

NST022C65K SiC Power MOSFET

1 Features and Benefits

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Avalanche Ruggedness
- Halogen Free, RoHS Compliant
- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

3 Description

NST022C65K is a 650V SiC MOSFET that contributes to miniaturization and low power consumption of applications. By leveraging advanced SiC technology, it delivers a superior balance between conduction efficiency and switching speed.

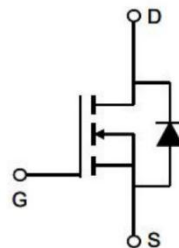
Device information

Part Number	Package	Device Marking
NST022C65K	TO-252	NST022C65K

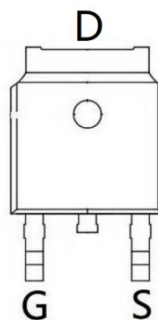
2 Application

- Motor driver
- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Motor Drives
- Pulsed Power applications

TO252 Pin Configuration



Schematic Diagram



Pin Assignment



4 Selection Guide

Part Number	TYPE	R _{DS_(ON)}	VDS	VTH
NST022C65K	N	215mΩ	650V	3.4V

5 Ordering Guide

Part Number	LOGO	Package
NST022C65K	 NST022C65K XXXXXX	TO-252

6 Revision history

Version	Content	Time
V1.0	Create	2024.02.13

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7 Function Pin Description

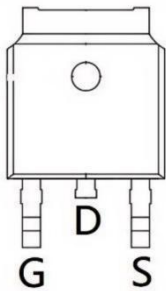


Figure7-1 3-Pin TO252 Top view

Table7-1 Lead Definitions

Symbol	Description
G	GATE
D	DRAIN
S	SOURCE

8 Product specifications

8.1 Absolute Maximum Ratings

PARAMETER	SYMBOL	MAX	UNIT
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	-10/+22	V
Drain Current-Continuous	$I_D(T_C=25^{\circ}C)$	15.4	A
	$I_D(T_C=100^{\circ}C)$	10.9	
Drain Current-Pulsed	I_{DM}	24.5	A
Maximum Power Dissipation	P_D	55	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^{\circ}C$

