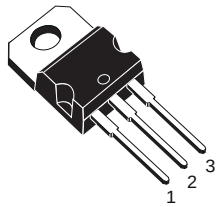
STP100NF04L

N-CHANNEL 40V - 0.0036 Ω - 100A TO-220
STripFET™ II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STP100NF04L	40 V	<0.0042Ω	100 A

- TYPICAL R_{DS}(on) = 0.0036 Ω
- LOW THRESHOLD DRIVE
- 100% AVALANCHE TESTED
- LOGIC LEVEL DEVICE



TO-220

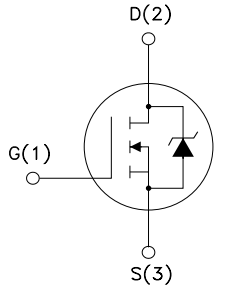
DESCRIPTION

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.

APPLICATIONS

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

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	40	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	40	V
V_{GS}	Gate- source Voltage	± 16	V
I_D(*)	Drain Current (continuos) at T_C = 25°C	100	A
I_D	Drain Current (continuos) at T_C = 100°C	70	A
I_{DM}(•)	Drain Current (pulsed)	400	A
P_{tot}	Total Dissipation at T_C = 25°C	300	W
	Derating Factor	2	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	3.6	V/ns
E_{AS} (2)	Single Pulse Avalanche Energy	1.4	J
T_{stg}	Storage Temperature	-65 to 175	°C
T_j	Max. Operating Junction Temperature	175	°C

(•) Pulse width limited by safe operating area.
(*) Current Limited by package

(1) I_{SD} ≤100A, di/dt ≤240A/µs, V_{DD} ≤ 32V, T_j ≤ T_{JMAX}
(2) Starting T_j = 25 ºC, I_{AR} = 50A, V_{DD}= 30V

THERMAL DATA

Rthj-case Rthj-amb T_j	Thermal Resistance Junction-case Thermal Resistance Junction-ambient Maximum Lead Temperature For Soldering Purpose	Max Max Typ	0.5 62.5 300	°C/W °C/W °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	40			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} = ± 16 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	1			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		0.0036 0.0040	0.0042 0.0065	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS} = 15 V I_D = 20 A		50		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		6400 1300 190		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} = 20 V I_D = 50 A R_G = 4.7 Ω V_{GS} = 4.5 V (Resistive Load, Figure 3)		37 270		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}= 32V I_D= 100A V_{GS}= 4.5V		72 20 28.5	90	nC nC nC

SWITCHING OFF

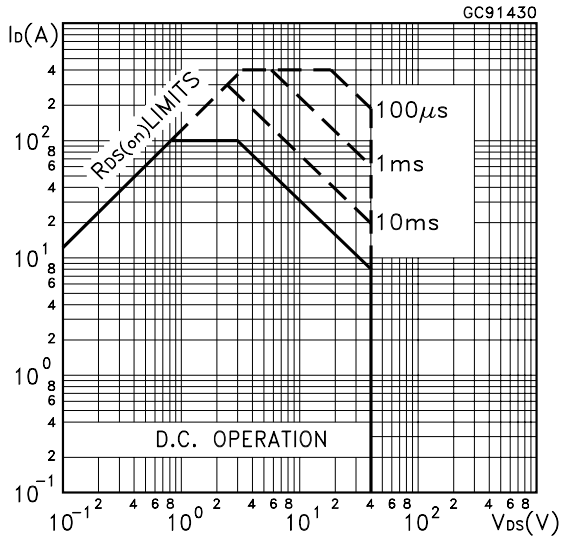
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 20 V $_D$ = 50 A R_G = 4.7Ω, V_{GS} = 4.5 V (Resistive Load, Figure 3)		90 80		ns ns
$t_{r(Voff)}$ t_f t_c	Off-voltage Rise Time Fall Time Cross-over Time	V_{clamp} = 32 V I_D = 100 A R_G = 4.7Ω, V_{GS} = 4.5 V (Inductive Load, Figure 5)		85 125 160		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} = 100A 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)		88 240 5.5		ns nC A

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

Safe Operating Area



Thermal Impedance