



## 40V N-Channel SGT Power MOSFET

### General Description

The SJH012N04 uses SGT technology to provide excellent  $R_{DS(ON)}$ , low gate charge and fast switching characteristics. This device is suitable for use as a wide variety of applications.

### Features

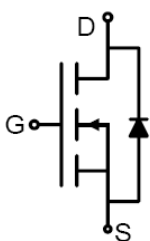
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handling capability
- Lead free product is acquired

### Application

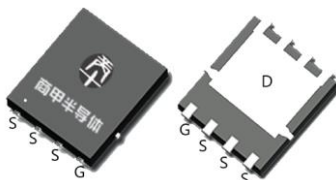
- DC/DC Converter
- Load Switching, Quick/Wireless Charging, Motor Driving

### Key Performance Parametes

Parameter	Value	Unit
$V_{DS}$	40	V
$R_{DS(ON\_TYP)}$	1.1	m $\Omega$
$I_D$	205	A
$Q_G$	101	nC



Schematic Diagram



PDFN5X6-8L top&bottom view



### Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJH012N04	SJH012N04	PDFN5X6	Tape	\	\	5000 Pcs

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

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	40	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	$\pm 20$	V
$I_D$	Drain Current-Continuous( $T_C=25^{\circ}\text{C}$ )	205	A
	Drain Current-Continuous( $T_C=100^{\circ}\text{C}$ )	129	A
$I_{DM}$ (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	820	A
$P_D$	Maximum Power Dissipation( $T_C=25^{\circ}\text{C}$ )	96	W
	Maximum Power Dissipation( $T_C=100^{\circ}\text{C}$ )	38	W
$E_{AS}$	Avalanche energy (Note 2)	812	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
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.3	$^{\circ}\text{C/W}$



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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 <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	40			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V T <sub>J</sub> =25℃			1	μA
		V <sub>DS</sub> =40V, V <sub>GS</sub> =0V T <sub>J</sub> =125℃			100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1		2.5	V
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A		66		S
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A T <sub>J</sub> =25℃		1.1	1.4	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A T <sub>J</sub> =25℃		1.4	2	mΩ
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =20V,V <sub>GS</sub> =0V, f=1.0MHz		6112		pF
C <sub>oss</sub>	Output Capacitance			2137		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			130		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1.0MHz		1.8		Ω
Switching Parameters						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, R <sub>L</sub> =1Ω, R <sub>GEN</sub> =3Ω		19.6		nS
t <sub>r</sub>	Turn-on Rise Time			27.6		nS
t <sub>d(off)</sub>	Turn-Off Delay Time			85		nS
t <sub>f</sub>	Turn-Off Fall Time			31		nS
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, I <sub>D</sub> =20A		101		nC
Q <sub>gs</sub>	Gate-Source Charge			16		nC
Q <sub>gd</sub>	Gate-Drain Charge			17.2		nC
Source-Drain Diode Characteristics						
I <sub>SD</sub>	Source-Drain Current (Body Diode)				205	A
V <sub>SD</sub>	Forward on Voltage (Note 3)	V <sub>GS</sub> =0V, I <sub>S</sub> =20A			1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =20A, dI/dt=100A/μs		65.2		ns
Q <sub>rr</sub>	Reverse Recovery Charge	I <sub>F</sub> =20A, dI/dt=100A/μs		74.9		nC

