2N7002KDW

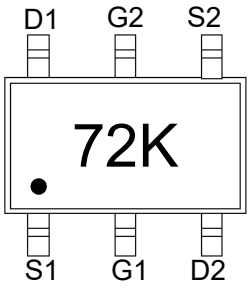
60V/0.34A Dual N-Channel MOSFET

Features

- 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



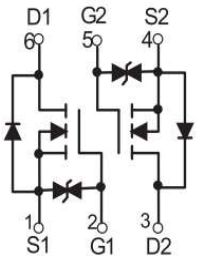
72K: Device code

Marking and pin assignment

Product Summary

V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
60V	3.5Ω@10V	0.34A
	4.5Ω@4.5V	

SOT-363 top view



Schematic diagram

Pb-Free RoHS Halogen-Free

Absolute Maximum Ratings (TA=25℃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		-55 to 155	°C
I_S	Diode Continuous Forward Current	Tc=25°C	0.34	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested	Tc=25°C	1.2	A
I_D	Continuous Drain Current	Tc=25°C	0.34	A
P_D	Maximum Power Dissipation	Tc=25°C	0.15	W
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient		833	°C/W

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
2N7002KDW	SOT-363	72K	3,000	45,000	180,000	7"reel

Electrical Characteristics (TJ=25℃ unless otherwise noted)						
Symbol	**Parameter**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$BV_{(BR)DSS}$	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}=±20V, V_{DS}=0V	--	--	±10	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	1.6	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=0.5A	--	1.6	3.5	Ω
		V_{GS}=4.5V, I_D=0.2A	--	2.1	4.5	Ω
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=30V, V_{GS}=0V, f=1MHz	--	21	--	pF
C_{OSS}	Output Capacitance		--	9	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	4	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=30V, I_D=0.34A, V_{GS}=10V	--	1.22	2.4	nC
Q_{gs}	Gate-Source Charge		--	0.5	--	nC
Q_{gd}	Gate-Drain Charge		--	0.18	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=50V, I_D=0.34A, V_{GS}=10V, R_G=50Ω	--	7	--	nS
t_r	Turn-on Rise Time		--	19	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	20	--	nS
t_f	Turn-off fall Time		--	84	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃, Is=0.34A	--	--	1.2	V

