2N7002T
60V/0.3A N-Channel MOSFET

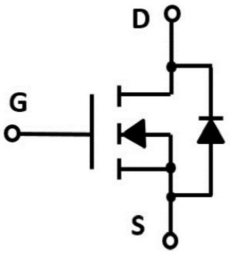
Features

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

Product Summary

V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
60V	5Ω@10V	0.3A
	7Ω@4.5V	

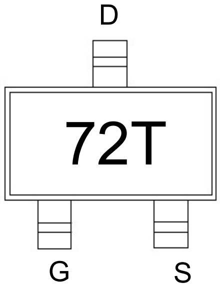
SOT-523 top view



Schematic diagram

Application

- Load Switch for Portable Devices
- DC/DC Converter



72T: Device code

Marking and pin assignment

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		-50 to 155	°C
I_S	Diode Continuous Forward Current	Tc=25°C	0.3	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested	Tc=25°C	0.8	A
I_D	Continuous Drain Current	Tc=25°C	0.3	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
2N7002T	SOT-523	72T	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	--	--	±100	nA
$V_{GS(th)}$	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	--	0.85	5.0	Ω
		V_{GS}=5V，I_D=0.05A	--	1.0	7.0	Ω
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=30V，V_{GS}=0V， f=1MHz	--	34	--	pF
C_{OSS}	Output Capacitance		--	6	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	2	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=30V，I_D=0.3A，V_{GS}=10V	--	1.7	--	nC
Q_{gs}	Gate-Source Charge		--	0.57	--	nC
Q_{gd}	Gate-Drain Charge		--	0.3	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V，I_D=0.3A，V_{GS}=10V，R_G=3Ω	--	4	--	nS
t_r	Turn-on Rise Time		--	19	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	12	--	nS
t_f	Turn-off fall Time		--	24	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃，Is=0.3A	--	--	1.2	V

