150V N-Channel Trench Power MOSFET

General Description

The SJT015N053 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 10V. This device is suitable for use as a wide variety of applications.

Features

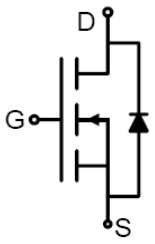
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handing capability
- Lead free product is acquired

Application

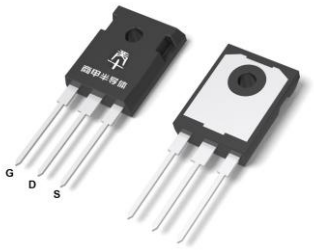
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Key Performance Parametes

Parameter	Value	Unit
V_{DS}	150	V
$R_{DS(ON)_TYP}$	5.6	mΩ
I_D	169	A
Q_G	170	nC



Schematic Diagram



TO-247 top & bottom view

RoHS

Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJT015N053	SJT015N053	TO-247	Tube	\	\	450 Pcs

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

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	150	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±20	V
I_D	Drain Current-Continuous(T_C=25℃)	169	A
	Drain Current-Continuous(T_C=100℃)	107	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	676	A
P_D	Maximum Power Dissipation(T_C=25℃)	500	W
	Maximum Power Dissipation(T_C=100℃)	200	W
E_{AS}	Avalanche energy (Note 2)	3721	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		0.25	℃/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	150			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=150V, V_{GS}=0V T_J=25℃			1	μA
		V_{DS}=150V, 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	3		5	V
g_{FS}	Forward Transconductance	V_{DS}=10V, I_D=20A		41		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=40A T_J=25℃		5.6	7.3	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=75V,V_{GS}=0V, f=1.0MHz		11700		pF
C_{oss}	Output Capacitance			823		pF
C_{rss}	Reverse Transfer Capacitance			171		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		1.8		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V, V_{DS}=75V, R_L=2Ω, R_{GEN}=3Ω		50		nS
t_r	Turn-on Rise Time			120		nS
$t_{d(off)}$	Turn-Off Delay Time			86		nS
t_f	Turn-Off Fall Time			122		nS
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=75V, I_D=40A		170		nC
Q_{gs}	Gate-Source Charge			65		nC
Q_{gd}	Gate-Drain Charge			45		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				169	A
V_{SD}	Forward on Voltage (Note 3)	V_{GS}=0V, I_S=20A			1.2	V
t_{rr}	Reverse Recovery Time	I_F=40A, dI/dt=100A/μs		126		ns
Q_{rr}	Reverse Recovery Charge	I_F=40A, dI/dt=100A/μs		570		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

