



**THE DATASHEET OF
2N7002K**



60V/0.3A N-Channel MOSFET

Features

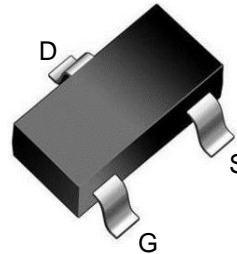
- Trench Power MV MOSFET technology
- Voltage controlled small signal switch
- Low input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage

Application

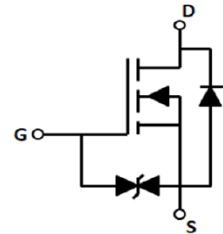
- Battery operated systems
- Solid-state relays

Product Summary

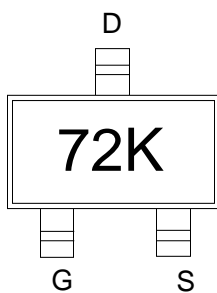
V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
60V	3.5Ω@10V	0.3A
	4.5Ω@4.5V	



SOT-23 top view



Schematic diagram



72K: Device code

Marking and pin assignment

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Symbol	Parameter	Rating	Unit
Common Ratings (TC=25°C Unless Otherwise Noted)			
V_{DS}	Drain-Source Breakdown Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
T_J	Maximum Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-50 to 155	°C
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ 0.3	A
Mounted on Large Heat Sink			
I_{DM}	Pulse Drain Current Tested	$T_C=25^\circ\text{C}$ 1.2	A
I_D	Continuous Drain Current@GS=10V	$T_C=25^\circ\text{C}$ 0.3	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 0.35	W
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient @ Steady State	357	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)						
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
BV _{(BR)DSS}	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	60	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	VDS=60V, VGS=0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	VGS=±20V, VDS=0V	--	--	±10	μA
V _{GS(th)}	Gate Threshold Voltage	VDS=VGS, ID=250μA	0.8	1.5	3	V
R _{DS(on)}	Drain-Source On-State Resistance	VGS=10V, ID=0.3A	--	2	3.5	Ω
		VGS=4.5V, ID=0.2A	--	3	4.5	
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C _{ISS}	Input Capacitance	VDS=60V, VGS=0V, f=1MHz	--	18	--	pF
C _{OSS}	Output Capacitance		--	12	--	pF
C _{RSS}	Reverse Transfer Capacitance		--	7	--	pF
Switching Characteristics						
Q _g	Total Gate Charge	VDS=60V, ID=0.3A, VGS=10V	--	1.7	--	nC
t _{d(on)}	Turn-on Delay Time	VDD=30V, ID=0.2A, VGS=4.5V, RG=10Ω	--	4.8	--	nS
t _{d(off)}	Turn-Off Delay Time		--	18	--	nS
t _{rr}	Reverse recovery Time	VGS=0V, IS=300mA, VR=25V, di _s /dt=-100A/μs	--	31	--	nS
Source- Drain Diode Characteristics						
V _{SD}	Forward on voltage	T _J =25°C, I _S =0.1A,	--	--	1.2	V

