



STP3NB100 STP3NB100FP

N - CHANNEL 1000V - 5.3 Ω - 3 A - TO-220/TO-220FP
PowerMESH™ MOSFET

TARGET DATA

TYPE	V _{DSS}	R _{DS(on)}	I _D
STP3NB100	1000 V	< 6 Ω	3 A
STP3NB100FP	1000 V	< 6 Ω	3 A

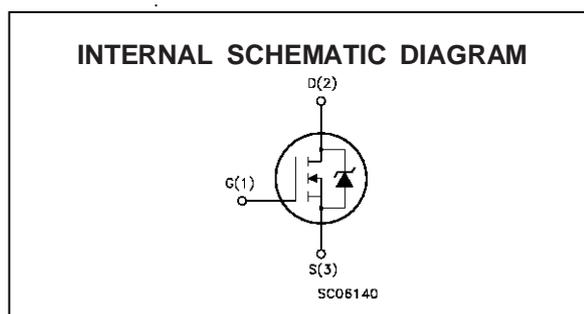
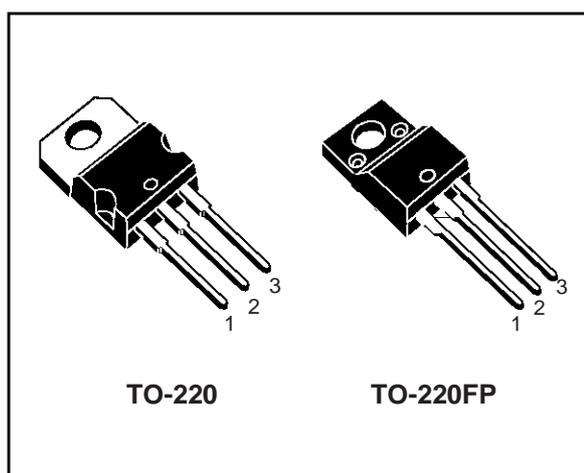
- TYPICAL R_{DS(on)} = 5.3 Ω
- EXTREMELY HIGH dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- VERY LOW INTRINSIC CAPACITANCES
- GATE CHARGE MINIMIZED

DESCRIPTION

Using the latest high voltage MESH OVERLAY™ process, STMicroelectronics has designed an advanced family of power MOSFETs with outstanding performances. The new patent pending strip layout coupled with the Company's proprietary edge termination structure, gives the lowest RDS(on) per area, exceptional avalanche and dv/dt capabilities and unrivalled gate charge and switching characteristics.

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SWITCH MODE POWER SUPPLIES (SMPS)
- DC-AC CONVERTERS FOR WELDING EQUIPMENT AND UNINTERRUPTIBLE POWER SUPPLIES AND MOTOR DRIVE



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STP3NB100	STP3NB100FP	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	1000		V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 kΩ)	1000		V
V _{GS}	Gate-source Voltage	± 30		V
I _D	Drain Current (continuous) at T _c = 25 °C	3	3(**)	A
I _D	Drain Current (continuous) at T _c = 100 °C	1.9	1.1	A
I _{DM} (•)	Drain Current (pulsed)	12	12	A
P _{tot}	Total Dissipation at T _c = 25 °C	100	35	W
	Derating Factor	0.8	0.28	W/°C
dv/dt(1)	Peak Diode Recovery voltage slope	4.5	4.5	V/ns
V _{ISO}	Insulation Withstand Voltage (DC)	—	2000	V
T _{stg}	Storage Temperature	-65 to 150		°C
T _j	Max. Operating Junction Temperature	150		°C

(•) Pulse width limited by safe operating area

(1) I_{SD} ≤ 3 A, di/dt ≤ 200 A/μs, V_{DD} ≤ V_{(BR)DSS}, T_j ≤ T_{JMAX}

(**) Limited only by T_{MAX}

STP3NB100/FP

THERMAL DATA

		TO-220	TO220-FP	
R _{thj-case}	Thermal Resistance Junction-case Max	1.25	3.57	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient Max	62.5		°C/W
R _{thc-sink}	Thermal Resistance Case-sink Typ	0.5		°C/W
T _l	Maximum Lead Temperature For Soldering Purpose	300		°C

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _j max)	3	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 50 V)	244	mJ

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	I _D = 250 μA V _{GS} = 0	1000			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating T _c = 125 °C			1 50	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 30 V			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} I _D = 250 μA	3	4	5	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10V I _D = 1.5 A		5.3	6	Ω
I _{D(on)}	On State Drain Current	V _{DS} > I _{D(on)} × R _{DS(on)max} V _{GS} = 10 V	3			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} > I _{D(on)} × R _{DS(on)max} I _D = 1.5 A	1.5			S
C _{iss}	Input Capacitance	V _{DS} = 25 V f = 1 MHz V _{GS} = 0		700		pF
C _{oss}	Output Capacitance			80		pF
C _{rss}	Reverse Transfer Capacitance			4		pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 500\text{ V}$ $I_D = 1.5\text{ A}$		TBD		ns
t_r	Rise Time	$R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$				ns
Q_g	Total Gate Charge	$V_{DD} = 800\text{ V}$ $I_D = 3\text{ A}$ $V_{GS} = 10\text{ V}$		21		nC
Q_{gs}	Gate-Source Charge			8		nC
Q_{gd}	Gate-Drain Charge			9		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{DD} = 800\text{ V}$ $I_D = 3\text{ A}$		TBD		ns
t_f	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$				ns
t_c	Cross-over Time					ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				3	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				12	A
$V_{SD}(\ast)$	Forward On Voltage	$I_{SD} = 3\text{ A}$ $V_{GS} = 0$			1.6	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 3\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 100\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$		TBD		ns
Q_{rr}	Reverse Recovery Charge					μC
I_{RRM}	Reverse Recovery Current					A

(\ast) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

(\bullet) Pulse width limited by safe operating area