

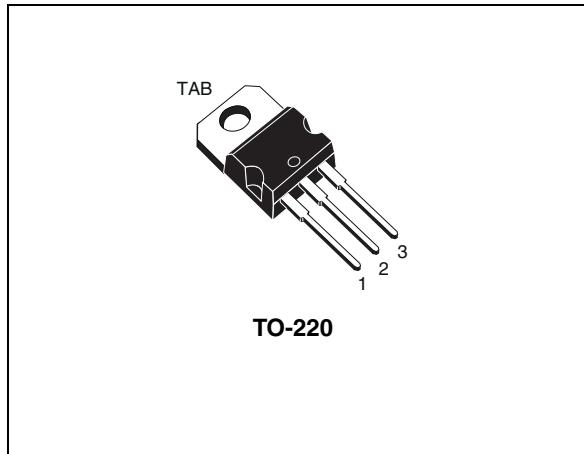
**N-channel 68 V, 0.0063 Ω typ., 96 A STripFET™ VI DeepGATE™ Power MOSFET in TO-220 package**

Datasheet – production data

## Features

Order code	V <sub>DSS</sub> max.	R <sub>DS(on)</sub> max.	I <sub>D</sub>	P <sub>TOT</sub>
STP80N70F6	68 V	< 0.008 Ω (V <sub>GS</sub> = 10 V)	96 A	110 W

- R<sub>DS(on)</sub> \* Q<sub>g</sub> industry benchmark
- Extremely low on-resistance R<sub>DS(on)</sub>
- High avalanche ruggedness
- Low gate drive power losses
- Very low switching gate charge



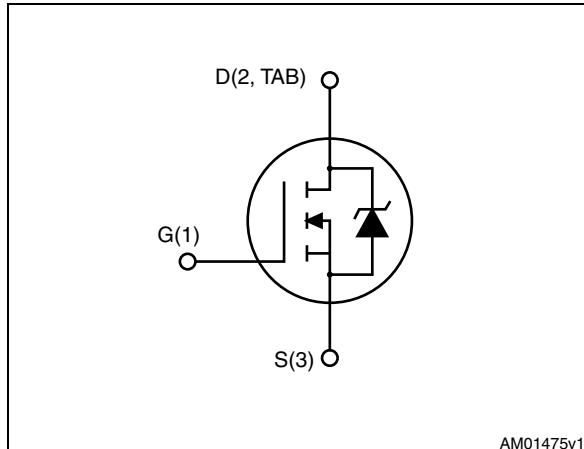
## Applications

- Switching applications

## Description

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

**Figure 1. Internal schematic diagram**



**Table 1. Device summary**

Order code	Marking	Package	Packaging
STP80N70F6	80N70F6	TO-220	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

<b>Symbol</b>	<b>Parameter</b>	<b>Value</b>	<b>Unit</b>
$V_{DS}$	Drain-source voltage	68	V
$V_{GS}$	Gate-source voltage	$\pm 20$	V
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25^\circ\text{C}$	96	A
$I_D^{(1)}$	Drain current (continuous) at $T_C = 100^\circ\text{C}$	60	A
$I_{DM}^{(1)}$	Drain current (pulsed)	384	A
$P_{TOT}^{(1)}$	Total dissipation at $T_C = 25^\circ\text{C}$	110	W
$T_{stg}$	Storage temperature	- 55 to 175	$^\circ\text{C}$
$T_j$	Operating junction temperature		

1. This value is rated according to  $R_{thj-c}$

**Table 3. Thermal data**

<b>Symbol</b>	<b>Parameter</b>	<b>Value</b>	<b>Unit</b>
$R_{thj-c}$	Thermal resistance junction-case max	1.36	$^\circ\text{C/W}$
$R_{thj-a}$	Thermal resistance junction-ambient max	62.5	$^\circ\text{C/W}$

## 2 Electrical characteristics

( $T_{CASE} = 25^\circ\text{C}$  unless otherwise specified).

**Table 4. On/off states**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage ( $V_{GS} = 0$ )	$I_D = 250 \mu\text{A}$	68			V
$I_{DSS}$	Zero gate voltage Drain current ( $V_{GS} = 0$ )	$V_{DS} = 68 \text{ V}$ $V_{DS} = 68 \text{ V}, T_C = 125^\circ\text{C}$			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
$V_{GS(\text{th})}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	2		4	V
$R_{DS(\text{on})}$	Static drain-source on-resistance	$V_{GS} = 10 \text{ V}, I_D = 48 \text{ A}$		0.0063	0.008	$\Omega$

**Table 5. Dynamic**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$C_{iss}$	Input capacitance			5850		pF
$C_{oss}$	Output capacitance		-	341	-	pF
$C_{rss}$	Reverse transfer capacitance	$V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}, V_{GS} = 0$		240		pF
$Q_g$	Total gate charge			99		nC
$Q_{gs}$	Gate-source charge	$V_{DD} = 34 \text{ V}, I_D = 96 \text{ A}, V_{GS} = 10 \text{ V}$	-	31	-	nC
$Q_{gd}$	Gate-drain charge			19		nC

**Table 6. Switching times**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(\text{on})}$	Turn-on delay time	$V_{DD} = 10 \text{ V}, I_D = 48 \text{ A}$ $R_G = 4.7 \Omega, V_{GS} = 10 \text{ V}$	-	23	-	ns
$t_r$	Rise time			29	-	ns
$t_{d(\text{off})}$	Turn-off-delay time		-	102	-	ns
$t_f$	Fall time			23	-	ns

