



STT5NF20V

N-channel 20 V, 0.030 Ω , 5 A SOT23-6L
2.5 V drive STripFET™ II Power MOSFET

Preliminary data

Features

Type	V _{DSS}	R _{DS(on)}	I _D
STT5NF20V	20 V	< 0.035 Ω @ 4.5 V	5 A
		< 0.045 Ω @ 2.5 V	

Applications

- Switching

Description

This Power MOSFET is the latest development of STMicroelectronics unique “single feature size” strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

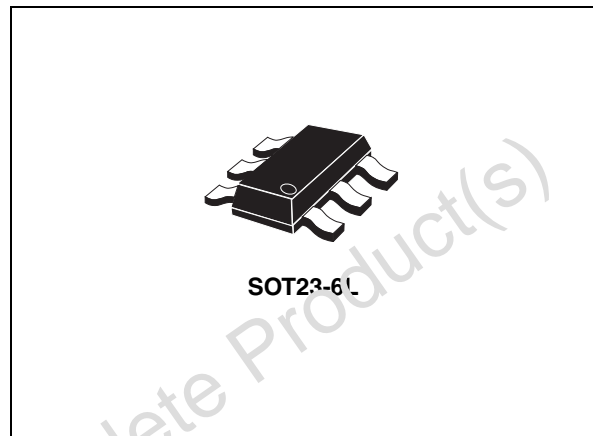


Figure 1. Internal schematic diagram

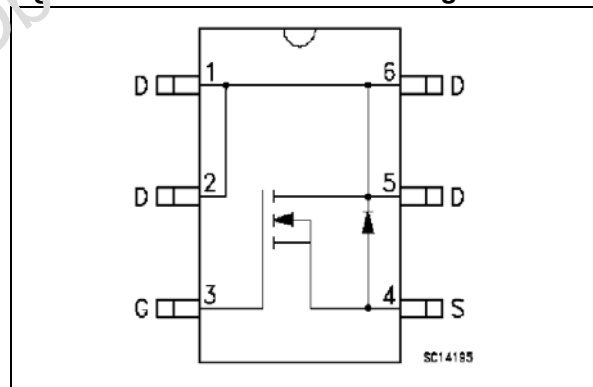


Table 1. Device summary

Order code	Marking	Package	Packing
STT5NF20V	STT2	SOT23-6L	Tape and reel

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage ($V_{GS} = 0$)	20	V
V_{GS}	Gate-source voltage	± 12	V
I_D	Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	5	A
I_D	Drain current (continuous) at $T_C = 100\text{ }^\circ\text{C}$	3	A
$I_{DM}^{(1)}$	Drain current (pulsed)	20	A
P_{TOT}	Total dissipation at $T_C = 25\text{ }^\circ\text{C}$	1.6	W
T_{stg}	Storage temperature	-55 to 150	$^\circ\text{C}$
T_j	Max. operating junction temperature	150	$^\circ\text{C}$

1. Pulse width limited by safe operating area

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{thj-amb}$	Thermal resistance junction-case max	78	$^\circ\text{C/W}$

2 Electrical characteristics

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

Table 4. Static

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown Voltage	$I_D = 250\ \mu\text{A}$, $V_{GS} = 0$	20			V
I_{DSS}	Zero gate voltage drain current ($V_{GS} = 0$)	$V_{DS} = \text{max rating}$ $V_{DS} = \text{max rating}$, $T_C = 125\text{ °C}$			1 10	μA μA
I_{GSS}	Gate body leakage current ($V_{DS} = 0$)	$V_{GS} = \pm 12\text{ V}$			± 100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	0.6			V
$R_{DS(on)}$	Static drain-source on resistance	$V_{GS} = 4.5\text{ V}$, $I_D = 2.5\text{ A}$		0.030	0.035	Ω
		$V_{GS} = 2.5\text{ V}$, $I_D = 2.5\text{ A}$		0.037	0.045	Ω

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min	Typ.	Max.	Unit
C_{iss}	Input capacitance	$V_{DS} = 15\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0$		460		pF
C_{oss}	Output capacitance		-	200		pF
C_{rss}	Reverse transfer capacitance				50	
Q_g	Total gate charge	$V_{DD} = 16\text{ V}$, $I_D = 5\text{ A}$		8.5	11.5	nC
Q_{gs}	Gate-source charge	$V_{GS} = 4.5\text{ V}$		1.8		nC
Q_{gd}	Gate-drain charge	Figure 3		2.4		nC

Table 6. Switching on/off (inductive load)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 10\text{ V}$, $I_D = 2.5\text{ A}$, $R_G = 4.7\ \Omega$, $V_{GS} = 4.5\text{ V}$ <i>Figure 2</i>	-	7	-	ns
t_r	Rise time		-	33	-	ns
$t_{d(off)}$	Turn-off delay time	<i>Figure 2</i>	-	27	-	ns
t_f	Fall time		-	10	-	ns

