BORN SEMICONDUCTOR

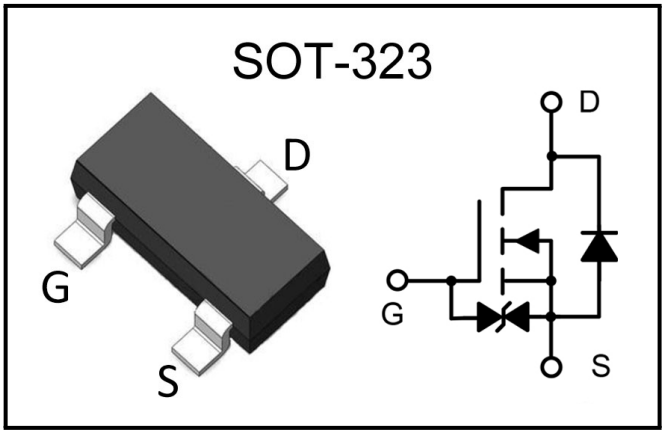
2N7002KW

N-Channel MOSFET

Features

- V_{DS}=60V
- I_D=0.3A
- $R_{DS(ON)}$ @V_{GS}=10V, TYP=1.8Ω
- $R_{DS(ON)}$ @V_{GS}=4.5V, TYP=2.3Ω

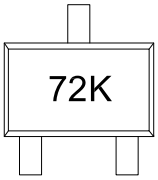
Package



Description

- Super High dense cell design for extremely low RDS(ON)
- Reliable and Rugged.
- SOT-323 for Surface Mount Package.
- ESD Rating:>2000V HBM

Marking



Ordering information

Order code	Package	Marking	Base qty	Delivery mode
2N7002KW	SOT-323	72K	3K	Tape and reel

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

Symbol	Parameter		Value	Unit
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Drain Current,T_J = 150°C	T_C = 25°C	0.30	A
		T_C = 70°C	0.26	
		T_A = 25°C	0.34 [bc]	
		T_A = 70°C	0.27[bc]	
I_S	Continuous Source-Drain Diode Current	T_C = 25°C	0.43	A
		T_A = 70°C	0.25[bc]	
I_{DM}	Pulsed Drain Current (t = 300 μs)	T_C = 25°C	0.65	A
P_D	Maximum Power Dissipation	T_C = 25°C	0.51	W
		T_C = 70°C	0.33	
		T_A = 25°C	0.30[bc]	
		T_A = 70°C	0.20[bc]	
T_J,T_{stg}	Operating Junction and Storage Temperature Range		-55 to +150	°C

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Symbol	Parameter		Typical	Maximum	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient[bd]	t≤5s	360	415	°C
$R_{\theta JF}$	Maximum Junction-to-Foot (Drain)	Steady State	300	350	

Notes: a. T_C=25°C

b.Surface mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Maximum under steady state conditions is 400 °C/W.

Electrical Characteristics @T_A=25°C unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
OFF Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D =250uA	60	–	–	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60V, V_{GS} = 0V	–	–	1	uA
I_{GSS}	Gate-body leakage	V_{GS} = ±20V, V_{DS} = 0V	–	–	±10	uA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	1	1.5	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance [a]	V_{GS} = 10V, I_D = 0.3A	–	1.8	3.0	Ω
		V_{GS} = 4.5V, I_D = 0.2A	–	2.3	4.0	
g_{fs}	Forward transconductance [a]	V_{DS} = 30V, I_D = 0.2A	–	159	–	ms
Dynamic Characteristics [b]						
C_{iss}	Input Capacitance	V_{DS} = 30V,	–	18.5	–	pF
C_{oss}	Output Capacitance	V_{GS} = 0V,	–	7.5	–	
C_{rss}	Reverse Transfer Capacitance	f = 1.0MHZ	–	4.2	–	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 30V, R_{GEN} = 1Ω,	–	6.5	–	ns
t_r	Rise time	I_D = 0.3A,	–	12	–	
$t_{d(off)}$	Turn-off delay time	V_{GEN} = 10V,	–	13	–	
t_f	Fall time	R_L = 100Ω	–	14	–	
Q_g	Total Gate Charge	V_{DS} = 30V	–	0.5	–	nC
Q_{gs}	Gate-Source Charge	I_D = 0.3A,	–	0.2	–	
Q_{gd}	Gate-Drain Charge	V_{GS} = 4.5V	–	0.15	–	
DRAIN-SOURCE DIODE CHARACTERISTICS						
V_{SD}	Diode forward voltage	V_{GS} = 0V,I_S = 0.2A	–	-0.8	-1.2	V

Notes: a. Pulse Test : Pulse Width ≤300% , Duty Cycle ≤2%

b. Guaranteed by design, not subject to production testing

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Typical Performance Characteristics(T_J = 25 °C, unless otherwise noted)

