



STP80N6F6

N-channel 60 V, 110 A STripFET™ VI DeepGATE™ Power MOSFET in TO-220 package

Datasheet – preliminary data

Features

Order codes	V _{DSS}	R _{DS(on)} max	I _D
STP80N6F6	60 V	5.8 mΩ	110 A

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

Applications

- Switching applications

Description

This device is an N-channel Power MOSFET developed using the 6th generation of STripFET™ DeepGATE™ technology, with a new gate structure. The resulting Power MOSFET exhibits the lowest RDS(on) in all packages.

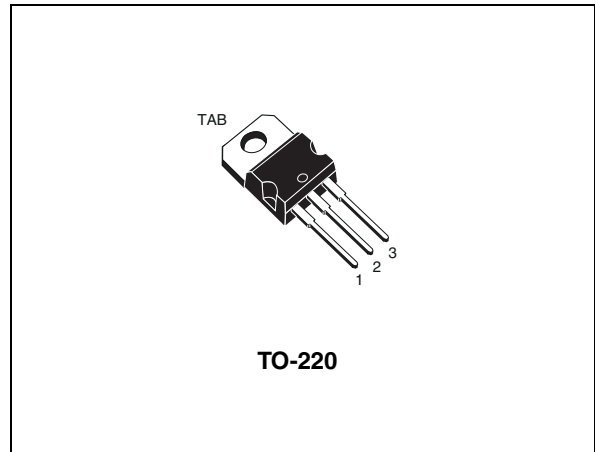


Figure 1. Internal schematic diagram

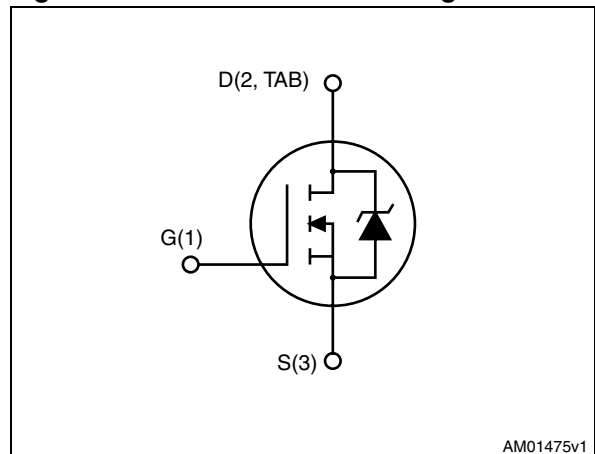


Table 1. Device summary

Order codes	Marking	Package	Packaging
STP80N6F6	80N6F6	TO-220	Tube

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1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	60	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current (continuous) at $T_C = 25\text{ }^{\circ}\text{C}$	110	A
I_D	Drain current (continuous) at $T_C = 100\text{ }^{\circ}\text{C}$	110	A
I_{DM}	Drain current (pulsed)	440	A
P_{TOT}	Total dissipation at $T_C = 25\text{ }^{\circ}\text{C}$	150	W
	Derating factor	2	W/ $^{\circ}\text{C}$
T_{stg}	Storage temperature	- 55 to 175	$^{\circ}\text{C}$
T_j	Operating junction temperature		

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	1	$^{\circ}\text{C}/\text{W}$
R_{thj-a}	Thermal resistance junction-ambient max	62.5	$^{\circ}\text{C}/\text{W}$
T_l	Maximum lead temperature for soldering purpose	300	$^{\circ}\text{C}$

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 ($V_{GS} = 0$)	$I_D = 250\text{ }\mu\text{A}$	60			V
I_{DSS}	Zero gate voltage Drain current ($V_{GS} = 0$)	$V_{DS} = 60\text{ V}$ $V_{DS} = 60\text{ V}, T_C = 125\text{ °C}$			1 100	μA μA
I_{GSS}	Gate-body leakage current ($V_{DS} = 0$)	$V_{GS} = \pm 20\text{ V}$			± 100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	3		4.5	V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 10\text{ V}, I_D = 50\text{ A}$		TBD	5.8	m Ω

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	$V_{DS} = 25\text{ V}, f = 1\text{ MHz},$ $V_{GS} = 0$	-	7480	-	pF
C_{oss}	Output capacitance			450		pF
C_{rss}	Reverse transfer capacitance			340		pF
Q_g	Total gate charge	$V_{DD} = 30\text{ V}, I_D = 110\text{ A},$ $V_{GS} = 10\text{ V}$	-	122	-	nC
Q_{gs}	Gate-source charge			TBD		nC
Q_{gd}	Gate-drain charge			TBD		nC

