30V N&P-Channel Trench Power MOSFET

General Description

The SJH30NP960 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

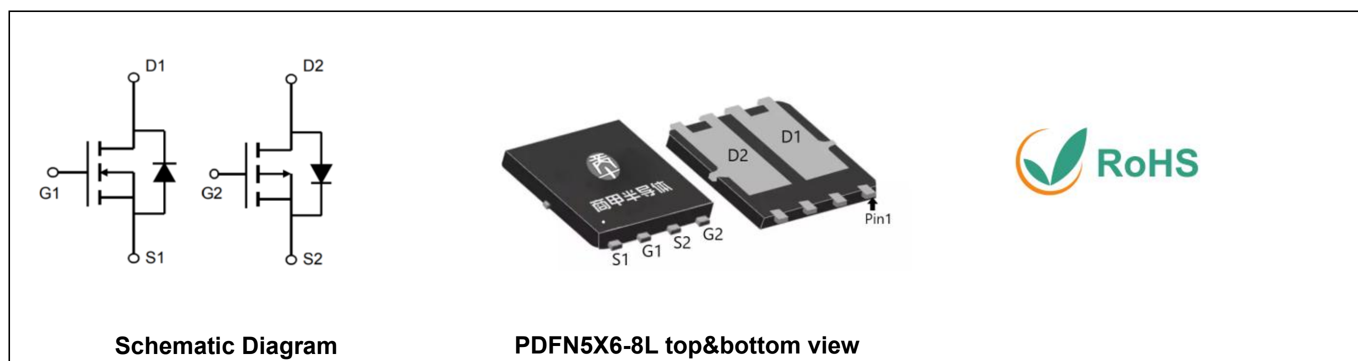
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handing capability
- Lead free product is acquired

Application

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

Key Performance Parametes

Parameter	Value	Value	Unit
V_{DS}	30	-30	V
$R_{DS(ON)_TYP}$	4.4	7.7	mΩ
I_D	77	-61	A
Q_G	42	61	nC



Schematic Diagram

PDFN5X6-8L top&bottom view

Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJH30NP960	SJH30NP960	PDFN5X6-8L	Tape	\	\	5000 Pcs

Table 1. Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Symbol	Parameter	N Limit	P Limit	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	30	-30	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±20	±20	V
I_D	Drain Current-Continuous(T_C=25℃)	77	-61	A
	Drain Current-Continuous(T_C=100℃)	49	-39	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	308	-244	A
P_D	Maximum Power Dissipation(T_C=25℃)	52	57	W
	Maximum Power Dissipation(T_C=100℃)	21	23	W
E_{AS}	Avalanche energy (Note 2)	121	306	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150		℃

Table 2. Thermal Characteristic

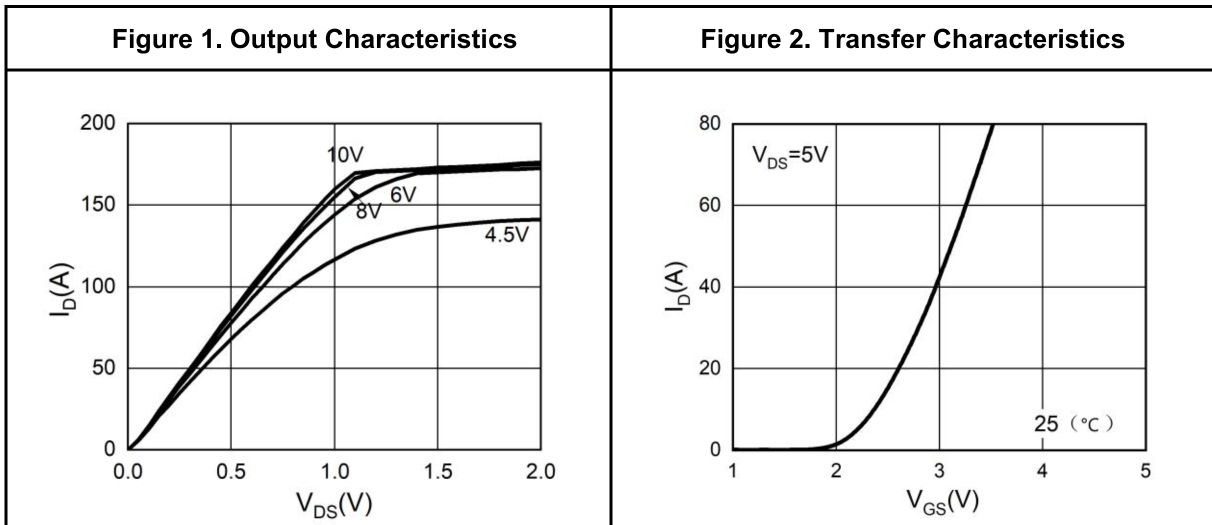
Symbol	Parameter	N Limit	P Limit	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.4	2.2	℃/W

