



20V N-Channel Trench Power MOSFET

General Description

The SJK20ND170 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a wide variety of applications.

Features

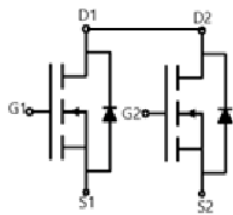
- Low Gate Charge
- High Power and current handling capability
- Lead free product is acquired

Application

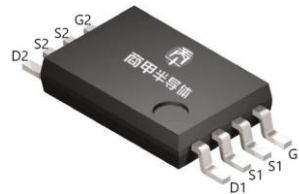
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Key Performance Parametes

Parameter	Value	Unit
V_{DS}	20	V
$R_{DS(ON_TYP)}$	17.8	m Ω
I_D	7.9	A
Q_G	19	nC



Schematic Diagram



TSSOP-8 top view



Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJK20ND170	SJK20ND170	TSSOP-8	Tape	\	\	5000 Pcs

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

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0\text{V}$)	20	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0\text{V}$)	± 12	V
I_D	Drain Current-Continuous($T_A=25^{\circ}\text{C}$)	7.9	A
	Drain Current-Continuous($T_A=100^{\circ}\text{C}$)	5	A
$I_{DM}(\text{pluse})$	Drain Current-Continuous@ Current-Pulsed (Note 1)	31.6	A
P_D	Maximum Power Dissipation($T_A=25^{\circ}\text{C}$)	2	W
	Maximum Power Dissipation($T_A=100^{\circ}\text{C}$)	0.8	W
E_{AS}	Avalanche energy (Note 2)	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		62	$^{\circ}\text{C/W}$



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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	20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V T _J =25℃			1	μA
		V _{DS} =20V, V _{GS} =0V T _J =125℃			100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.4		1	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =2A		69		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =3A T _J =25℃		17.8	23.1	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =2.5V, I _D =2A T _J =25℃		20.8	27.7	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =4.5V,V _{GS} =0V, f=1.0MHz		785		pF
C _{oss}	Output Capacitance			129		pF
C _{rss}	Reverse Transfer Capacitance			108		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		3.4		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =4.5V, V _{DS} =10V, R _L =3Ω, R _{GEN} =3Ω		6.4		nS
t _r	Turn-on Rise Time			2.4		nS
t _{d(off)}	Turn-Off Delay Time			30.8		nS
t _f	Turn-Off Fall Time			3		nS
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =21V, I _D =3A		19		nC
Q _{gs}	Gate-Source Charge			1.5		nC
Q _{gd}	Gate-Drain Charge			2.7		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				7.9	A
V _{SD}	Forward on Voltage (Note 3)	V _{GS} =0V, I _S =3A			1.2	V
t _{rr}	Reverse Recovery Time	I _F =3A, dI/dt=100A/μs		14		ns
Q _{rr}	Reverse Recovery Charge	I _F =3A, dI/dt=100A/μs		5.2		nC

