

MOSFET – Power, N-Channel, SUPERFET® III

Product Preview NTD360N80S3Z

800 V, 360 mΩ, 13 A

Description

800 V SUPERFET III is ON Semiconductor's high performance MOSFET family offering 800 V breakdown voltage.

New 800 V SUPERFET III MOSFET which is optimized for primary switch of flyback converter, enables lower switching losses and case temperature without sacrificing EMI performance due to its optimized design.

This new family of 800 V SUPERFET III MOSFET enables to make more efficient, compact, cooler and more robust applications because of its remarkable performance in switching power applications such as Laptop adapter, Audio, Lighting, ATX power and industrial power supplies.

Features

- Typ. $R_{DS(on)} = 300\text{ m}\Omega$
- Ultra Low Gate Charge (Typ. $Q_g = 24.7\text{ nC}$)
- Low Stored Energy in Output Capacitance ($E_{oss} = 2.9\text{ }\mu\text{J @ 400 V}$)
- 100% Avalanche Tested
- ESD Improved Capability with Zener Diode
- RoHS Compliant

Applications

- Adapters / Chargers
- LED Lighting
- AUX Power
- Audio
- Industrial Power

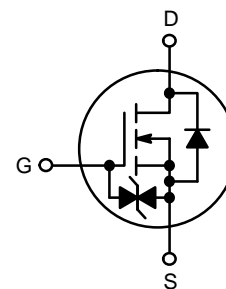
This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.



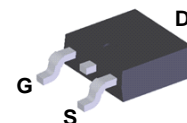
ON Semiconductor®

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$V_{(BR)DSS}$	$R_{DS(ON)}\text{ MAX}$	$I_D\text{ MAX}$
800 V	360 mΩ	13 A

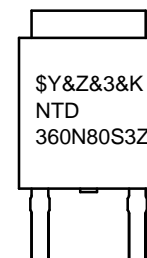


POWER MOSFET



**D-PAK
TO-252
CASE 369AS**

MARKING DIAGRAM



$\$Y$ = ON Semiconductor Logo
 $\&Z$ = Assembly Plant Code
 $\&3$ = Data Code (Year & Week)
 $\&K$ = Lot
 NTD360N80S3Z = Specific Device Code

ORDERING INFORMATION

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

NTD360N80S3Z

ABSOLUTE MAXIMUM RATINGS (T_J = 25°C, unless otherwise noted)

Symbol	Parameter	Value	Unit
V _{DSS}	Drain-to-Source Voltage	800	V
V _{GS}	Gate-to-Source Voltage	DC	±20
		AC (f > 1 Hz)	±30
I _D	Drain Current	Continuous (T _C = 25°C)	13
		Continuous (T _C = 100°C)	8.2
I _{DM}	Drain Current	Pulsed (Note 1)	32.5
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)	152
		Derate Above 25°C	TBD
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T _L	Lead Temperature Soldering Reflow for Soldering Purposes (1/8" from Case for 10 seconds)	260	°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} ≤ 6 A, di/dt ≤ 200 A/μs, V_{DD} ≤ 400 V, starting T_J = 25°C.

THERMAL RESISTANCE RATINGS

Symbol	Parameter	Value	Unit
R _{θJC}	Junction-to-Case – Steady State	TBD	°C/W
R _{θJA}	Junction-to-Ambient – Steady State	TBD	

PACKAGE MARKING AND ORDERING INFORMATION

Part Number	Top Marking	Package	Packing Method	Reel Size	Tape Width	Quantity
NTD360N80S3Z	NTD360N80S3Z	DPAK	TBD	N/A	N/A	TBD Units

NTD360N80S3Z

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ 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	800			V
		V _{GS} = 0 V, I _D = 1 mA, T _J = 150°C	900			V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 1 mA, Referenced to 25°C		0.96		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 800 V, V _{GS} = 0 V			10	μA
		V _{DS} = 640 V, T _C = 125°C		20		
I _{GSS}	Gate-to-Body Leakage Current	V _{GS} = ±20 V, V _{DS} = 0 V			10	μA

ON CHARACTERISTICS

V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 0.3 mA	2.2		3.8	V
R _{DS(on)}	Static Drain-to-Source On Resistance	V _{GS} = 10 V, I _D = 6.5 A		300	360	mΩ
g _{FS}	Forward Transconductance	V _{DS} = 20 V, I _D = 6.5 A		12.8		S

DYNAMIC CHARACTERISTICS

C _{iss}	Input Capacitance	V _{DS} = 400 V, V _{GS} = 0 V, f = 250 kHz		1120		pF
C _{oss}	Output Capacitance				16.4	
C _{oss(eff.)}	Effective Output Capacitance	V _{DS} = 0 V to 400 V, V _{GS} = 0 V		315		pF
C _{oss(er.)}	Energy Related Output Capacitance	V _{DS} = 0 V to 400 V, V _{GS} = 0 V		34		pF
Q _{g(tot)}	Total Gate Charge at 10 V	V _{DS} = 400 V, I _D = 6.5 A, V _{GS} = 10 V (Note 4)		24.7		nC
Q _{gs}	Gate-to-Source Gate Charge			6		nC
Q _{gd}	Gate-to-Drain "Miller" Charge			10.1		nC
ESR	Equivalent Series Resistance	f = 1 MHz		3.6		Ω

SWITCHING CHARACTERISTICS

t _{d(on)}	Turn-On Delay Time	V _{DD} = 400 V, I _D = 6.5 A, V _{GS} = 10 V, R _g = 25 Ω (Note 4)		20		ns
t _r	Turn-On Rise Time			2.8		ns
t _{d(off)}	Turn-Off Delay Time			36.6		ns
t _f	Turn-Off Fall Time			9.6		ns

SOURCE-DRAIN DIODE CHARACTERISTICS

I _S	Maximum Continuous Source-to-Drain Diode Forward Current			13		A
I _{SM}	Maximum Pulsed Source-to-Drain Diode Forward Current			32.5		A
V _{SD}	Source-to-Drain Diode Forward Voltage	V _{GS} = 0 V, I _{SD} = 6.5 A			1.2	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _{SD} = 6.5 A, dI _F /dt = 100 A/μs		370		ns
Q _{rr}	Reverse Recovery Charge				3.2	

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.

