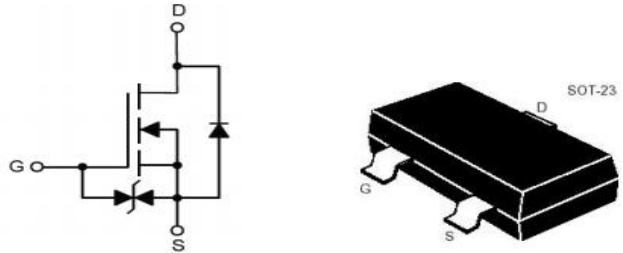


SOT-23 60V N Channel ESD Protection 沟道带静电保护
MOS Field Effect Transistor 场效应管



■ **Absolute Maximum Ratings 最大额定值**

Characteristic 特性参数	Symbol 符号	Rat 额定值	Unit 单位
Drain-Source Voltage 漏极-源极电压	BV_{DSS}	60	V
Gate- Source Voltage 栅极-源极电压	V_{GS}	± 20	V
Drain Current (continuous)漏极电流-连续	I_D (at $T_A = 25^\circ C$)	340	mA
Drain Current (pulsed)漏极电流-脉冲	I_{DM}	1.5	A
Total Device Dissipation 总耗散功率	P_D (at $T_A = 25^\circ C$)	350	mW
ESD Protected Up to 人体模式静电保护范围	ESD(HBM)	2.0	kV
Thermal Resistance Junction-Ambient 热阻	$R_{\theta JA}$	357	$^\circ C/W$
Junction/Storage Temperature 结温/储存温度	T_J, T_{stg}	-55~150	$^\circ C$

■ **Device Marking 产品字标**

2N7002K=72K

■ Electrical Characteristics 电特性

($T_A=25^{\circ}\text{C}$ unless otherwise noted 如无特殊说明, 温度为 25°C)

Characteristic 特性参数	Symbol 符号	Min 最小值	Typ 典型值	Max 最大值	Unit 单位
Drain-Source Breakdown Voltage 漏极-源极击穿电压($I_D=250\mu\text{A}, V_{GS}=0\text{V}$)	BV_{DSS}	60	—	—	V
Gate Threshold Voltage 栅极开启电压($I_D=250\mu\text{A}, V_{GS}=V_{DS}$)	$V_{GS(th)}$	1	1.4	2.5	V
Zero Gate Voltage Drain Current 零栅压漏极电流($V_{GS}=0\text{V}, V_{DS}=60\text{V}$)	I_{DSS}	—	—	1	μA
Gate Body Leakage 栅极漏电流($V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$)	I_{GSS}	—	—	± 10	μA
Static Drain-Source On-State Resistance 静态漏源导通电阻($I_D=340\text{mA}, V_{GS}=10\text{V}$) ($I_D=200\text{mA}, V_{GS}=4.5\text{V}$)	$R_{DS(ON)}$	—	1.3 1.4	2.5 3.0	Ω
Diode Forward Voltage Drop 内附二极管正向压降($I_{SD}=300\text{mA}, V_{GS}=0\text{V}$)	V_{SD}	—	—	1.2	V
Input Capacitance 输入电容 ($V_{GS}=0\text{V}, V_{DS}=30\text{V}, f=1\text{MHz}$)	C_{ISS}	—	21	—	pF
Common Source Output Capacitance 共源输出电容($V_{GS}=0\text{V}, V_{DS}=30\text{V}, f=1\text{MHz}$)	C_{OSS}	—	3	—	pF
Reverse Transfer Capacitance 反馈电容($V_{GS}=0\text{V}, V_{DS}=30\text{V}, f=1\text{MHz}$)	C_{RSS}	—	2	—	pF
Total Gate Charge 栅极电荷密度 ($V_{DS}=30\text{V}, I_D=300\text{mA}, V_{GS}=10\text{V}$)	Q_g	—	1.6	—	nC
Gate Source Charge 栅源电荷密度 ($V_{DS}=30\text{V}, I_D=300\text{mA}, V_{GS}=10\text{V}$)	Q_{gs}	—	0.5	—	nC
Gate Drain Charge 栅漏电荷密度 ($V_{DS}=30\text{V}, I_D=300\text{mA}, V_{GS}=10\text{V}$)	Q_{gd}	—	0.3	—	nC
Turn-ON Delay Time 开启延迟时间 ($V_{DS}=30\text{V}, I_D=300\text{mA}, R_{GEN}=6\Omega, V_{GS}=10\text{V}$)	$t_{d(on)}$	—	4	—	ns
Turn-ON Rise Time 开启上升时间 ($V_{DS}=30\text{V}, I_D=300\text{mA}, R_{GEN}=6\Omega, V_{GS}=10\text{V}$)	t_r	—	16	—	ns
Turn-OFF Delay Time 关断延迟时间 ($V_{DS}=30\text{V}, I_D=300\text{mA}, R_{GEN}=6\Omega, V_{GS}=10\text{V}$)	$t_{d(off)}$	—	20	—	ns
Turn-OFF Fall Time 关断下降时间 ($V_{DS}=30\text{V}, I_D=300\text{mA}, R_{GEN}=6\Omega, V_{GS}=10\text{V}$)	t_f	—	80	—	ns