Typical Operating Characteristics

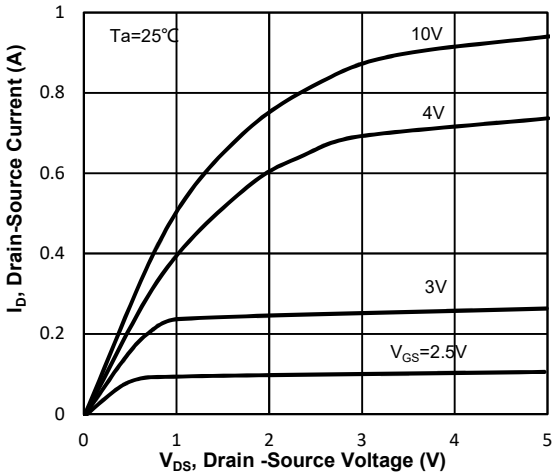


Fig1. Typical Output Characteristics

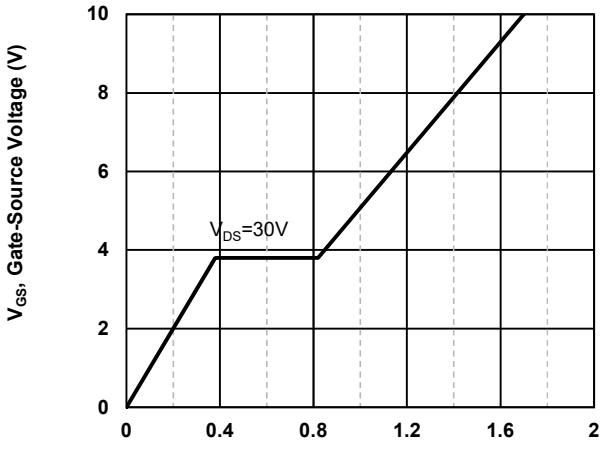


Fig2. Typical Gate Charge Vs.Gate-Source Voltage

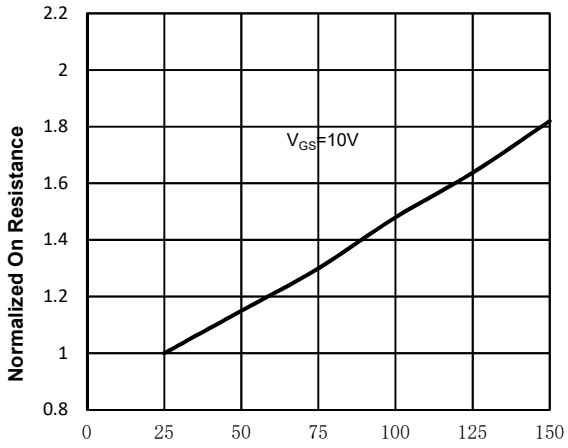


Fig3. Normalized On-Resistance Vs. Temperature

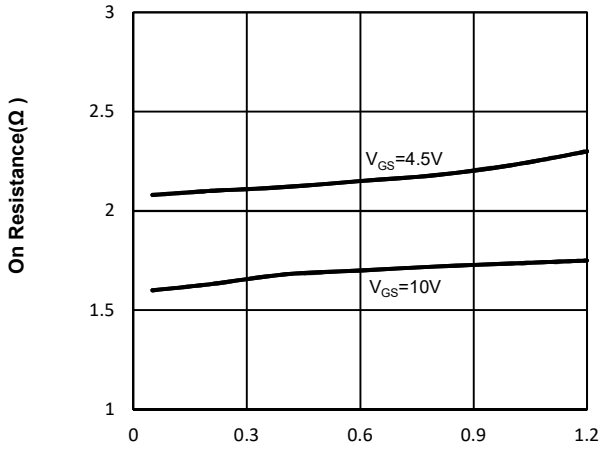


Fig4. On-Resistance Vs. Drain-Source Current

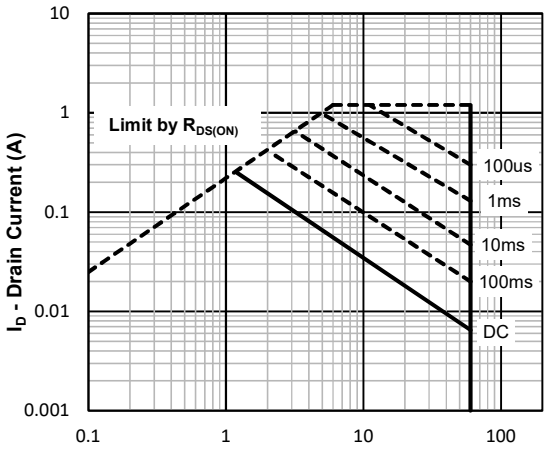


Fig5. Maximum Safe Operating Area

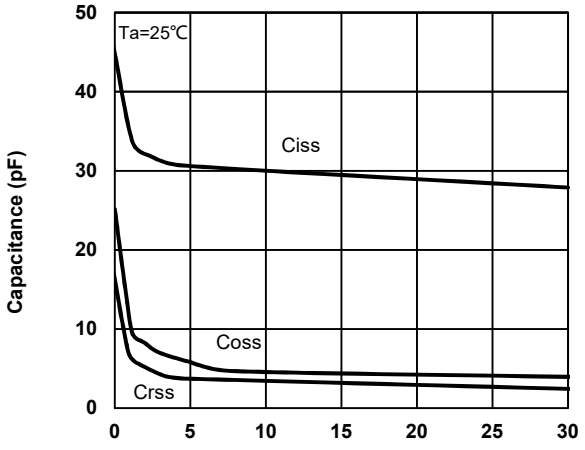
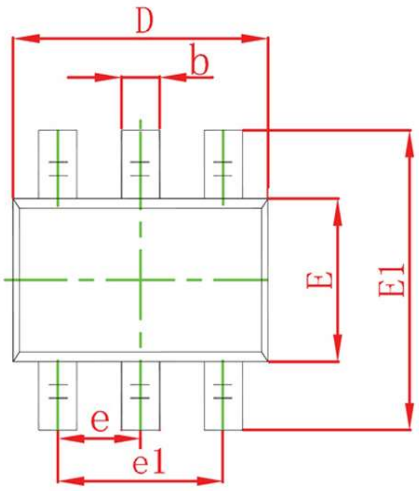
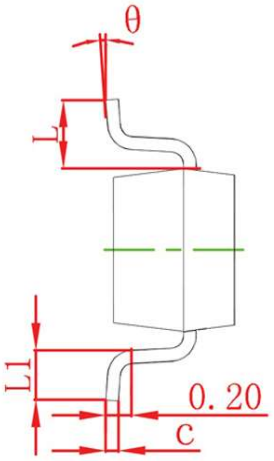
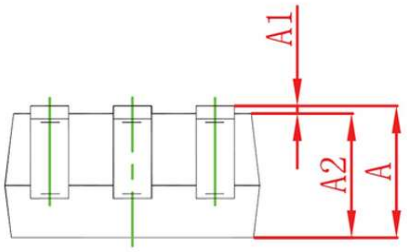


Fig6 Typical Capacitance Vs.Drain-Source Voltage

SOT-363 Package information







Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.100	0.150	0.004	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.400	0.085	0.094
e	0.650TYP		0.026TYP	
e1	1.200	1.400	0.047	0.055
L	0.525REF		0.021REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°