BORN SEMICONDUCTOR

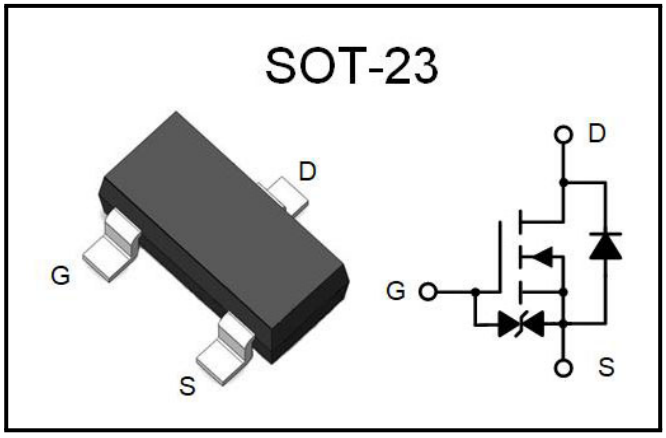
2N7002

N-Channel MOSFET

Features

- V_{DS}=60V
- I_D=0.3A
- $R_{DS(ON)}$ @V_{GS}=10V, MAX=3Ω
- $R_{DS(ON)}$ @V_{GS}=4.5V, MAX=4Ω

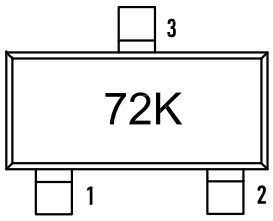
Package



Description

- Super High dense cell design for extremely low RDS(ON)
- Reliable and Rugged
- SOT-23 for Surface Mount Package
- ESD protected

Marking



Ordering information

Order code	Package	Marking	Base qty	Delivery mode
2N7002	SOT-23	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	Continuous Drain Current	0.3	A
P_D	Maximum Power Dissipation	0.225	W
T_J	Junction Temperature	150	°C
T_{stg}	Storage Temperature	-55 to + 150	°C
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance	556	°C/W

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N-Channel MOSFET

Electrical Characteristics @T_A=25°C unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	60	–	–	V
$V_{GS(th)}$	Gate Threshold Voltage(1)	V_{DS} = V_{GS} , I_D = 250uA	1	1.5	2.5	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 48V, V_{GS} = 0V	–	–	1	uA
I_{GSS1}	Gate-Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	–	–	±10	uA
I_{GSS2}		V_{GS} = ±10V, V_{DS} = 0V	–	–	±200	nA
I_{GSS3}		V_{GS} = ±5V, V_{DS} = 0V	–	–	±100	nA
$R_{DS(on)}$	Drain-Source On-Resistance(1)	V_{GS} = 4.5V, I_D = 200mA	–	–	4.0	Ω
		V_{GS} = 10V, I_D = 300mA	–	–	3.0	
V_{SD}	Diode Forward Voltage	V_{GS} = 0V, I_S = 200mA	–	–	1.2	V
Q_r	Recovered Charge	V_{GS} = 0V, I_S = 300mA, V_R = 25V, d_{Is}/d_t = -100A/uS	–	30	–	nC
Dynamic(2)						
C_{iss}	Input Capacitance	V_{DS} = 10V, V_{GS} = 0V, f = 1MHz	–	–	40	pF
C_{oss}	Output Capacitance		–	–	30	
C_{rss}	Reverse Transfer Capacitance		–	–	10	
Switching(2)						
$t_{d(on)}$	Turn-on Delay Time	V_{DS} = 10V, V_{DD} = 50V, R_G = 50Ω, R_{GS} = 50Ω, R_L = 250Ω	–	–	10	nS
$t_{d(off)}$	Turn-off Delay Time		–	–	15	
t_{rr}	Reverse Recovery Time	V_{GS} = 0V, I_S = 300mA, V_R = 25V, d_{Is}/d_t = -100A/uS	–	30	–	nS
GATE-SOURCE ZENER DIODE						
BV_{GSO}	Gate-Source Breakdown Voltage	I_{gs} = ±1mA(Open Drain)	±21.5	–	±30	V

Notes:

(1) Pulse Test : Pulse Width ≤300% , Duty Cycle ≤2%

(2) These parameters have no way to verify.