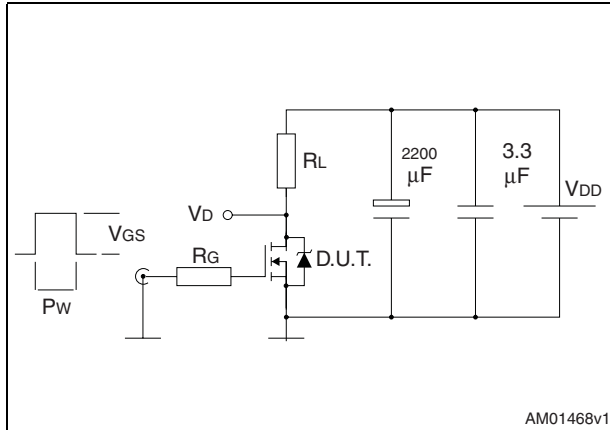
Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain current		-		5	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		20	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 5\text{ A}$, $V_{GS} = 0$	-		1.2	V
t_{rr}	Reverse recovery time	$I_{SD} = 5\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $V_{DD} = 10\text{ V}$, $T_J = 150\text{ }^\circ\text{C}$ <i>Figure 4</i>	-	26		ns
Q_{rr}	Reverse recovery charge		-	13		nC
I_{RRM}	Reverse recovery current		-	1		A

1. Pulse width limited by safe operating area
2. Pulsed: pulse duration = 300 μs , duty cycle 1.5%

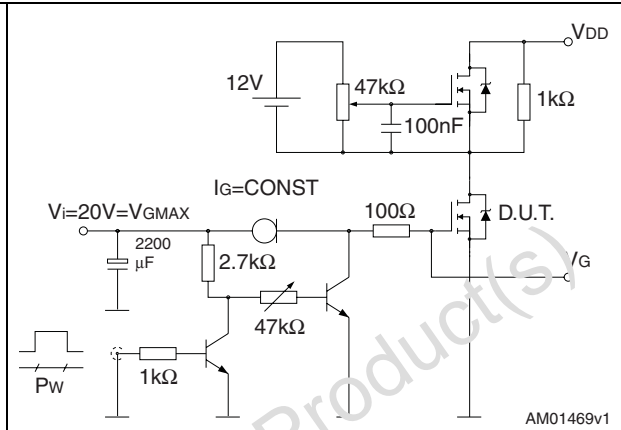
3 Test circuits

Figure 2. Switching times test circuit for resistive load



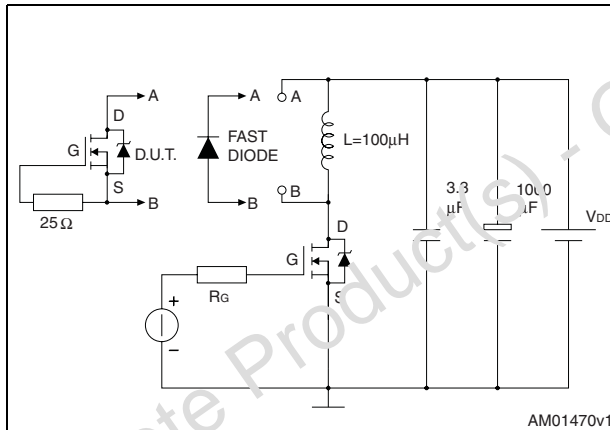
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Figure 3. Gate charge test circuit



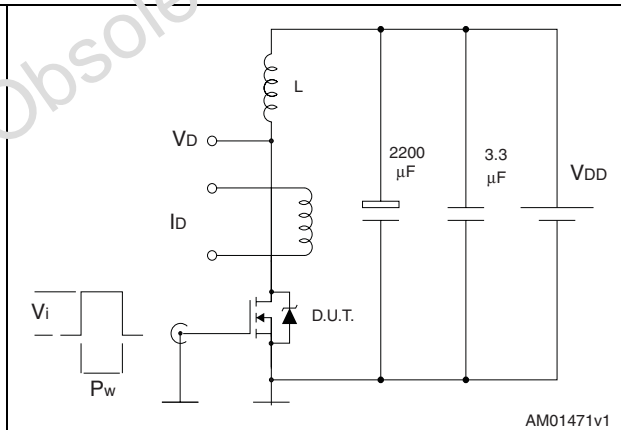
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Figure 4. Test circuit for inductive load switching and diode recovery times



