

## N-channel 60 V, 80 A STripFET™ VI DeepGATE™ Power MOSFET in DPAK package

Datasheet – preliminary data

### Features

Order codes	V <sub>DSS</sub>	R <sub>DS(on)</sub> max	I <sub>D</sub>
STD80N6F6	60 V	6.5 mΩ	80 A <sup>(1)</sup>

1. Current limited by package

- 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.

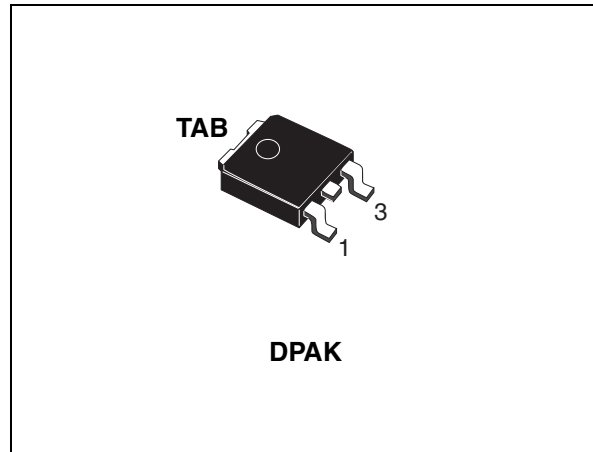


Figure 1. Internal schematic diagram

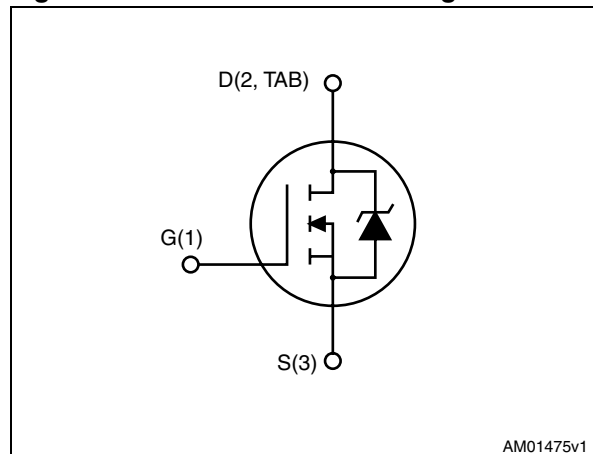


Table 1. Device summary

Order codes	Marking	Package	Packaging
STD80N6F6	80N6F6	DPAK	Tape and reel

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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	$\pm 20$	V
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25\text{ °C}$	80	A
$I_D^{(1)}$	Drain current (continuous) at $T_C = 100\text{ °C}$	80	A
$I_{DM}^{(1)}$	Drain current (pulsed)	320	A
$P_{TOT}$	Total dissipation at $T_C = 25\text{ °C}$	120	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	1.25	°C/W
$R_{thj-pcb}^{(1)}$	Thermal resistance junction - PCB max	50	°C/W

1. When mounted on FR-4 board of 1 inch<sup>2</sup>, 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 ( $V_{GS} = 0$ )	$I_D = 250\ \mu\text{A}$	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	$\mu\text{A}$ $\mu\text{A}$
$I_{GSS}$	Gate-body leakage current ( $V_{DS} = 0$ )	$V_{GS} = \pm 20\ \text{V}$			$\pm 100$	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	3		4.5	V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 10\ \text{V}, I_D = 40\ \text{A}$		TBD	6.5	m $\Omega$