■ Typical Characteristic Curve 典型特性曲线

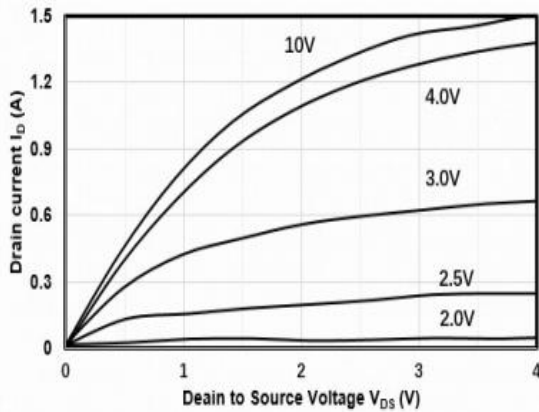


Figure 1: Output Characteristics

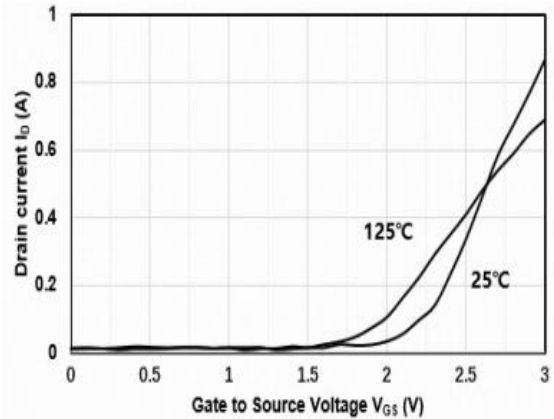


Figure 2: Transfer Characteristics

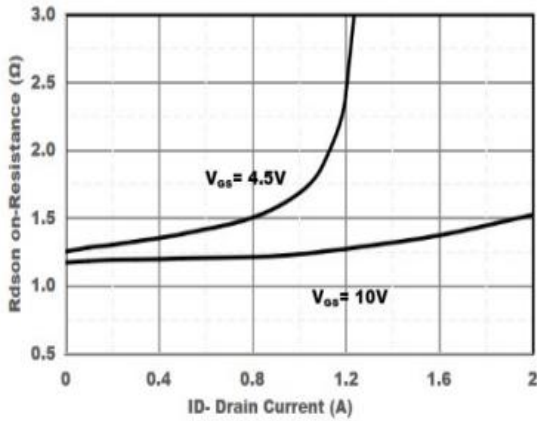


Figure 3: On-Resistance vs. Drain Current

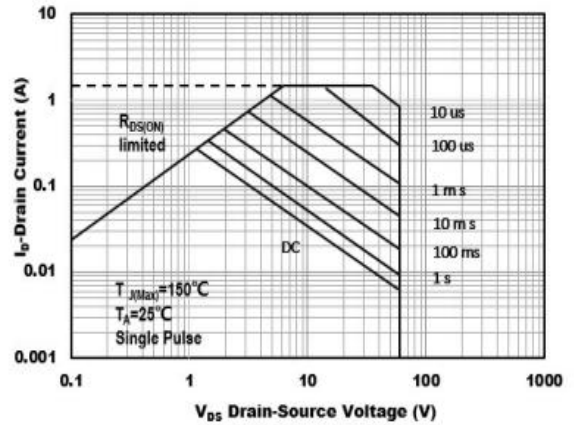


Figure 4: Safe Operating Area

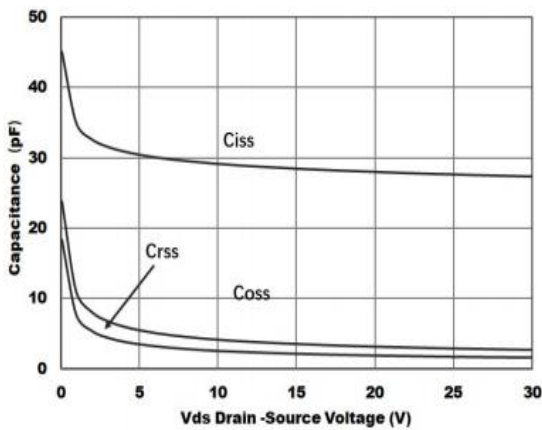


