



STH210N75F6-2

N-channel 75 V, 0.0022 Ω , 180 A H²PAK-2
STripFET™ VI DeepGATE™ Power MOSFET

Preliminary data

Features

Order code	V _{DSS}	R _{DS(on)} max	I _D
STH210N75F6-2	75 V	< 0.0028 Ω	180 A

- Low gate charge
- Very low on-resistance
- High avalanche ruggedness

Application

Switching applications

Description

This product is a 75 V N-channel STripFET™ VI Power MOSFET based on the ST's proprietary STripFET™ technology, with a new gate structure. The resulting Power MOSFET exhibits the lowest R_{DS(on)} in all packages.

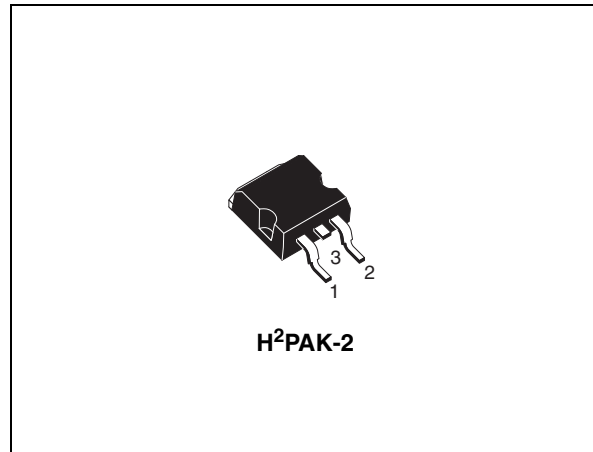


Figure 1. Internal schematic diagram

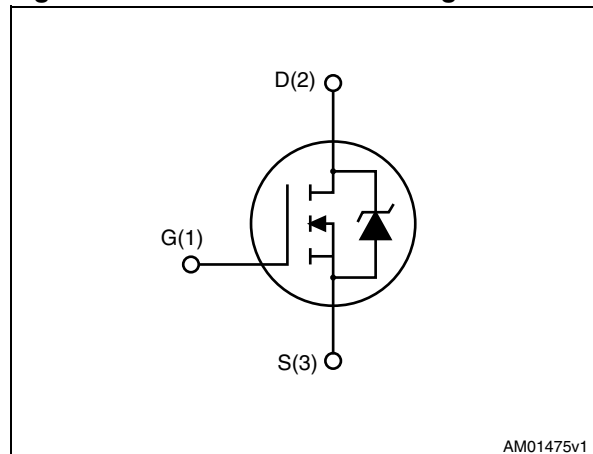


Table 1. Device summary

Order code	Marking	Package	Packaging
STH210N75F6-2	210N75F6	H ² PAK-2	Tape and reel

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1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage ($V_{GS} = 0$)	75	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current (continuous) at $T_C = 25\text{ }^{\circ}\text{C}$	180	A
I_D	Drain current (continuous) at $T_C = 100\text{ }^{\circ}\text{C}$	150	A
$I_{DM}^{(1)}$	Drain current (pulsed)	720	A
P_{TOT}	Total dissipation at $T_C = 25\text{ }^{\circ}\text{C}$	300	W
	Derating factor	2	W/ $^{\circ}\text{C}$
T_{stg}	Storage temperature	- 55 to 175	$^{\circ}\text{C}$
T_j	Operating junction temperature		

1. Current limited by package.

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	0.5	$^{\circ}\text{C}/\text{W}$
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-pcb max	35	$^{\circ}\text{C}/\text{W}$
T_l	Maximum lead temperature for soldering purpose	300	$^{\circ}\text{C}$

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

2 Electrical characteristics

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

Table 4. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown voltage	$I_D = 250\text{ }\mu\text{A}$, $V_{GS} = 0$	75			V
I_{DSS}	Zero gate voltage Drain current ($V_{GS} = 0$)	$V_{DS} = \text{max rating}$			1	μA
		$V_{DS} = \text{max rating}$, $T_C = 125\text{ °C}$			100	μA
I_{GSS}	Gate-body leakage current ($V_{DS} = 0$)	$V_{GS} = \pm 20\text{ V}$			100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	2		4	V
$R_{DS(on)}$	Static drain-source on resistance	For H ² PAK-2 $V_{GS} = 10\text{ V}$, $I_D = 90\text{ A}$		2.2	2.8	m Ω