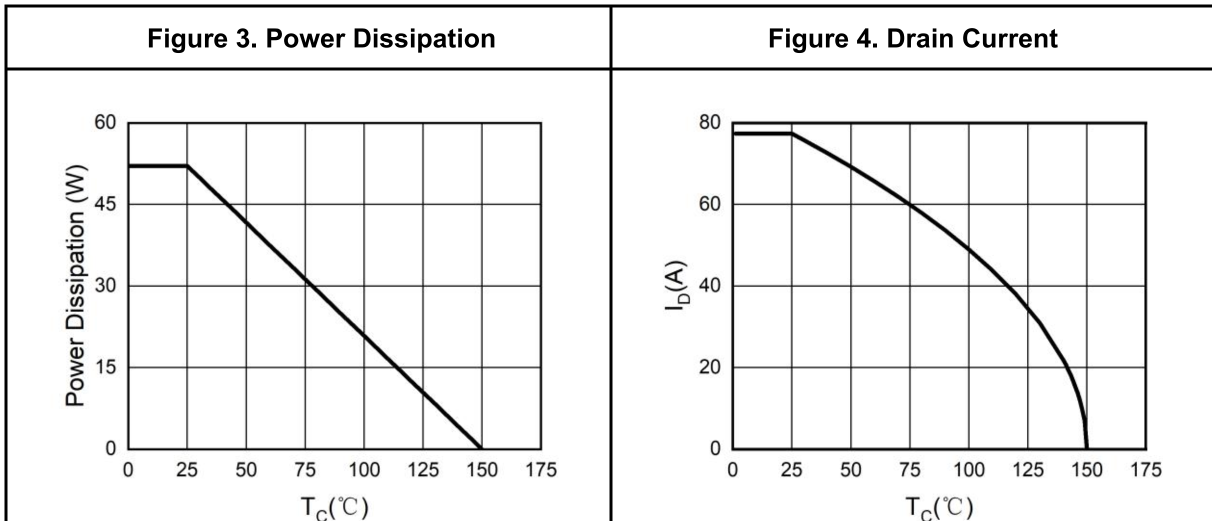
Table 3. N-Channel Electrical Characteristics (T_J=25℃ unless otherwise noted)