8.2 Thermal Characteristic

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	2.7	$^{\circ}C/W$

8.3 Electrical Characteristics (TA=25℃ unless otherwise noted)

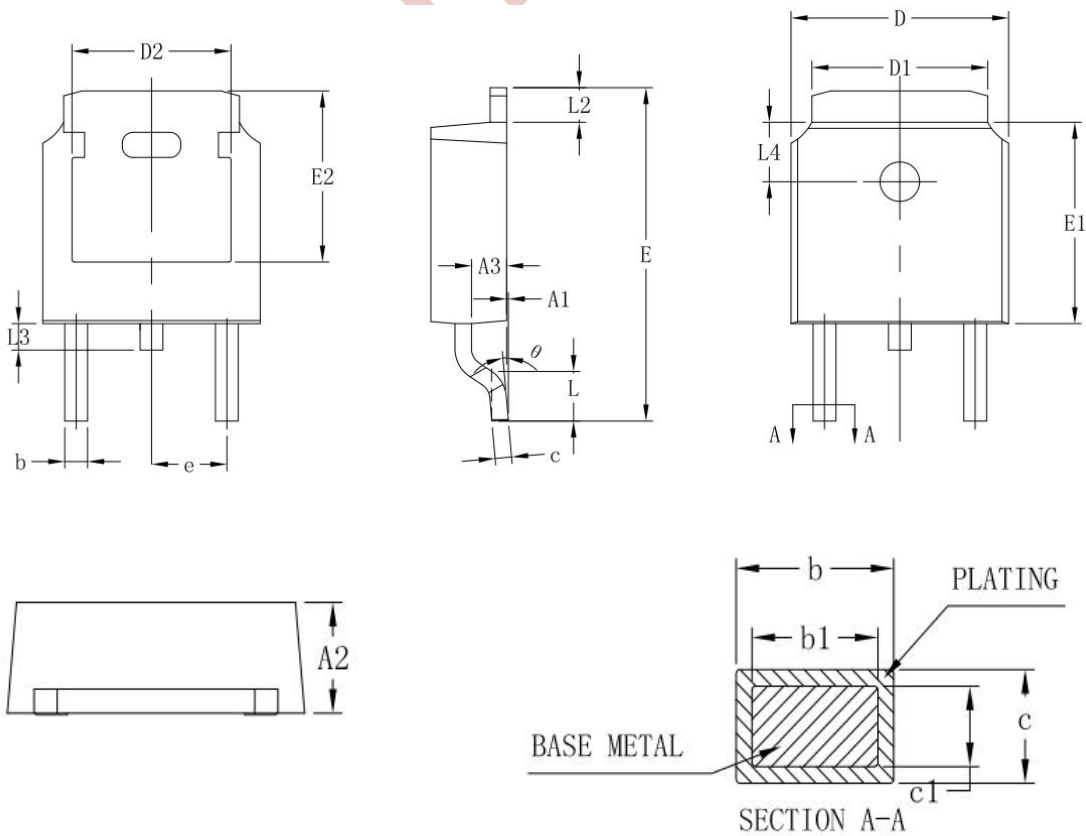
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 100μA	650	--	--	V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 3.5mA, T _J =25℃	2.7	3.4	4.1	V
		V _{DS} = V _{GS} , I _D = 3.5mA, T _J =175℃	--	2.4	--	V
Gate-Body Leakage	I _{GSS+}	V _{DS} = 0V, V _{GS} = +22V	--	--	250	nA
Gate-Body Leakage	I _{GSS-}	V _{DS} = 0V, V _{GS} = -10V	--	--	-250	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 650V, V _{GS} = 0V, T _J =25℃	--	0.1	100	μA
		V _{DS} = 650V, V _{GS} = 0V, T _J =175℃	--	1	--	
Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 15V, I _D = 8A, T _J =25℃	--	215	280	mΩ
		V _{GS} = 15V, I _D = 8A, T _J =175℃	--	229	--	
		V _{GS} = 18V, I _D = 8A, T _J =25℃	--	163	--	
		V _{GS} = 18V, I _D = 8A, T _J =175℃	--	207	--	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 400V, V _{GS} = 0V, f = 1MHz	--	289	--	pF
Output Capacitance	C _{oss}		--	23	--	
Reverse Transfer Capacitance	C _{rss}		--	2.1	--	
Switching Capacitance						
Turn-On Delay Time	t _{d(on)}	V _{DD} = 400V, I _D = 8A V _{GS} = 15V, R _G = 20Ω	--	35	--	ns
Turn-On Rise Time	t _r		--	30	--	
Turn-Off Delay Time	t _{d(off)}		--	40	--	
Turn-Off Fall Time	t _f		--	50	--	
Total Gate Charge	Q _g	V _{DS} = 400V, I _D =8A, V _{GS} =15V	--	12.5	--	nC
Gate-Source Charge	Q _{gs}		--	4.5	--	
Gate-Drain Charge	Q _{gd}		--	1.5	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _{SD} = 4A, T _J =25℃	--	3.6	--	V
		V _{GS} = 0V, I _{SD} = 4A, T _J =175℃	--	3.2	--	V

9 Package Information

TO-252 Package Information

SYMBOL	MILLIMETER			SYMBOL	MILLIMETER		
	MIN(mm)	TYP(mm)	MAX(mm)		MIN(mm)	NOM(mm)	MAX(mm)
A1	0.00	—	0.10	E	9.90	10.10	10.30
A2	2.20	2.30	2.40	E1	6.00	6.10	6.20
A3	1.02	1.07	1.12	E2	5.30REF		
b	0.65		0.77	e	2.286BSC		
b1	0.64	0.69	0.74	L	1.40	1.50	1.60
C	0.51	—	0.55	L2	0.90	—	1.25
c1	0.50	0.51	0.52	L3	0.60	0.80	1.00
D	6.50	6.60	6.70	L4	1.70	1.80	1.90
D1	5.33REF			Θ	0		8°
D2	4.83REF						

TO-252 Package Outlines



10 ATTENTION

- The NST022C65K product and its associated datasheet (hereinafter referred to as the "Product") provided by our company (NSIC Technology (Wuxi) Co., Ltd.) are not designed or tested for applications requiring very high reliability. Examples include life support systems, aircraft control systems, or other applications where failure could result in serious personal injury and/or material damage. Before using this product in this application, be sure to check with a representative of the company near you.
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