250μA	60			V
Gate Threshold Voltage*	V _{GS(th)}	V _{DS} =V _{GS} , I _D =1mA	1		2.5	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =48V, V _{GS} = 0V			1	μA
Gate –Source leakage current	I _{GSS1}	V _{GS} =±20V, V _{DS} = 0V			±10	μA
	I _{GSS2}	V _{GS} =±10V, V _{DS} = 0V			±200	nA
	I _{GSS3}	V _{GS} =±5V, V _{DS} = 0V			±100	nA
Drain-Source On-Resistance*	R _{DS(on)}	V _{GS} = 4.5V, I _D =200mA		1.7	5.3	Ω
		V _{GS} =10V, I _D =500mA			5	Ω
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/μS		30		nC
Dynamic Characteristics**						
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
Switching Characteristics**						
Turn-On Delay Time	t _{d(on)}	V _{GS} =10V, V _{DD} =50V, R _G =50Ω, R _{GS} =50Ω, R _L =250Ω			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 _S /dt=-100A/μS		30		ns
GATE-SOURCE ZENER DIODE						
Gate-Source Breakdown Voltage	BV _{GSO}	I _{gs} =±1mA (Open Drain)	±21.5		±30	V

RATING AND CHARACTERISTIC CURVES (2N7002K)

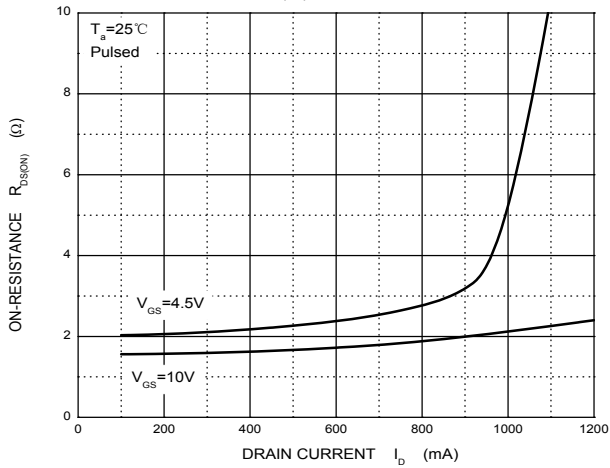
Output Characteristics



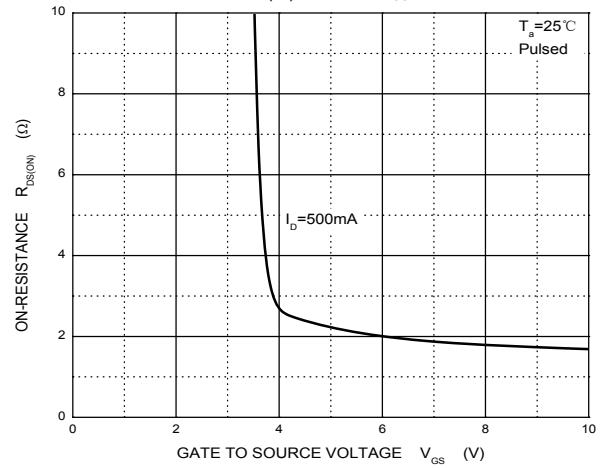
Transfer Characteristics



$R_{DS(ON)}$ — I_D



$R_{DS(ON)}$ — V_{GS}



I_S — V_{SD}

