40V N-Channel Trench Power MOSFET

General Description

The SJH40N045 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

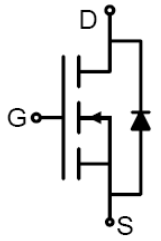
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handing capability
- Lead free product is acquired

Application

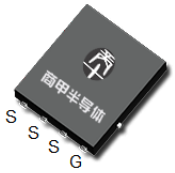
- Load switch
- PMW

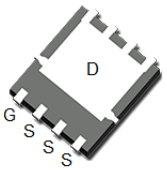
Key Performance Parametes

Parameter	Value	Unit
V_{DS}	40	V
$R_{DS(ON)\_TYP}$	3.9	mΩ
I_D	79	A
Q_G	55	nC



Schematic Diagram





PDFN5X6-8L top&bottom view

RoHS

Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJH40N045	SJH40N045	PDFN5X6-8L	Tape	\	\	5000 Pcs

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

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	40	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±20	V
I_D	Drain Current-Continuous(T_C=25℃)	79	A
	Drain Current-Continuous(T_C=100℃)	50	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	316	A
P_D	Maximum Power Dissipation(T_C=25℃)	53	W
	Maximum Power Dissipation(T_C=100℃)	21	W
E_{AS}	Avalanche energy (Note 2)	256	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		2.36	℃/W

Table 3. 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	40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V, V_{GS}=0V T_J=25℃			1	μA
		V_{DS}=40V, 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	1.0		2.5	V
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		38		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A T_J=25℃		3.9	5.1	mΩ
		V_{GS}=4.5V, I_D=15A T_J=25℃		5.5	7.3	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=20V,V_{GS}=0V, f=1.0MHz		3260		pF
C_{oss}	Output Capacitance			215		pF
C_{rss}	Reverse Transfer Capacitance			187		pF
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		1.6		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V, V_{DS}=20V, R_L=1Ω, R_{GEN}=3Ω		14		nS
t_r	Turn-on Rise Time			8		nS
$t_{d(off)}$	Turn-Off Delay Time			44		nS
t_f	Turn-Off Fall Time			15		nS
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=20V, I_D=20A		55		nC
Q_{gs}	Gate-Source Charge			10		nC
Q_{gd}	Gate-Drain Charge			10		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				79	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		44		ns
Q_{rr}	Reverse Recovery Charge	I_F=20A, dI/dt=500A/μs		49		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.E_{AS} condition: T_J=25℃,V_{DD}=40V,V_G=10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

