

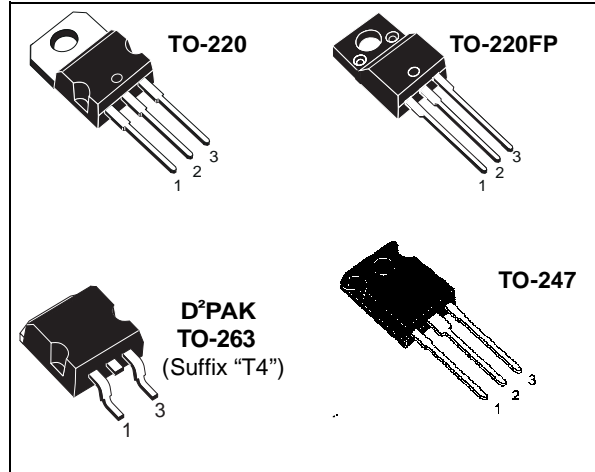


STB80NF12 STW80NF12 STP80NF12 STP80NF12FP

N-CHANNEL 120V-0.013Ω-80A TO-220/TO-247/TO-220FP/D²PAK
STripFET™ II POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STB80NF12	120 V	<0.018 Ω	80 A(*)
STP80NF12	120 V	<0.018 Ω	80 A(*)
STP80NF12FP	120 V	<0.018 Ω	80 A(*)
STW80NF12	120 V	<0.018 Ω	80 A(*)

- TYPICAL R_{DS(on)} = 0.013Ω
- 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")



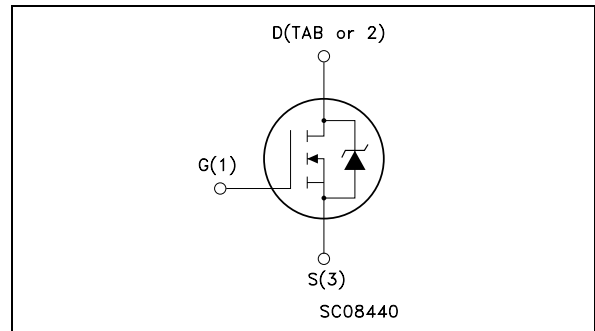
DESCRIPTION

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
		STB_P_W80NF12	STP80NF12FP	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	120		V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	120		V
V _{GS}	Gate- source Voltage	± 20		V
I _D (*)	Drain Current (continuous) at T _C = 25°C	80	80(#)	A
I _D	Drain Current (continuous) at T _C = 100°C	60	60(#)	A
I _{DM} (•)	Drain Current (pulsed)	320	320(#)	A
P _{tot}	Total Dissipation at T _C = 25°C	300	45	W
	Derating Factor	2.0	0.3	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	10		V/ns
E _{AS} (2)	Single Pulse Avalanche Energy	700		mJ
V _{ISO}	Insulation Withstand Voltage (DC)	-----	2500	V
T _{stg}	Storage Temperature	-55 to 175		°C
T _j	Operating Junction Temperature			

(•) Pulse width limited by safe operating area.

(*) Limited by Package

(2) I_{SD} ≤ 35A, di/dt ≤ 300A/μs, V_{DD} ≤ V_{(BR)DSS}, T_j ≤ T_{JMAX}.

(#) Refer to SOA for the max allowable current values on FP-type due to thermal resistance value.

(1) Starting T_j = 25 °C, I_D = 40A, V_{DD} = 45V

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THERMAL DATA

		TO-247	D ² PAK TO-220	TO-220FP	
Rthj-case	Thermal Resistance Junction-case Max	0.5	0.5	3.33	°C/W
Rthj-amb T _I	Thermal Resistance Junction-ambient Max Maximum Lead Temperature For Soldering Purpose	50 300	62.5 300	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	120			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} = ± 20V			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} I _D = 250 μA	2			V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10 V I _D = 40 A		0.013	0.018	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} = 15 V I _D = 40 A		80		S
C _{iss} C _{oss} C _{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{DS} = 25V f = 1 MHz V _{GS} = 0		4300 600 230		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	$V_{DD} = 50\text{ V}$ $I_D = 40\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3)		40 145		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 80\text{ V}$ $I_D = 80\text{ A}$ $V_{GS} = 10\text{ V}$		140 23 51	189	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	$V_{DD} = 50\text{ V}$ $I_D = 40\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3)		134 115		ns ns