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N-Channel MOSFET

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

Figure 1 :Output Characteristics

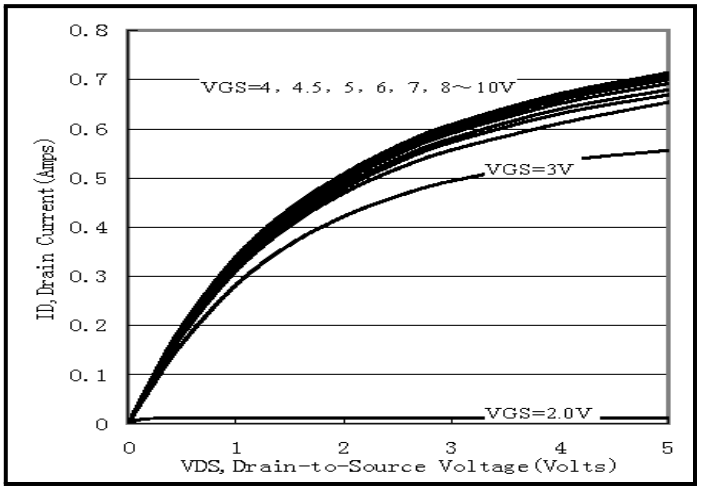


Figure 2 :Transfer Characteristics

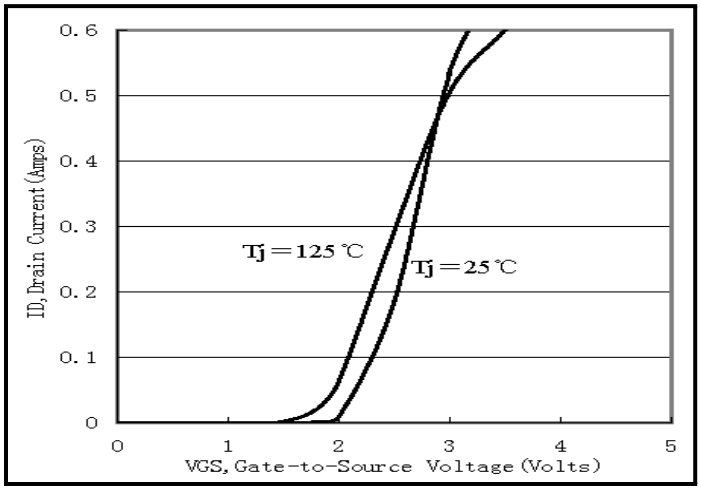


Figure 3 :Breakdown Voltage Variation Temperature

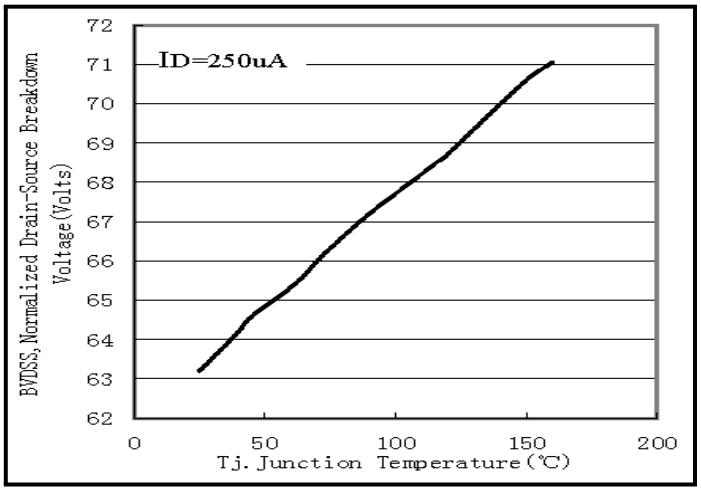
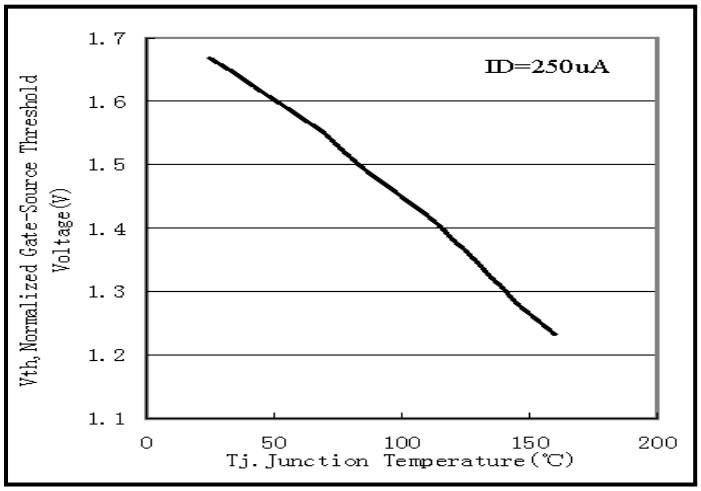


