

MOSFET – Power, N-Channel, SUPERFET® III

Product Preview NTPF360N80S3Z

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 ($E_{oss} = 2.9 \mu\text{J} @ 400 \text{ V}$)
- 100% Avalanche Tested
- ESD Improved Capability with Zener Diode
- RoHS Compliant

Applications

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

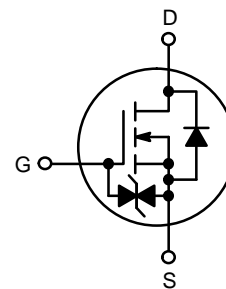
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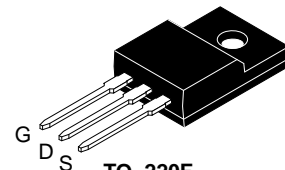
ON Semiconductor®

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

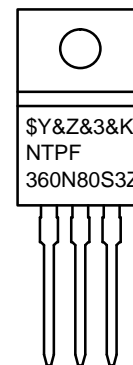


POWER MOSFET



**TO-220F
CASE 221AT**

MARKING DIAGRAM



- \$Y = ON Semiconductor Logo
- &Z = Assembly Plant Code
- &3 = Data Code (Year & Week)
- &K = Lot
- NTPF360N80S3Z = Specific Device Code

ORDERING INFORMATION

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

NTPF360N80S3Z

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	V
		AC (f > 1 Hz)	±30	
I _D	Drain Current	Continuous (T _C = 25°C)	13*	A
		Continuous (T _C = 100°C)	8.2*	
I _{DM}	Drain Current	Pulsed (Note 1)	32.5*	A
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	W/°C
		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.

*Drain current limited by maximum junction temperature, with heatsink.

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
NTPF360N80S3Z	NTPF360N80S3Z	TO-220 FULLBACK	Tube	N/A	N/A	50 Units

NTPF360N80S3Z

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	$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}, T_J = 25^\circ\text{C}$	800			V
		$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}, T_J = 150^\circ\text{C}$	900			V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 1\text{ mA}$, Referenced to 25°C		0.96		V/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$			10	μA
		$V_{DS} = 640\text{ V}, T_C = 125^\circ\text{C}$		20		
I_{GSS}	Gate-to-Body Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			10	μA

ON CHARACTERISTICS

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 0.3\text{ mA}$	2.2		3.8	V
$R_{DS(on)}$	Static Drain-to-Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 6.5\text{ A}$		300	360	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = 20\text{ V}, I_D = 6.5\text{ A}$		13.1		S

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	$V_{DS} = 400\text{ V}, V_{GS} = 0\text{ V}, f = 250\text{ kHz}$		1120		pF
C_{oss}	Output Capacitance			16.4		pF
$C_{oss(eff.)}$	Effective Output Capacitance	$V_{DS} = 0\text{ V to } 400\text{ V}, V_{GS} = 0\text{ V}$		315		pF
$C_{oss(er.)}$	Energy Related Output Capacitance	$V_{DS} = 0\text{ V to } 400\text{ V}, V_{GS} = 0\text{ V}$		34		pF
$Q_{g(tot)}$	Total Gate Charge at 10 V	$V_{DS} = 400\text{ V}, I_D = 6.5\text{ A}, V_{GS} = 10\text{ V}$ (Note 4)		24.7		nC
Q_{gs}	Gate-to-Source Gate Charge			6		nC
Q_{gd}	Gate-to-Drain "Miller" Charge			10.2		nC
ESR	Equivalent Series Resistance	$f = 1\text{ MHz}$		3.6		Ω

SWITCHING CHARACTERISTICS

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 400\text{ V}, I_D = 6.5\text{ A}, V_{GS} = 10\text{ V},$ $R_g = 25\ \Omega$ (Note 4)		20.3		ns
t_r	Turn-On Rise Time			2.8		ns
$t_{d(off)}$	Turn-Off Delay Time			37		ns
t_f	Turn-Off Fall Time			10.1		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	$V_{GS} = 0\text{ V}, I_{SD} = 6.5\text{ A}$		1.2		V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}, I_{SD} = 6.5\text{ A},$ $di_F/dt = 100\text{ A}/\mu\text{s}$		370		ns
Q_{rr}	Reverse Recovery Charge			3.2		μC

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.

