



## 68V N-Channel Trench Power MOSFET

### General Description

The SJ68N069 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 handling capability
- Lead free product is acquired

### Application

- 48V E-bike controller
- Uninterruptible power supply
- Hard switched and high frequency circuits

### Key Performance Parameters

Parameter	Value	Unit
$V_{DS}$	68	V
$R_{DS(ON\_TYP)}$	7.1	m $\Omega$
$I_D$	80	A
$Q_G$	60	nC



### Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Reel Size	Tape width	Quantity
SJ68N069	SJ68N069	TO-220	\	\	\

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

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	68	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	$\pm 20$	V
$I_D$	Drain Current-Continuous( $T_C=25^\circ\text{C}$ )	80	A
	Drain Current-Continuous( $T_C=100^\circ\text{C}$ )	51	A
$I_{DM}$ (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	320	A
$P_D$	Maximum Power Dissipation( $T_C=25^\circ\text{C}$ )	110	W
	Maximum Power Dissipation( $T_C=100^\circ\text{C}$ )	44	W
$E_{AS}$	Avalanche energy (Note 2)	272	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		1.14	$^\circ\text{C}/\text{W}$



## 68V N-Channel Trench Power MOSFET

**Table 3. Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	68			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=65V, V_{GS}=0V, T_J=25^\circ\text{C}$			1	$\mu A$
		$V_{DS}=65V, V_{GS}=0V, T_J=125^\circ\text{C}$			100	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2		4	V
$g_{FS}$	Forward Transconductance	$V_{DS}=10V, I_D=20A$		35		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=40A, T_J=25^\circ\text{C}$		7.1	8.5	m $\Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1.0\text{MHz}$		3199		pF
$C_{oss}$	Output Capacitance			195		pF
$C_{rss}$	Reverse Transfer Capacitance			169		pF
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1.0\text{MHz}$		1.85		$\Omega$
<b>Switching Parameters</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{GS}=10V, V_{DS}=30V, R_L=1.5\Omega, R_{GEN}=6\Omega$		14.8		nS
$t_r$	Turn-on Rise Time			33.2		nS
$t_{d(off)}$	Turn-Off Delay Time			59.2		nS
$t_f$	Turn-Off Fall Time			12		nS
$Q_g$	Total Gate Charge	$V_{GS}=10V, V_{DS}=30V, I_D=20A$		60		nC
$Q_{gs}$	Gate-Source Charge			12.8		nC
$Q_{gd}$	Gate-Drain Charge			15.6		nC
<b>Source-Drain Diode Characteristics</b>						
$I_{SD}$	Source-Drain Current (Body Diode)				80	A
$V_{SD}$	Forward on Voltage (Note 3)	$V_{GS}=0V, I_S=20A$			1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=20A, dI/dt=100A/\mu s$		27.2		ns
$Q_{rr}$	Reverse Recovery Charge	$I_F=20A, dI/dt=100A/\mu s$		28		nC