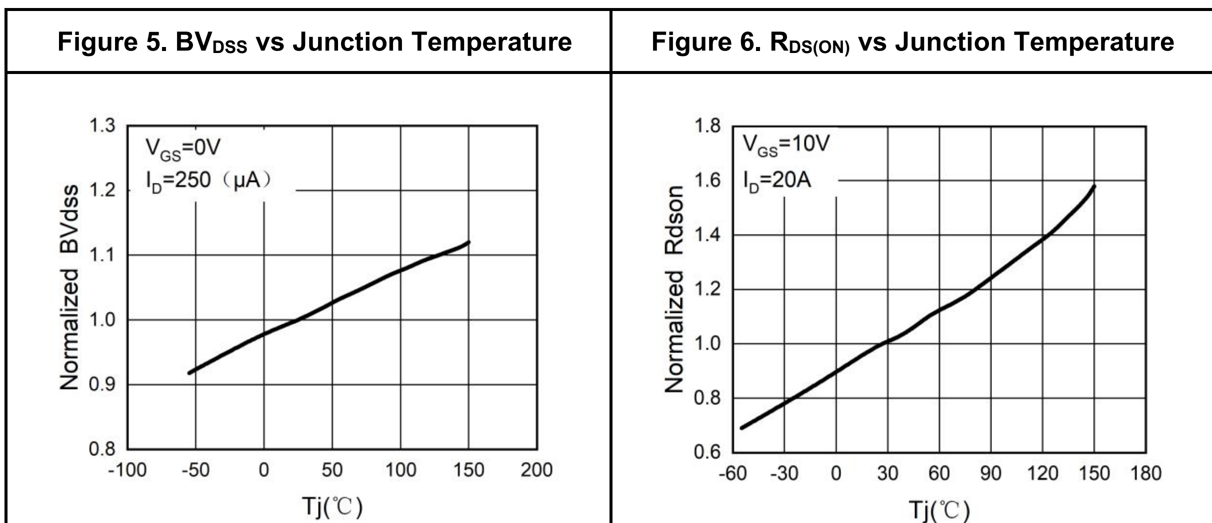
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V T_J=25℃			1	μA
		V_{DS}=30V, V_{GS}=0V T_J=125℃			100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1		2.5	V
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		37		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A T_J=25℃		4.4	5.5	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=15A T_J=25℃		5.7	7.6	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1.0MHz		2040		pF
C_{oss}	Output Capacitance			250		pF
C_{rss}	Reverse Transfer Capacitance			211		pF
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		1.4		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V, V_{DS}=15V, R_L=0.75Ω, R_{GEN}=3Ω		7.8		nS
t_r	Turn-on Rise Time			7.4		nS
$t_{d(off)}$	Turn-Off Delay Time			39.4		nS
t_f	Turn-Off Fall Time			11.2		nS
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=20A		42		nC
Q_{gs}	Gate-Source Charge			5		nC
Q_{gd}	Gate-Drain Charge			9.5		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				77	A
V_{SD}	Forward on Voltage (Note 3)	V_{GS}=0V, I_S=20A			1.2	V
t_{rr}	Reverse Recovery Time	I_F=20A, dI/dt=500A/μs		19.2		ns
Q_{rr}	Reverse Recovery Charge	I_F=20A, dI/dt=500A/μs		9.6		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.E_{AS} condition: T_J=25℃,V_{DD}=30V,V_G=10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

N-Channel Typical Electrical And Thermal Characteristics (Curves)