Table 6. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 30\text{ V}, I_D = 50\text{ A}$ $R_G = 4.7\text{ }\Omega, V_{GS} = 10\text{ V}$	-	TBD	-	ns
t_r	Rise time					ns
$t_{d(off)}$	Turn-off-delay time	$V_{DD} = 30\text{ V}, I_D = 50\text{ A}$ $R_G = 4.7\text{ }\Omega, V_{GS} = 10\text{ V}$	-	TBD	-	ns
t_f	Fall time					ns

Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max	Unit
I_{SD}	Source-drain current		-		110	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		440	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 110\text{ A}$, $V_{GS} = 0$	-		1.1	V
t_{rr}	Reverse recovery time	$I_{SD} = 110\text{ A}$, $V_{DD} = 48\text{ V}$ $di/dt = 100\text{ A}/\mu\text{s}$, $T_j = 150\text{ }^{\circ}\text{C}$	-	TBD		ns
Q_{rr}	Reverse recovery charge					nC
I_{RRM}	Reverse recovery current					A

1. Current limited by package.

2. Pulsed: pulse duration = 300 μs , duty cycle 1.5%

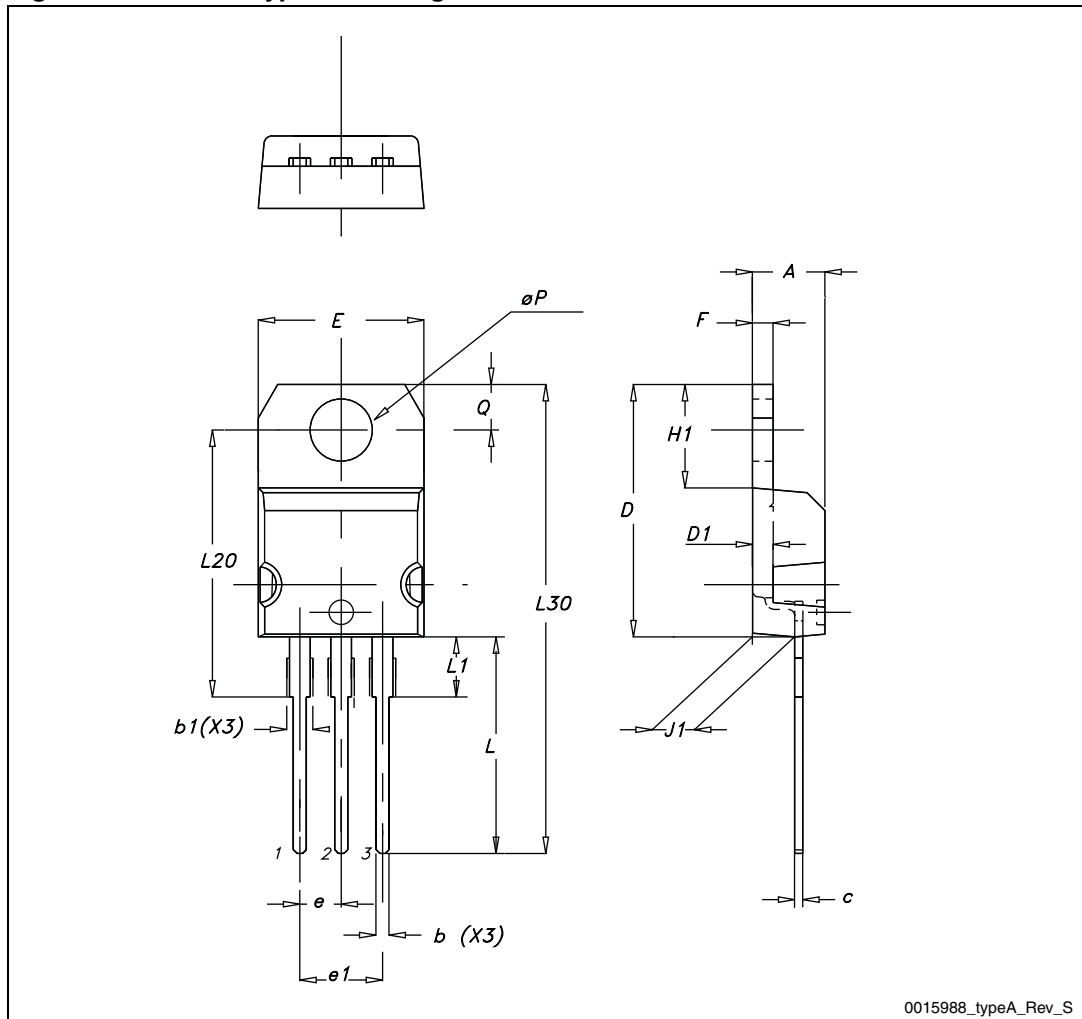
3 Package mechanical data

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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	
ØP	3.75		3.85
Q	2.65		2.95

Figure 2. TO-220 type A drawing



4 Revision history

Table 9. Document revision history

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

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