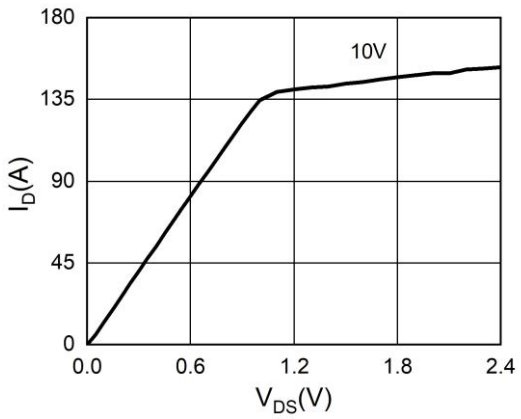


Figure 2. Transfer Characteristics

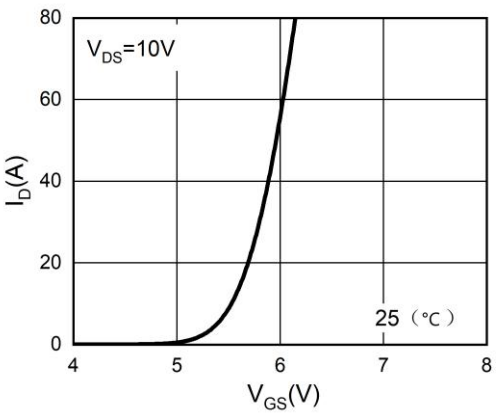


Figure 3. Power Dissipation

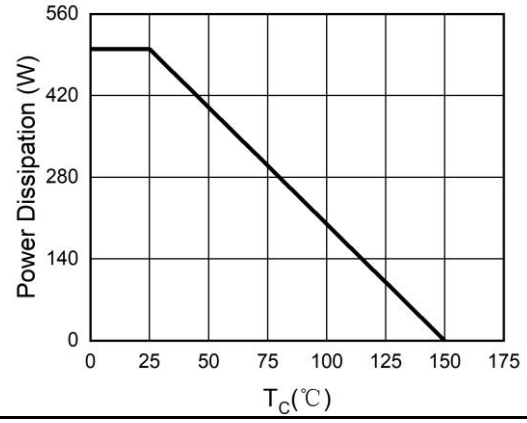


Figure 4. Drain Current

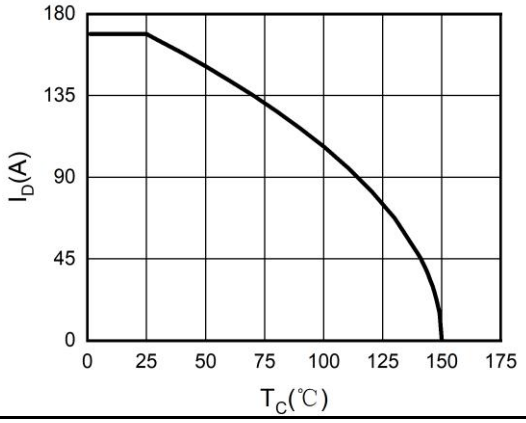


Figure 5. BV_{DSS} vs Junction Temperature

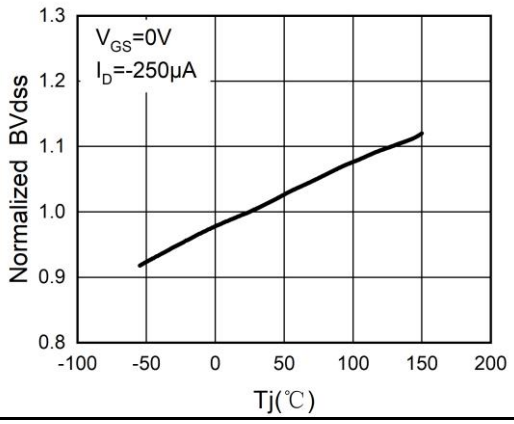
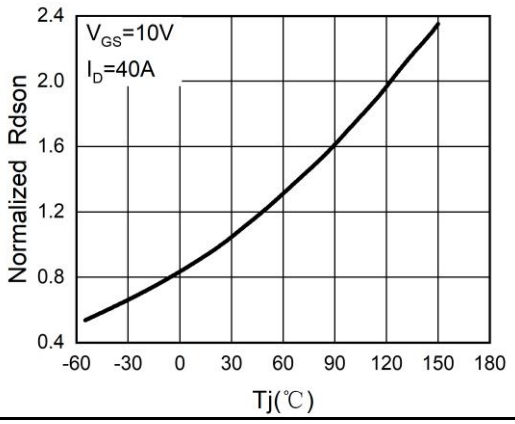


