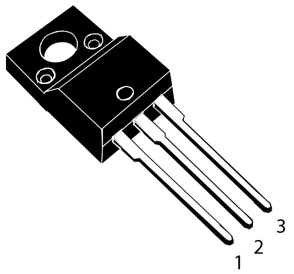
STF260N4F7

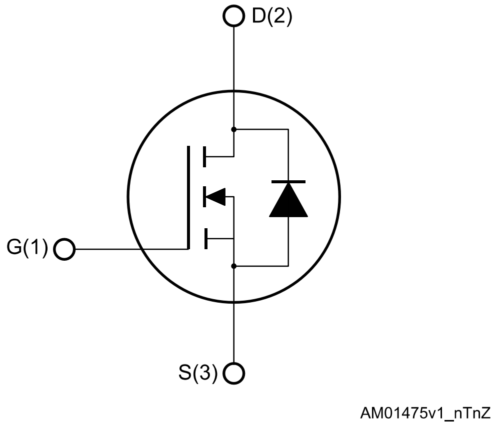
N-channel 40 V, 1.95 mΩ typ., 90 A, STripFET™ F7 Power MOSFET in a TO-220FP package

Datasheet - preliminary data



TO-220FP

Figure 1: Internal schematic diagram



Features

Order code	V_{DS}	$R_{DS(on)}$ max.	I_D
STF260N4F7	40 V	2.5 mΩ	35 W

- Among the lowest $R_{DS(on)}$ on the market
- Excellent figure of merit (FoM)
- Low C_{rss}/C_{iss} ratio for EMI immunity
- High avalanche ruggedness

Applications

- Switching applications

Description

This N-channel Power MOSFET utilizes STripFET™ F7 technology with an enhanced trench gate structure that results in very low on-state resistance, while also reducing internal capacitance and gate charge for faster and more efficient switching.

Table 1: Device summary

Order code	Marking	Package	Packaging
STF260N4F7	260N4F7	TO-220FP	Tube

Contents

1 Electrical ratings

Table 2: Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	40	V
V_{GS}	Gate-source voltage	±20	V
I_D	Drain current (continuous) at T_C= 25 °C	90	A
I_D	Drain current (continuous) at T_C = 100 °C	64	A
I_{DM}(1)	Drain current (pulsed)	360	A
P_{TOT}	Total dissipation at T_C = 25 °C	35	W
V_{iso}	Insulation withstand voltage (RMS) from all three leads to external heat sink (t = 1s; T_C= 25 °C)	2.5	kV
T_{stg}	Storage temperature	-55 to 175	°C
T_J	Operation junction temperature		

Notes:

(1)Pulse width limited by safe operating area

Table 3: Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case max	4.29	°C/W
$R_{thj\text{-}amb}$	Thermal resistance junction-ambient max	62.5	°C/W

2 Electrical characteristics

(T_C = 25 °C unless otherwise specified)

Table 4: On /off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	V_{GS} = 0 V, I_D = 250 µA	40			V
I_{DSS}	Zero gate voltage drain current	V_{GS} = 0 V, V_{DS} = 40 V			1	µA
		V_{GS} = 0 V, V_{DS} = 40 V T_C = 125 °C			100	µA
I_{GSS}	Gate-body leakage current	V_{DS} = 0 V, V_{GS} = + 20 V			100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS} = V_{GS}, I_D = 250 µA	2		4	V
$R_{DS(on)}$	Static drain-source on- resistance	V_{GS} = 10 V, I_D = 60 A		1.95	2.5	mΩ

Table 5: Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	-	5640	-	pF
C_{oss}	Output capacitance		-	2370	-	pF
C_{rss}	Reverse transfer capacitance		-	34	-	pF
Q_g	Total gate charge	V_{DD} = 20 V, I_D = 120 A, V_{GS} = 10 V (see *Figure 3: "Test circuit for gate charge behavior"*)	-	67	-	nC
Q_{gs}	Gate-source charge		-	31	-	nC
Q_{gd}	Gate-drain charge		-	10	-	nC

Table 6: Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	V_{DD} = 20 V, I_D = 60 A, R_G = 4.7 Ω, V_{GS} = 10 V (see *Figure 2: "Test circuit for resistive load switching times"* and *Figure 7: "Switching time waveform"*	-	30	-	ns
t_r	Rise time		-	21	-	ns
$t_{d(off)}$	Turn-off delay time		-	42	-	ns
t_f	Fall time		-	13	-	ns