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

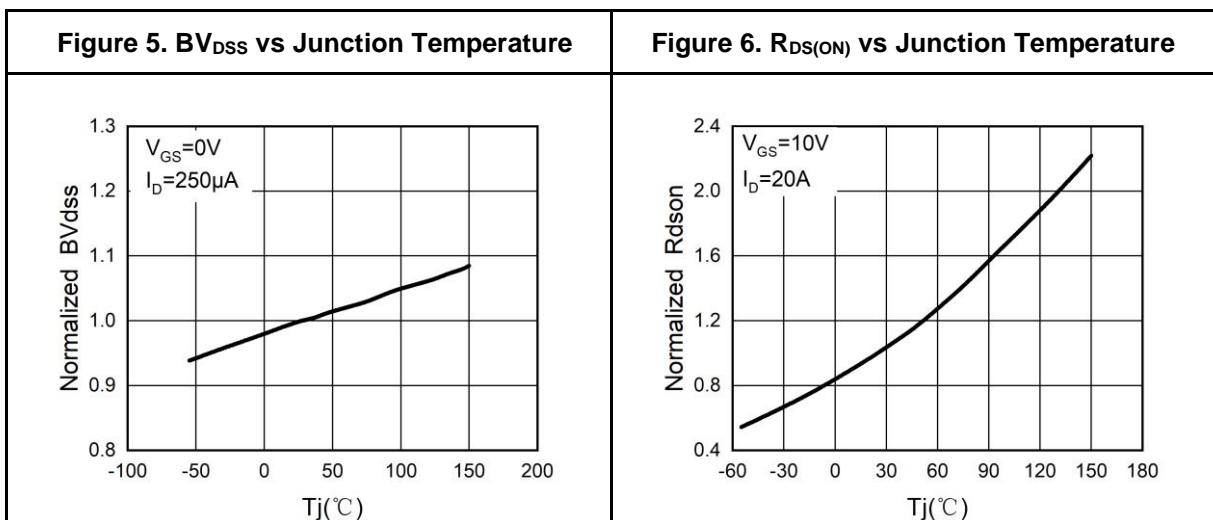
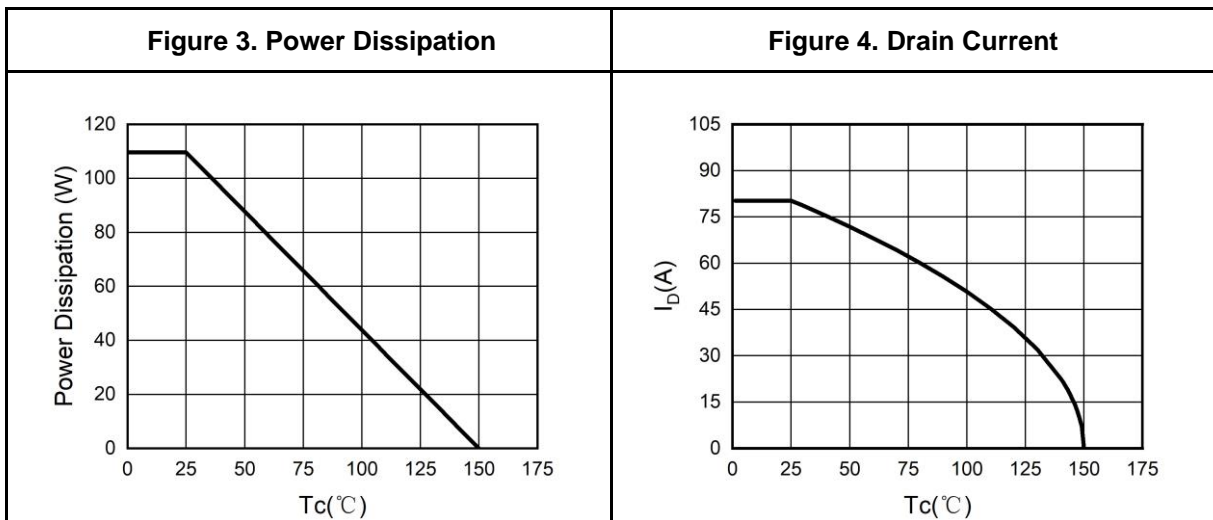
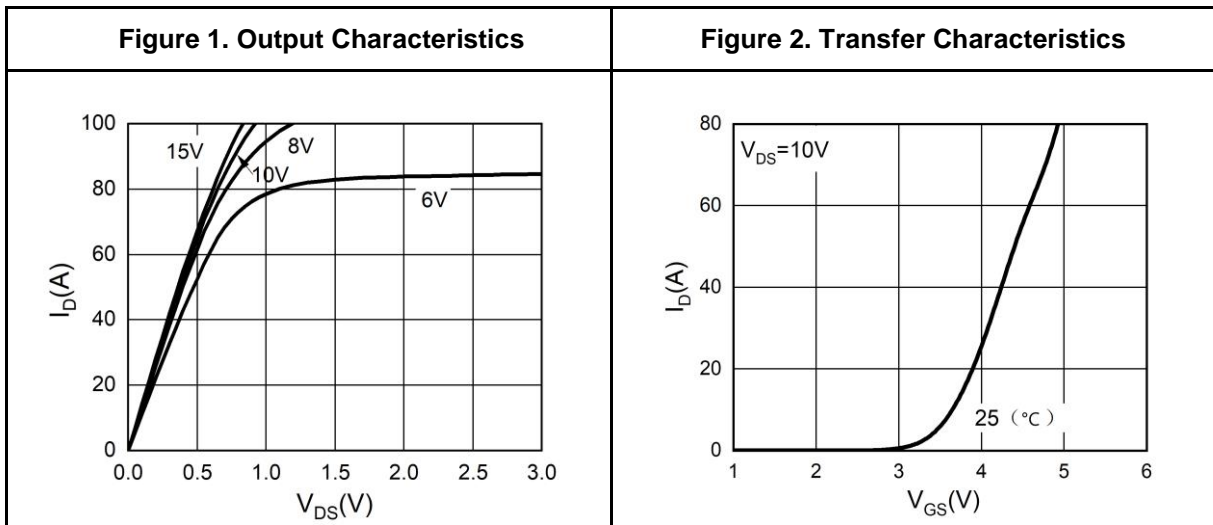
Notes 2.EAS condition:  $T_J=25^\circ\text{C}, V_{DD}=40V, V_G=10V, R_g=25\Omega, L=0.5\text{mH}$ .