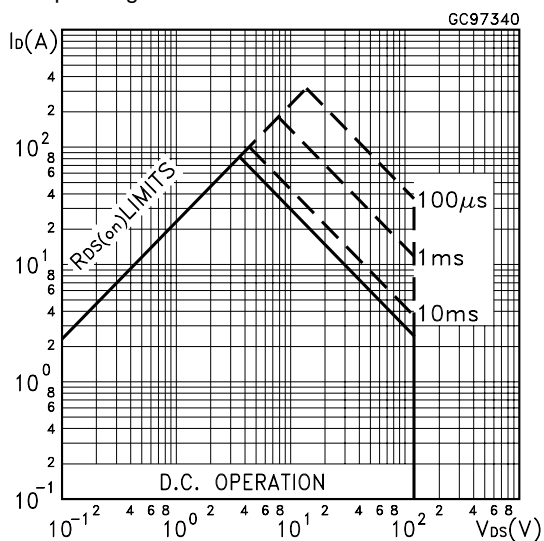
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} $I_{SDM}^{(*)}$	Source-drain Current Source-drain Current (pulsed)				80 320	A A
$V_{SD}^{(*)}$	Forward On Voltage	$I_{SD} = 80\text{ A}$ $V_{GS} = 0$			1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 80\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 35\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 5)		155 0.85 11		ns nC A

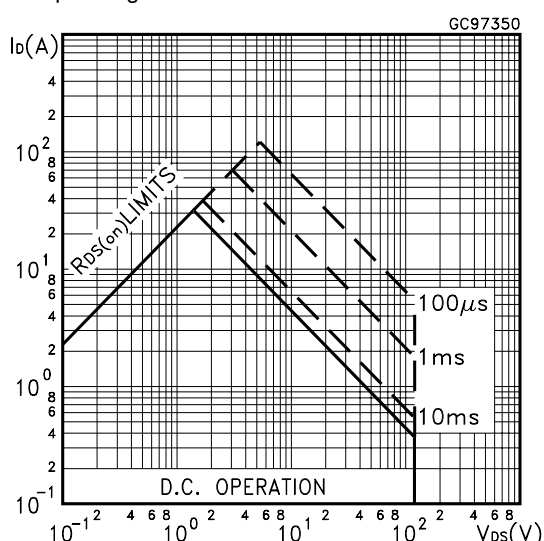
(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.

(●) Pulse width limited by safe operating area.