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

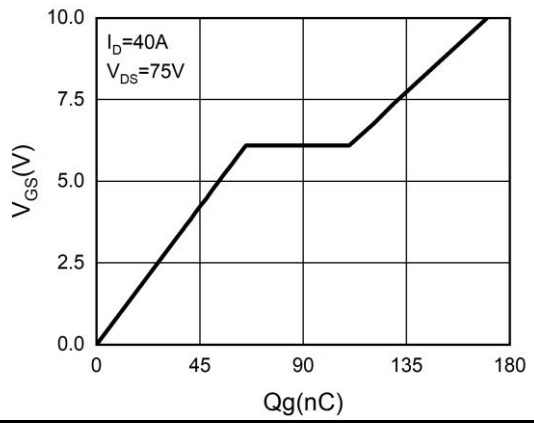


Figure 8. Capacitance

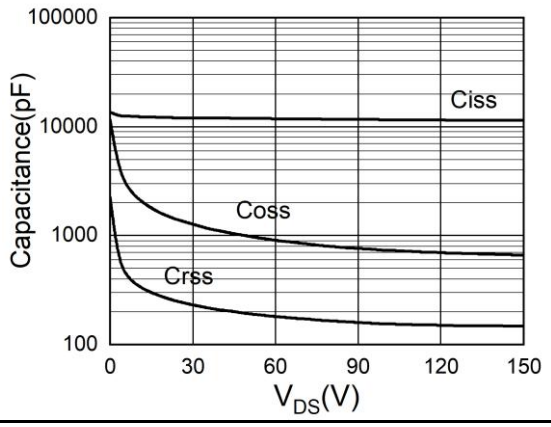


Figure 9. Body-Diode Characteristics

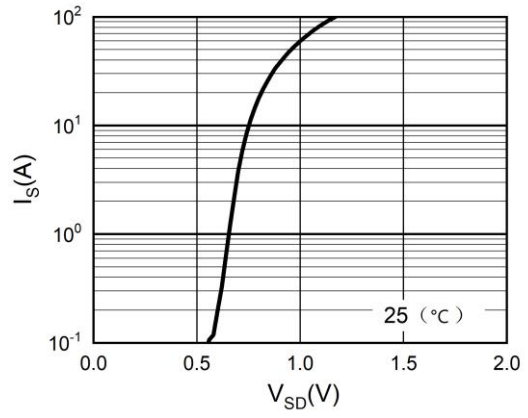
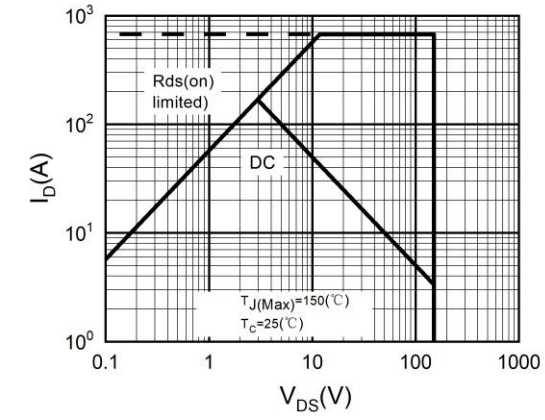
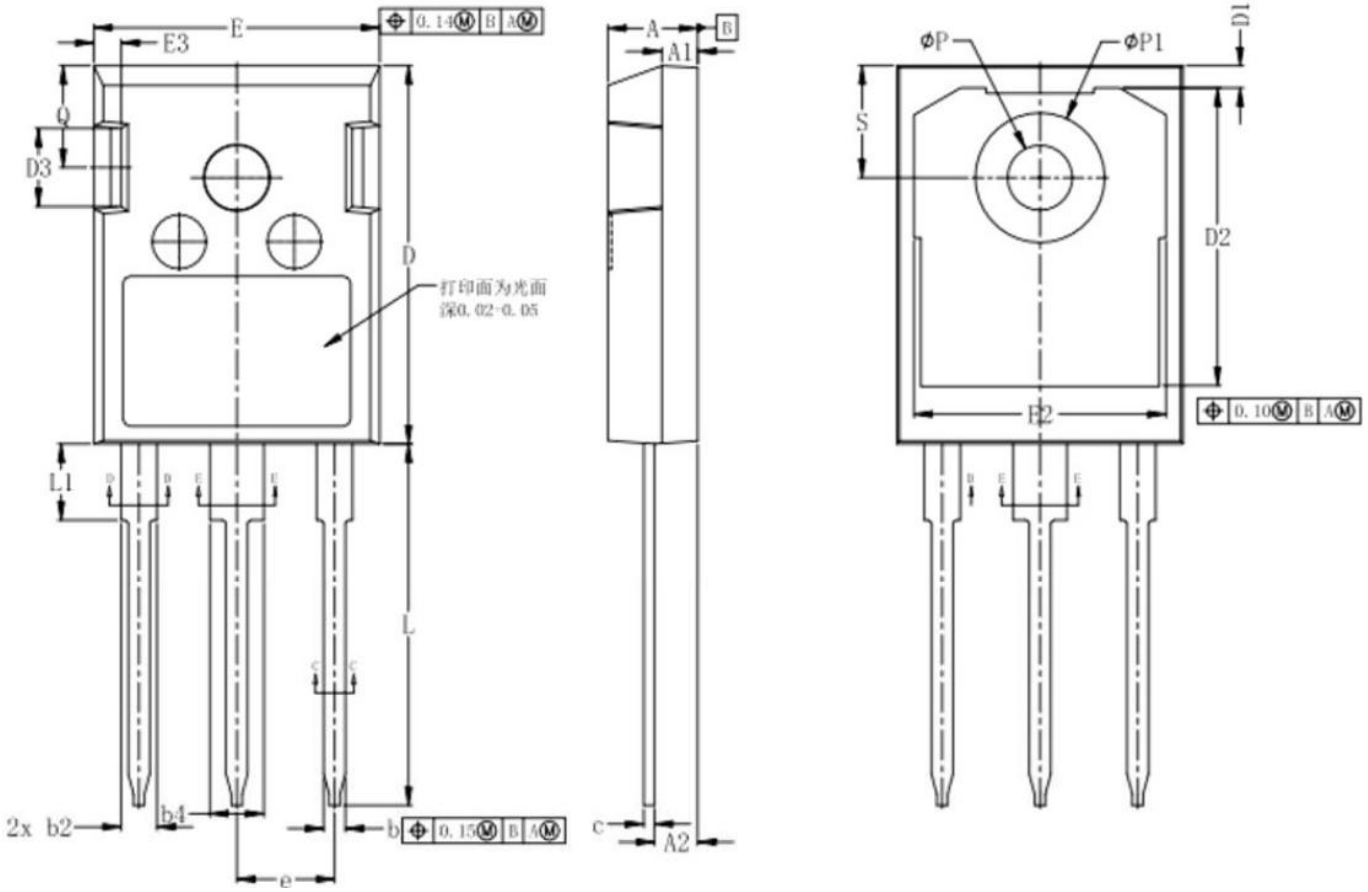


Figure 10. Maximum Safe Operating Area



TO-247 Package Information



DIM / SYMBOL	MIN.	NOM.	MAX.
A	4.900	5.000	5.100
A1	1.940	2.040	2.140
A2	2.300	2.400	2.500
b	1.139	1.239	1.330
b1	1.099	1.199	1.299
b2	1.939	2.039	2.139
b3	1.899	1.999	2.099
b4	2.940	3.040	3.140
b5	2.900	3.000	3.100
c	0.550	0.640	0.700
c1	0.500	0.600	0.700
D	20.850	20.950	21.050
D1	1.022	1.222	1.400
D2	16.348	16.548	16.748
D3	4.232	4.332	4.432
E	15.800	15.900	16.000
E2	13.821	14.021	14.221
E3	1.430	1.530	1.630
e	5.436 BSC.		
L	19.900	20.100	20.300
L1	4.024	4.224	4.424
□P	3.500	3.600	3.700
□P1	7.088	7.188	7.288
Q	5.435	5.635	5.835
S	6.040	6.200	6.300

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