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



# 68V N-Channel Trench Power MOSFET

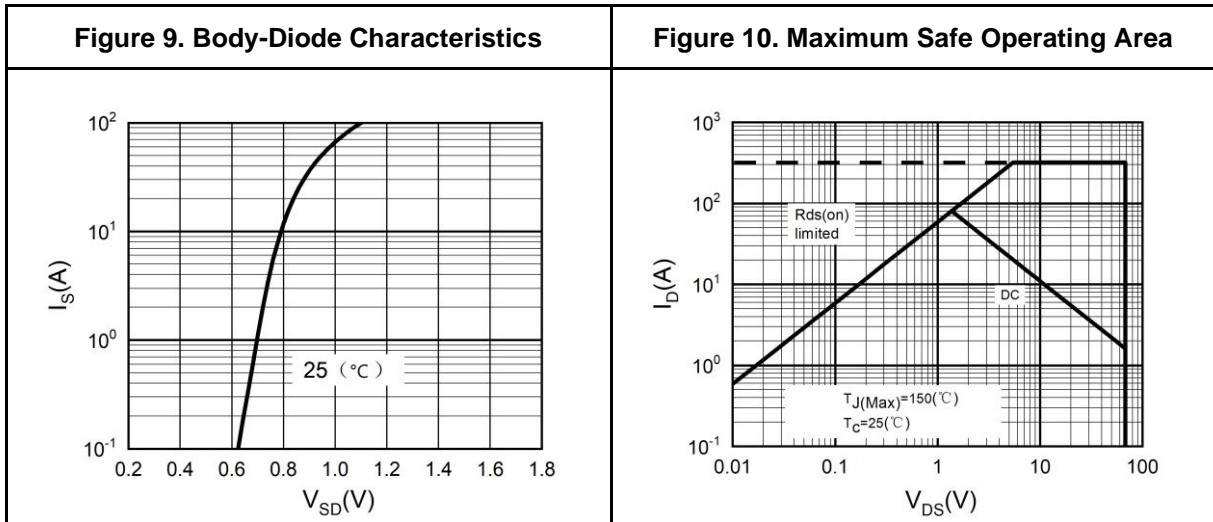
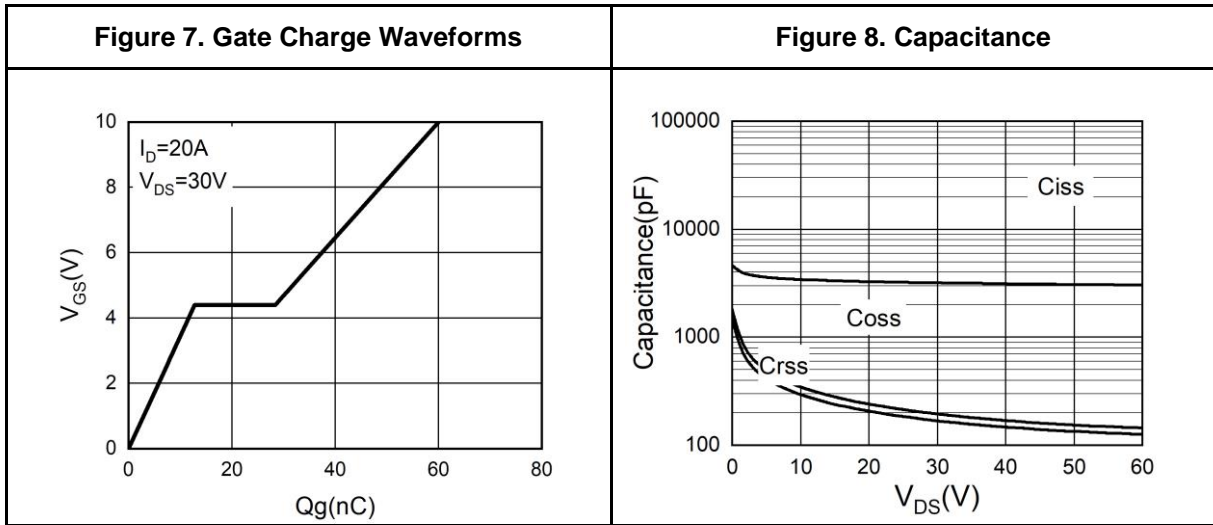
## Typical Electrical And Thermal Characteristics (Curves)