Safe Operating Area

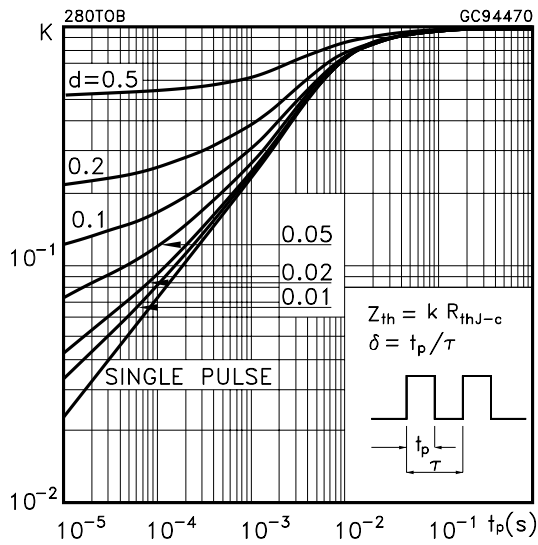


Safe Operating Area for TO-220FP

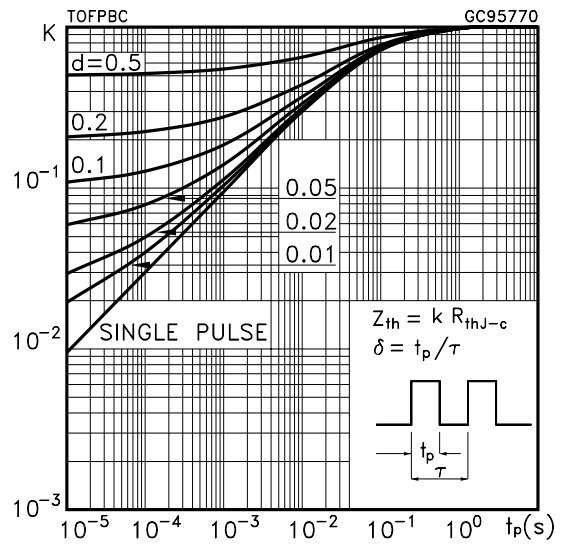


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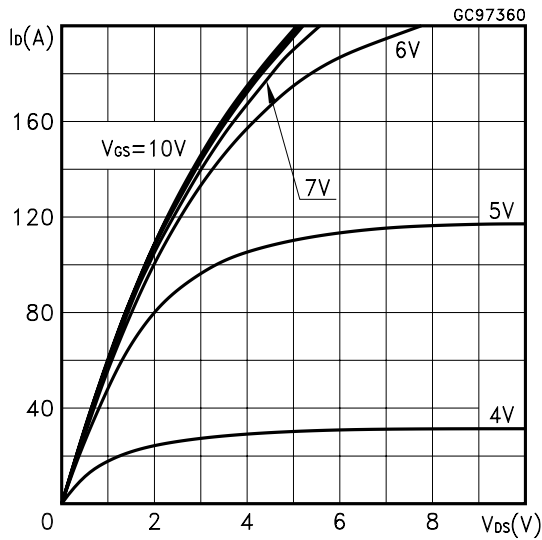
Thermal Impedance



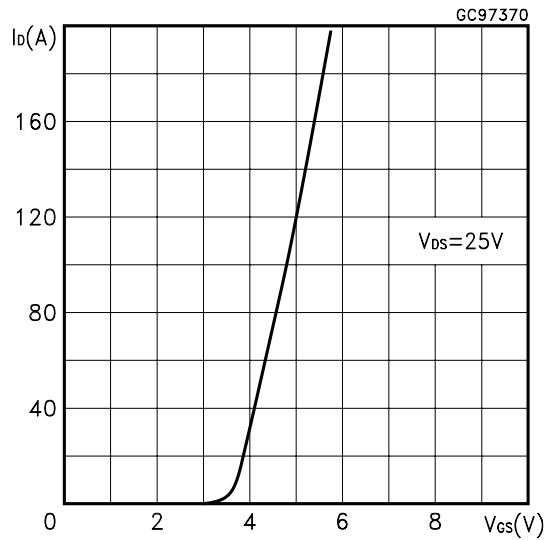
Thermal Impedance for TO-220FP



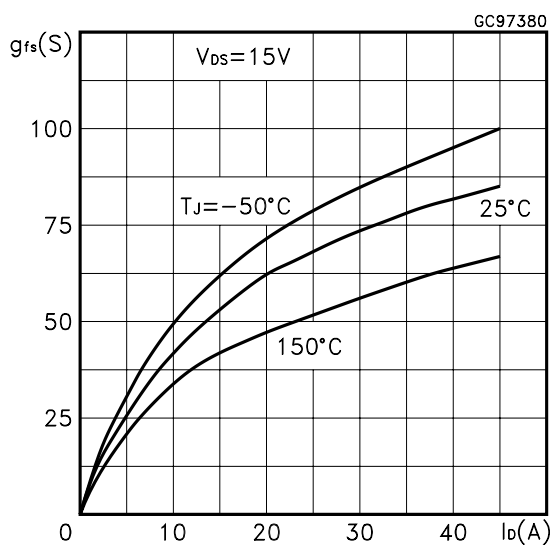
Output Characteristics



Transfer Characteristics



Transconductance



Static Drain-source On Resistance

