

# STP200NF03

## STB200NF03 STB200NF03-1

N-CHANNEL 30V - 0.0032  $\Omega$  - 120A D<sup>2</sup>PAK/I<sup>2</sup>PAK/TO-220

STripFET™ II POWER MOSFET

AUTOMOTIVE SPECIFIC

TYPE	V <sub>DSS</sub>	R <sub>D(on)</sub>	I <sub>D</sub>
STB200NF03/-1	30 V	<0.0036 $\Omega$	120 A(**)
STB200NF03	30 V	<0.0036 $\Omega$	120 A(**)

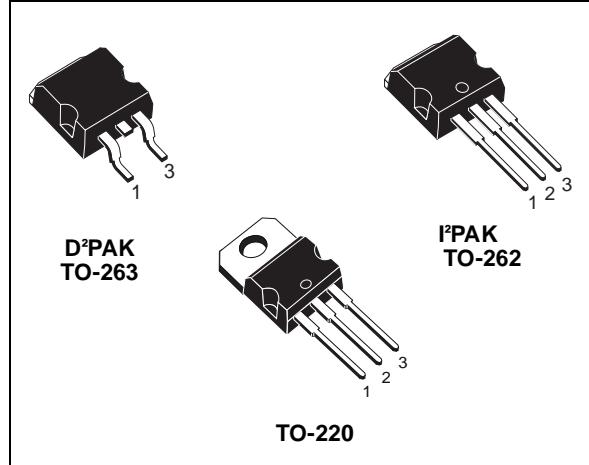
- TYPICAL R<sub>D(on)</sub> = 0.0032  $\Omega$
- STANDARD THRESHOLD DRIVE
- 100% AVALANCHE TESTED

### DESCRIPTION

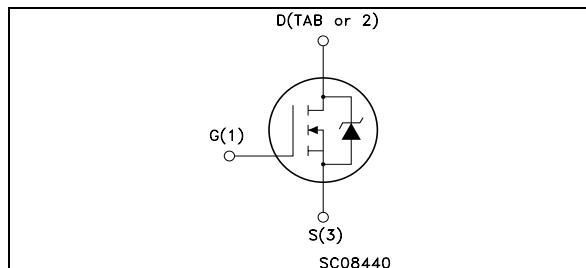
This Power MOSFET is the latest development of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

### APPLICATIONS

- HIGH CURRENT, HIGH SWITCHING SPEED
- DC-DC & DC-AC CONVERTERS
- SOLENOID AND RELAY DRIVERS



### INTERNAL SCHEMATIC DIAGRAM



### Ordering Information

SALES TYPE	MARKING	PACKAGE	PACKAGING
STB200NF03T4	B200NF03	D <sup>2</sup> PAK	TAPE & REEL
STP200NF03	P200NF03	TO-220	TUBE
STB200NF03-1	B200NF03	I <sup>2</sup> PAK	TUBE

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	30	V
V <sub>DGR</sub>	Drain-gate Voltage (R <sub>GS</sub> = 20 k $\Omega$ )	30	V
V <sub>GS</sub>	Gate-source Voltage	$\pm 20$	V
I <sub>D</sub> (**)	Drain Current (continuous) at T <sub>C</sub> = 25°C	120	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 100°C	120	A
I <sub>DM</sub> (•)	Drain Current (pulsed)	480	A
P <sub>tot</sub>	Total Dissipation at T <sub>C</sub> = 25°C	300	W
	Derating Factor	2.0	W/ $^{\circ}$ C
dv/dt (1)	Peak Diode Recovery voltage slope	1.5	V/ns
E <sub>AS</sub> (2)	Single Pulse Avalanche Energy	1.45	J
T <sub>stg</sub>	Storage Temperature	-55 to 175	°C
T <sub>j</sub>	Operating Junction Temperature		

(•) Pulse width limited by safe operating area.