Figure 1 :Output Characteristics

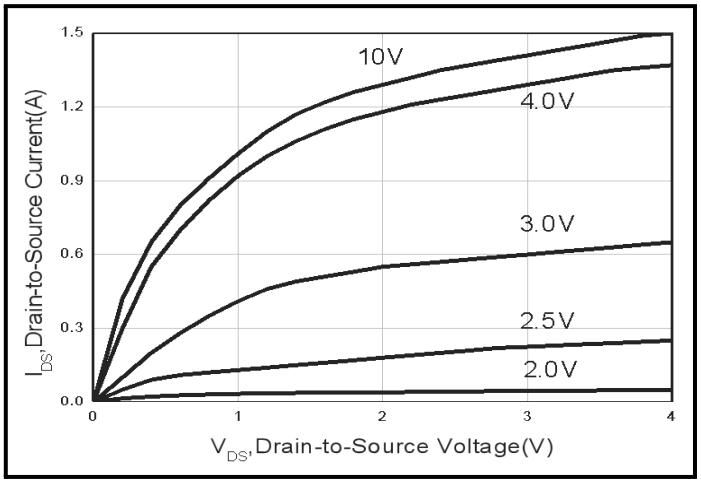


Figure 2 :Transfer Characteristics

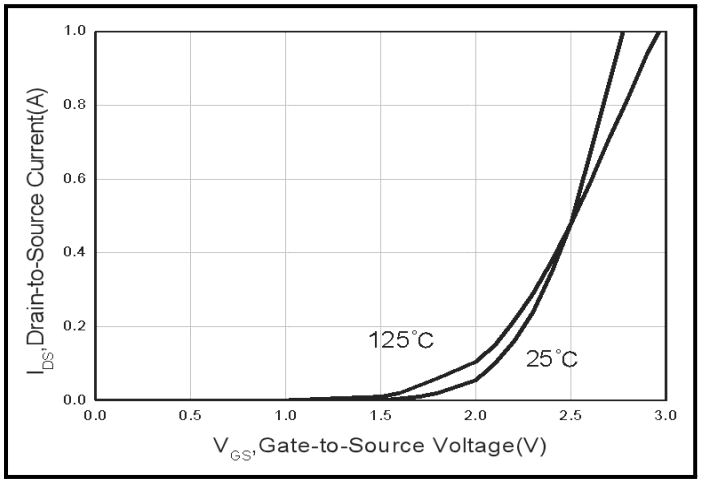


Figure 3 :Capacitance Characteristics

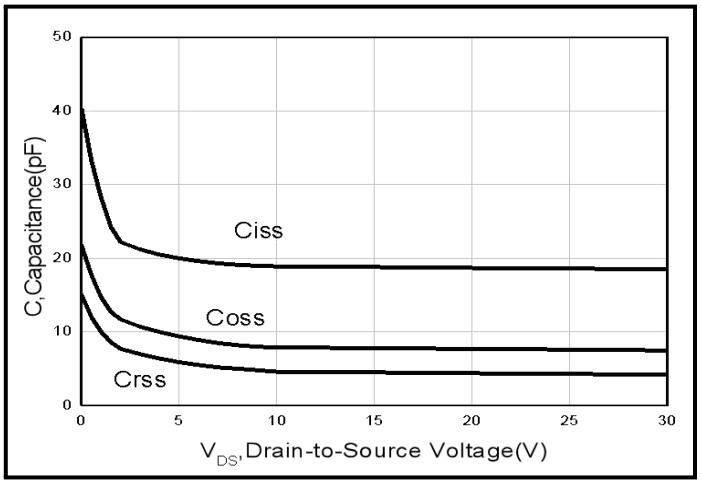


Figure 4 :Gate Charge

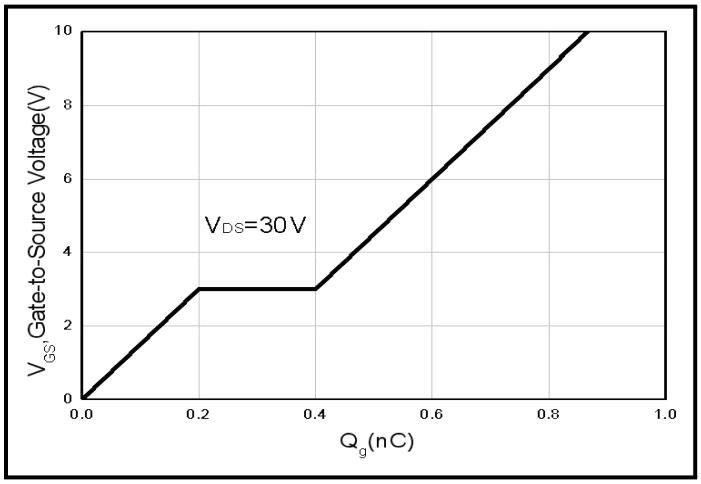


Figure 5 :Drain-Source on Resistance

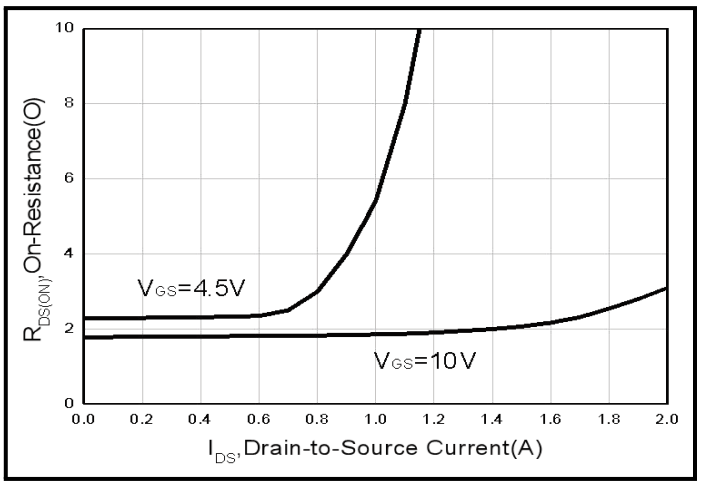
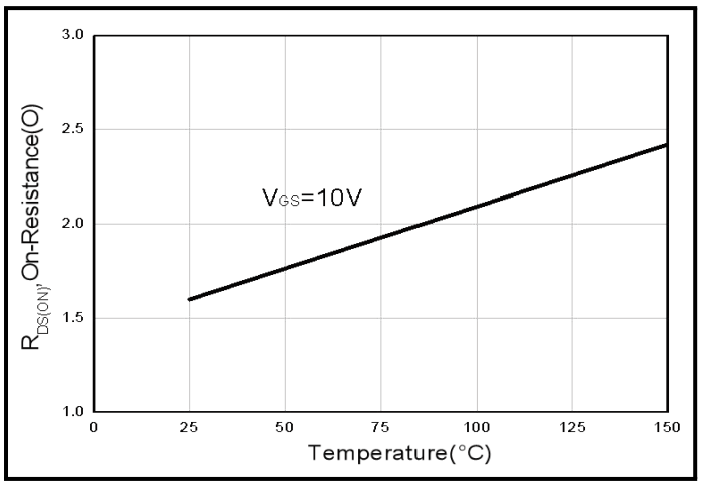


Figure 6 : Drain-Source on Resistance

