STP130N10F3

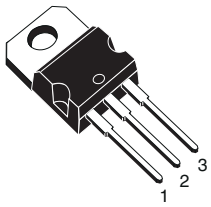
N-channel 100 V, 6.2 mΩ, 180 A STripFET™ Power MOSFET TO-220

Preliminary data

Features

Order codes	V_{DSS}	$R_{DS(on)}$ max.	I_D
STP130N10F3	100 V	8.4 mΩ	130 A

- Ultra low on-resistance
- 100% avalanche tested



TO-220

Application

High current switching applications

Description

This product is an N-channel enhancement mode Power MOSFET built with STripFET™ technology, which is especially tailored to minimize on-resistance and gate charge, providing superior switching performance.

Figure 1. Internal schematic diagram

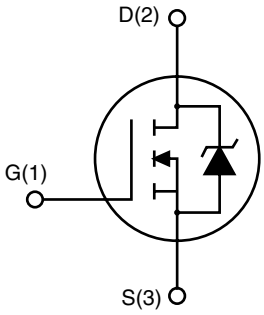


Table 1. Device summary

Order codes	Marking	Package	Packaging
STP130N10F3	130N10F3	TO-220	Tube

Contents

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
		TO-220	
V_{DS}	Drain-source voltage (V_{GS}=0)	100	V
V_{GS}	Gate-source voltage	± 20	V
I_D (1)	Drain current (continuous) at T_C = 25°C	130	A
I_D (1)	Drain current (continuous) at T_C=100°C	78	A
I_{DM} (2)	Drain current (pulsed)	500	A
P_{TOT}	Total dissipation at T_C = 25°C	250	W
dv/dt	Peak diode recovery voltage slope	TBD	V/ns
E_{AS} (3)	Single pulse avalanche energy	TBD	mJ
T_j T_{stg}	Operating junction temperature storage temperature	- 55 to 175	°C

1. Current limited by package.
2. Pulse width limited by safe operating area.
3. Starting Tj = 25 °C, I_D = 80 A, V_{DD} = 50 V.

Table 3. Thermal data

Symbol	Parameter	TO-220	Unit
Rthj-case	Thermal resistance junction-case	0.6	°C/W
Rthj-a	Thermal resistance junction-ambient max	62.5	°C/W
Rthj-pcb(1)	Thermal resistance junction-ambient max		°C/W
T_l	Maximum lead temperature for soldering purpose	300	°C

1. When mounted on FR-4 board, on 1inch², 2oz Cu.

2 Electrical characteristics

(T_{CASE} = 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	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, @125°C			10 100	µA µA
I_{GSS}	Gate body leakage current (V_{DS} = 0)	V_{GS} = ±20 V			±200	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= 65 A TO-220		6.8	8.4	mΩ

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0	-	3140 360 45	-	pF pF pF
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	V_{DD} = 50 V, I_D = 130 A, V_{GS} = 10 V (see *Figure 3*)	-	50 TBD TBD	-	nC nC nC

Table 6. Dynamic

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} = 50 V, I_D = 65 A R_G = 4.7 Ω V_{GS} = 10 V (see *Figure 2*, *Figure 7*)	-	TBD TBD TBD TBD	-	ns ns ns ns

Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}(1)	Source-drain current Source-drain current (pulsed)		-		130 520	A A
V_{SD}(2)	Forward on voltage	I_{SD}=130 A, V_{GS}=0	-		1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	I_{SD}=130 A, di/dt = 100 A/µs, V_{DD}=80 V, Tj=150°C (see *Figure 4*)	-	TBD TBD TBD		ns µC A

