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# STI360N4F6, STP360N4F6

## N-channel 40 V, 120 A STripFET™ VI DeepGATE™ Power MOSFET in I<sup>2</sup>PAK and TO-220 packages

Datasheet – preliminary data

### Features

Order codes	V <sub>DSS</sub>	R <sub>DS(on) max</sub>	I <sub>D</sub>
STI360N4F6	40 V	< 1.8 mΩ	120 A <sup>(1)</sup>
STP360N4F6			

1. Current limited by package

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

### Applications

- Switching applications

### Description

These devices are N-channel Power MOSFETs developed using the 6th generation of STripFET™ DeepGATE™ technology, with a new gate structure. The resulting Power MOSFETs exhibits the lowest R<sub>DS(on)</sub> in all packages.

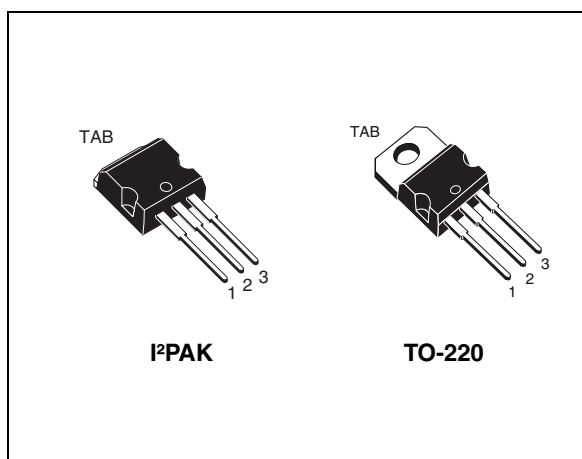
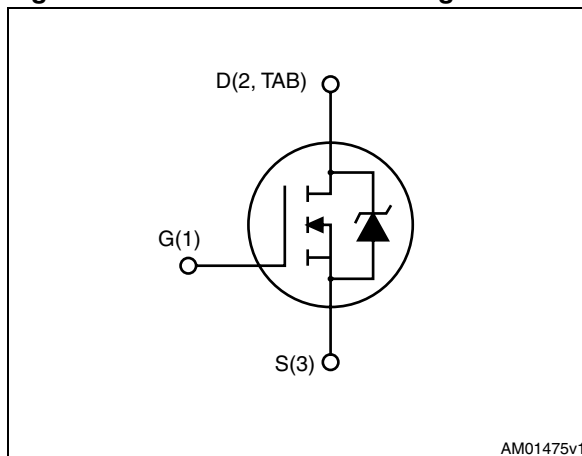


Figure 1. Internal schematic diagram



AM01475v1

Table 1. Device summary

Order codes	Marking	Package	Packaging
STI360N4F6	360N4F6	I <sup>2</sup> PAK	Tube
STP360N4F6		TO-220	

## Contents

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# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-source voltage	40	V
$V_{GS}$	Gate-source voltage	$\pm 20$	V
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	120	A
$I_D^{(1)}$	Drain current (continuous) at $T_C = 100\text{ }^\circ\text{C}$	120	A
$I_{DM}^{(1)}$	Drain current (pulsed)	480	A
$P_{TOT}$	Total dissipation at $T_C = 25\text{ }^\circ\text{C}$	300	W
	Derating factor	2	W/°C
$T_{stg}$	Storage temperature	- 55 to 175	°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	°C/W
$R_{thj-a}$	Thermal resistance junction-ambient max	62.5	°C/W
$T_l$	Maximum lead temperature for soldering purpose	300	°C

Electrical characteristics

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## 2 Electrical characteristics

(T<sub>CASE</sub> = 25 °C unless otherwise specified)

**Table 4. On/off states**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V <sub>(BR)DSS</sub>	Drain-source breakdown voltage (V <sub>GS</sub> = 0)	I <sub>D</sub> = 250 μA	40			V
I <sub>DSS</sub>	Zero gate voltage Drain current (V <sub>GS</sub> = 0)	V <sub>DS</sub> = 40 V V <sub>DS</sub> = 40 V, T <sub>C</sub> = 125 °C			1 100	μA μA
I <sub>GSS</sub>	Gate-body leakage current (V <sub>DS</sub> = 0)	V <sub>GS</sub> = ± 20 V			± 100	nA
V <sub>GS(th)</sub>	Gate threshold voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	3		4.5	V
R <sub>DS(on)</sub>	Static drain-source on-resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 60 A		TBD	1.8	mΩ