**Table 5. Dynamic**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$C_{iss}$	Input capacitance			7480		pF
$C_{oss}$	Output capacitance	$V_{DS} = 25\ \text{V}, f = 1\ \text{MHz},$ $V_{GS} = 0$	-	450	-	pF
$C_{rss}$	Reverse transfer capacitance			310		pF
$Q_g$	Total gate charge			122		nC
$Q_{gs}$	Gate-source charge	$V_{DD} = 30\ \text{V}, I_D = 80\ \text{A},$ $V_{GS} = 10\ \text{V}$	-	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		-	TBD	-	ns
$t_r$	Rise time	$V_{DD} = 30\ \text{V}, I_D = 40\ \text{A}$ $R_G = 4.7\ \Omega, V_{GS} = 10\ \text{V}$				ns
$t_{d(off)}$	Turn-off-delay time		-	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		-		80	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		320	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 80 \text{ A}$ , $V_{GS} = 0$	-		1.1	V
$t_{rr}$	Reverse recovery time	$I_{SD} = 80 \text{ A}$ , $V_{DD} = 48 \text{ V}$ $di/dt = 100 \text{ A}/\mu\text{s}$ , $T_j = 150 \text{ }^\circ\text{C}$	-	TBD		ns
$Q_{rr}$	Reverse recovery charge					nC
$I_{RRM}$	Reverse recovery current					A

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

### 3 Package mechanical data

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

**Table 8. DPAK (TO-252) mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
c	0.45		0.60
c2	0.48		0.60
D	6.00		6.20
D1		5.10	
E	6.40		6.60
E1		4.70	
e		2.28	
e1	4.40		4.60
H	9.35		10.10
L	1		
L1		2.80	
L2		0.80	
L4	0.60		1
R		0.20	
V2	0°		8°

Figure 2. DPAK (TO-252) drawing

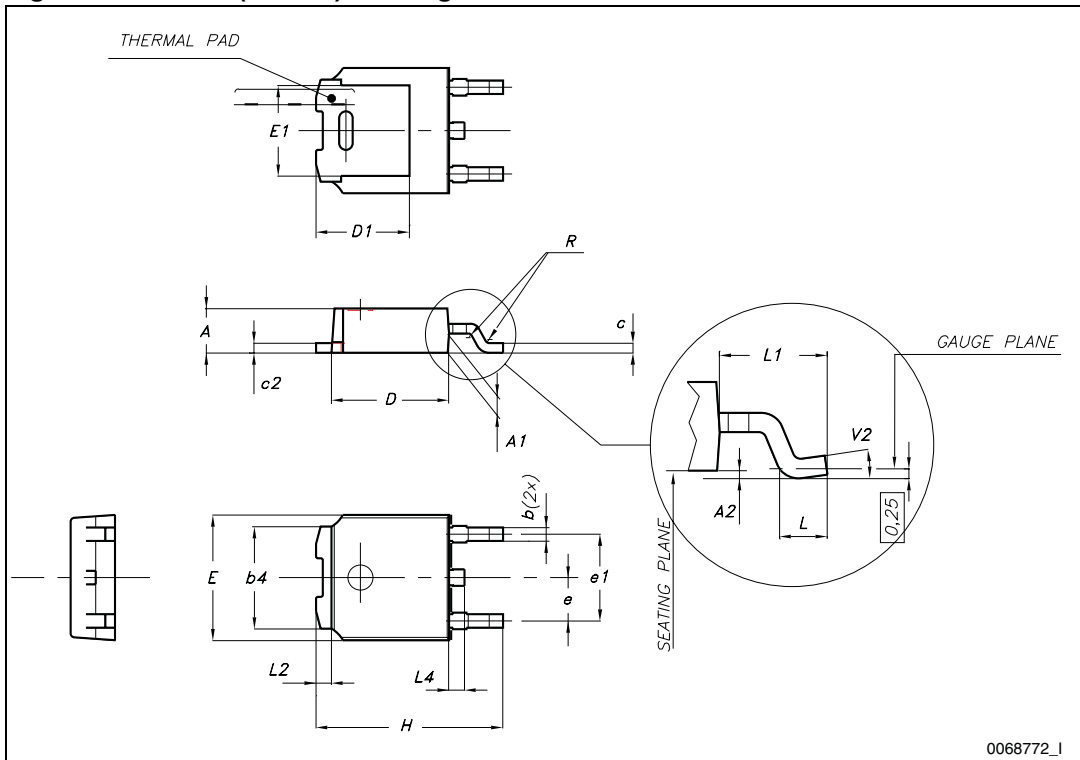
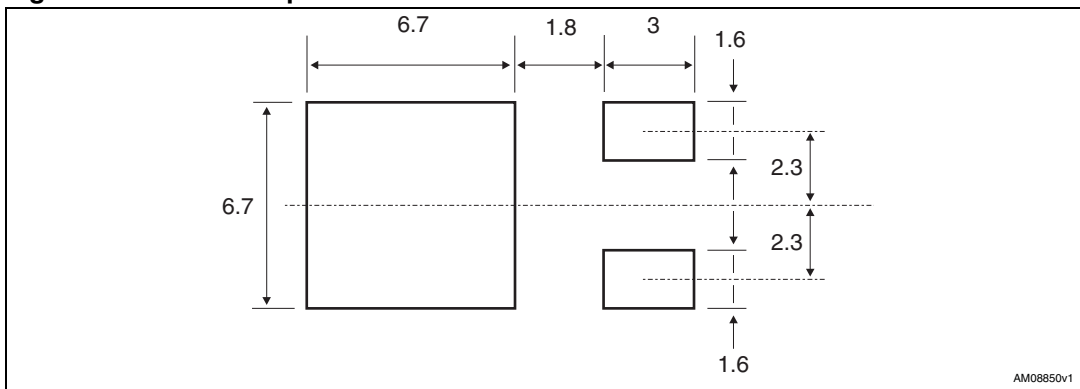


