



60V N-Channel Trench Power MOSFET

General Description

The SJS2N7002 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a wide variety of applications.

Features

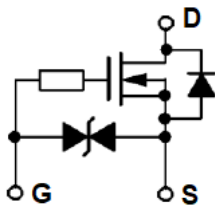
- Low Gate Charge
- High Power and current handling capability
- Lead free product is acquired
- ESD Rating:HBM 2KV

Application

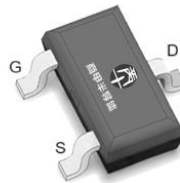
- PWM Applications
- Load Switch
- Power Management

Key Performance Parametes

Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(ON_TYP)}$	1.7	Ω
I_D	0.3	A
Q_G	1.1	nC



Schematic Diagram



SOT-23 top view



Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJS2N7002	2N7002	SOT-23	Tape	\	\	3000 Pcs

Table 1. Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	60	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	V
I_D	Drain Current-Continuous($T_A=25^\circ\text{C}$)	0.3	A
	Drain Current-Continuous($T_A=100^\circ\text{C}$)	0.19	A
I_{DM} (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	1.2	A
P_D	Maximum Power Dissipation($T_A=25^\circ\text{C}$)	0.42	W
	Maximum Power Dissipation($T_A=100^\circ\text{C}$)	0.17	W
E_{AS}	Avalanche energy (Note 2)	0.25	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ\text{C}$

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	300		$^\circ\text{C/W}$



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Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{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 T _J =25℃			1	μA
		V _{DS} =60V, V _{GS} =0V T _J =125℃			100	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		2.5	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =0.3A		0.26		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =0.3A T _J =25℃		1.7	2.1	Ω
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =0.2A T _J =25℃		1.9	2.5	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =30V,V _{GS} =0V, f=1MHz		27		pF
C _{oss}	Output Capacitance			9.5		pF
C _{rss}	Reverse Transfer Capacitance			4.7		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		183		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =30V, R _L =100Ω, R _{GEN} =3Ω		2		nS
t _r	Turn-on Rise Time			14.5		nS
t _{d(off)}	Turn-Off Delay Time			7.5		nS
t _f	Turn-Off Fall Time			20		nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =0.3A		1.1		nC
Q _{gs}	Gate-Source Charge			0.3		nC
Q _{gd}	Gate-Drain Charge			0.3		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				0.3	A
V _{SD}	Forward on Voltage (Note 3)	V _{GS} =0V, I _S =0.3A			1.2	V
t _{rr}	Reverse Recovery Time	I _F =0.3A, dI/dt=500A/μs		8		ns
Q _{rr}	Reverse Recovery Charge	I _F =0.3A, dI/dt=500A/μs		2.5		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, R_g=25\Omega, L=0.5\text{mH}$.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.



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Typical Electrical And Thermal Characteristics (Curves)