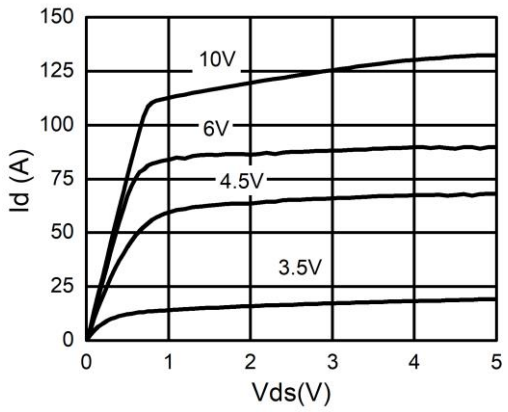


Figure 2. Transfer Characteristics

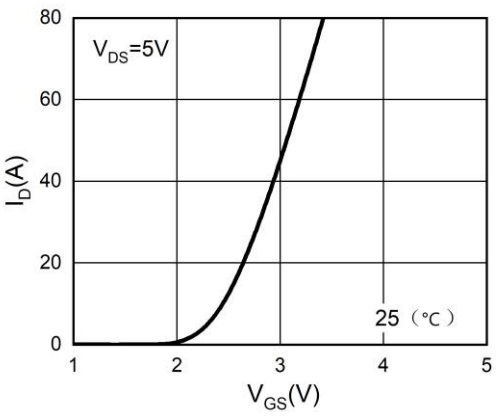


Figure 3. Power Dissipation

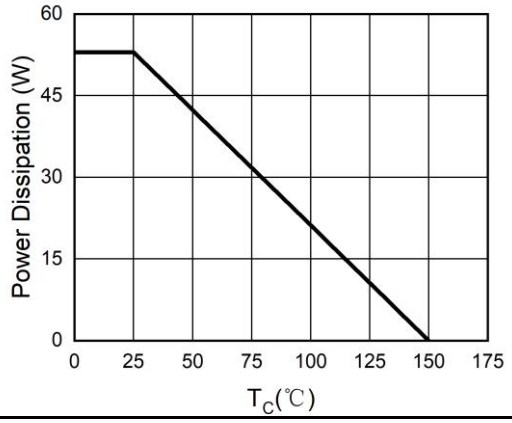


Figure 4. Drain Current

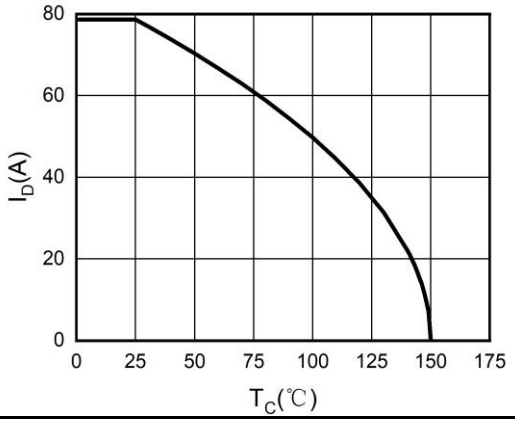


Figure 5. BV_{DSS} vs Junction Temperature

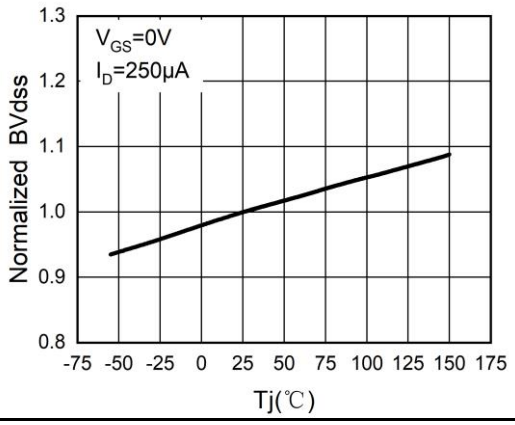
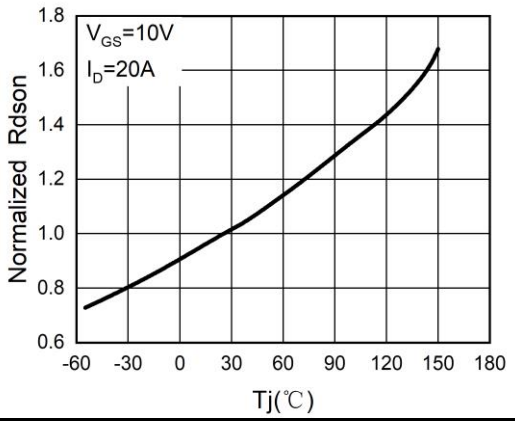