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

3 Test circuits

Figure 2. Switching times test circuit for resistive load

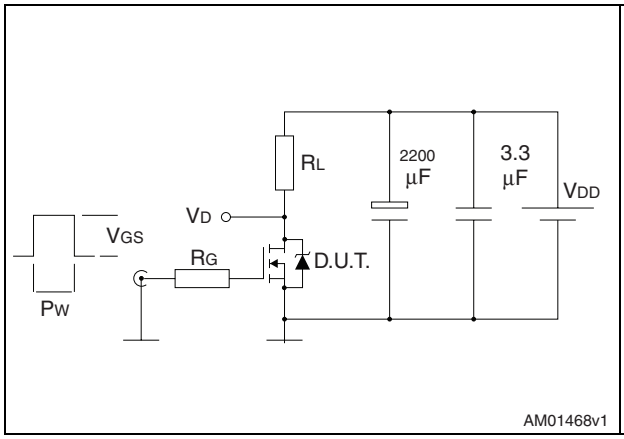


Figure 3. Gate charge test circuit

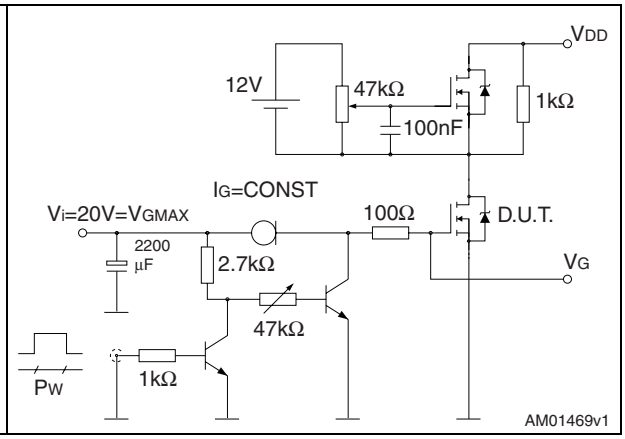


Figure 4. Test circuit for inductive load switching and diode recovery times

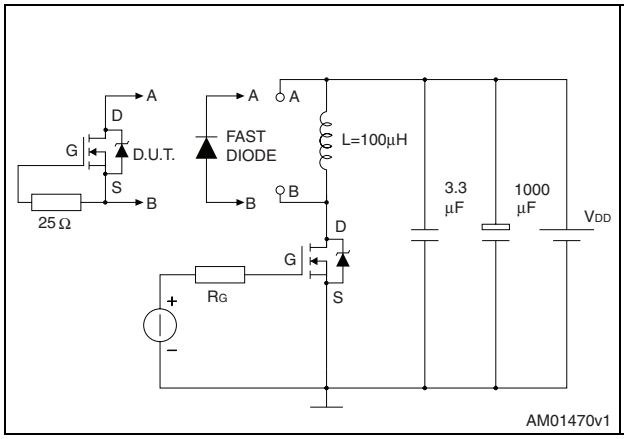


Figure 5. Unclamped inductive load test circuit

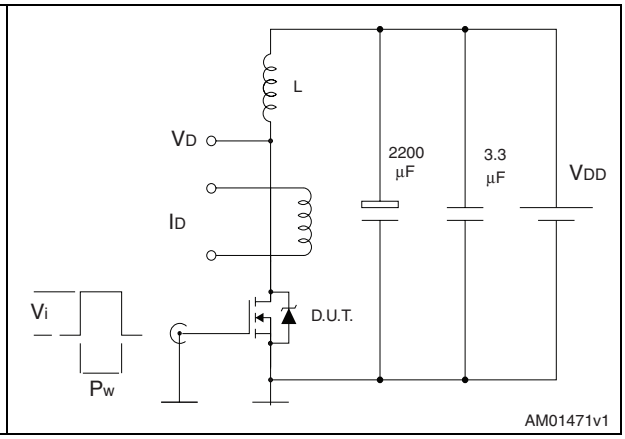


Figure 6. Unclamped inductive waveform

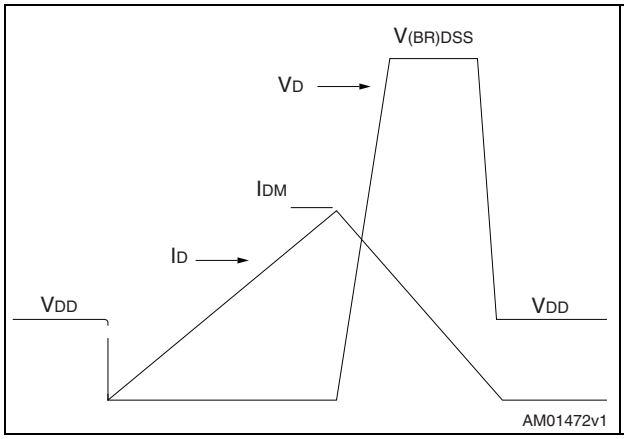
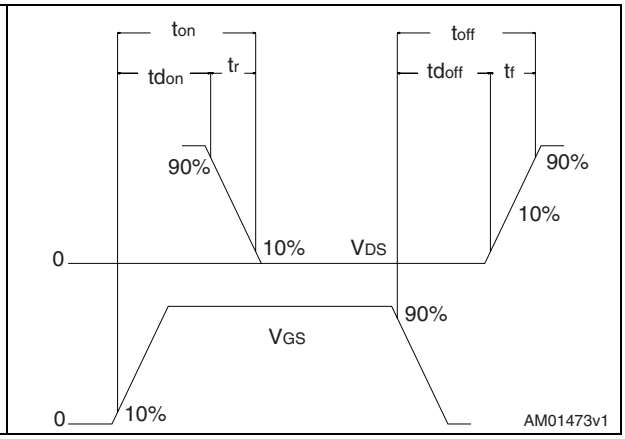


