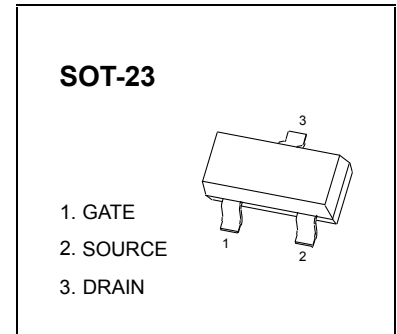




2N7002KX N-channel MOSFET

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	3Ω@10V	300mA
	3.5Ω@ 5V	



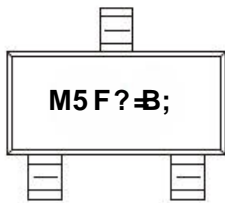
FEATURE

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

APPLICATION

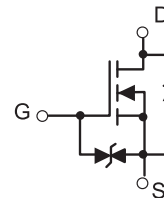
- Load Switch for Portable Devices
- DC/DC Converter

M5F?B;



Marking: NJ , 72K , 7002

Equivalent circuit



Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current ($T_J=150^\circ\text{C}$)	I_D	$T_A=25^\circ\text{C}$	0.3
		$T_A=100^\circ\text{C}$	0.19
Drain Current-Pulsed	I_{DM}	0.8	A
Maximum Power Dissipation	P_D	0.35	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-50 To 150	°C



Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±10V, V _{DS} =0V			±500	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1		2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =0.3A		2	3	Ω
		V _{GS} =5V, I _D =0.3A		2.1	3.5	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		21	50	pF
C _{oss}	Output Capacitance			11	25	pF
C _{rss}	Reverse Transfer Capacitance			4	5	pF
Switching Times						
t _{d(on)}	Turn-on Delay Time	V _{DD} =30V, I _D =0.2A V _{GS} =10V, R _G =10Ω		10		nS
t _r	Turn-on Rise Time			50		nS
t _{d(off)}	Turn-Off Delay Time			17		nS
t _f	Turn-Off Fall Time			10		nS
Q _g	Total Gate Charge	V _{DS} =10V, I _D =0.3A, V _{GS} =4.5V		1.7	3	nC
Q _{gs}	Gate-Source Charge			0.8		nC
Q _{gd}	Gate-Drain Charge			0.8		nC
Source-Drain Diode Characteristics						
V _{SD}	Forward on Voltage	V _{GS} =0V, I _S =0.2A		0.87	1.2	V