Figure 4 :Gate Threshold Variation Temperature



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N-Channel MOSFET

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

Figure 5 :On-Resistance Variation with Temperature

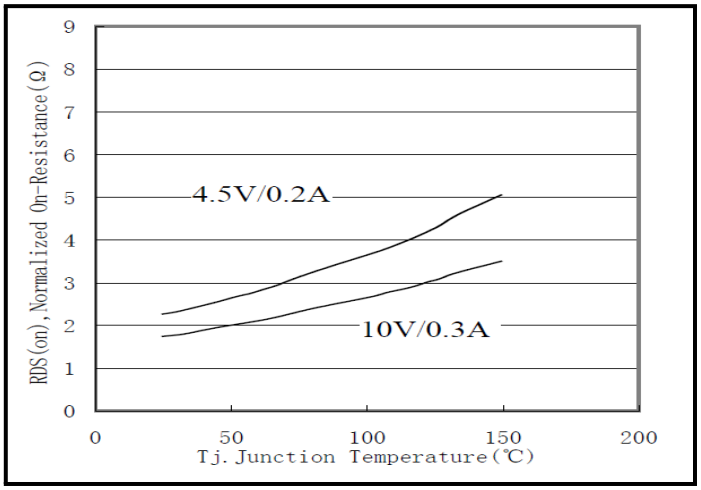


Figure 6 : On-Resistance vs. Drain Current

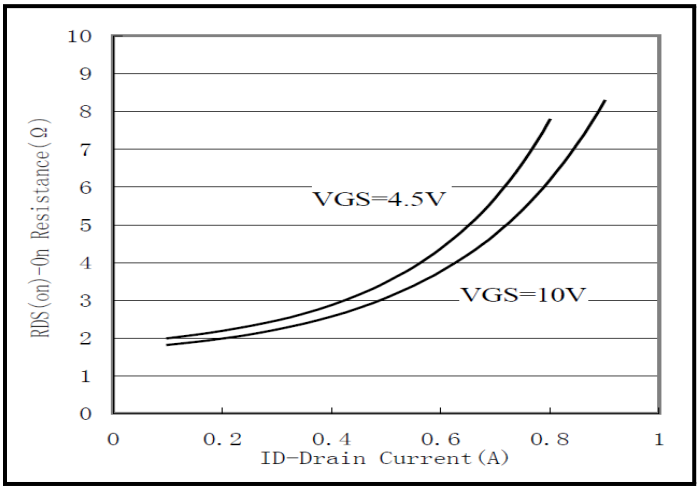


Figure 7 :On-Resistance vs. Gate-to-Source Voltage

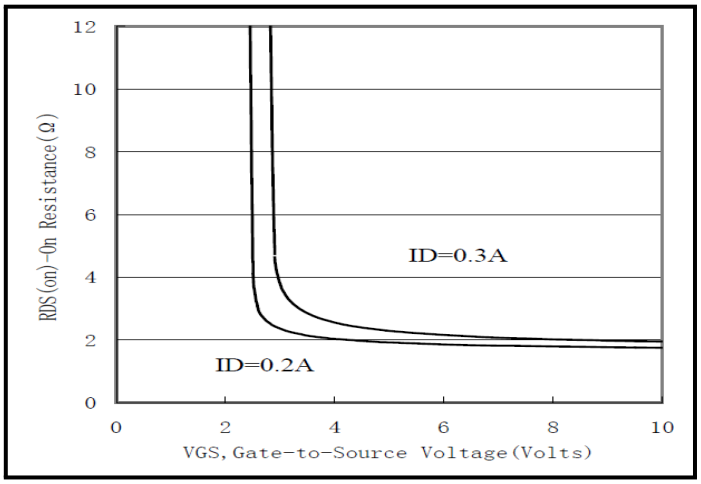
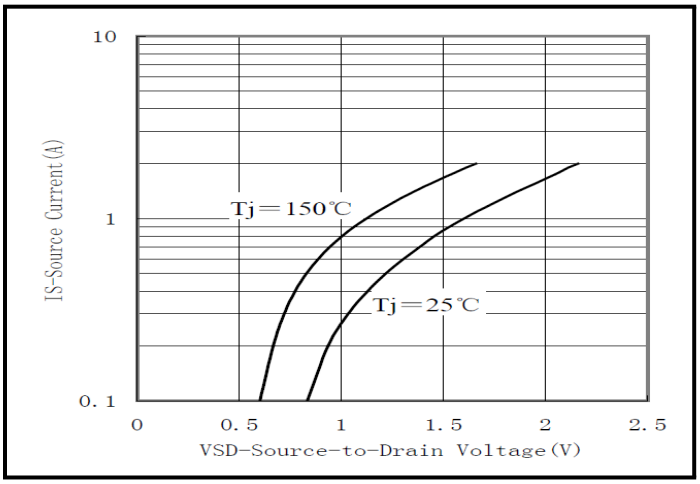