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	$V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0$	-	11800	-	pF
C_{oss}	Output capacitance			1060		pF
C_{rss}	Reverse transfer capacitance			394		pF
Q_g	Total gate charge	$V_{DD} = 37.5\text{ V}$, $I_D = 120\text{ A}$, $V_{GS} = 10\text{ V}$ (see Figure 3)	-	171	-	nC
Q_{gs}	Gate-source charge			50		nC
Q_{gd}	Gate-drain charge			36		nC

Table 6. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 40\text{ V}$, $I_D = 60\text{ A}$ $R_G = 4.7\text{ }\Omega$, $V_{GS} = 10\text{ V}$ (see Figure 2)	-	34	-	ns
t_r	Rise time			70		ns
$t_{d(off)}$	Turn-off-delay time		-	154	-	ns
t_f	Fall time			71		ns

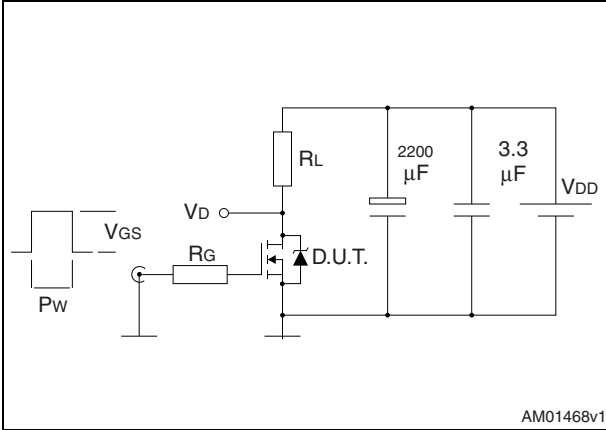
Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max	Unit
I_{SD}	Source-drain current		-		180	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		720	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 180 \text{ A}$, $V_{GS} = 0$	-		1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	$I_{SD} = 120 \text{ A}$, $V_{DD} = 60 \text{ V}$ $di/dt = 100 \text{ A}/\mu\text{s}$, $T_j = 150 \text{ }^\circ\text{C}$ (see Figure 4)	-	60 144 4.8		ns nC A

1. Current limited by package.
2. Pulsed: pulse duration = 300 μs , duty cycle 1.5%

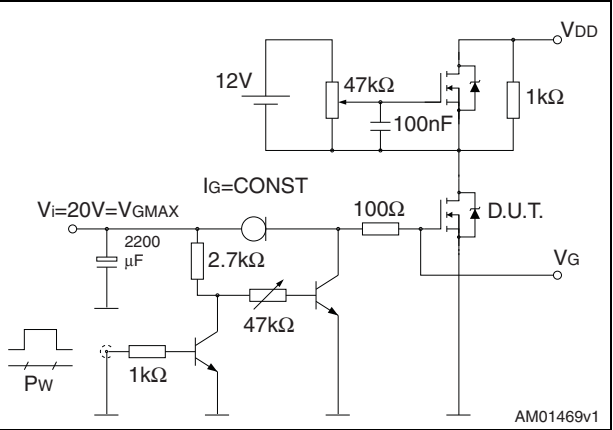
3 Test circuits

Figure 2. Switching times test circuit for resistive load



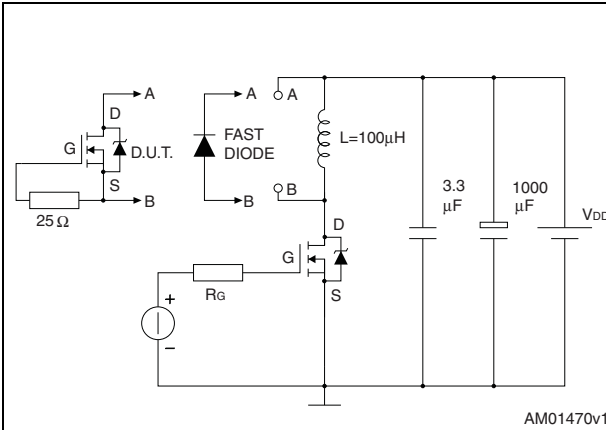
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Figure 3. Gate charge test circuit



