



NST80N03K N-Channel Enhancement Mode Power MOSFET

1 Features and Benefits

- 100% Avalanche Tested
- Fast Switching
- High Power and Current Handling Capability
- Termination is Lead-free and RoHS Compliant
- Parameters

$V_{DS} = 30V, I_D = 80A$
 $R_{DS(ON)typ.} = 3.9m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)typ.} = 5.8m\Omega @ V_{GS} = 4.5V$

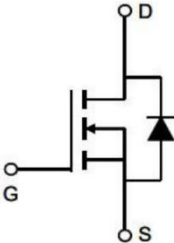
3 Description

The NST80N03K combines advanced trench technology to provide excellent $R_{DS(ON)}$, it is tailored to minimize conduction loss, and provide superior switching performance. It can be used in a wide variety of applications.

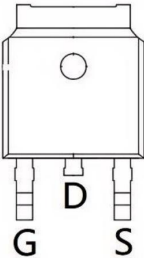
Device information

Part Number	Package	Device Marking
NST80N03K	TO252	NST80N03K

TO252 Pin Configuration



Schematic Diagram



Pin Assignment

2 Application

- PWM Applications
- Load Switch
- Power Management

4 Selection Guide

Part Number	TYPE	R _{DS_(ON)}	VDS	VTH
NST80N03K	N	3.9mΩ	30V	1.6V

5 Ordering Guide

Part Number	LOGO	Package
NST80N03K	 NST80N03K XXXXXX	TO252

6 Revision history

Version	Content	Time
V1.0	Create	2024.02.13



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7 Function Pin Description

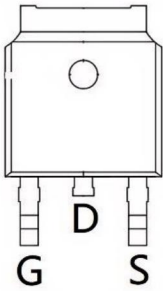


Figure7-1 3-Pin TO252 Top view

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}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	$I_D(T_C=25^{\circ}\text{C})$	80	A
	$I_D(T_C=100^{\circ}\text{C})$	45	
Drain Current-Pulsed ^{BC}	I_{DM}	320	A
Single pulse avalanche energy ^D	EAS	156	mJ
Maximum Power Dissipation ^{AC}	P_D	70	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^{\circ}\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.8	$^{\circ}\text{C/W}$
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8.2 Electrical Characteristics (TA=25°C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 250μA	30	--	--	V
Gate-Threshold Voltage	V _{th(GS)}	V _{DS} = V _{GS} , I _D = 250μA	1	1.6	2.2	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	--	--	±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V	--	--	1	μA
Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 20A	--	3.9	4.5	mΩ
		V _{GS} = 4.5V, I _D = 20A	--	5.8	7	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 15V, V _{GS} = 0V, F = 1MHz	--	1977	--	pF
Output Capacitance	C _{oss}		--	220	--	
Reverse Transfer Capacitance	C _{rss}		--	173	--	
Switching Capacitance						
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15V, R _L = 3Ω V _{GS} = 10V, R _{GEN} = 3Ω	--	21	--	ns
Turn-On Rise Time	t _r		--	16	--	ns
Turn-Off Delay Time	t _{d(off)}		--	62	--	ns
Turn-Off Fall Time	t _f		--	9	--	ns
Total Gate Charge	Q _g	V _{DS} = 15V, I _D = 5A, V _{GS} = 4.5V	--	37	--	nC
Gate-Source Charge	Q _{gs}		--	5.6	--	nC
Gate-Drain Charge	Q _{gd}		--	8	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _D = 1A	--	0.7	1.2	V
Diode Forward Current	I _s		--	--	80	A

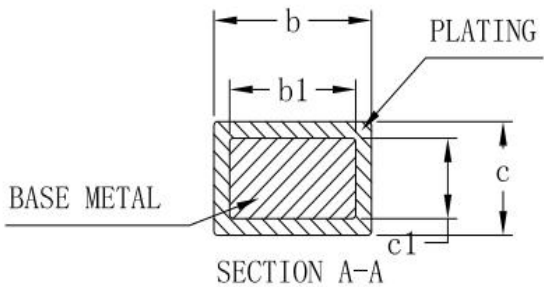
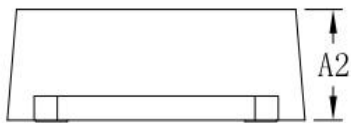
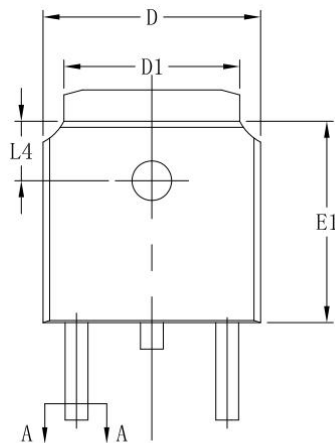
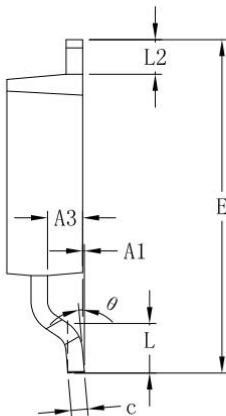
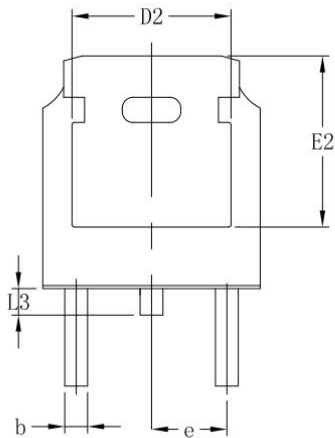
Notes:

- A. The Power dissipation PD is based on $T_J(\text{MAX}) = 150^{\circ}\text{C}$, using $\leq 10s$ junction-to-ambient thermal resistance.
- B. Repetitive rating, pulse width limited by junction temperature $T_J(\text{MAX}) = 150^{\circ}\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J = 25^{\circ}\text{C}$.
- C. The Static characteristics in Figures are obtained using $< 300\mu s$ pulses, duty cycle 2% max.
- D. EAS condition: $T_J = 25^{\circ}\text{C}$, $V_{DD} = 15V$, $V_{GS} = 10V$, $R_G = 25\Omega$, $L = 0.5mH$.

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						



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