Figure 3. DPAK footprint<sup>(a)</sup>



a. All dimensions are in millimeters.

## 4 Packaging mechanical data

Table 9. DPAK (TO-252) tape and reel mechanical data

Tape			Reel		
Dim.	mm		Dim.	mm	
	Min.	Max.		Min.	Max.
A0	6.8	7	A		330
B0	10.4	10.6	B	1.5	
B1		12.1	C	12.8	13.2
D	1.5	1.6	D	20.2	
D1	1.5		G	16.4	18.4
E	1.65	1.85	N	50	
F	7.4	7.6	T		22.4
K0	2.55	2.75			
P0	3.9	4.1	Base qty.		2500
P1	7.9	8.1	Bulk qty.		2500
P2	1.9	2.1			
R	40				
T	0.25	0.35			
W	15.7	16.3			



Figure 4. Tape for DPAK (TO-252)

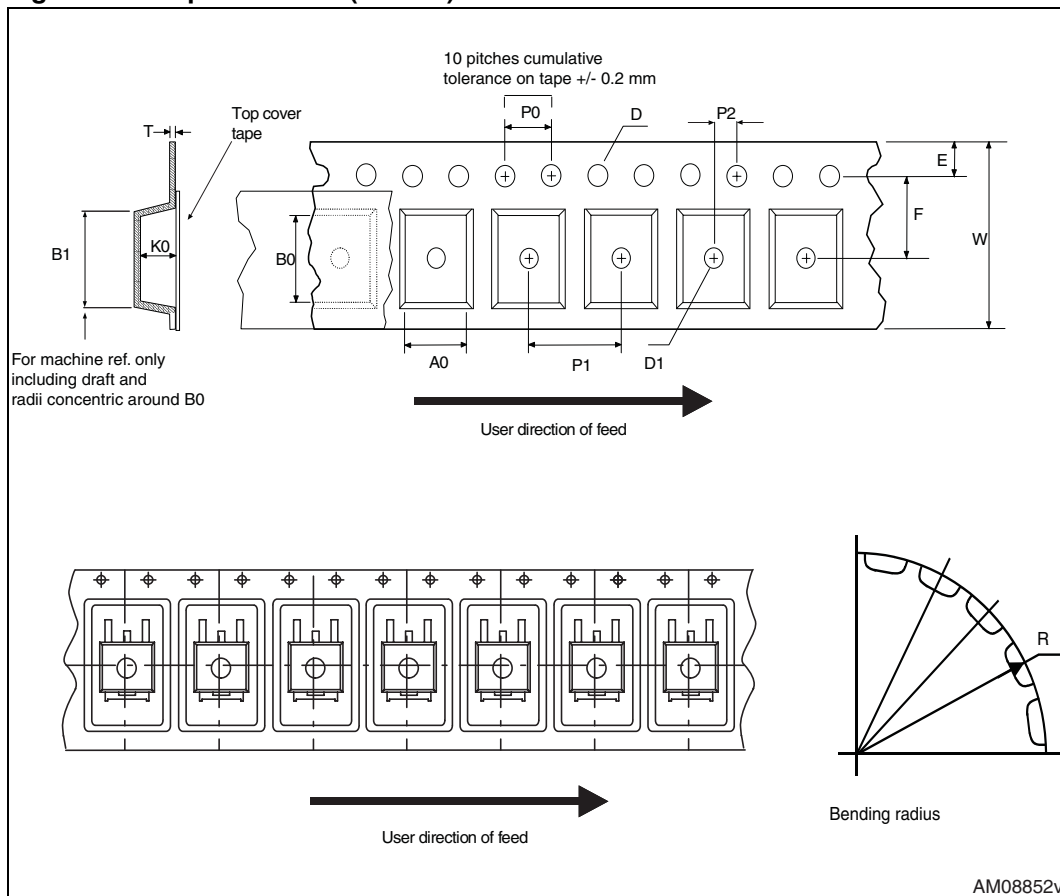
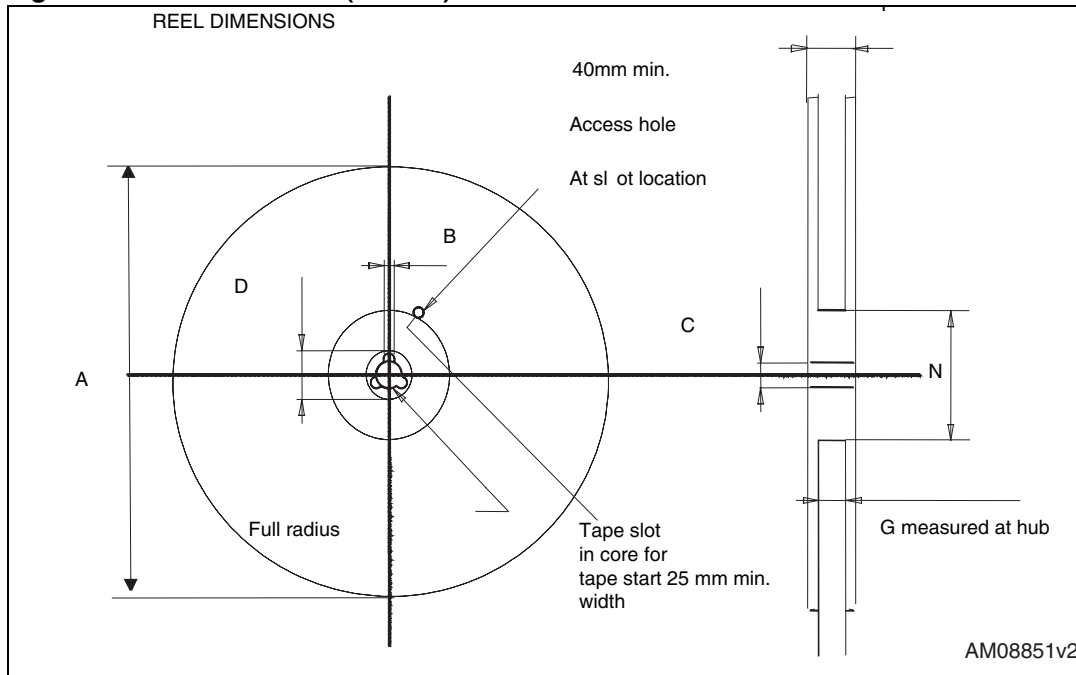


Figure 5. Reel for DPAK (TO-252)



## 5 Revision history

Table 10. Document revision history

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

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