Typical Operating Characteristics

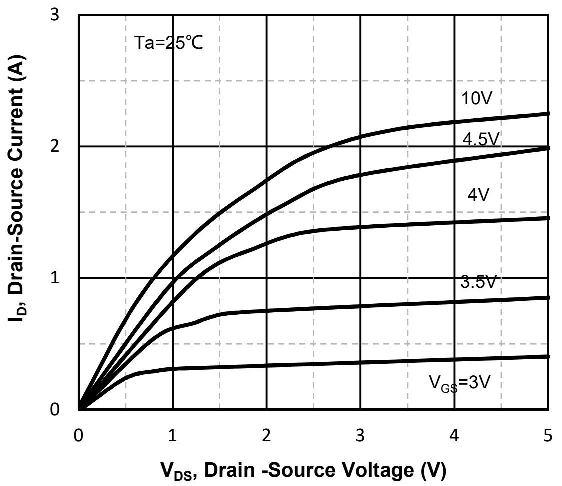


Fig1. Typical Output Characteristics

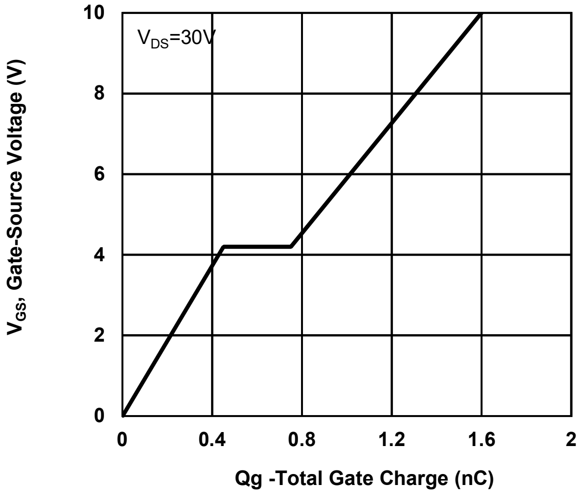


Fig2. Typical Gate Charge Vs.Gate-Source Voltage

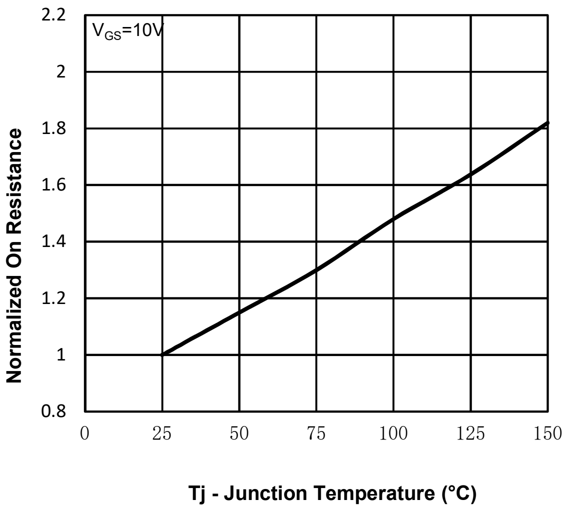


Fig3. Normalized On-Resistance Vs. Temperature

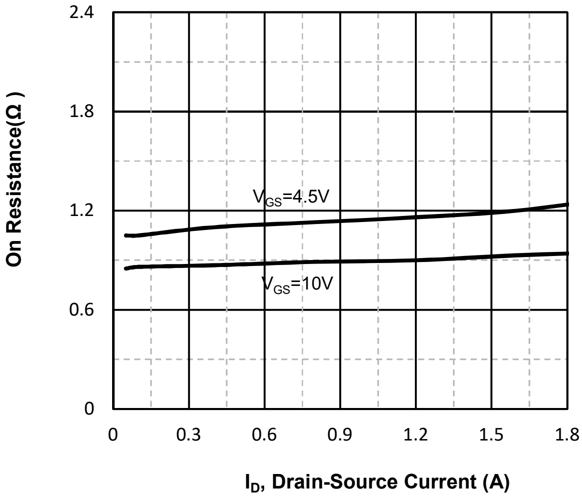


Fig4. On-Resistance Vs. Drain-Source Current

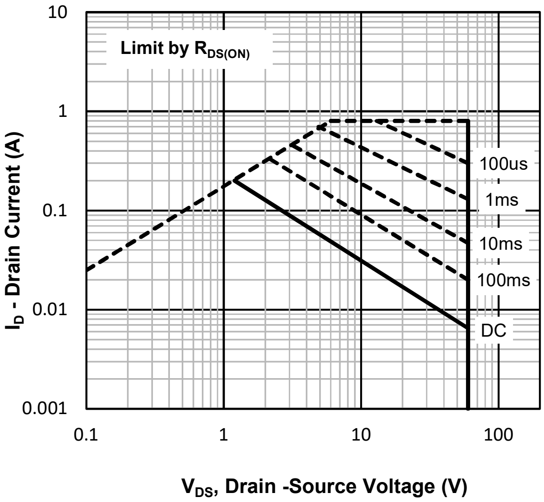


Fig5. Maximum Safe Operating Area

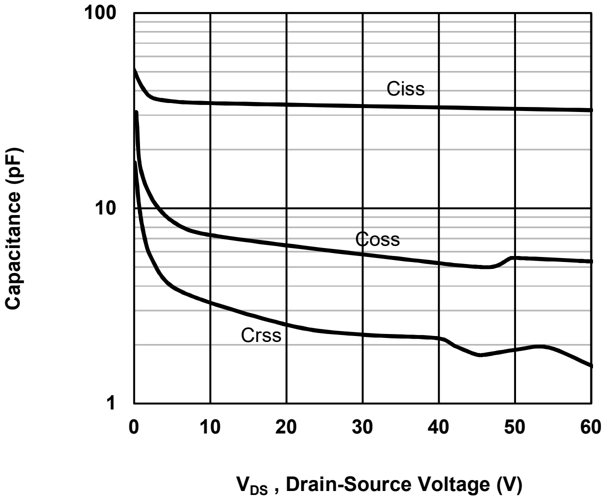
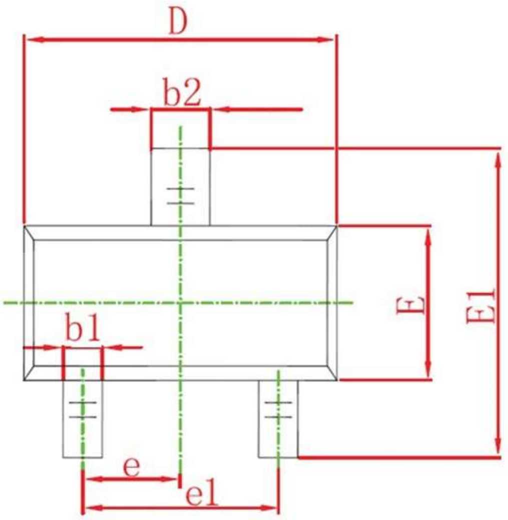
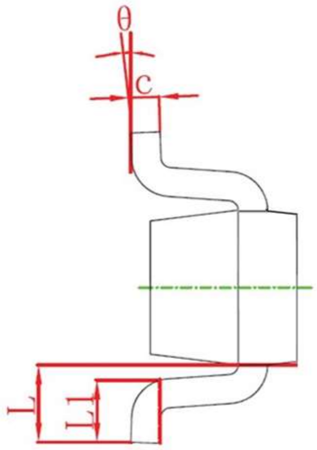
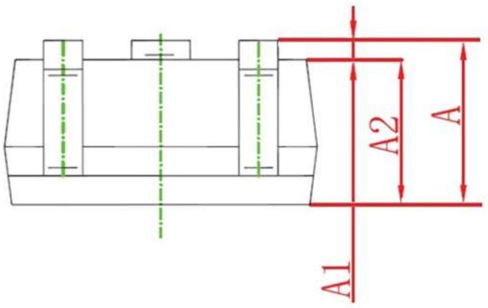


Fig6 Typical Capacitance Vs.Drain-Source Voltage

SOT-523 Package information







Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500TYP		0.020TYP	
e1	0.900	1.100	0.035	0.043
L	0.400REF		0.016REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°