

NTH4L019N65S3H

Product Preview

Power MOSFET, N-Channel, SUPERFET[®] III, FAST, 650 V, 75 A, 19 mΩ



ON Semiconductor[®]

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Description

SUPERFET III MOSFET is ON Semiconductor's brand-new high voltage super-junction (SJ) MOSFET family that is utilizing charge balance technology for outstanding low on-resistance and lower gate charge performance. This advanced technology is tailored to minimize conduction loss, provides superior switching performance, and withstand extreme dv/dt rate.

Consequently, SUPERFET III MOSFET is very suitable for the various power system for miniaturization and higher efficiency.

Features

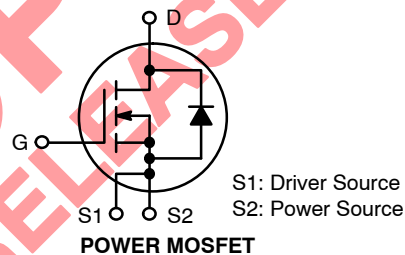
- 700 V @ $T_J = 150^\circ\text{C}$
- Typ. $R_{DS(on)} = 15\text{ m}\Omega$
- Ultra Low Gate Charge (Typ. $Q_g = 259\text{ nC}$)
- Low Effective Output Capacitance (Typ. $C_{oss(eff.)} = \text{TBD pF}$)
- 100% Avalanche Tested

Applications

- Telecom / Server Power Supplies
- Industrial Power Supplies
- EV Charger
- UPS / Solar

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

V_{DSS}	$R_{DS(on)}\text{ MAX}$	$I_D\text{ MAX}$
650 V	19 mΩ @ 10 V	75 A



TO-247-4LD
CASE 340CJ

MARKING DIAGRAM



&Z = Assembly Plant Code
&3 = Data Code (Year & Week)
&K = Lot
NTH4L019N65S3H = Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

NTH4L019N65S3H

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C, Unless otherwise noted)

Symbol	Parameter	Value	Unit
V _{DSS}	Drain to Source Voltage	650	V
V _{GSS}	Gate to Source Voltage	- DC	±30
		- AC (f > 1 Hz)	±30
I _D	Drain Current	- Continuous (T _C = 25°C)	75
		- Continuous (T _C = 100°C)	65.8
I _{DM}	Drain Current	- Pulsed (Note 1)	308
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	TBD	mJ
I _{AS}	Avalanche Current (Note 2)	TBD	A
E _{AR}	Repetitive Avalanche Energy (Note 1)	TBD	mJ
dv/dt	MOSFET dv/dt	100	V/ns
	Peak Diode Recovery dv/dt (Note 3)	20	
P _D	Power Dissipation	(T _C = 25°C)	595
		- Derate Above 25°C	4.76
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T _L	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 seconds	300	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Repetitive rating: pulse-width limited by maximum junction temperature.

2. I_{AS} = TBD A, R_G = 25 Ω, starting T_J = 25°C.

3. I_{SD} ≤ 75 A, di/dt ≤ 200 A/μs, V_{DD} ≤ 400 V, starting T_J = 25°C.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
R _{θJC}	Thermal Resistance, Junction to Case, Max.	0.21	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient, Max.	40	

PACKAGE MARKING AND ORDERING INFORMATION

Part Number	Top Marking	Package	Packing Method	Reel Size	Tape Width	Quantity
NTH4L019N65S3H	NTH4L019N65S3H	TO-247 A04	Tube	N/A	N/A	30 Units

NTH4L019N65S3H

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

BV _{DSS}	Drain to Source Breakdown Voltage	V _{GS} = 0 V, I _D = 1 mA, T _J = 25°C	650			V
		V _{GS} = 0 V, I _D = 1 mA, T _J = 150°C	700			V
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 1 mA, Referenced to 25°C		0.68		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650 V, V _{GS} = 0 V			1	μA
		V _{DS} = 520 V, T _C = 125°C		7		
I _{GSS}	Gate to Body Leakage Current	V _{GS} = ±30 V, V _{DS} = 0 V			±100	nA

ON CHARACTERISTICS

V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 7.5 mA	2.4		4.0	V
R _{DS(on)}	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 37.5 A		15	19	mΩ
g _{FS}	Forward Transconductance	V _{DS} = 20 V, I _D = 37.5 A		TBD		S

DYNAMIC CHARACTERISTICS

C _{iss}	Input Capacitance	V _{DS} = 400 V, V _{GS} = 0 V, f = 1 MHz		15244		pF
C _{oss}	Output Capacitance			215		pF
C _{oss(eff.)}	Effective Output Capacitance	V _{DS} = 0 V to 400 V, V _{GS} = 0 V		TBD		pF
C _{oss(er.)}	Energy Related Output Capacitance	V _{DS} = 0 V to 400 V, V _{GS} = 0 V		TBD		pF
Q _{g(tot)}	Total Gate Charge at 10V	V _{DS} = 400 V, I _D = 37.5 A, V _{GS} = 10 V (Note 4)		259		nC
Q _{gs}	Gate to Source Gate Charge			60		nC
Q _{gd}	Gate to Drain "Miller" Charge			63		nC
ESR	Equivalent Series Resistance	f = 1 MHz		0.8		Ω

SWITCHING CHARACTERISTICS

t _{d(on)}	Turn-On Delay Time	V _{DD} = 400 V, I _D = 37.5 A, V _{GS} = 10 V, R _g = 2.2 Ω (Note 4)		TBD		ns
t _r	Turn-On Rise Time			TBD		ns
t _{d(off)}	Turn-Off Delay Time			TBD		ns
t _f	Turn-Off Fall Time			TBD		ns

SOURCE-DRAIN DIODE CHARACTERISTICS


I _S	Maximum Continuous Source to Drain Diode Forward Current			75		A
I _{SM}	Maximum Pulsed Source to Drain Diode Forward Current			300		A
V _{SD}	Source to Drain Diode Forward Voltage	V _{GS} = 0 V, I _{SD} = 37.5 A			1.2	V
t _{rr}	Reverse Recovery Time	V _{DD} = 400 V, I _{SD} = 37.5 A, dI _F /dt = 100 A/μs		TBD		ns
Q _{rr}	Reverse Recovery Charge				TBD	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. Essentially independent of operating temperature typical characteristics.

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