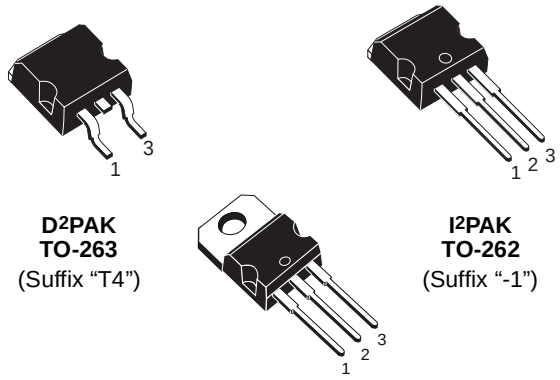
STB100NF03L-03 STP100NF03L-03 STB100NF03L-03-1

N-CHANNEL 30V - 0.0026 Ω -100A D²PAK/I²PAK/TO-220 STripFET™ II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STB100NF03L-03	30 V	<0.0032 Ω	100 A
STP100NF03L-03	30 V	<0.0032 Ω	100 A
STB100NF03L-03-01	30 V	<0.0032 Ω	100 A

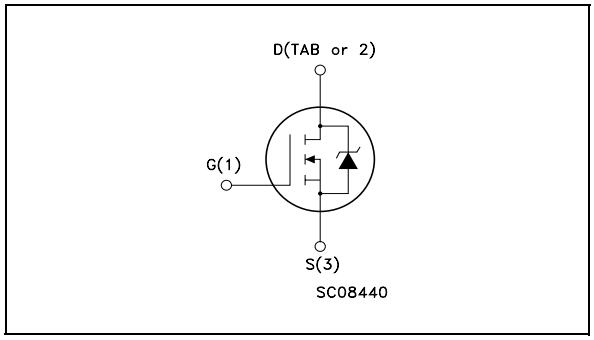
- TYPICAL R_{DS}(on) = 0.0026 Ω
- LOW THRESHOLD DRIVE
- 100% AVALANCHE TESTED
- LOGIC LEVEL DEVICE
- THROUGH-HOLE IPAK (TO-251) POWER PACKAGE IN TUBE (SUFFIX "-1")
- SURFACE-MOUNTING D²PAK (TO-263) POWER PACKAGE IN TUBE (NO SUFFIX) OR IN TAPE & REEL (SUFFIX "T4")



DESCRIPTION

This Power MOSFET is the latest development of STMicroelectronis 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.

INTERNAL SCHEMATIC DIAGRAM



APPLICATIONS

- HIGH CURRENT, HIGH SWITCHING SPEED
- MOTOR CONTROL, AUDIO AMPLIFIERS
- DC-DC & DC-AC CONVERTERS
- SOLENOID AND RELAY DRIVERS

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
$I_{D(1)}$	Drain Current (continuous) at T_C = 25°C	100	A
$I_{D(1)}$	Drain Current (continuous) at T_C = 100°C	100	A
I_{DM}(•)	Drain Current (pulsed)	400	A
P_{tot}	Total Dissipation at T_C = 25°C	300	W
	Derating Factor	2	W/°C
$E_{AS(2)}$	Single Pulse Avalanche Energy	1.9	J
T_{stg}	Storage Temperature	-55 to 175	°C
T_j	Operating Junction Temperature		

(•) Pulse width limited by safe operating area
(1) Current Limited by Package
(2) Starting T_j = 25 °C, I_{AR} = 50A, V_{DD} = 50V

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case	Max	0.5	°C/W
Rthj-amb	Thermal Resistance Junction-ambient	Max	62.5	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose		300	°C

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	1.7	2.5	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V I_D = 50 A V_{GS} = 4.5 V I_D = 50 A		0.0026 0.0032	0.0032 0.0045	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS}>$I_{D(on)}$x$R_{DS(on)max}$ I_D=10 A	10			S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V f = 1 MHz V_{GS} = 0		6200 1720 300		pF pF pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Time Rise Time	V_{DD} = 15 V I_D = 50 A R_G = 4.7 Ω V_{GS} = 4.5 V (Resistive Load, Figure 3)		35 315		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}= 24V I_D= 100A V_{GS}= 5V		88 22.5 36		nC nC nC

SWITCHING OFF

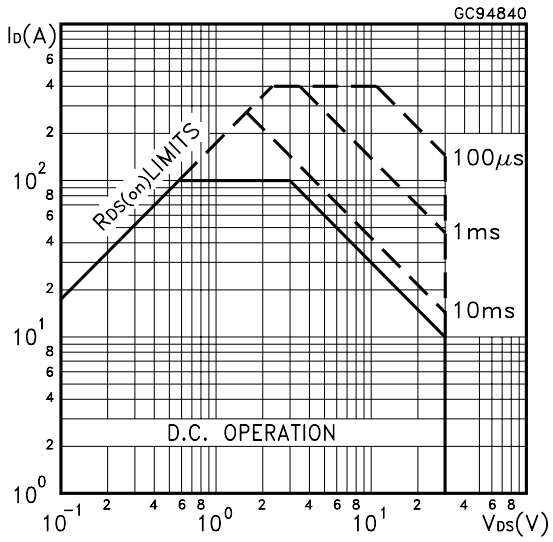
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 20 V I_D = 50 A R_G = 4.7Ω, V_{GS} = 4.5 V (Resistive Load, Figure 3)		115 95		ns ns
$t_{r(Voff)}$ t_f t_c	Off-Voltage Rise Time Fall Time Cross-over Time	V_{clamp} = 24 V I_D = 100 A R_G = 4.7Ω V_{GS} = 4.5 V (Inductive Load, Figure 5)		110 55 100		ns ns ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (•)	Source-drain Current Source-drain Current (pulsed)				100 400	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 100 A V_{GS} = 0			1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 100 A di/dt = 100A/µs V_{DD} = 20 V T_j = 150°C (see test circuit, Figure 5)		75 150 4		ns nC A

(*)Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
(•)Pulse width limited by safe operating area.

Safe Operating Area



Thermal Impedance