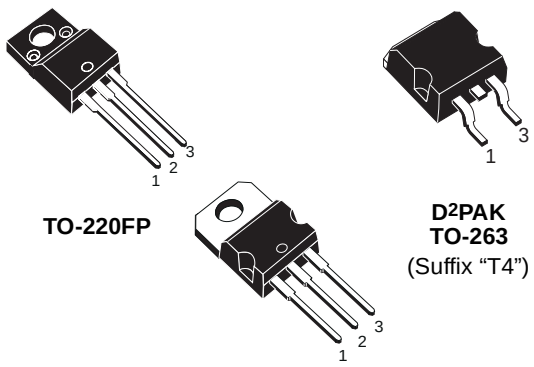
STB14NF10
STP14NF10 STP14NF10FP

N-CHANNEL 100V - 0.115 Ω - 15A TO-220/TO-220FP/D²PAK
LOW GATE CHARGE STripFET™ II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STB14NF10	100 V	<0.13 Ω	15 A
STP14NF10	100 V	<0.13 Ω	15 A
STP14NF10FP	100 V	<0.13 Ω	10 A

- TYPICAL R_{DS}(on) = 0.115 Ω
- EXCEPTIONAL dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- APPLICATION ORIENTED CHARACTERIZATION
- SURFACE-MOUNTING D²PAK (TO-263) POWER PACKAGE IN TUBE (NO SUFFIX) OR IN TAPE & REEL (SUFFIX "T4")



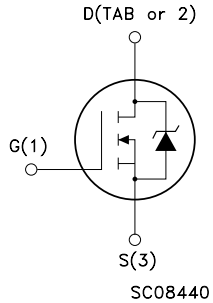
DESCRIPTION

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

APPLICATIONS

- HIGH-EFFICIENCY DC-DC CONVERTERS
- UPS AND MOTOR CONTROL

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STB14NF10 STP14NF10	STP14NF10FP	
V_{DS}	Drain-source Voltage (V_{GS} = 0)	100		V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	100		V
V_{GS}	Gate- source Voltage	± 20		V
I_D	Drain Current (continuous) at T_C = 25°C	15	10	A
I_D	Drain Current (continuous) at T_C = 100°C	10	6.3	A
I_{DM}(•)	Drain Current (pulsed)	60	40	A
P_{tot}	Total Dissipation at T_C = 25°C	60	25	W
	Derating Factor	0.4	0.17	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	9		V/ns
E_{AS} (2)	Single Pulse Avalanche Energy	70		mJ
V_{ISO}	Insulation Withstand Voltage (DC)	------	2000	V
T_{stg}	Storage Temperature	-55 to 175		°C
T_j	Operating Junction Temperature			

(•) Pulse width limited by safe operating area.

(1) I_{SD} ≤14A, di/dt ≤300A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_j ≤ T_{JMAX}
(2) Starting T_j = 25 °C, I_D = 15A, V_{DD}= 50V

THERMAL DATA

			D²PAK TO-220	TO-220FP	
Rthj-case	Thermal Resistance Junction-case	Max	2.5	6	°C/W
Rthj-amb T_l	Thermal Resistance Junction-ambient Maximum Lead Temperature For Soldering Purpose	Max	62.5 300		°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	100			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} = ± 20 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	2	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V I_D = 7 A		0.115	0.13	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS} = 15 V I_D = 7 A		20		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		460 70 30		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} = 50 V I_D = 7 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, Figure 3)		16 25		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}= 80 V I_D= 12 A V_{GS}= 10V		15.5 3.7 4.7	21	nC nC nC

SWITCHING OFF

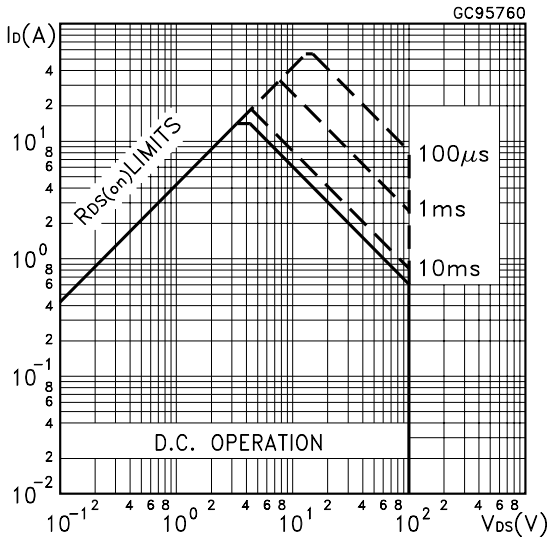
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 50 V I_D = 7 A R_G = 4.7Ω, V_{GS} = 10 V (Resistive Load, Figure 3)		32 8		ns ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (•)	Source-drain Current Source-drain Current (pulsed)				15 60	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 14 A V_{GS} = 0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 14 A di/dt = 100A/µs V_{DD} = 50 V T_j = 150°C (see test circuit, Figure 5)		90 230 5		ns nC A

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

Safe Operating Area for TO-220



Safe Operating Area for TO-220FP