Typical Operating Characteristics

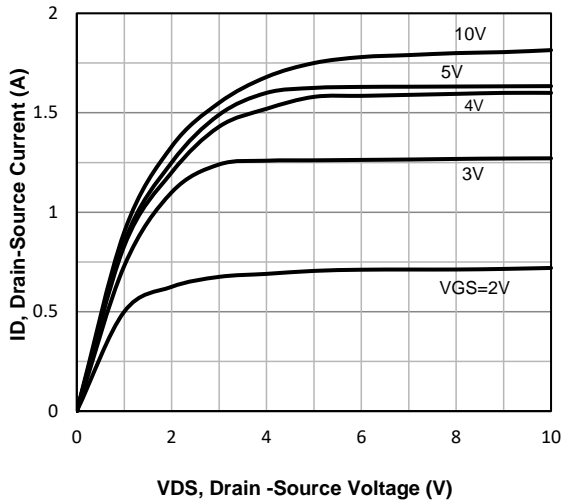


Fig1. Typical Output Characteristics

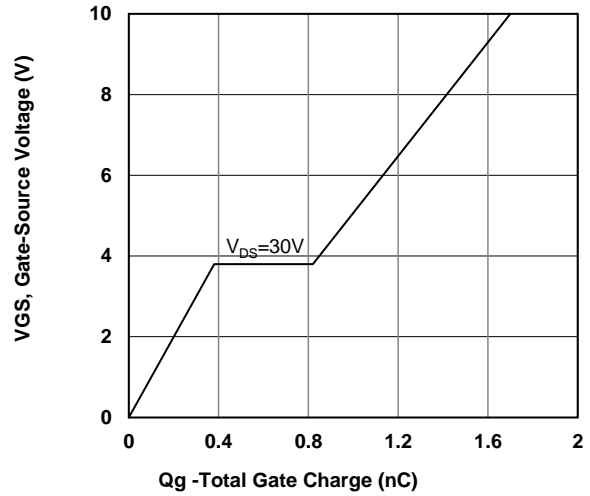


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

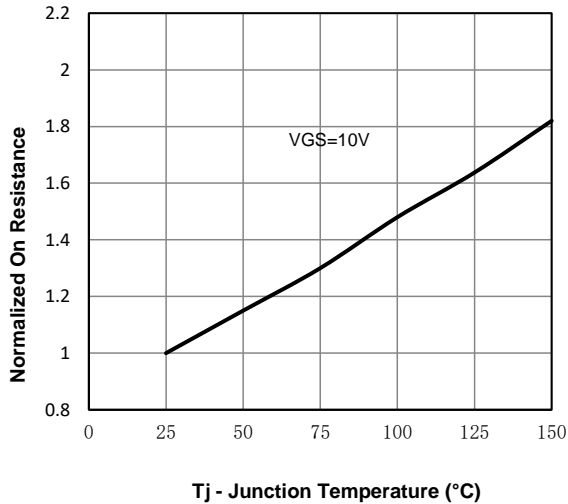


Fig3. Normalized On-Resistance Vs. Temperature

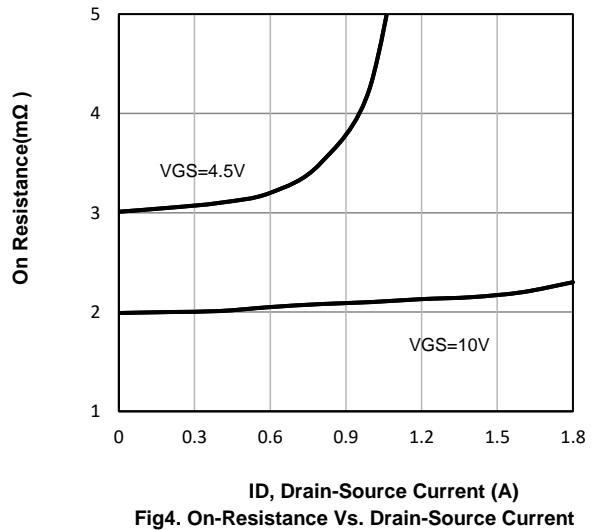


Fig4. On-Resistance Vs. Drain-Source Current

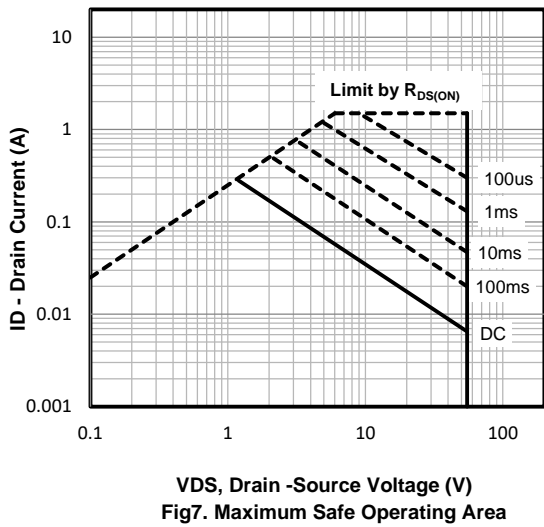