Figure 7. Switching time waveform



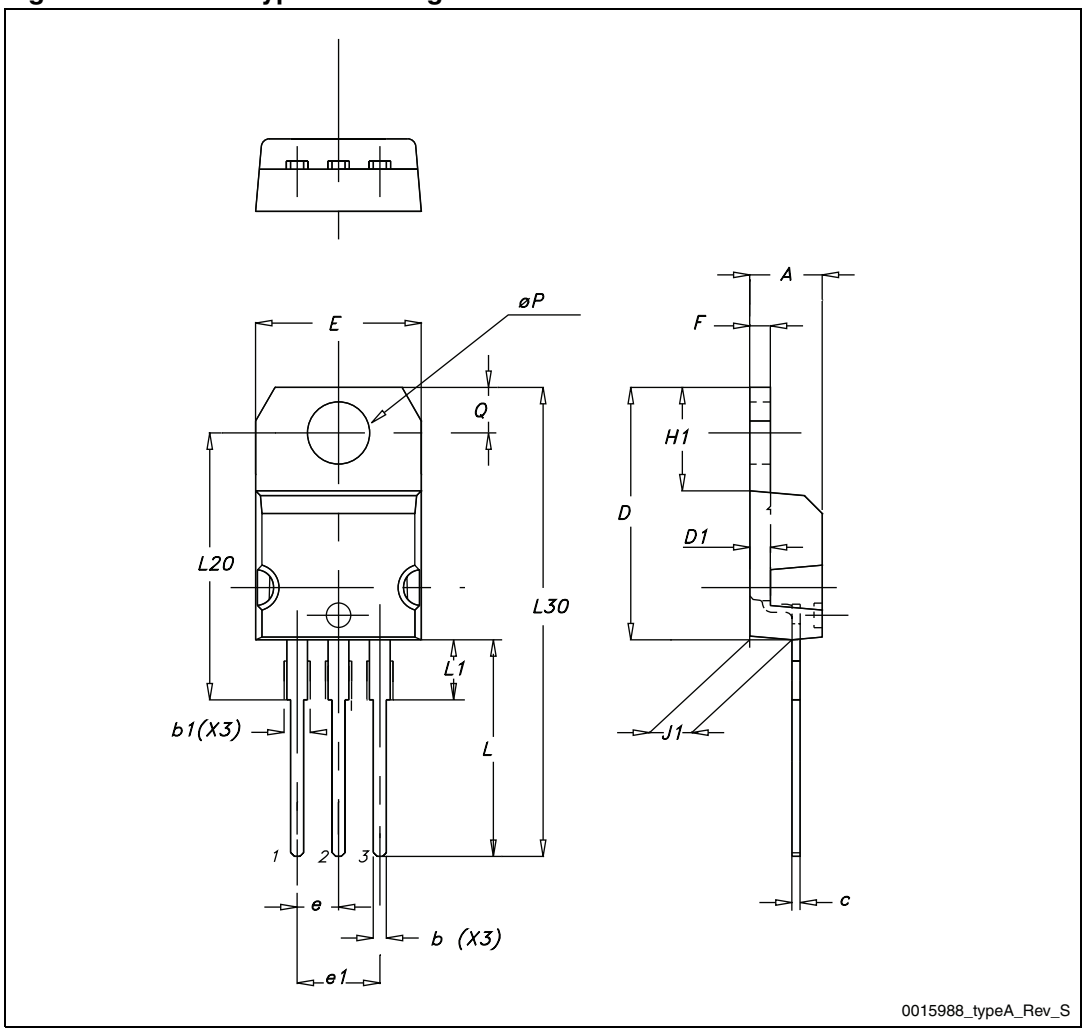
4 Package mechanical data

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.

Table 8. TO-220 type A mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
∅P	3.75		3.85
Q	2.65		2.95

Figure 8. TO-220 type A drawing



5 Revision history

Table 9. Document revision history

Date	Revision	Changes
24-Feb-2011	1	First version

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