N-Channel Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

Figure 8. Capacitance

Figure 9. Body-Diode Characteristics

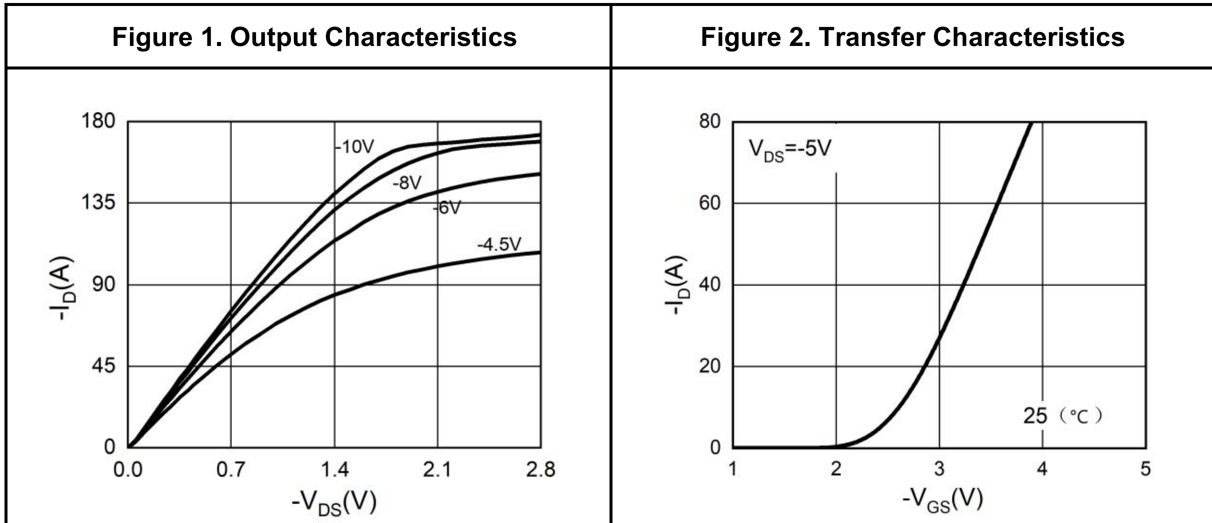
Figure 10. Maximum Safe Operating Area

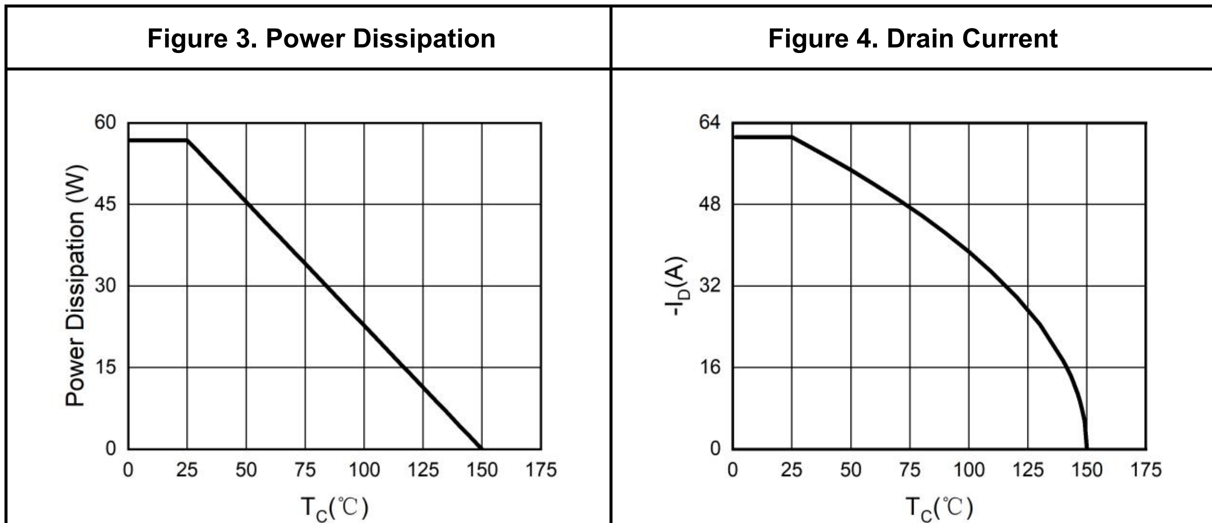
Table 4. P-Channel Electrical Characteristics (T_J=25℃ unless otherwise noted)