Typical Electrical And Thermal Characteristics

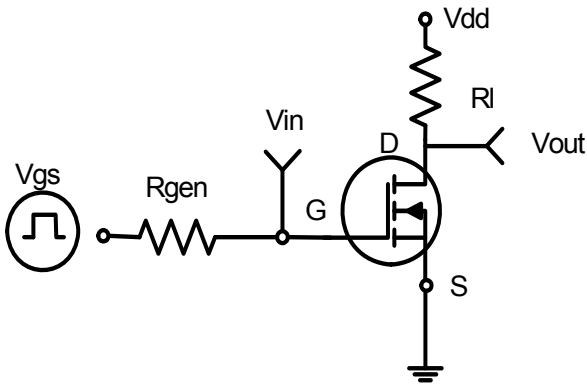


Figure 1: Switching Test Circuit

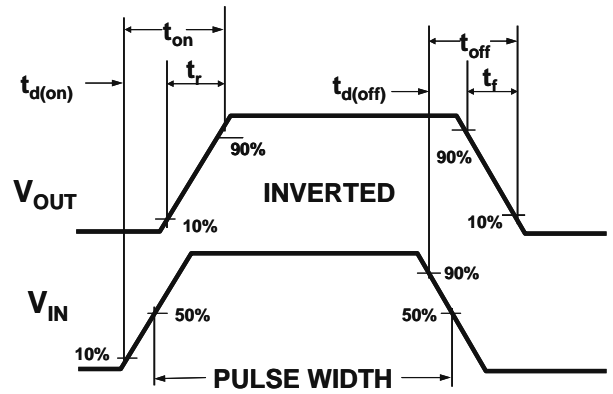


Figure 2: Switching Waveforms

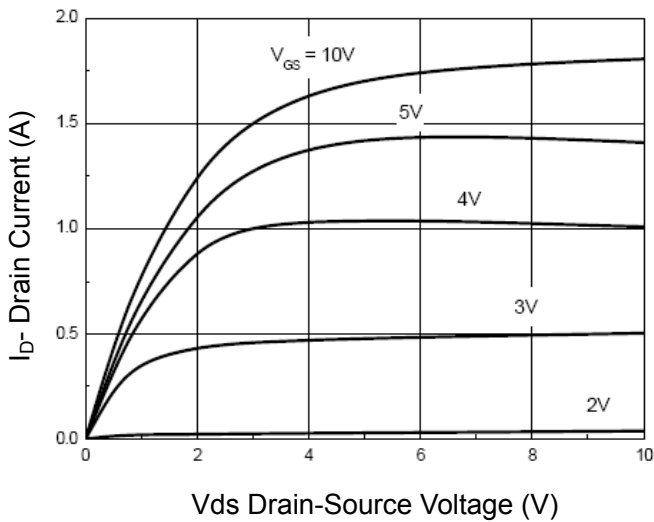


Figure 3 Output Characteristics

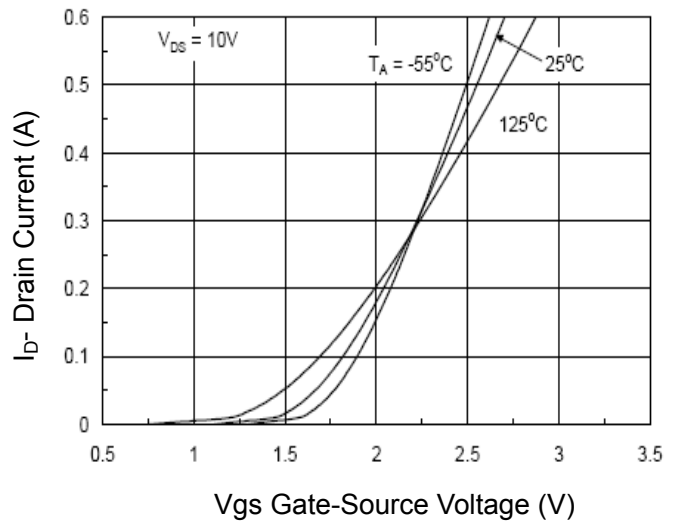


Figure 4 Transfer Characteristics