Table 7: Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{SD}(1)	Forward on voltage	V_{GS} = 0 V, I_{SD} = 120 A	-	-	1.1	V
t_{rr}	Reverse recovery time	I_{SD} = 120 A, di/dt = 100 A/µs V_{DD} = 32 V (see *Figure 4: "Test circuit for inductive load switching and diode recovery times"*)	-	68		ns
Q_{rr}	Reverse recovery charge		-	98		nC
I_{RRM}	Reverse recovery current		-	3		A

Notes:

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

3 Test circuits

Figure 2: Test circuit for resistive load switching times

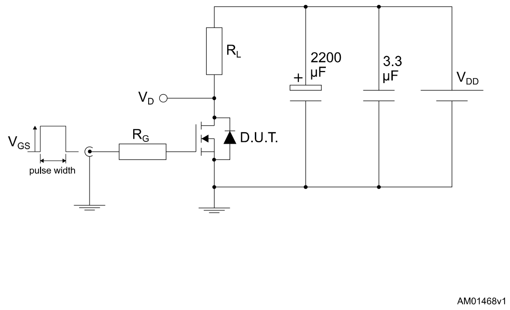


Figure 3: Test circuit for gate charge behavior

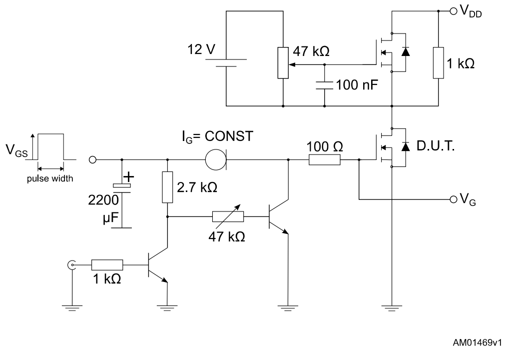


Figure 4: Test circuit for inductive load switching and diode recovery times

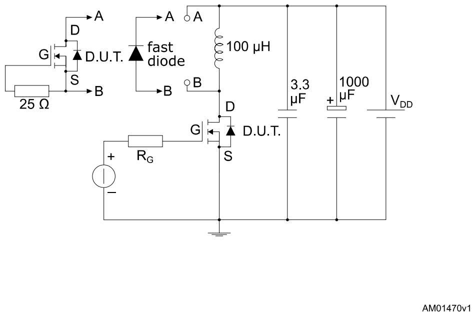


Figure 5: Unclamped inductive load test circuit

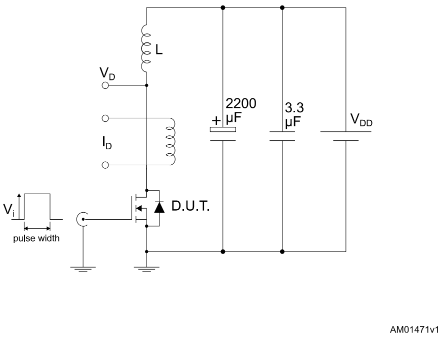


Figure 6: Unclamped inductive waveform

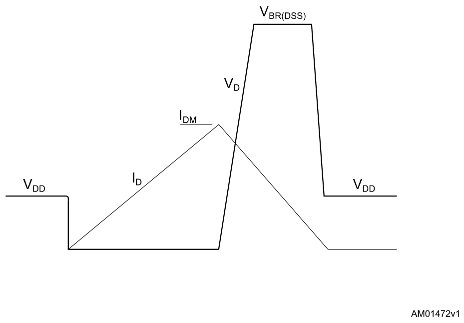
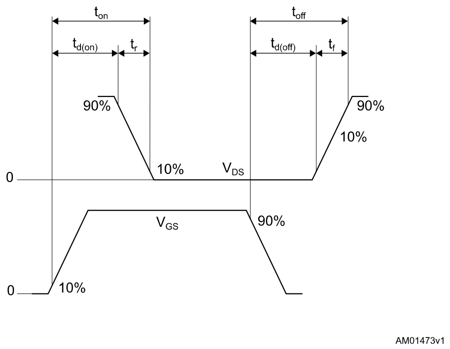


Figure 7: Switching time waveform



4 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: ***www.st.com***. ECOPACK® is an ST trademark.