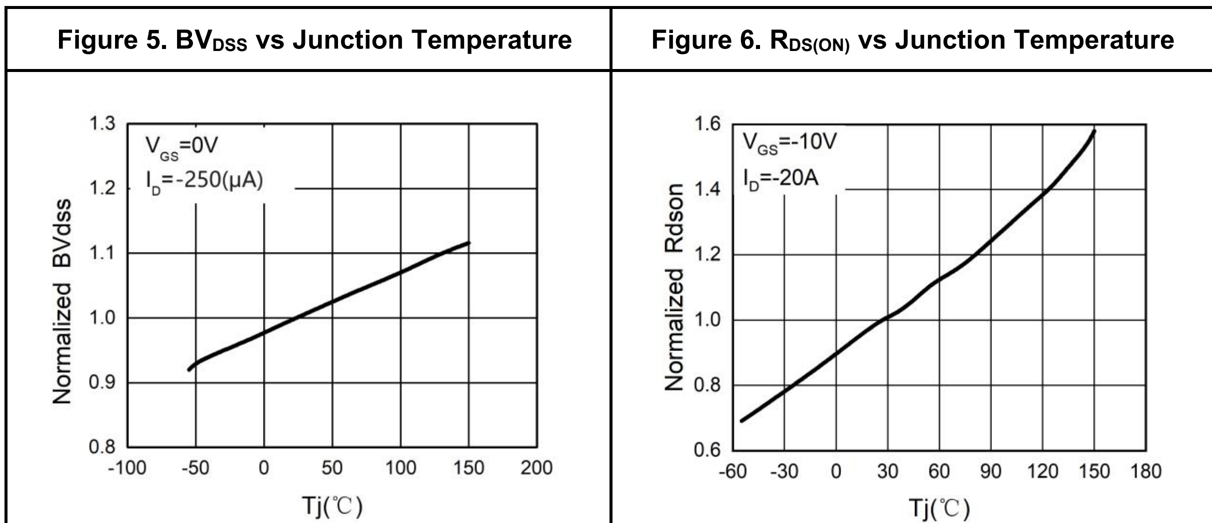
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=-250μA	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V T_J=25℃			-1	μA
		V_{DS}=-30V, V_{GS}=0V T_J=125℃			-100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-1		-2.5	V
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-20A		32		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-20A T_J=25℃		7.7	9.6	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-4.5V, I_D=-20A T_J=25℃		11.2	14.9	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-15V,V_{GS}=0V, f=1.0MHz		3080		pF
C_{oss}	Output Capacitance			389		pF
C_{rss}	Reverse Transfer Capacitance			363		pF
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		3.5		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=-10V, V_{DS}=-15V, R_L=0.75Ω, R_{GEN}=3Ω		21		nS
t_r	Turn-on Rise Time			18		nS
$t_{d(off)}$	Turn-Off Delay Time			26		nS
t_f	Turn-Off Fall Time			8		nS
Q_g	Total Gate Charge	V_{GS}=-10V, V_{DS}=-15V, I_D=-20A		61		nC
Q_{gs}	Gate-Source Charge			7.5		nC
Q_{gd}	Gate-Drain Charge			15.5		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				-61	A
V_{SD}	Forward on Voltage (Note 3)	V_{GS}=0V, I_S=-20A			-1.2	V
t_{rr}	Reverse Recovery Time	I_F=-20A, dI/dt=-100A/μs		15		ns
Q_{rr}	Reverse Recovery Charge	I_F=-20A, dI/dt=-100A/μs		20		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.E_{AS} condition: T_J=25℃,V_{DD}=-30V,V_G=-10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

P-Channel Typical Electrical And Thermal Characteristics (Curves)







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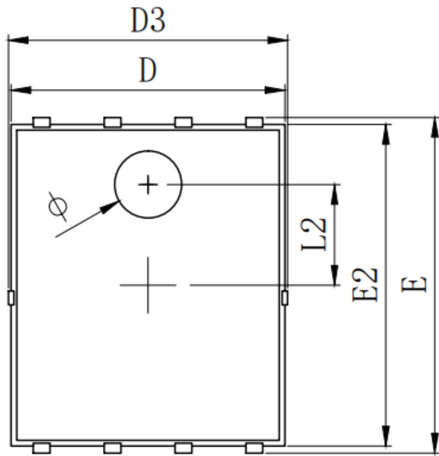
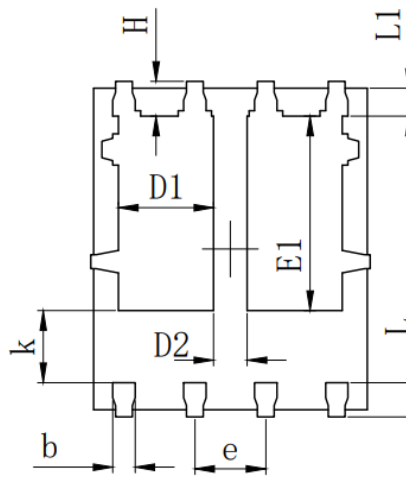
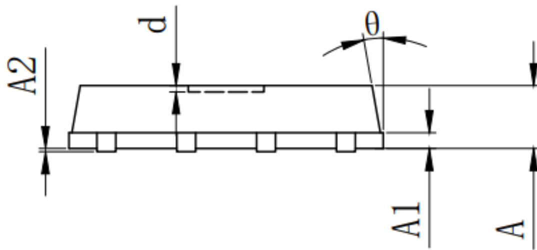
PDFN5X6-8L Package Information







SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0~0.05		
D	4.824	4.900	4.976
D1	1.605	1.705	1.805
D2	0.500	0.600	0.700
D3	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	1.290	1.390
H	0.549	0.625	0.701
θ	8°	10°	12°
Φ	1.100	1.200	1.300
d			0.100

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