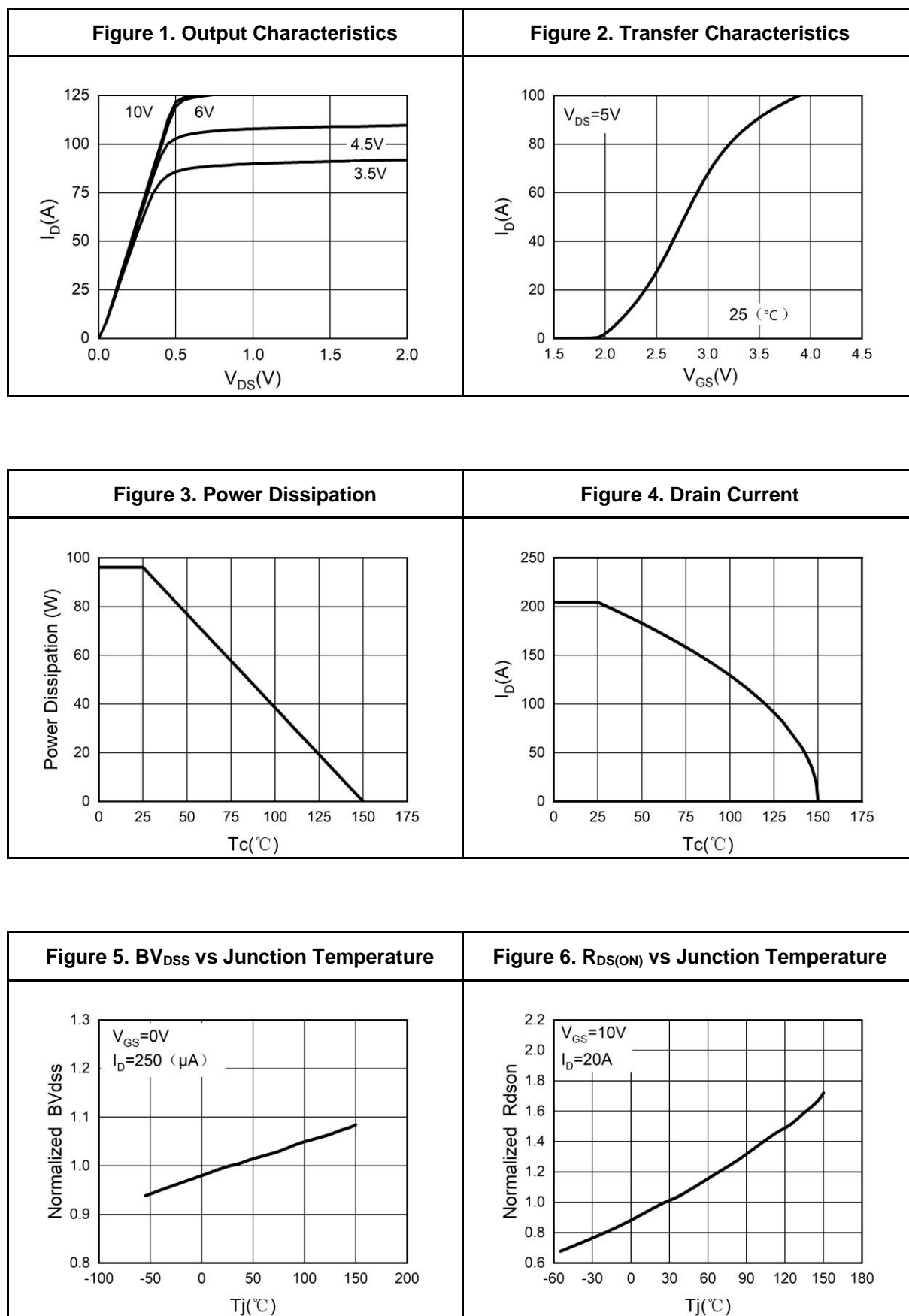
Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