**Table 7. Source drain diode**

<b>Symbol</b>	<b>Parameter</b>	<b>Test conditions</b>	<b>Min.</b>	<b>Typ.</b>	<b>Max</b>	<b>Unit</b>
$I_{SD}$	Source-drain current		-		96	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		384	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 96 \text{ A}, V_{GS} = 0$	-		1.5	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse recovery time Reverse recovery charge Reverse recovery current	$I_{SD} = 48 \text{ A}, V_{DD} = 24 \text{ V}$ $di/dt = 100 \text{ A}/\mu\text{s}$ , $T_j = 150^\circ\text{C}$	-	34 53 3		ns nC A

1. Pulse width is limited by safe operating area
2. Pulsed: pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5%

## 2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

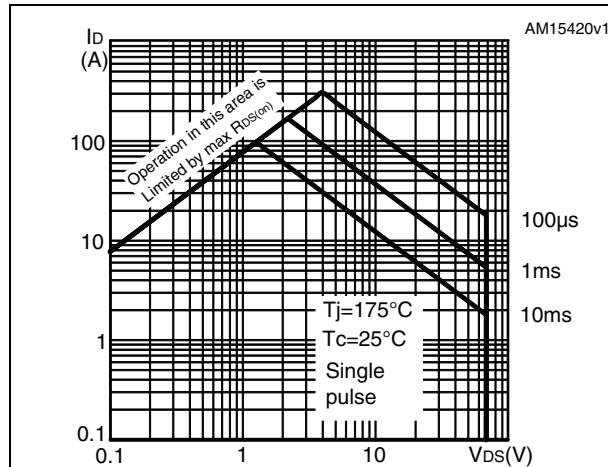


Figure 3. Thermal impedance

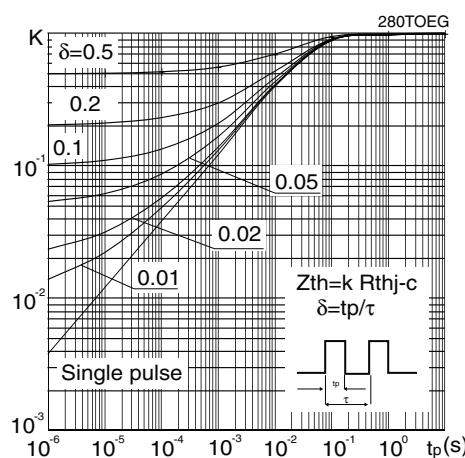


Figure 4. Output characteristics

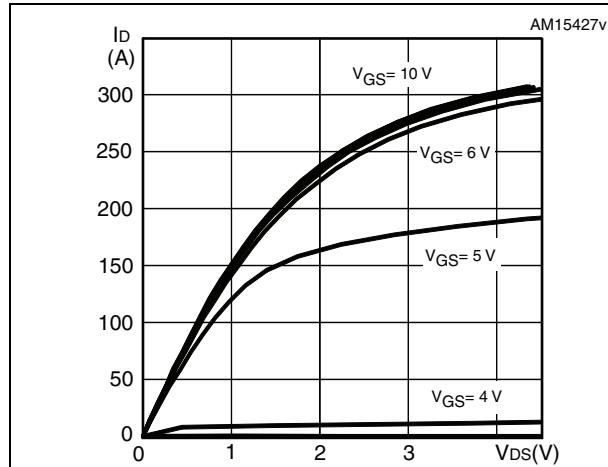


Figure 5. Transfer characteristics

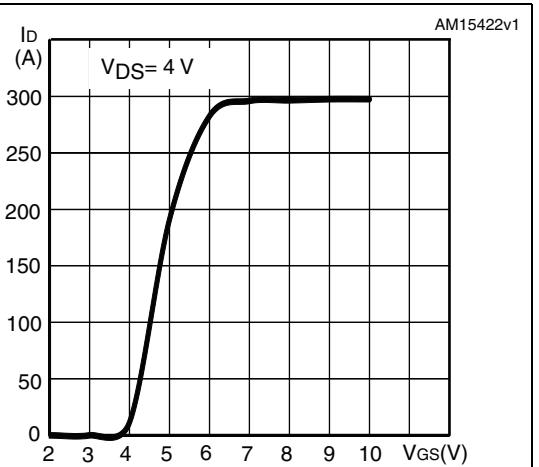


Figure 6. Gate charge vs gate-source voltage

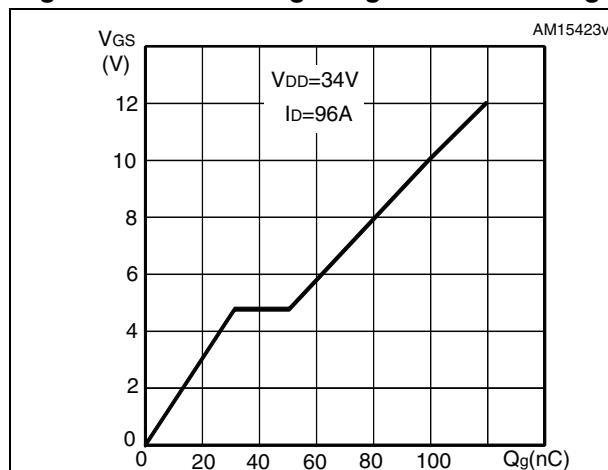


Figure 7. Static drain-source on-resistance