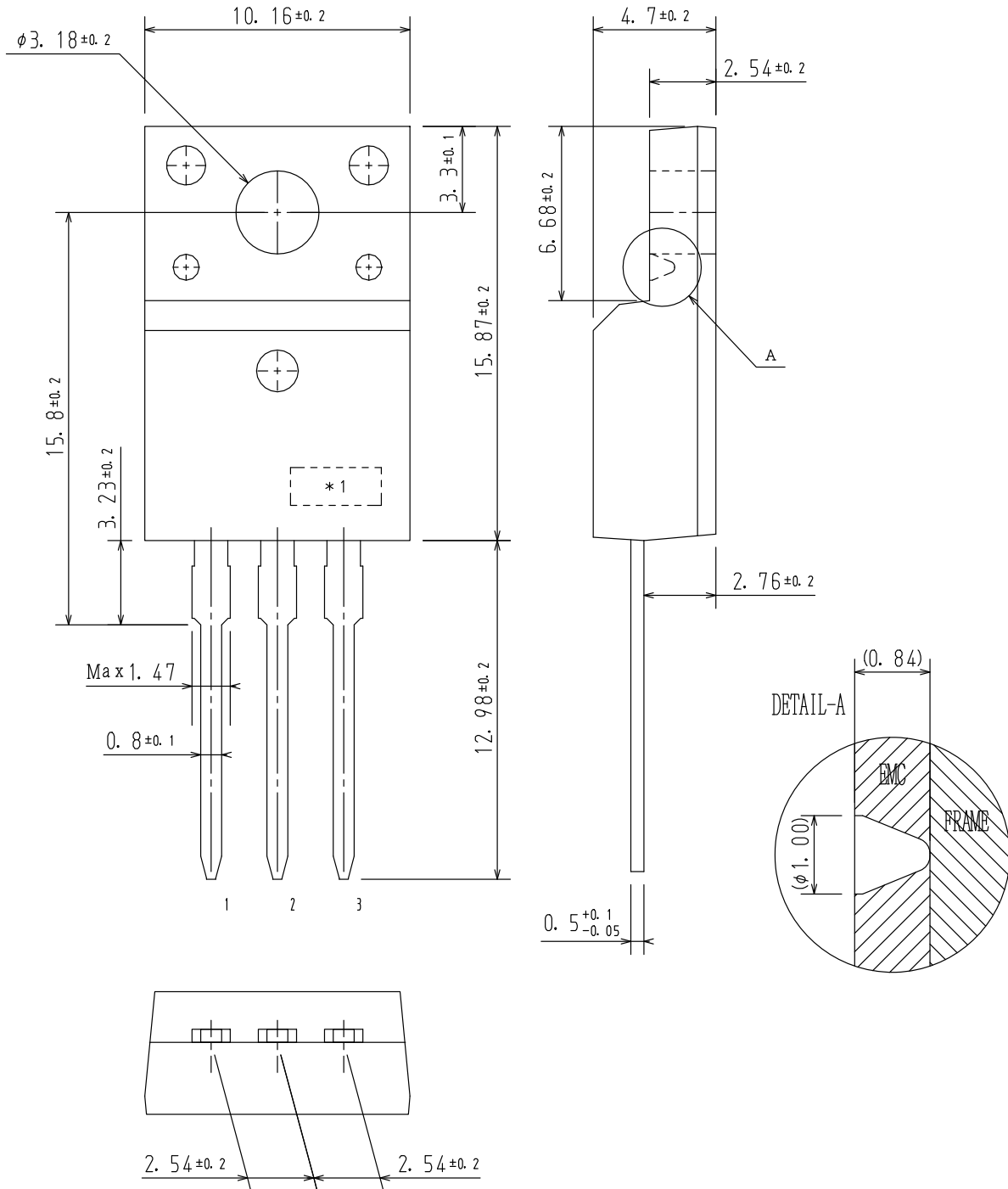
4. Essentially independent of operating temperature typical characteristics.

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NTPF360N80S3Z

PACKAGE DIMENSIONS

TO-220 Fullpack, 3-Lead / TO-220F-3SG
CASE 221AT
ISSUE A



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