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

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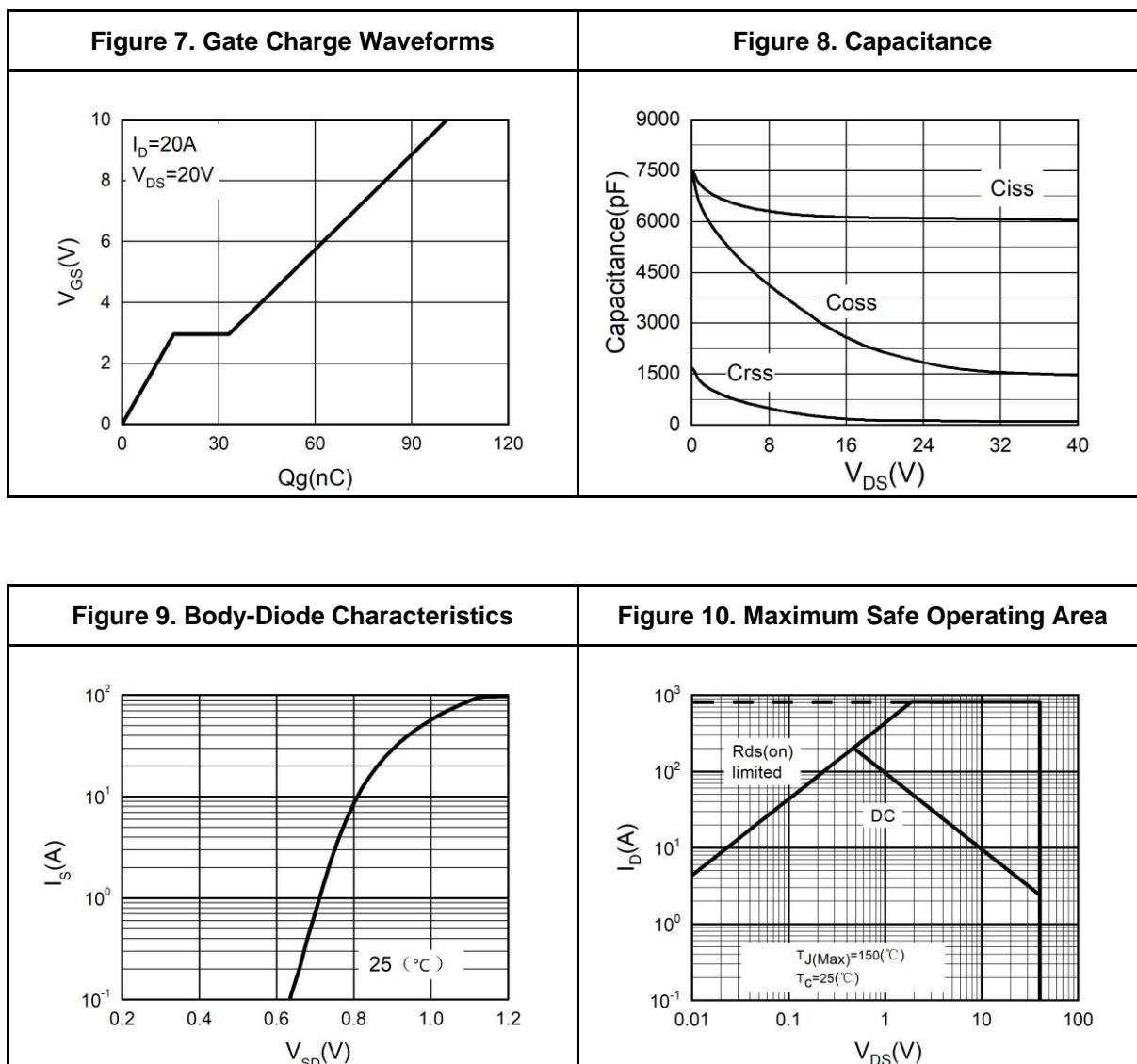


## Typical Electrical And Thermal Characteristics (Curves)



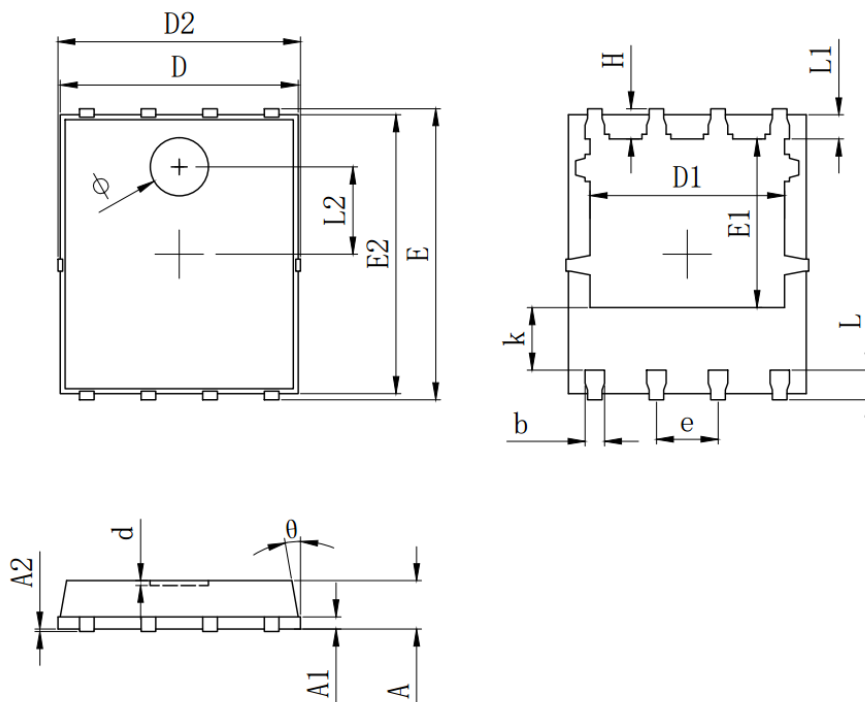


## Typical Electrical And Thermal Characteristics (Curves)





## 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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d			0.100



## **Attention**

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