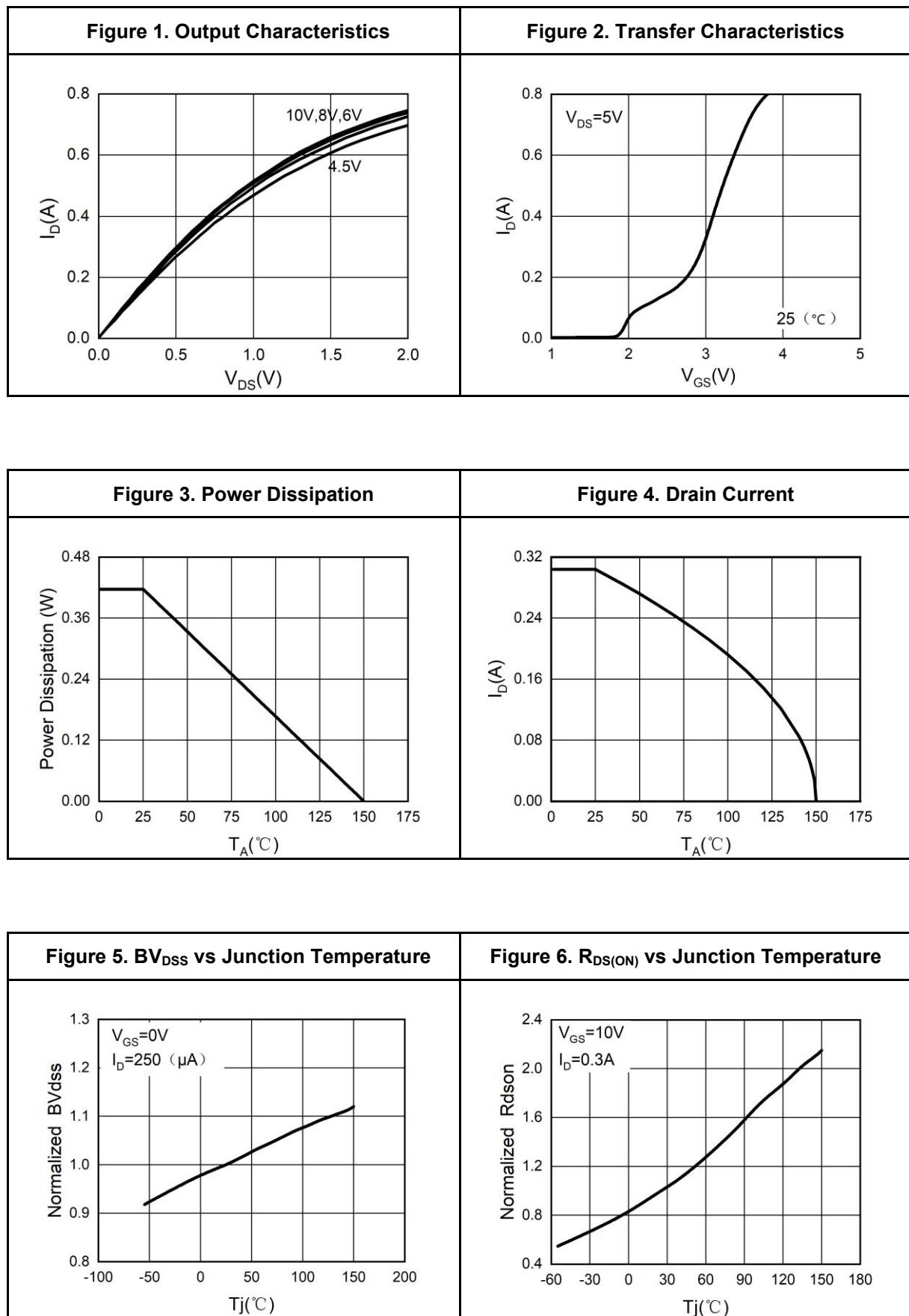




Figure 7. Gate Charge Waveforms

$V_{GS}(V)$

$I_D = 0.3A$
 $V_{DS} = 30V$

$Q_g(nC)$

Figure 8. Capacitance

Capacitance(pF)

$V_{DS}(V)$

C_{iss}
 C_{oss}
 C_{rss}

Figure 9. Body-Diode Characteristics

$I_S(A)$

$V_{SD}(V)$

25 (°C)

Figure 10. Maximum Safe Operating Area

$I_D(A)$

$V_{DS}(V)$

Rds(on) limited

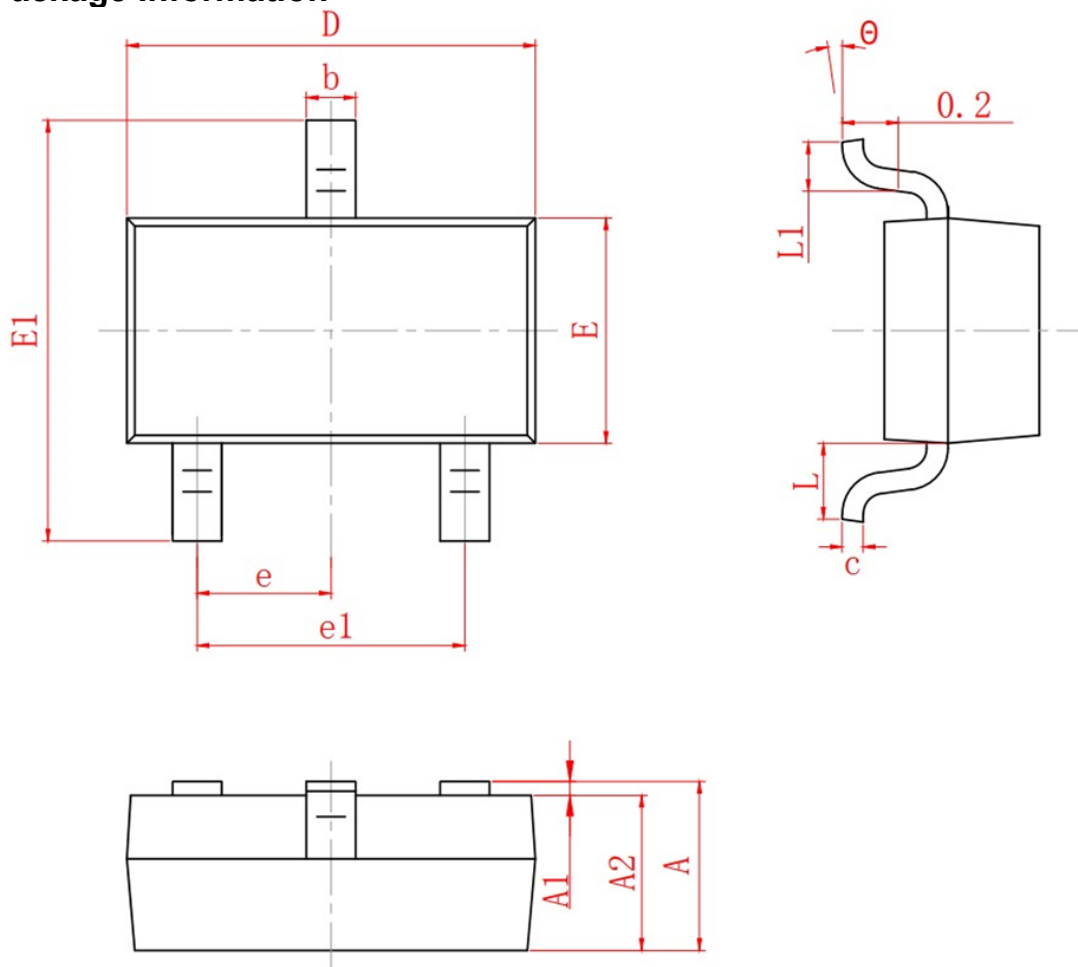
DC

$T_{J(Max)} = 150(^{\circ}C)$
 $T_A = 25(^{\circ}C)$



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SOT-23 Package Information



SYMBOL	MIN	NOM	MAX
A	0.90	1.05	1.20
A1	0.00	0.05	0.10
A2	0.90	1.00	1.10
b	0.30	0.40	0.50
c	0.08	0.10	0.15
D	2.80	2.90	3.00
E	1.20	1.30	1.40
E1	2.30	2.40	2.50
L	0.30	0.40	0.50
θ	0°	5°	10°
L1	0.55 REF		
e	0.95 BSC		
e1	1.90 REF		



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