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

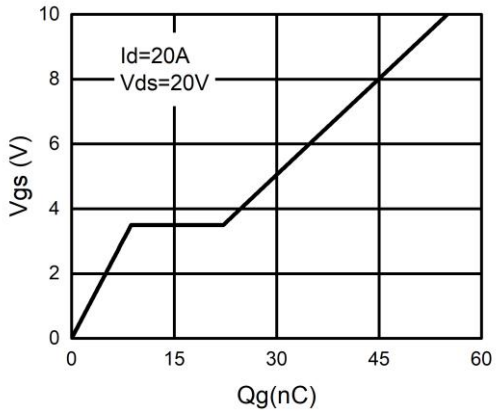


Figure 8. Capacitance

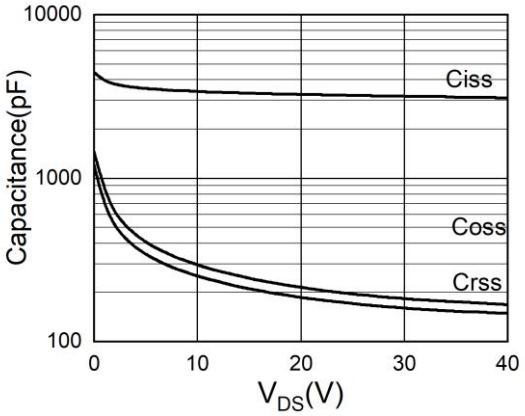


Figure 9. Body-Diode Characteristics

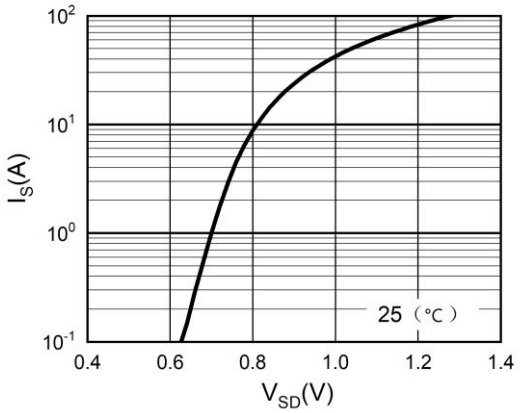
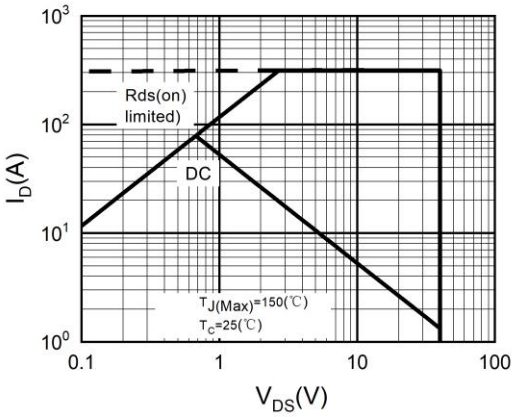
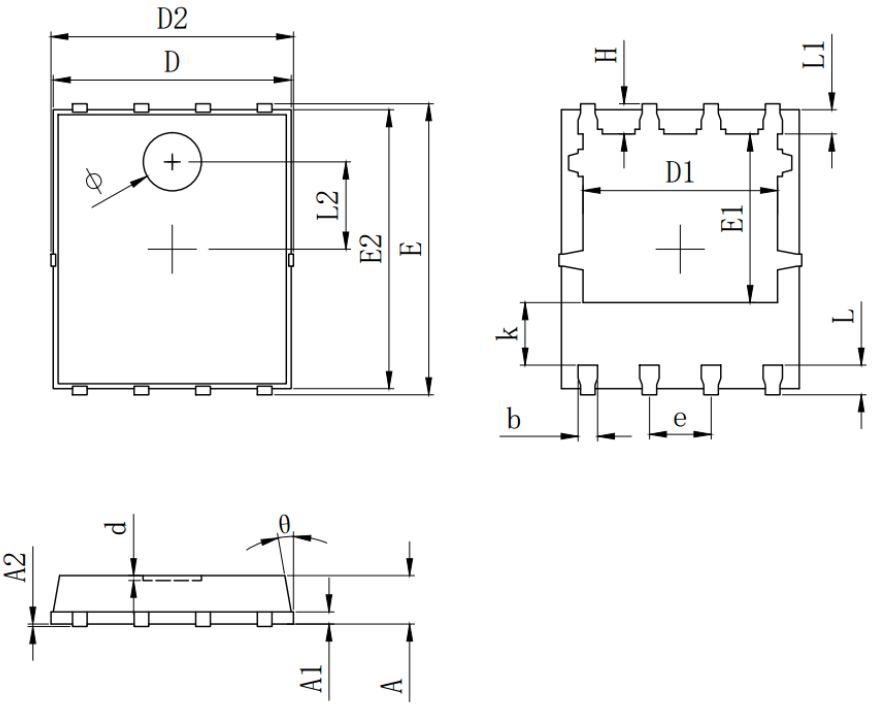


Figure 10. Maximum Safe Operating Area



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	3.910	4.010	4.110
D2	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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θ	8°	10°	12°
Φ	1.100	1.200	1.300
d			0.100

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