

N-CHANNEL 20V - 0.030 Ω - 5A SOT23-6L 2.7V-DRIVE STripFET™ II POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	ID
STT5NF20V	20 V	$\begin{array}{l} < \ 0.040 \ \Omega \ (\ @ \ 4.5 \ V \) \\ < \ 0.045 \ \Omega \ (\ @ \ 2.7 \ V \) \end{array}$	5 A

- TYPICAL R_{DS}(on) = 0.030 Ω @ 4.5 V
- TYPICAL R_{DS}(on) = 0.037 Ω @ 2.7 V
- ULTRA LOW THRESHOLD GATE DRIVE (2.7 V)
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY

DESCRIPTION

This Power MOSFET is the latest development of STMicroelectronis 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.

APPLICATIONS

- DC MOTOR DRIVE
- DC-DC CONVERTERS
- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT
- POWER MANAGEMENT IN PORTABLE/DESKTOP PCs



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	20	V
V _{DGR}	Drain-gate Voltage (R_{GS} = 20 k Ω)	20	V
V _{GS}	Gate- source Voltage	± 12	V
Ι _D	Drain Current (continuous) at $T_C = 25^{\circ}C$	5	А
Ι _D	Drain Current (continuous) at $T_C = 100^{\circ}C$	3	А
I _{DM} (●)	Drain Current (pulsed)	20	А
P _{tot}	Total Dissipation at $T_C = 25^{\circ}C$	1.6	W

(•) Pulse width limited by safe operating area.

THERMAL DATA

Rthj-amb	Thermal Resistance Junction-ambient	Max	78	°C/W
Tj	Max. Operating Junction Temperature		-55 to 150	°C
T _{stg}	Storage Temperature		-55 to 150	°C

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	$I_D = 250 \ \mu A, \ V_{GS} = 0$	20			V
IDSS	Zero Gate Voltage Drain Current (V _{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating T _C = 125°C			1 10	μΑ μΑ
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	$V_{GS} = \pm 12V$			±100	nA

ON (*)

Symbol	Parameter	Test Conditions		Min.	Тур.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}$	I _D = 250 μA	0.6			V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 4.5 V V _{GS} = 2.7 V	I _D = 2.5 A I _D = 2.5 A		0.030 0.037	0.040 0.045	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V_{DS} =15 V I_{D} = 2.5 A		9.5		S
C _{iss} C _{oss} C _{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{DS} = 15V f = 1 MHz, V _{GS} = 0		460 200 50		pF pF pF

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ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
t _{d(on)} t _r	Turn-on Delay Time Rise Time			7 33		ns ns
Q _g Q _{gs} Q _{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD} = 16V I _D = 5A V _{GS} =4.5V (see test circuit, Figure 2)		8.5 1.8 2.4	11.5	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
t _{d(off)} t _f	Turn-off Delay Time Fall Time			27 10		ns ns
t _{d(Voff)} t _f t _c	Off-voltage Rise Time Fall Time Cross-over Time			26 11 21		ns ns ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions		Min.	Тур.	Max.	Unit
I _{SD} I _{SDM} (●)	Source-drain Current Source-drain Current (pulsed)					5 20	A A
V _{SD} (*)	Forward On Voltage	I _{SD} = 5 A	$V_{GS} = 0$			1.2	V
t _{rr} Q _{rr} I _{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 5 A$ $V_{DD} = 10 V$ (see test circu	di/dt = 100A/µs T _j = 150°C it, Figure 3)		26 13 1		ns nC A

(*)Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
(•)Pulse width limited by safe operating area.

Safe Operating Area



Thermal Impedance



Output Characteristics







Normalized Gate Threshold Voltage vs Temperature

Normalized on Resistance vs Temperature

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Fig. 1: Switching Times Test Circuits For Resistive Load



Fig. 3: Test Circuit For Diode Recovery Behaviour



Fig. 2: Gate Charge test Circuit



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DIM.		mm				
2	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
А	0.90		1.45	0.035		0.057
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
С	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
е		0.95			0.037	
e1		1.90			0.075	













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