Fig7. Maximum Safe Operating Area

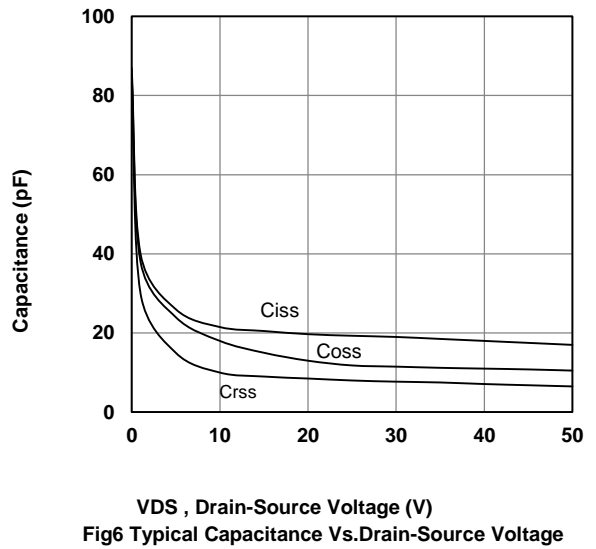
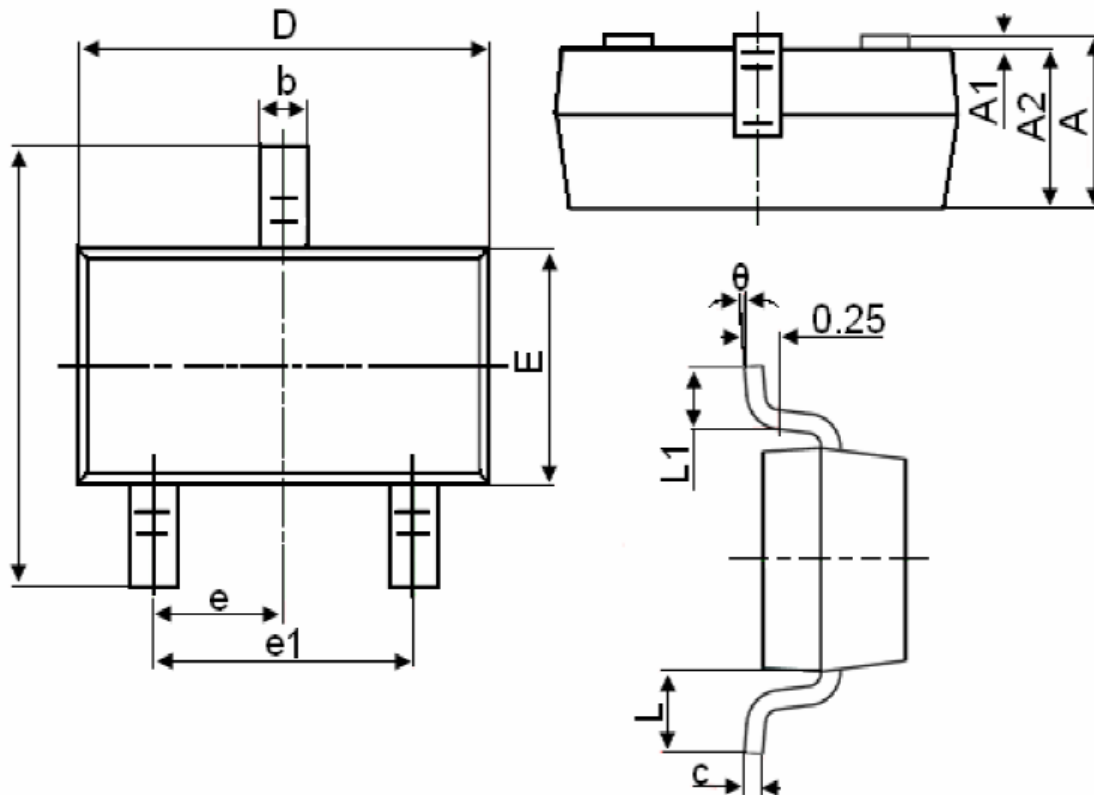


Fig6 Typical Capacitance Vs. Drain-Source Voltage

SOT-23 Package information


Symbol	Dimensions in Millimeters(mm)		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	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0° - 8°		0° - 8°	

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