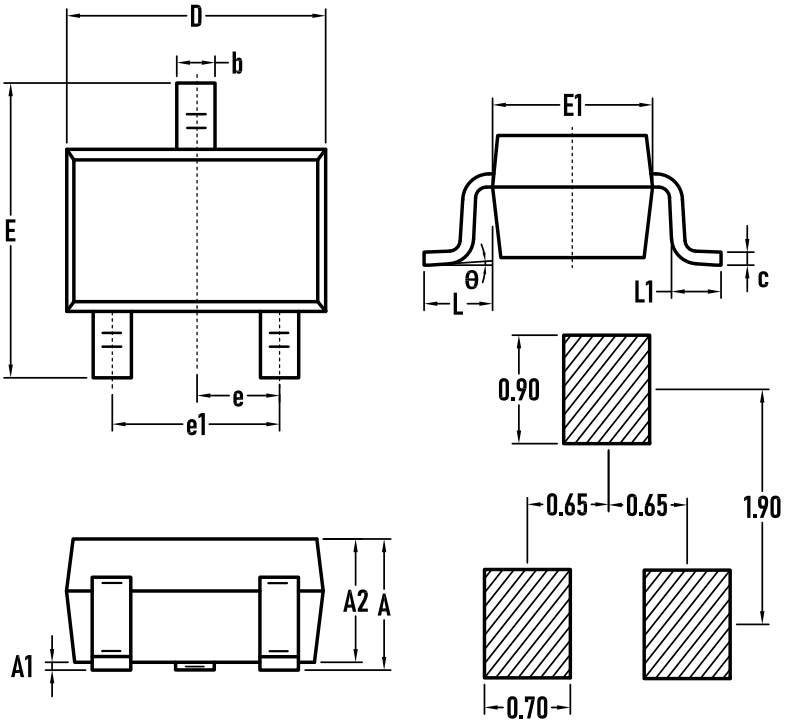


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2N7002KW

N-Channel MOSFET

Outline Drawing - SOT-323



SYMBOL	MILLIMETER		
	MIN.	Typ.	MAX.
A	0.90	1.00	1.10
A1	0.00	0.05	0.10
A2	0.90	0.95	1.00
b	0.20	0.30	0.40
c	0.08	0.12	0.15
D	2.00	2.10	2.20
E	2.15	2.30	2.45
E1	1.15	1.25	1.35
e		0.650Typ.	
e1	1.20	1.30	1.40
L1	0.26	0.36	0.46
L		0.525REF	
θ	0°	4°	8°

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