(\*\*) Current Limited by Package

(1) I<sub>SD</sub> ≤ 120A, di/dt ≤ 400A/ $\mu$ s, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>j</sub> ≤ T<sub>JMAX</sub>

(2) Starting T<sub>j</sub> = 25 °C, I<sub>D</sub> = 60 A, V<sub>DD</sub> = 25 V

## STB200NF03/-1 STP200NF03

---

### THERMAL DATA

Rthj-case Rthj-amb Rthj-pcb T <sub>I</sub>	Thermal Resistance Junction-case Thermal Resistance Junction-ambient Thermal Resistance Junction-pcb Maximum Lead Temperature For Soldering Purpose (for 10 sec. 1.6 mm from case)	Max Max Max Typ	0.5 62.5 see curve on page 6 300	°C/W °C/W °C/W °C
---	--	--------------------------	---	----------------------------

### ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^\circ\text{C}$ unless otherwise specified)

#### OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>(BR)DSS</sub>	Drain-source Breakdown Voltage	I <sub>D</sub> = 250 μA V <sub>GS</sub> = 0	30			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current (V <sub>GS</sub> = 0)	V <sub>DS</sub> = Max Rating V <sub>DS</sub> = Max Rating T <sub>C</sub> = 125°C			1 10	μA μA
I <sub>GSS</sub>	Gate-body Leakage Current (V <sub>DS</sub> = 0)	V <sub>GS</sub> = ± 20V			±100	nA

#### ON (\*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> I <sub>D</sub> = 250 μA	2		4	V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> = 10 V I <sub>D</sub> = 60 A		0.0032	0.0036	Ω

#### DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g <sub>fs</sub> (*)	Forward Transconductance	V <sub>DS</sub> = 15 V I <sub>D</sub> = 60 A		200		S
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub>	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V <sub>DS</sub> = 25V, f = 1 MHz, V <sub>GS</sub> = 0		4950 1750 280		pF pF pF

**ELECTRICAL CHARACTERISTICS (continued)**

**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ $t_r$	Turn-on Delay Time Rise Time	$V_{DD} = 15 \text{ V}$ $I_D = 60 \text{ A}$ $R_G = 4.7 \Omega$ $V_{GS} = 10 \text{ V}$ (Resistive Load, Figure 3)		30 195		ns ns
$Q_g$ $Q_{gs}$ $Q_{gd}$	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 24 \text{ V}$ $I_D = 120 \text{ A}$ $V_{GS} = 10 \text{ V}$		113 32 41	140	nC nC nC

**SWITCHING OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ $t_f$	Turn-off Delay Time Fall Time	$V_{DD} = 15 \text{ V}$ $I_D = 60 \text{ A}$ $R_G = 4.7 \Omega$ , $V_{GS} = 10 \text{ V}$ (Resistive Load, Figure 3)		75 60		ns ns

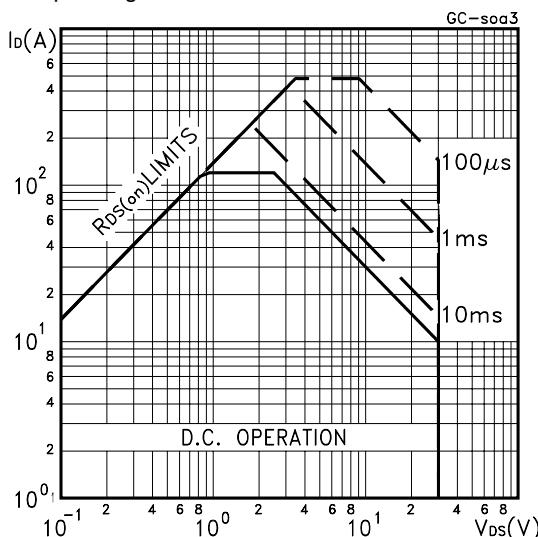
**SOURCE DRAIN DIODE**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$ $I_{SDM} (\bullet)$	Source-drain Current Source-drain Current (pulsed)				120 480	A A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 120 \text{ A}$ $V_{GS} = 0$			1.3	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 120 \text{ A}$ $di/dt = 100 \text{ A}/\mu\text{s}$ $V_{DD} = 25 \text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 5)		70 170 5		ns nC A

(\*)Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.

(•)Pulse width limited by safe operating area.

**Safe Operating Area**



**Thermal Impedance**