**Table 5. Dynamic**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C <sub>iss</sub>	Input capacitance	V <sub>DS</sub> = 25 V, f = 1 MHz, V <sub>GS</sub> = 0		17930		pF
C <sub>oss</sub>	Output capacitance		-	1560	-	pF
C <sub>rss</sub>	Reverse transfer capacitance			1170		pF
Q <sub>g</sub>	Total gate charge	V <sub>DD</sub> = 20 V, I <sub>D</sub> = 120 A, V <sub>GS</sub> = 10 V		340		nC
Q <sub>gs</sub>	Gate-source charge		-	TBD	-	nC
Q <sub>gd</sub>	Gate-drain charge			TBD		nC

**Table 6. Switching times**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t <sub>d(on)</sub> t <sub>r</sub>	Turn-on delay time Rise time	V <sub>DD</sub> = 20 V, I <sub>D</sub> = 60 A R <sub>G</sub> = 4.7 Ω V <sub>GS</sub> = 10 V	-	TBD	-	ns
t <sub>d(off)</sub> t <sub>f</sub>	Turn-off-delay time Fall time		-	TBD	-	ns

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**Electrical characteristics**

**Table 7. Source drain diode**

Symbol	Parameter	Test conditions	Min.	Typ.	Max	Unit
$I_{SD}^{(1)}$	Source-drain current		-		120	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		480	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 120\text{ A}, V_{GS} = 0$	-		1.1	V
$t_{rr}$	Reverse recovery time	$I_{SD} = 120\text{ A}, V_{DD} = 32\text{ V}$ $di/dt = 100\text{ A}/\mu\text{s},$ $T_j = 150\text{ }^\circ\text{C}$	-	TBD		ns
$Q_{rr}$	Reverse recovery charge					nC
$I_{RRM}$	Reverse recovery current					A

1. Current limited by package
2. Pulsed: pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5%

### 3 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](http://www.st.com). ECOPACK® is an ST trademark.

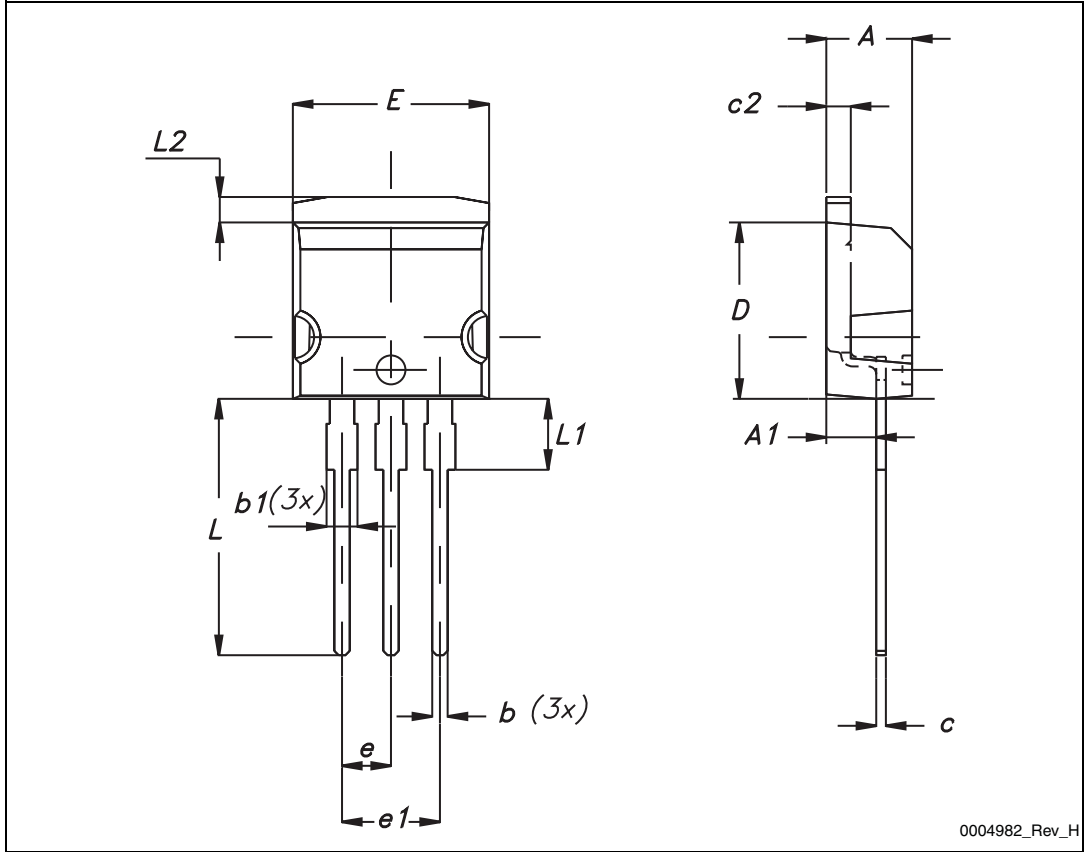
**Table 8. I<sup>2</sup>PAK (TO-262) mechanical data**