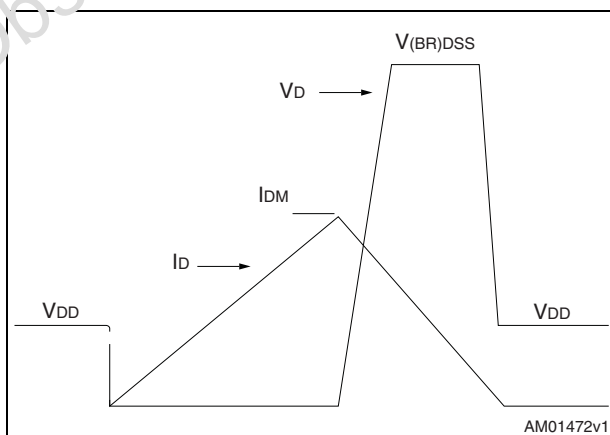
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Figure 5. Unclamped inductive load test circuit



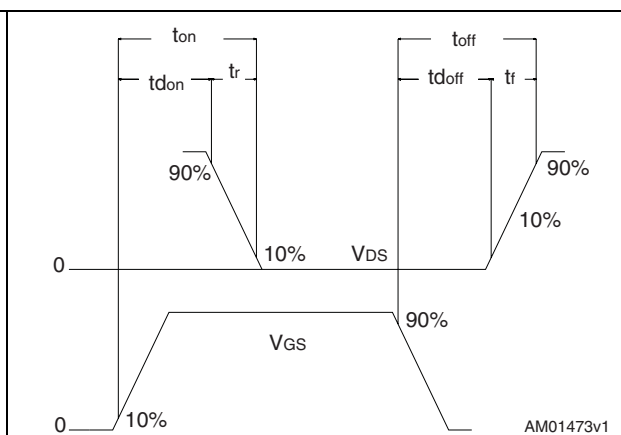
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Figure 6. Unclamped inductive waveform



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Figure 7. Switching time waveform



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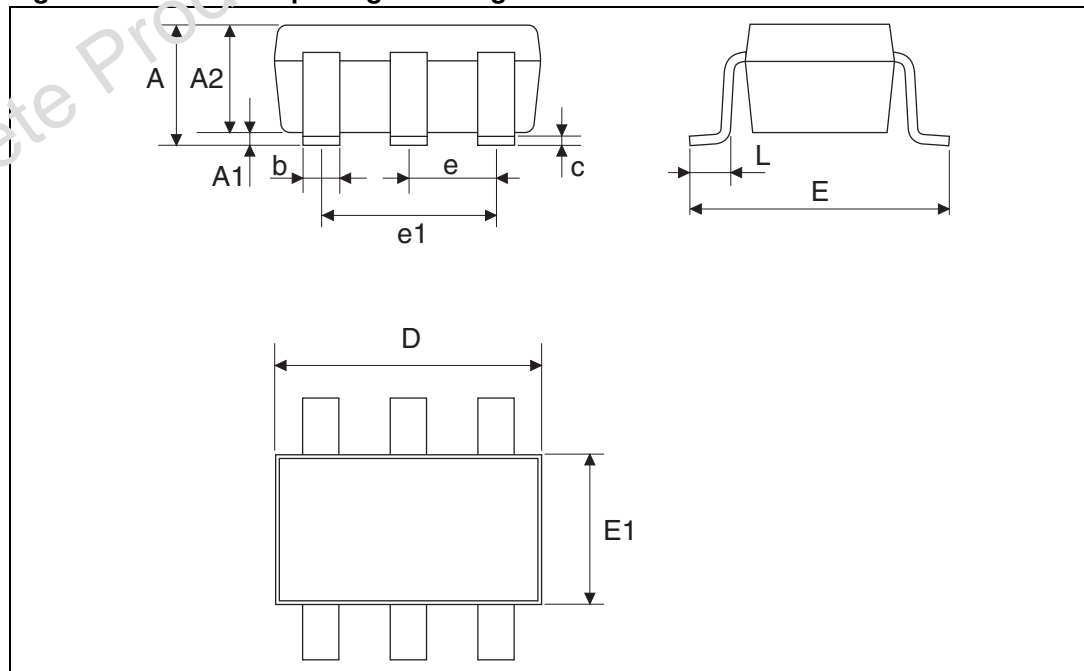
4 Package mechanical data

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. SOT23-6L package mechanical data

Dim.	mm			mils		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.25	0.035		0.049
A1	0.00		0.15	0.000		0.006
A2	0.90		1.30	0.035		0.051
b	0.25		0.50	0.010		0.020
C	0.09		0.20	0.004		0.008
D	2.80		3.10	0.110		0.122
E	2.60		3.00	0.102		0.118
E1	1.50		1.75	0.059		0.069
L	0.35		0.55	0.014		0.022
e		0.95			0.037	
e1		1.90			0.075	

Figure 8. SOT23-6L package drawing



5 Revision history

Table 9. Document revision history

Date	Revision	Changes
21-Jun-2004	3	
11-Sep-2009	4	Updated mechanical data

Obsolete Product(s) - Obsolete Product(s)

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