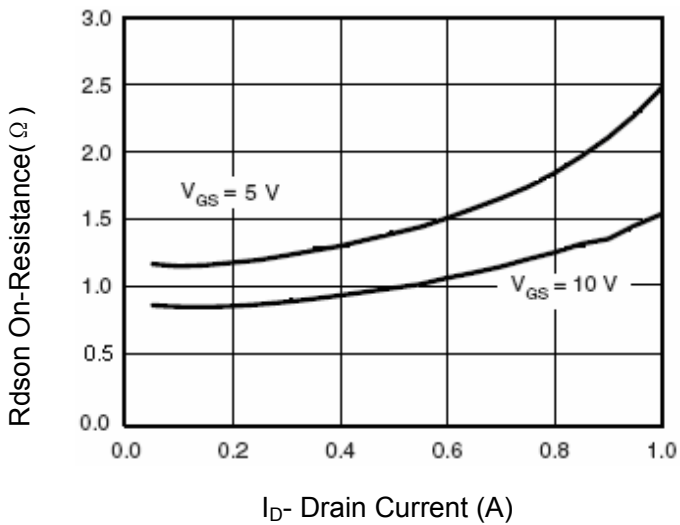


Figure 5 Drain-Source On-Resistance

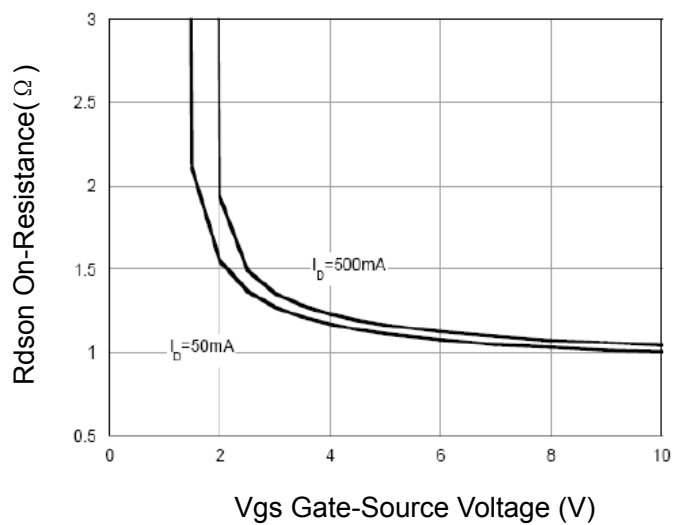


Figure 6 Rds(on) vs Vgs

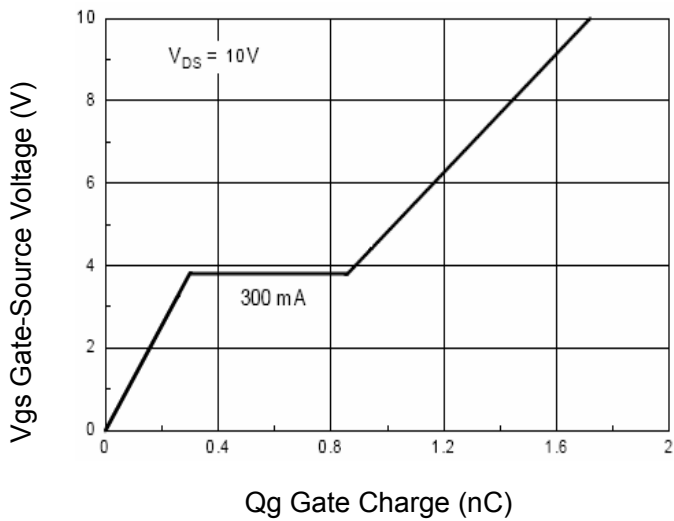


Figure 7 Gate Charge

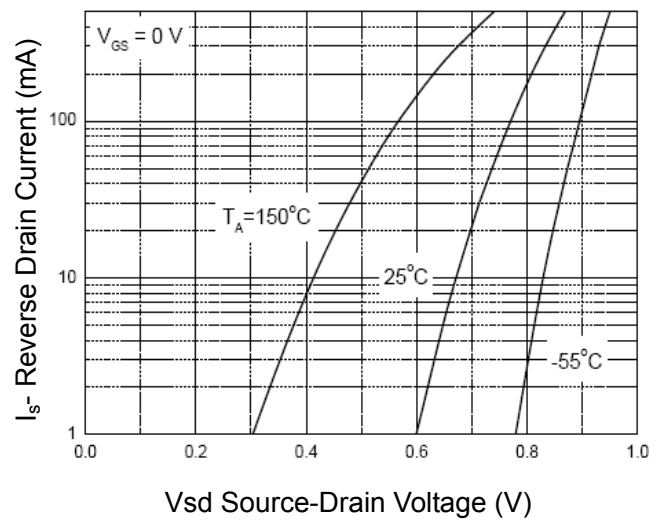


Figure 8 Source-Drain Diode Forward

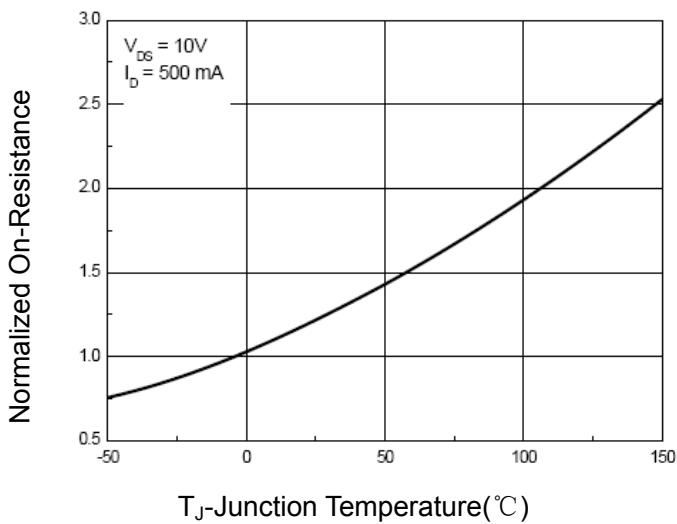


Figure 9 Drain-Source On-Resistance