DIM.	mm.		
	min.	typ	max.
A	4.40		4.60
A1	2.40		2.72
b	0.61		0.88
b1	1.14		1.70
c	0.49		0.70
c2	1.23		1.32
D	8.95		9.35
e	2.40		2.70
e1	4.95		5.15
E	10		10.40
L	13		14
L1	3.50		3.93
L2	1.27		1.40

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**Package mechanical data**

**Figure 2. I<sup>2</sup>PAK (TO-262) drawing**



0004982\_Rev\_H



Package mechanical data

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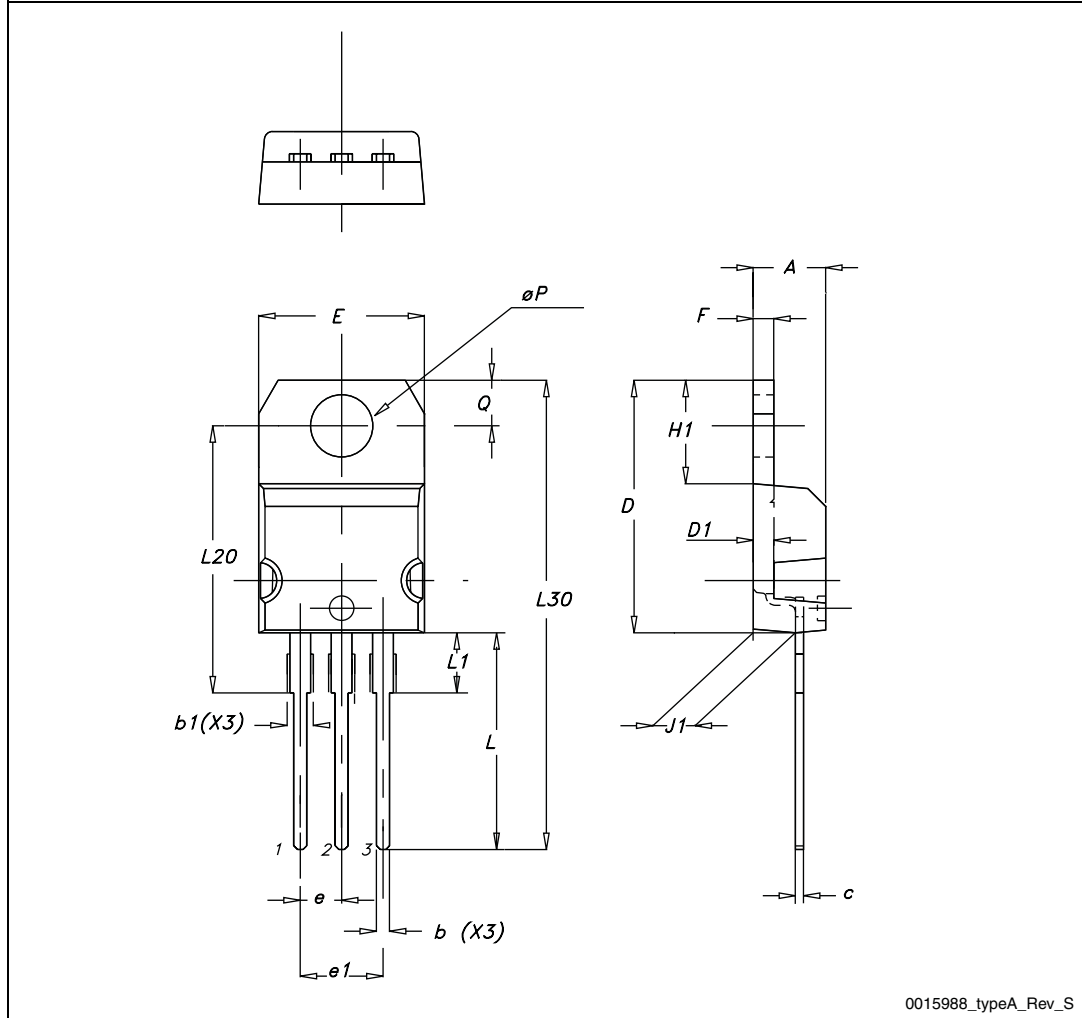
Table 9. TO-220 type A mechanical data

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	
ØP	3.75		3.85
Q	2.65		2.95

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Package mechanical data

Figure 3. TO-220 type A drawing



## 4 Revision history

Table 10. Document revision history

Date	Revision	Changes
08-Aug-2012	1	Initial release.

## STI360N4F6, STP360N4F6

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