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

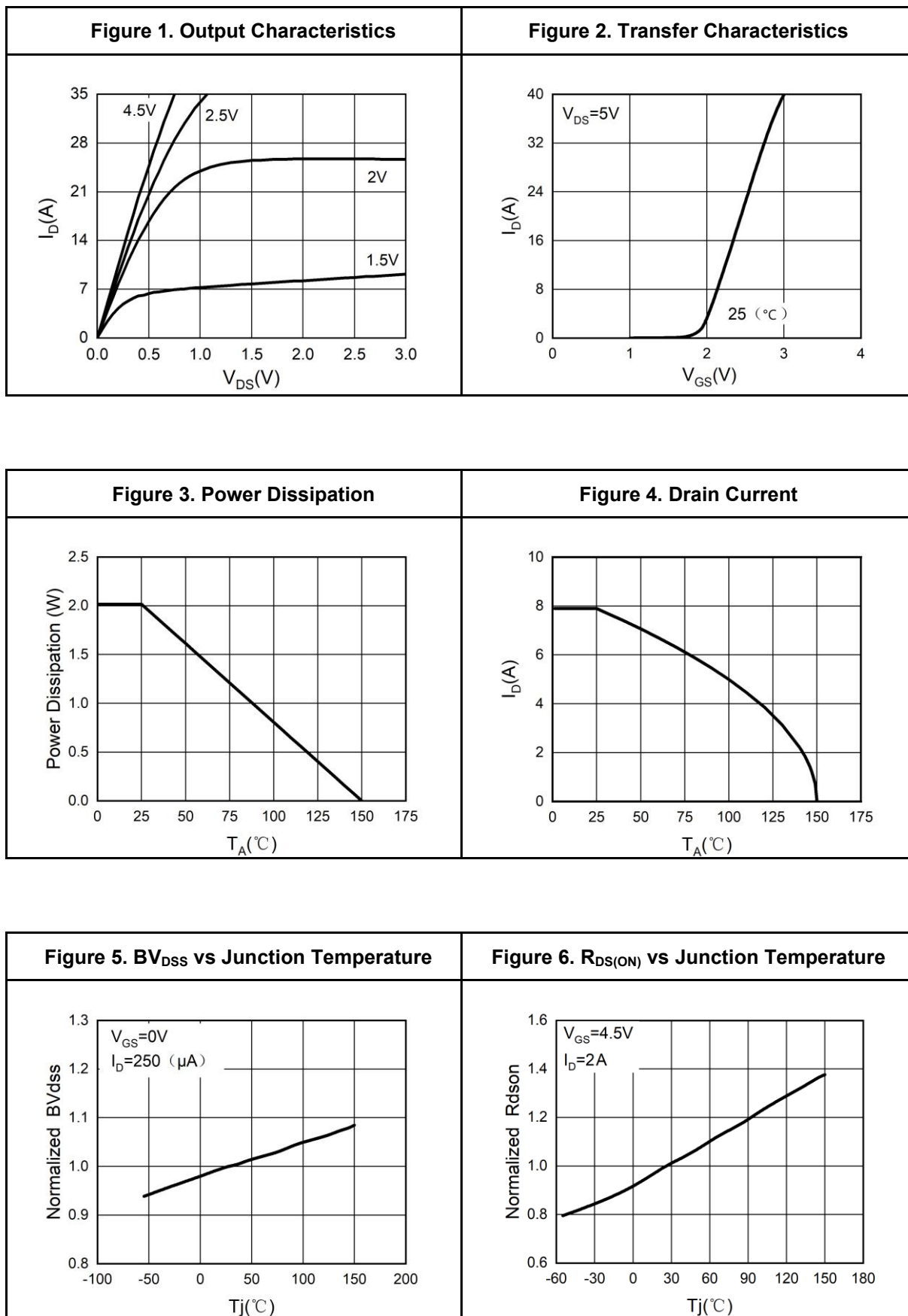
Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=40V, V_G=10V, R_g=25\Omega, L=0.5\text{mH}$.

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



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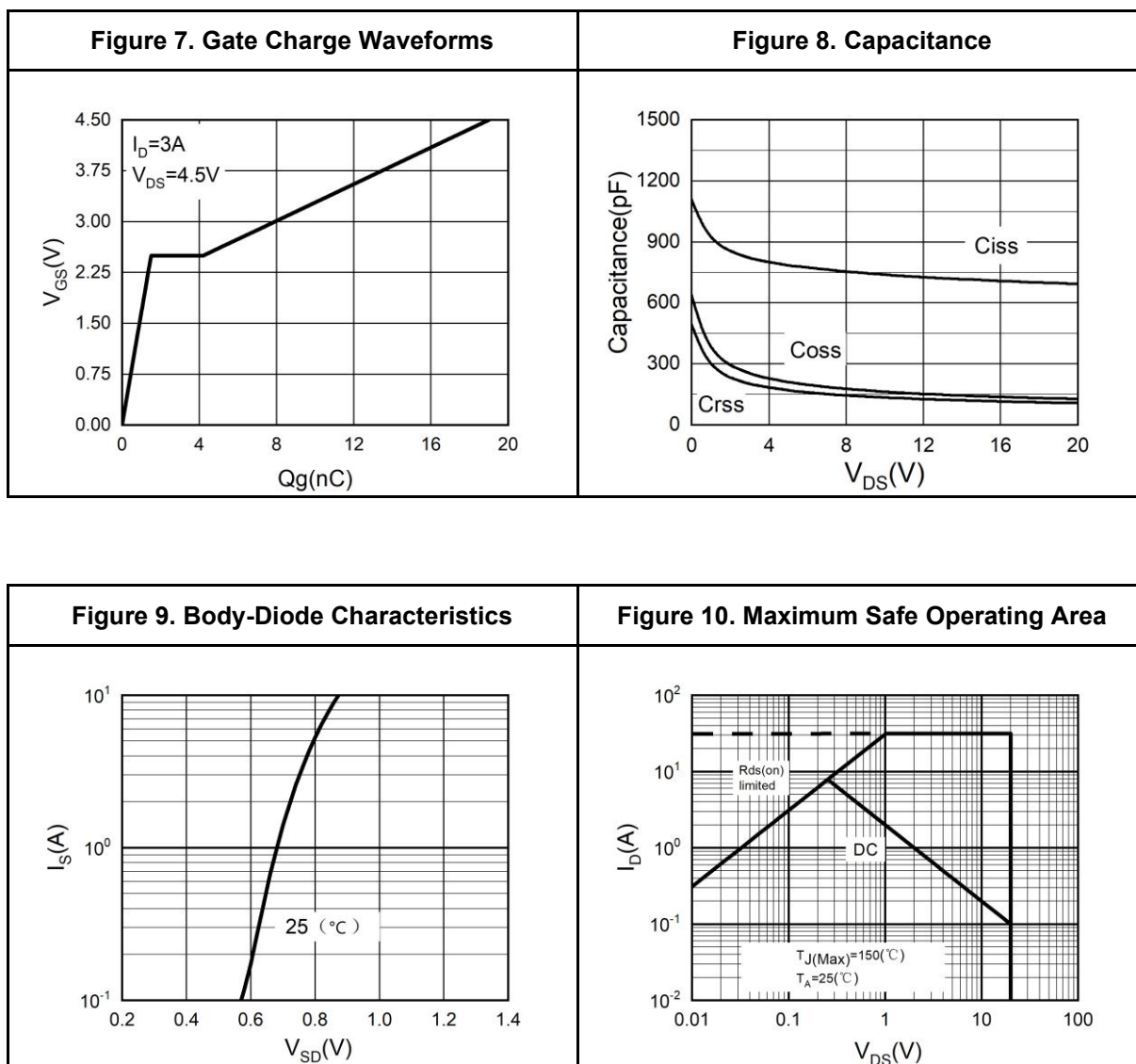
Typical Electrical And Thermal Characteristics (Curves)