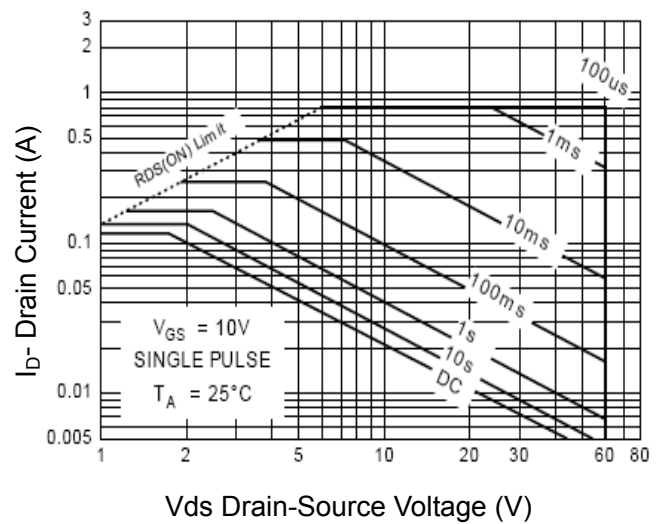


Figure 10 Safe Operation Area

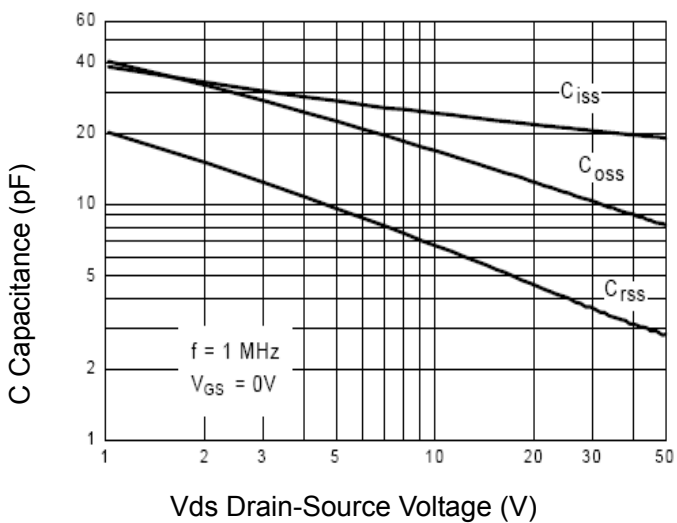


Figure 11 Capacitance vs Vds

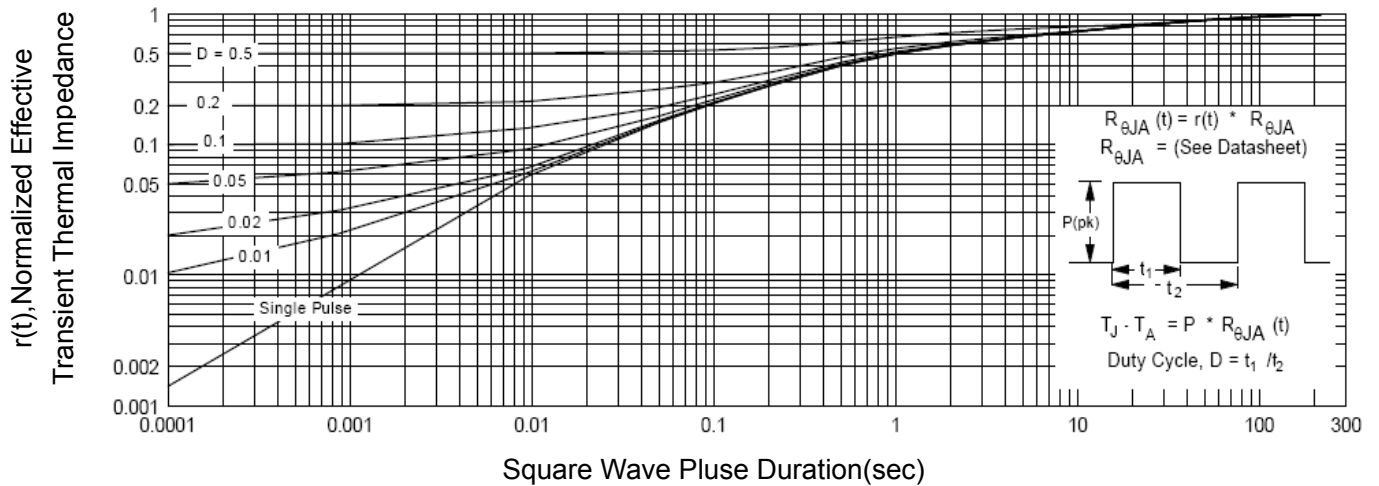
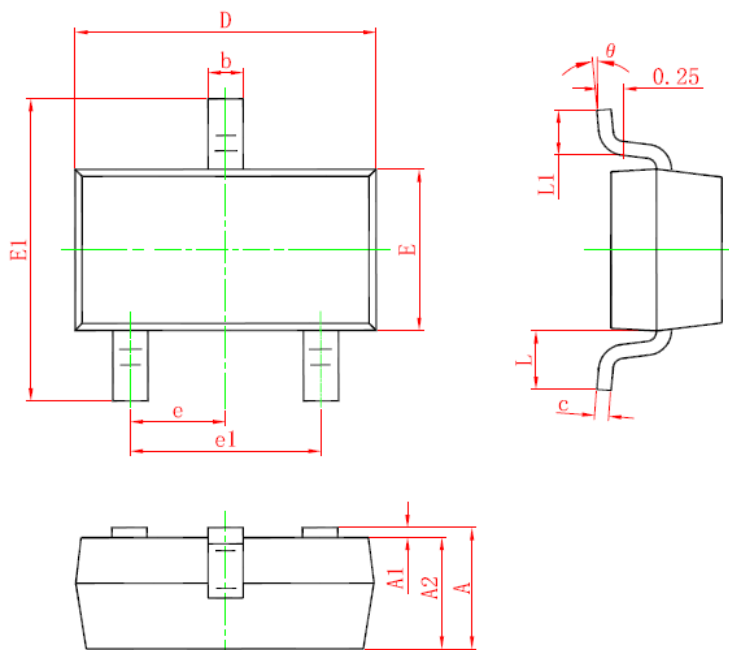


Figure 12 Normalized Maximum Transient Thermal Impedance

SOT-23 Package Information



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°