# 68V N-Channel Trench Power MOSFET

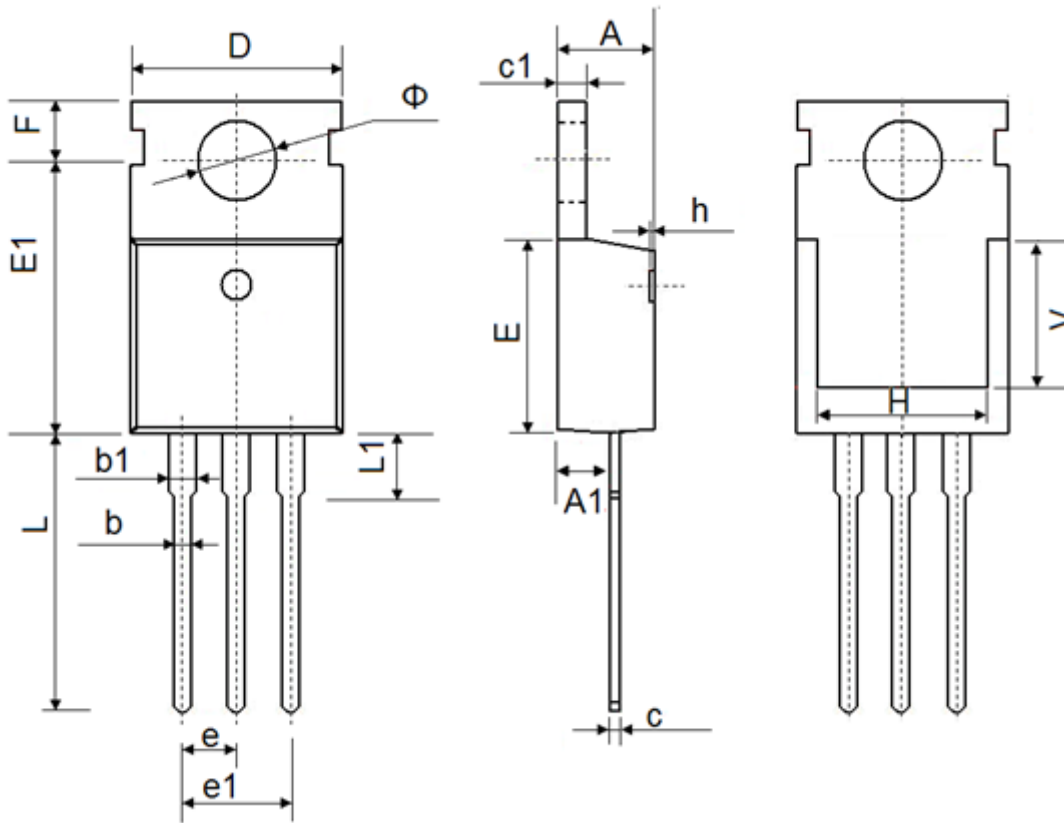
## Typical Electrical And Thermal Characteristics (Curves)





68V N-Channel Trench Power MOSFET

TO-220 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max
A	4.300	4.700	0.169	0.185
A1	2.200	2.600	0.087	0.102
b	0.700	0.950	0.028	0.037
b1	1.170	1.410	0.046	0.056
c	0.450	0.650	0.018	0.026
c1	1.200	1.400	0.047	0.055
D	9.600	10.400	0.378	0.409
E	8.8500	9.750	0.348	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.750	14.300	0.502	0.563
L1	2.850	3.950	0.112	0.156
V	7.500 REF.		0.295 REF.	
Φ	3.400	4.000	0.134	0.157



## **Attention**

This product described in this document can not be used in life support devices or systems, aircraft's control systems, and other applications whose failure can be reasonably expected to result in serious physical and/or material damage, apart from that when an application agreement is signed between customer and Wuxi Shangjia Semiconductor

The performances and characteristics of this product in the independent testing state are displayed in this document. Wuxi Shangjia Semiconductor can't guarantee of the performances and characteristics of this described product that mounted in the customer's products or equipments as same as that in the independent testing state. So the customer should evaluate and test devices mounted in the customer's products or equipments.

Wuxi Shangjia Semiconductor reserves the right to improve the designs, functions and reliability of this product and modify any and all information described in this document without notice customer, apart from that when a notice agreement is signed between customer and Wuxi Shangjia Semiconductor.

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Wuxi Shangjia Semiconductor hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.