4.1 TO-220FP package information

Figure 8: TO-220FP package outline

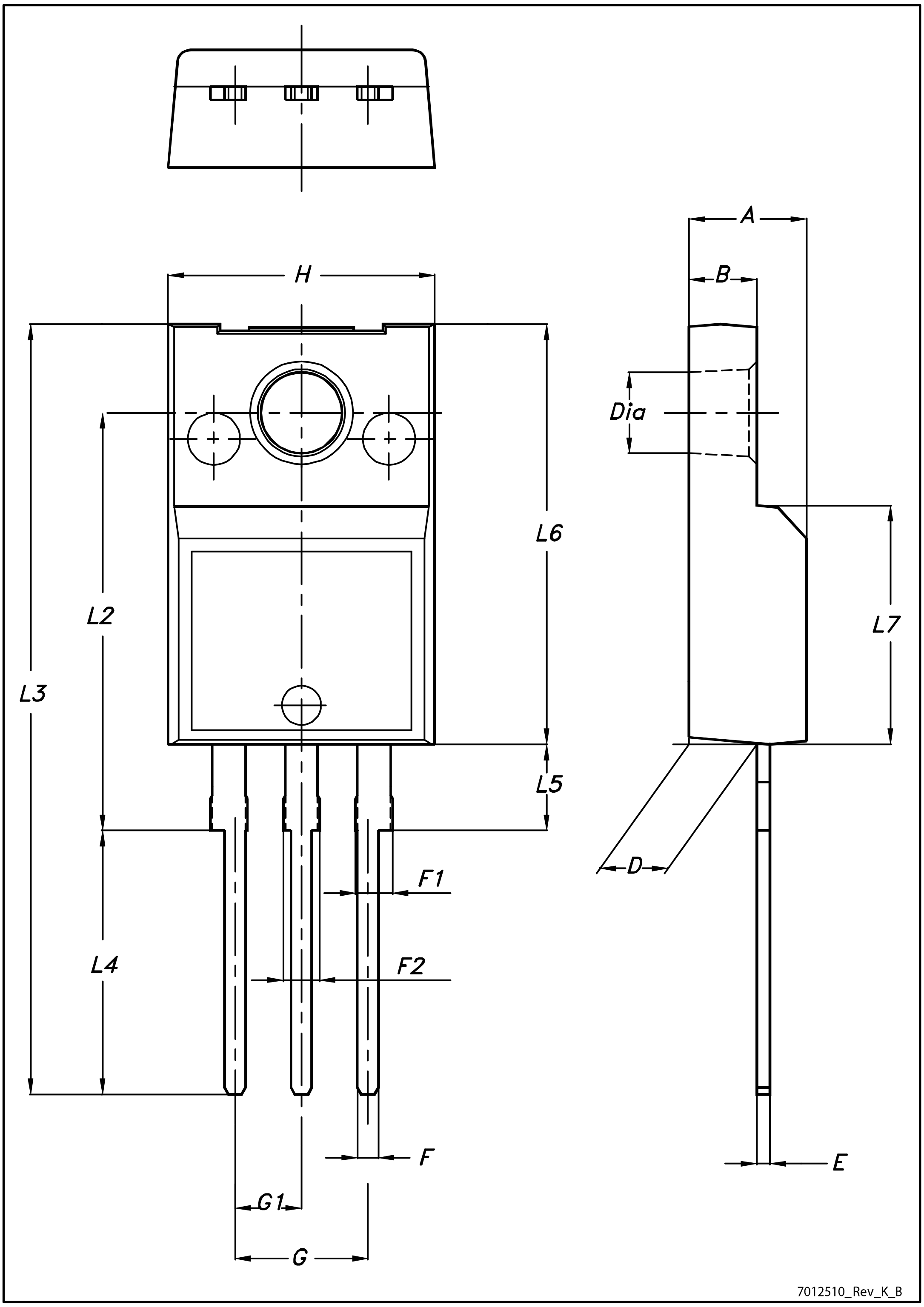


Table 8: TO-220FP package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.4		4.6
B	2.5		2.7
D	2.5		2.75
E	0.45		0.7
F	0.75		1
F1	1.15		1.70
F2	1.15		1.70
G	4.95		5.2
G1	2.4		2.7
H	10		10.4
L2		16	
L3	28.6		30.6
L4	9.8		10.6
L5	2.9		3.6
L6	15.9		16.4
L7	9		9.3
Dia	3		3.2

5 Revision history

Table 9: Document revision history

Date	Revision	Changes
13-Oct-2015	1	Initial release.

IMPORTANT NOTICE – PLEASE READ CAREFULLY