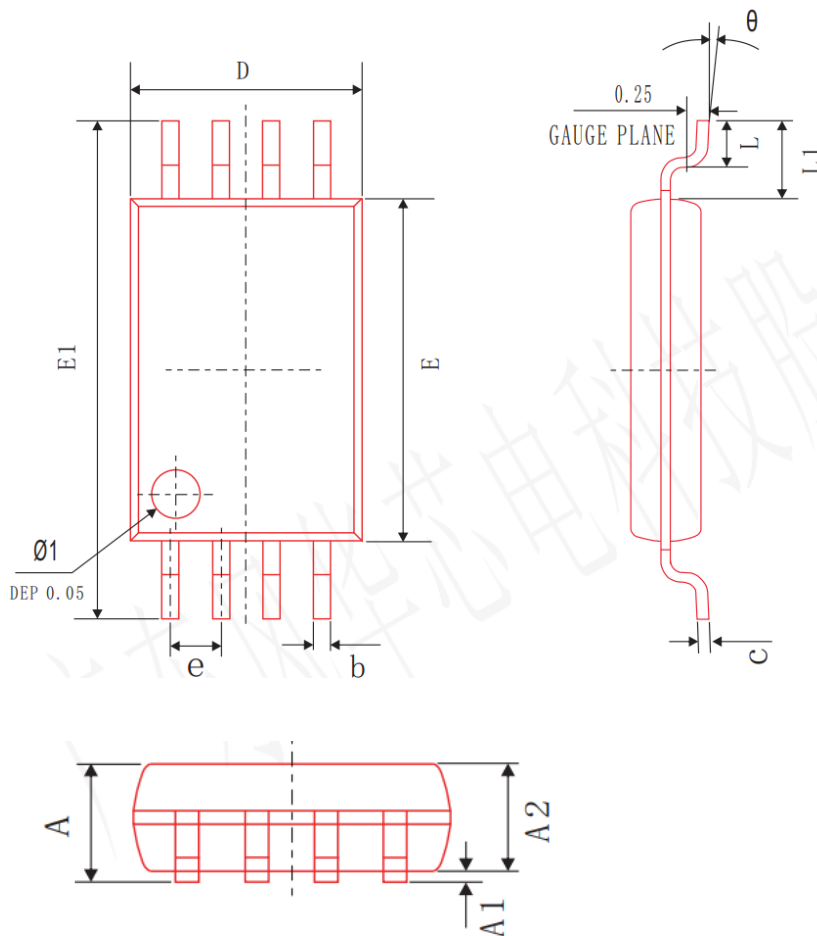
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Typical Electrical And Thermal Characteristics (Curves)





TSSOP-8 Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	1.00	1.10	1.20
A1	0.02	0.10	0.18
A2	0.90	1.00	1.10
b	0.17	0.22	0.27
c	0.122	0.127	0.132
L	0.40	0.60	0.80
D	2.87	2.97	3.07
E	4.30	4.40	4.50
E1	6.20	6.40	6.60
Ø1	0.50	0.60	0.70
θ	0°	5°	10°
L1	1.00 BSC		
e	0.65 BSC		



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