Figure 5: Capacitance Characteristics

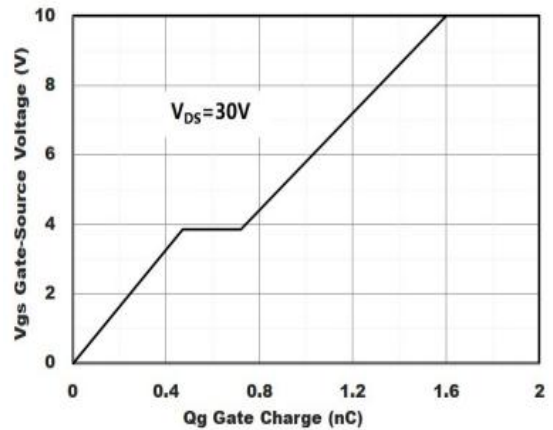
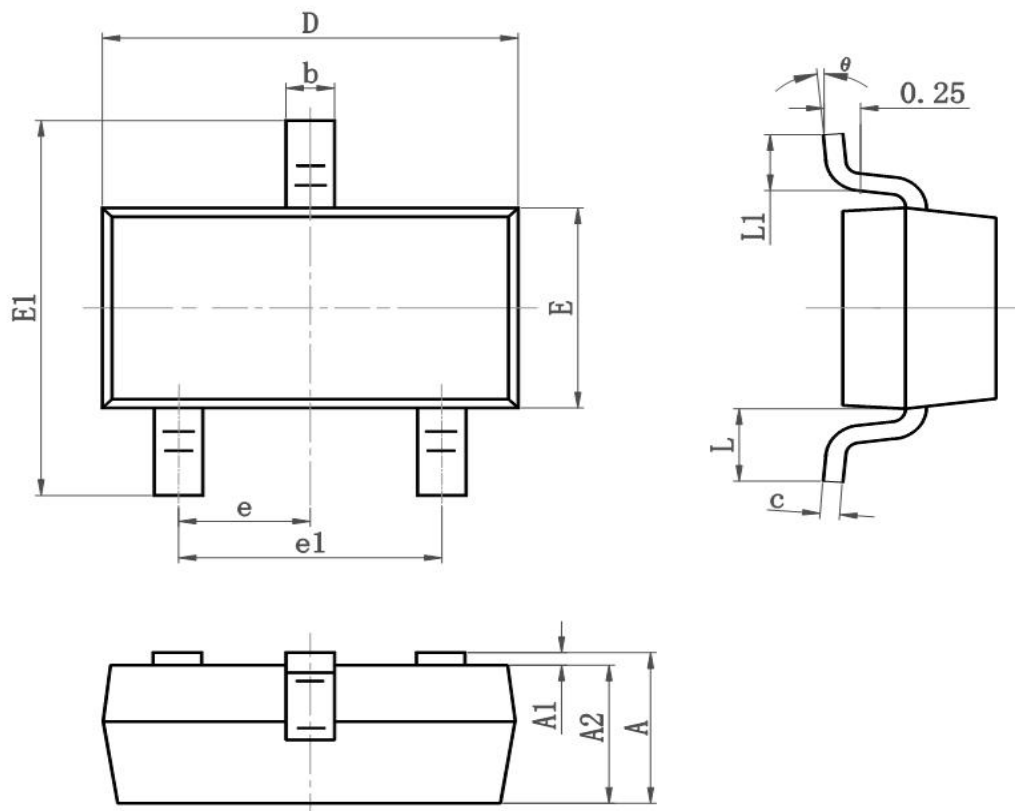


Figure 6: Gate-Charge Characteristics

■ Dimension 外形封装尺寸



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	0.050	0.055
E1	2.250	2.550	0.089	0.100
e	0.900	1.00	0.035	0.039
e1	1.800	2.000	0.071	0.079
L	0.500	0.600	0.020	0.024
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°