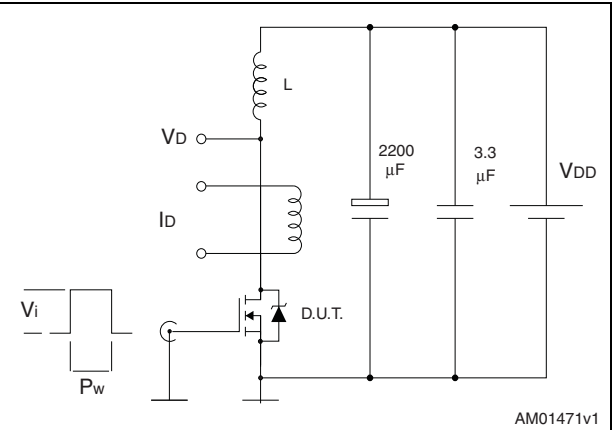
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Figure 4. Test circuit for inductive load switching and diode recovery times



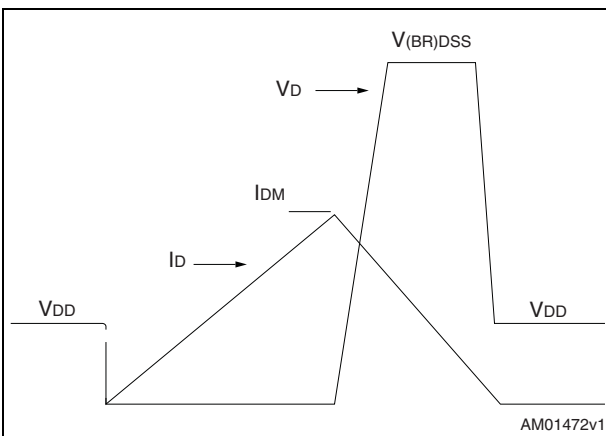
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Figure 5. Unclamped inductive load test circuit



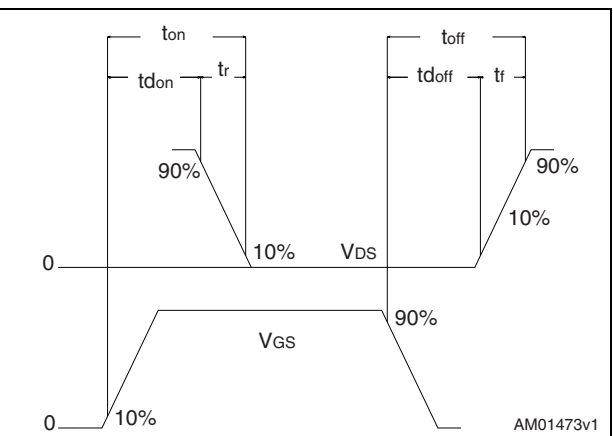
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Figure 6. Unclamped inductive waveform



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Figure 7. Switching time waveform



AM01473v1

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. H²PAK 2 leads mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.30		4.80
A1	0.03		0.20
C	1.17		1.37
e	4.98		5.18
E	0.50		0.90
F	0.78		0.85
H	10.00		10.40
H1	7.171		7.971
L	15.30		15.80
L1	1.27		1.40
L2	4.93		5.23
L3	7.45		7.85
L4	1.5		1.7
M	2.6		2.9
R	0.20		0.60
V	0°		8°