Figure 8 :Source-Drain Diode Forward Voltage



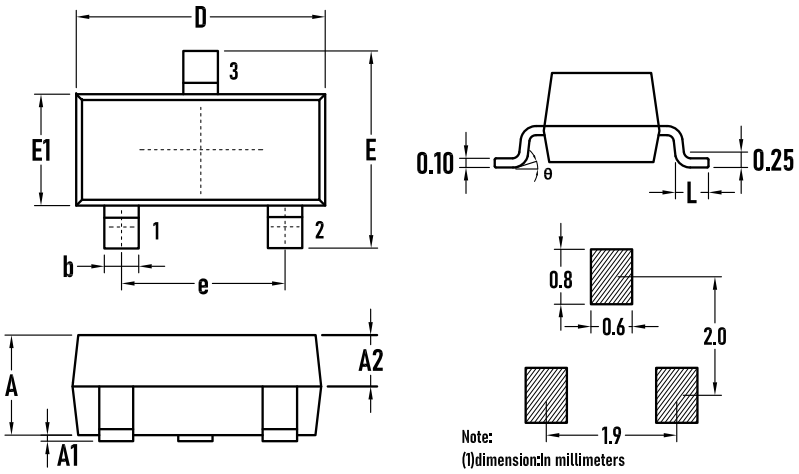
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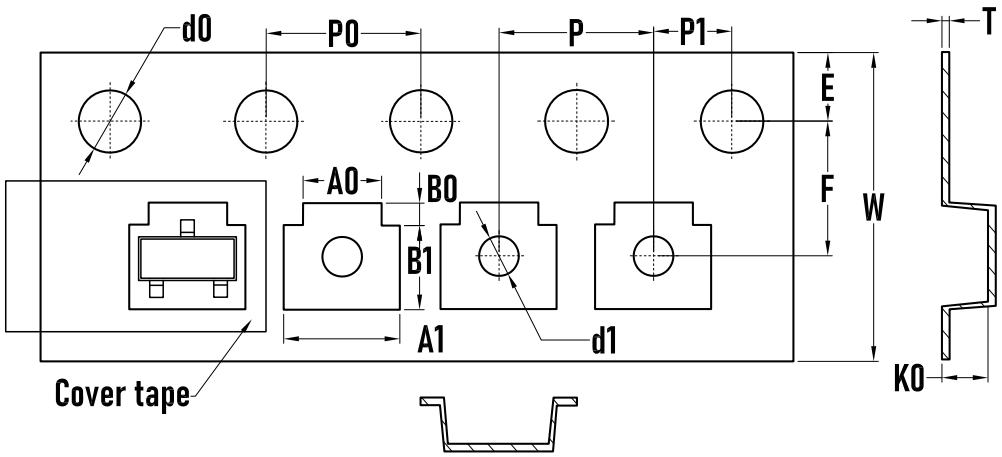
N-Channel MOSFET

Outline Drawing - SOT-23



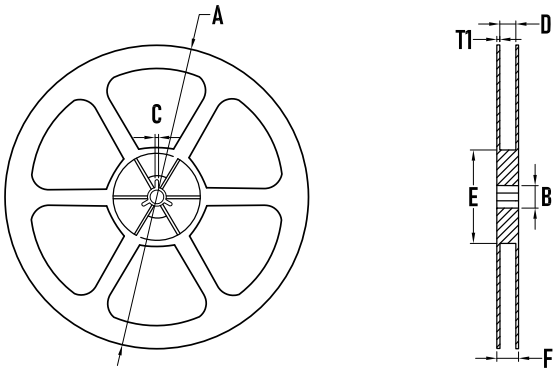
SYMBOL	MILLIMETER		
	MIN.	Typ.	MAX.
A	0.90	1.00	1.10
A1	0.01	–	0.10
A2	0.50	0.60	0.70
D	2.80	2.90	3.00
b	0.25	0.35	0.45
E	2.10	2.30	2.50
E1	1.20	1.30	1.40
e	1.80	1.90	2.00
L	0.25	0.35	0.45
θ	0	–	8°

Packaging Tape - SOT-23



SYMBOL	MILLIMETER
A0	2.10±0.10
A1	3.10±0.10
B0	0.65±0.10
B1	2.75±0.10
d0	1.55±0.10
d1	1.00±0.05
E	1.75±0.10
F	3.50±0.10
K0	1.10±0.10
P	4.00±0.10
P0	4.00±0.10
P1	2.00±0.10
W	8.00±0.30
T	0.20 ±0.05

Packaging Reel



SYMBOL	MILLIMETER
A	177.8±0.2
B	3.1
C	13.50
D	9.6±0.3
E	75±0.2
F	12.3±0.3
T1	1.0±0.2
Quantity	3000PCS

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