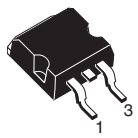
STP120NF10 - STB120NF10
STW120NF10

N-channel 100V - 0.009Ω - 110A - TO-247 - TO-220 - D²PAK
STripFET™ II Power MOSFET

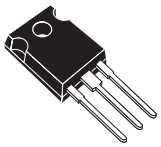
General features

Type	V_{DSS}	$R_{DS(on)}$	I_D
STW120NF10	100V	<0.0105Ω	110A
STP120NF10	100V	<0.0105Ω	110A
STB120NF10	100V	<0.0105Ω	110A

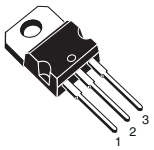
- Exceptional dv/dt capability
- 100% avalanche tested
- Application oriented characterization



D²PAK



TO-247



TO-220

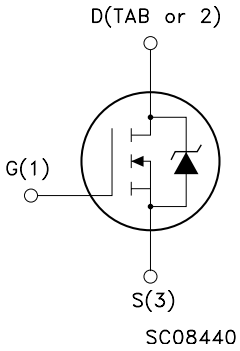
Description

This Power MOSFET series realized with STMicroelectronics unique STripFET™ process has specifically been designed to minimize the on-resistance. It is therefore suitable as primary switch in advanced high-efficiency,high-frequency isolated DC-DC converters for Telecom and Computer application. It is also intended for any applications with low gate drive requirements.

Applications

- Switching application

Internal schematic diagram



Order codes

Part number	Marking	Package	Packaging
STW120NF10	W120NF10	TO-247	Tube
STP120NF10	P120NF10	TO-220	Tube
STB120NF10	B120NF10	D²PAK	Tape & reel

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage (V_{GS} = 0)	100	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current (continuous) at T_C = 25°C	110	A
I_D	Drain current (continuous) at T_C=100°C	77	A
I_{DM} (1)	Drain current (pulsed)	440	A
P_{TOT}	Total dissipation at T_C = 25°C	312	W
	Derating factor	2.08	W/°C
dv/dt (2)	Peak diode recovery voltage slope	10	V/ns
E_{AS} (3)	Single pulse avalanche energy	550	mJ
T_J T_{stg}	Operating junction temperature Storage temperature	-55 to 175	°C
T_L	Maximum lead temperature for soldering purpose	300	°C

1. Pulse width limited by safe operating area.
2. $I_{SD} \leq 120A$, di/dt $\leq$ 300A/µs, $V_{DD} = 80\%V_{(BR)DSS}$
3. Starting Tj = 25°C, I_D = 60A, V_{DD} = 50V

Table 2. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case max	0.48	°C/W
$R_{thj\text{-}amb}$	Thermal resistance junction-ambient max	62.5	°C/W

2 Electrical characteristics

(T_{CASE}=25°C unless otherwise specified)

Table 3. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	I_D = 250µA, V_{GS}= 0	100			V
I_{DSS}	Zero gate voltage drain current (V_{GS} = 0)	V_{DS} = Max rating, V_{DS} = Max rating@125°C			1 10	µA µA
I_{GSS}	Gate body leakage current (V_{DS} = 0)	V_{GS} = ±20V			±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS}= V_{GS}, I_D = 250µA	2		4	V
$R_{DS(on)}$	Static drain-source on resistance	V_{GS}= 10V, I_D= 60A		0.009	0.0105	Ω

Table 4. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward transconductance	V_{DS} =25V, I_D = 60A		90		S
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} =25V, f=1 MHz, V_{GS}=0		5200 785 325		pF pF pF
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	V_{DD}=80V, I_D = 120A V_{GS} =10V *(see Figure 13)*		172 32 64	233	nC nC nC

1. Pulsed: pulse duration=300µs, duty cycle 1.5%

Table 5. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on delay time Rise time Turn-off delay time Fall time	V_{DD}=50V, I_D= 60A, R_G=4.7Ω, V_{GS}=10V *(see Figure 12)*		25 90 132 68		ns ns ns ns

Table 6. Source drain diode

Symbol	Parameter	Test conditions	Min	Typ.	Max	Unit
I_{SD}	Source-drain current				110	A
I_{SDM}(1)	Source-drain current (pulsed)				440	A
V_{SD}(2)	Forward on voltage	I_{SD}=120A, V_{GS}=0			1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	I_{SD}=120A, di/dt = 100A/µs, V_{DD}=40V, Tj=150°C *(see Figure 17)*		152 760 10		ns nC A

1. Pulse width limited by safe operating area
2. Pulsed: pulse duration=300µs, duty cycle 1.5%

4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark.

TO-247 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.85		5.15	0.19		0.20
A1	2.20		2.60	0.086		0.102
b	1.0		1.40	0.039		0.055
b1	2.0		2.40	0.079		0.094
b2	3.0		3.40	0.118		0.134
c	0.40		0.80	0.015		0.03
D	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e		5.45			0.214	
L	14.20		14.80	0.560		0.582
L1	3.70		4.30	0.14		0.17
L2		18.50			0.728	
øP	3.55		3.65	0.140		0.143
øR	4.50		5.50	0.177		0.216
S		5.50			0.216