Figure 8. H²PAK 2 leads drawing

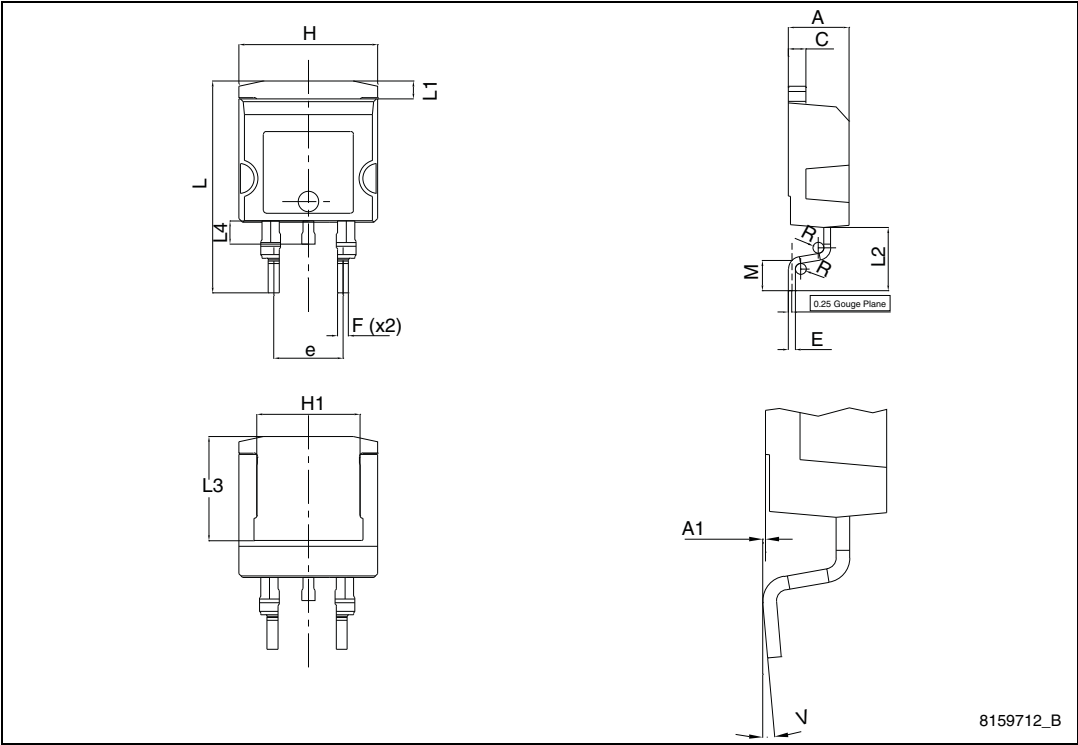
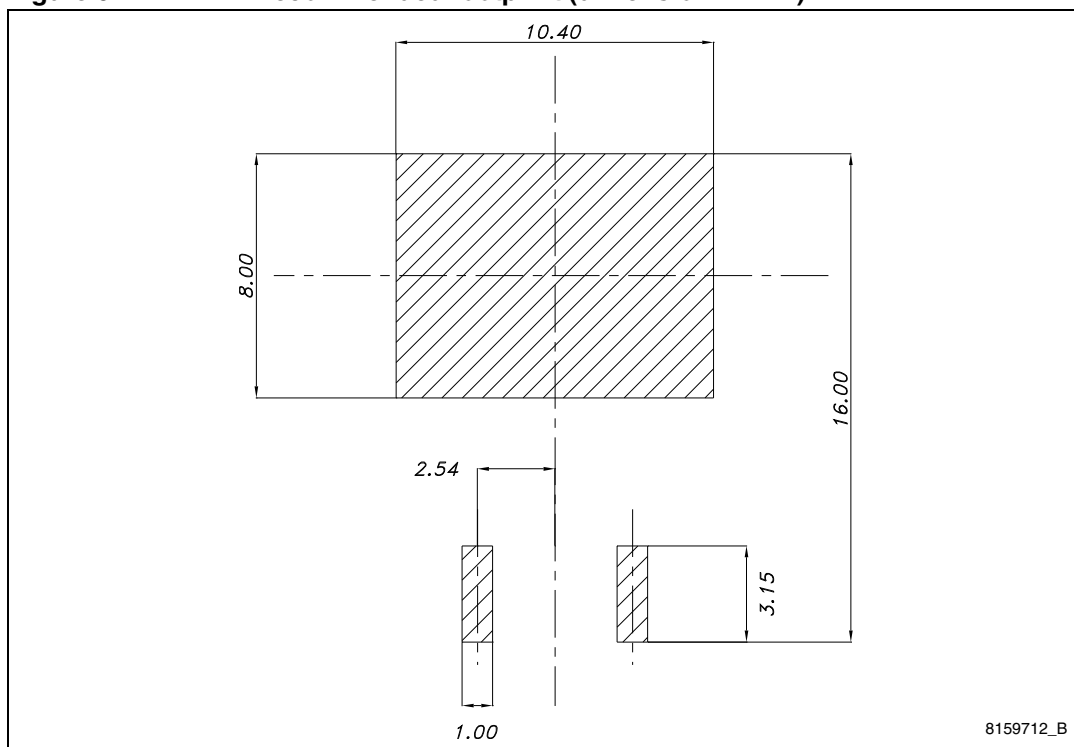


Figure 9. H²PAK2 recommended footprint (dimension in mm)



5 Revision history

Table 9. Document revision history

Date	Revision	Changes
23-May-2011	1	First release.

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