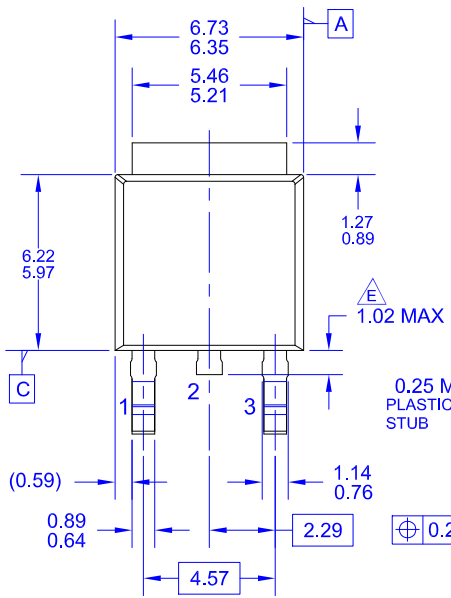
4. Essentially independent of operating temperature typical characteristics.

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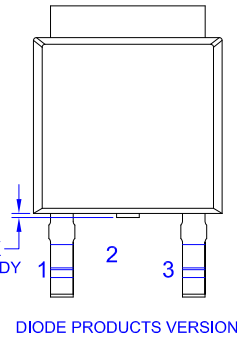
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PACKAGE DIMENSIONS

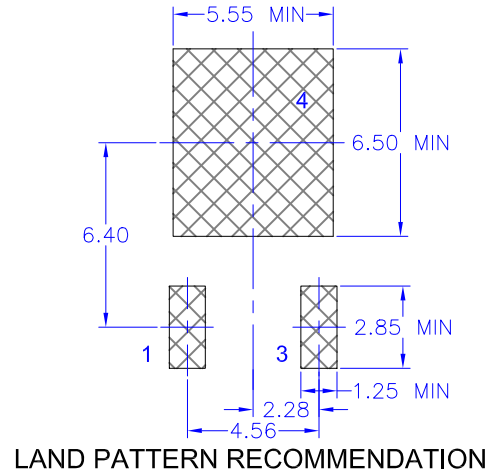
DPAK3 (TO-252 3 LD) CASE 369AS ISSUE O



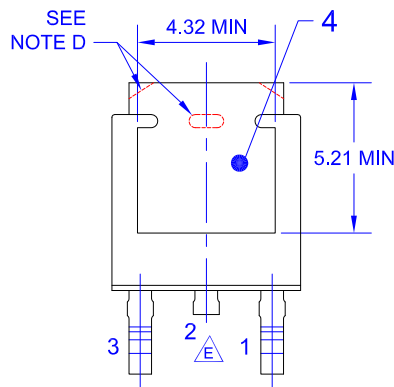
NON-DIODE PRODUCTS VERSION



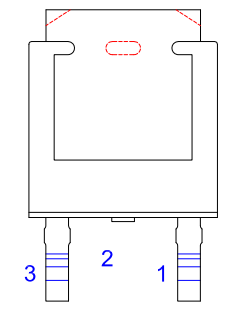
DIODE PRODUCTS VERSION



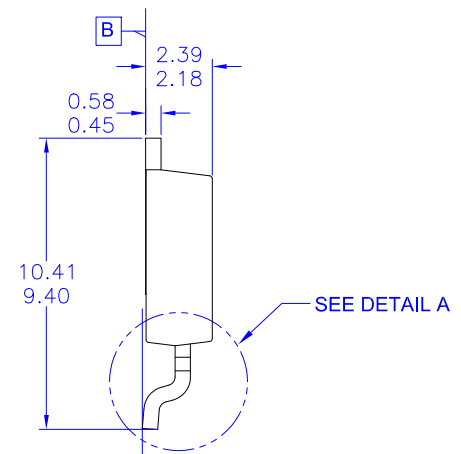
LAND PATTERN RECOMMENDATION



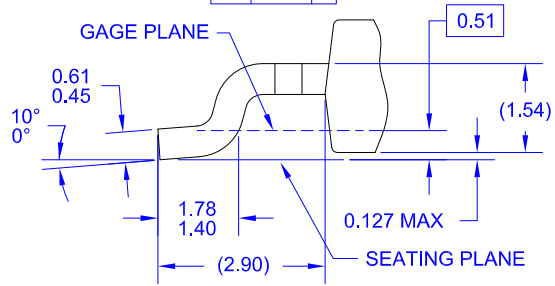
NON-DIODE PRODUCTS VERSION



DIODE PRODUCTS VERSION




0.10 B



DETAIL A
(ROTATED -90°)
SCALE: 12X

NOTES: UNLESS OTHERWISE SPECIFIED

- A) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE C, VARIATION AA.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
- D) SUPPLIER DEPENDENT MOLD LOCKING HOLES OR CHAMFERED CORNERS OR EDGE PROTRUSION.
- E) TRIMMED CENTER LEAD IS PRESENT ONLY FOR DIODE PRODUCTS
- F) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- G) LAND PATTERN RECOMMENDATION IS BASED ON IPC7351A STD TO228P991X239-3N.

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