

STP55NF03L

STB55NF03L STB55NF03L-1

N-CHANNEL 30V - 0.01 Ω - 55A TO-220/D²PAK/I²PAK

STripFET™ II POWER MOSFET

TYPE	V _{DSS}	R _{D(on)}	I _D
STP55NF03L	30 V	<0.013 Ω	55 A
STB55NF03L	30 V	<0.013 Ω	55 A
STB55NF03L-1	30 V	<0.013 Ω	55 A

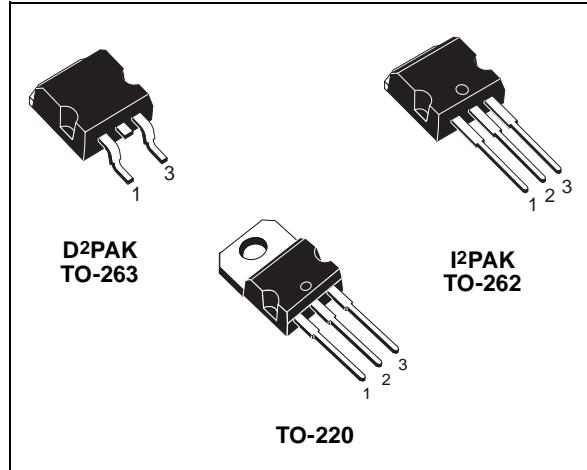
- TYPICAL R_{D(on)} = 0.01 Ω
- OPTIMIZED FOR HIGH SWITCHING OPERATIONS
- LOW GATE CHARGE
- LOGIC LEVEL GATE DRIVE

DESCRIPTION

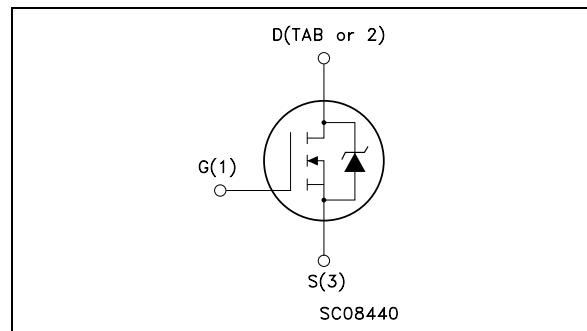
This Power MOSFET is the latest development of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing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

APPLICATIONS

- LOW VOLTAGE DC-DC CONVERTERS
- HIGH CURRENT, HIGH SWITCHING SPEED
- HIGH EFFICIENCY SWITCHING CIRCUITS



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	30	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	30	V
V _{GS}	Gate- source Voltage	± 16	V
I _D	Drain Current (continuous) at T _C = 25°C	55	A
I _D	Drain Current (continuous) at T _C = 100°C	39	A
I _{DM(•)}	Drain Current (pulsed)	220	A
P _{tot}	Total Dissipation at T _C = 25°C	80	W
	Derating Factor	0.53	W/°C
T _{stg}	Storage Temperature	-60 to 175	°C
T _j	Max. Operating Junction Temperature	175	°C

(•) Pulse width limited by safe operating area.

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THERMAL DATA

R _{thj-case} R _{thj-amb} T _I	Thermal Resistance Junction-case Thermal Resistance Junction-ambient Maximum Lead Temperature For Soldering Purpose	Max Max Typ	1.875 62.5 300	°C/W °C/W °C
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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	30			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating T _C = 125°C			1 10	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 16V			±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	1			V
R _{D5(on)}	Static Drain-source On Resistance	V _{GS} = 10 V I _D = 27.5 A V _{GS} = 4.5 V I _D = 27.5 A		0.01 0.013	0.013 0.020	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} > I _{D(on)} × R _{D5(on)max} , I _D = 27.5 A		30		S
C _{iss} C _{oss} C _{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{DS} = 25V, f = 1 MHz, V _{GS} = 0		1265 435 115		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	$V_{DD} = 15 \text{ V}$ $I_D = 27.5 \text{ A}$ $R_G = 4.7 \Omega$ $V_{GS} = 4.5 \text{ V}$ (Resistive Load, Figure 3)		28 400		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 24 \text{ V}$ $I_D = 55 \text{ A}$ $V_{GS} = 4.5 \text{ V}$		20 7 10	27	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	$V_{DD} = 15 \text{ V}$ $I_D = 27.5 \text{ A}$ $R_G = 4.7 \Omega$, $V_{GS} = 4.5 \text{ V}$ (Resistive Load, Figure 3)		25 50		ns ns

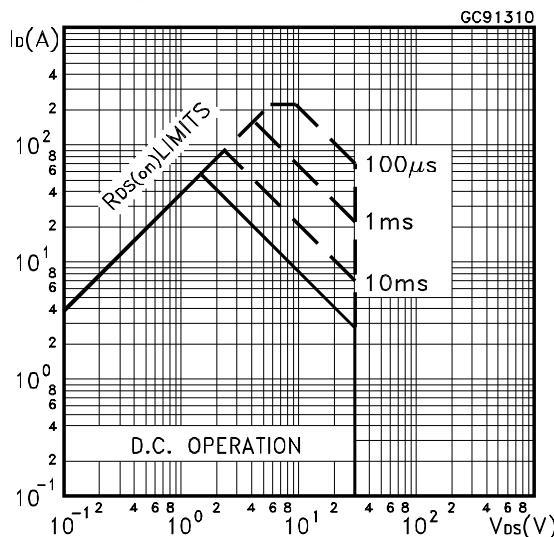
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} $I_{SDM} (\bullet)$	Source-drain Current Source-drain Current (pulsed)				55 220	A A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 55 \text{ A}$ $V_{GS} = 0$			1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 55 \text{ A}$ $di/dt = 100 \text{ A}/\mu\text{s}$ $V_{DD} = 30 \text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 5)		70 160 4.5		ns nC A

(*)Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.

(•)Pulse width limited by safe operating area.

Safe Operating Area



Thermal Impedance

