



# STN2NE10

## N - CHANNEL 100V - 0.33 $\Omega$ - 2A - SOT-223 STripFET™ POWER MOSFET

PRELIMINARY DATA

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
STN2NE10	100 V	< 0.4 $\Omega$	2 A

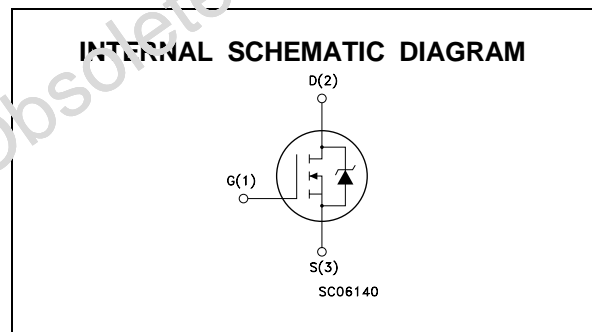
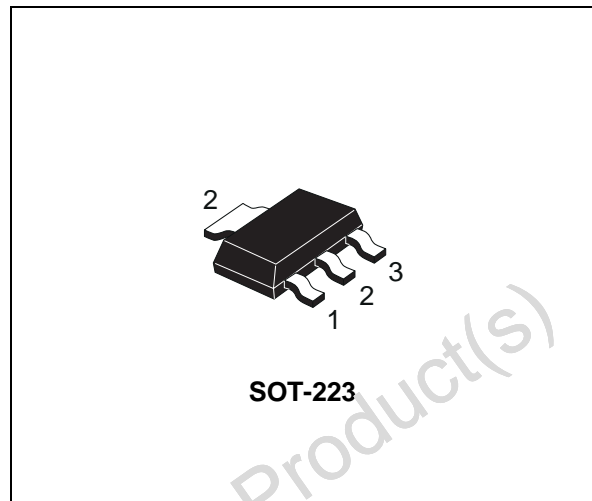
- TYPICAL R<sub>DS(on)</sub> = 0.33  $\Omega$
- EXCEPTIONAL dv/dt CAPABILITY
- AVALANCHE RUGGED TECHNOLOGY
- 100 % AVALANCHE TESTED
- APPLICATION ORIENTED CHARACTERIZATION

### DESCRIPTION

This Power Mosfet is the latest development of STMicroelectronics unique "Single Feature Size™" stip-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 CONTROL (DISK DRIVES, etc.)
- DC-DC & DC-AC CONVERTERS
- SYNCHRONOUS RECTIFICATION



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	100	V
V <sub>DGR</sub>	Drain- gate Voltage (R <sub>GS</sub> = 20 k $\Omega$ )	100	V
V <sub>GS</sub>	Gate-source Voltage	$\pm 20$	V
I <sub>D</sub>	Drain Current (continuous) at T <sub>c</sub> = 25 °C	2	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>c</sub> = 100 °C	1.3	A
I <sub>DM</sub> (*)	Drain Current (pulsed)	8	A
P <sub>tot</sub>	Total Dissipation at T <sub>c</sub> = 25 °C	2.5	W
	Derating Factor	0.02	W/°C
dv/dt(1)	Peak Diode Recovery voltage slope	6	V/ns
T <sub>stg</sub>	Storage Temperature	-65 to 150	°C
T <sub>j</sub>	Max. Operating Junction Temperature	150	°C

(\*) Pulse width limited by safe operating area  
New RDS (on) spec. starting from JULY 98

(1) I<sub>SD</sub>  $\leq$  7 A, di/dt  $\leq$  200 A/ $\mu$ s, V<sub>DD</sub>  $\leq$  V<sub>(BR)DSS</sub>, T<sub>j</sub>  $\leq$  T<sub>JMAX</sub>

## STN2NE10

### THERMAL DATA

R <sub>thj-pcb</sub>	Thermal Resistance Junction-PC Board	Max	50	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient (Surface Mounted)	Max	60	°C/W
T <sub>l</sub>	Maximum Lead Temperature For Soldering Purpose		260	°C

### AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I <sub>AR</sub>	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T <sub>j</sub> max)	2	A
E <sub>AS</sub>	Single Pulse Avalanche Energy (starting T <sub>j</sub> = 25 °C, I <sub>D</sub> = I <sub>AR</sub> , V <sub>DD</sub> = 25 V)	20	mJ

### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>(BR)DSS</sub>	Drain-source Breakdown Voltage	I <sub>D</sub> = 250 μA V <sub>GS</sub> = 0	100			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current (V <sub>GS</sub> = 0)	V <sub>DS</sub> = Max Rating V <sub>DS</sub> = Max Rating T <sub>c</sub> = 125 °C			1 10	μA μA
I <sub>GSS</sub>	Gate-body Leakage Current (V <sub>DS</sub> = 0)	V <sub>GS</sub> = ± 20 V			± 100	nA

ON (\*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> I <sub>D</sub> = 250 μA	2	3	4	V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> = 10 V I <sub>D</sub> = 1A		0.33	0.4	Ω
I <sub>D(on)</sub>	On State Drain Current	V <sub>DS</sub> > I <sub>D(on)</sub> × R <sub>DS(on)max</sub> V <sub>GS</sub> = 10 V	2			A

### DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g <sub>fs</sub> (*)	Forward Transconductance	V <sub>DS</sub> > I <sub>D(on)</sub> × R <sub>DS(on)max</sub> I <sub>D</sub> = 1 A	1	1.8		S
C <sub>iSS</sub>	Input Capacitance	V <sub>DS</sub> = 25 V f = 1 MHz V <sub>GS</sub> = 0 V		305		pF
C <sub>oSS</sub>	Output Capacitance			45		pF
C <sub>rSS</sub>	Reverse Transfer Capacitance			21		pF

**ELECTRICAL CHARACTERISTICS** (continued)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 50\text{ V}$ $I_D = 35\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, see fig. 3)		7		ns
$t_r$	Rise Time			17		ns
$Q_g$	Total Gate Charge	$V_{DD} = 80\text{ V}$ $I_D = 7\text{ A}$ $V_{GS} = 10\text{ V}$		14	19	nC
$Q_{gs}$	Gate-Source Charge			6		nC
$Q_{gd}$	Gate-Drain Charge			4		nC

**SWITCHING OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off Delay Time	$V_{DD} = 50\text{ V}$ $I_D = 3.5\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, see fig. 3)		25		ns
$t_f$	Fall Time			7		ns
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{clamp} = 16\text{ V}$ $I_D = 80\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Inductive Load, see fig. 5)		7		ns
$t_f$	Fall Time			8		ns
$t_c$	Cross-over Time			16		ns

**SOURCE DRAIN DIODE**

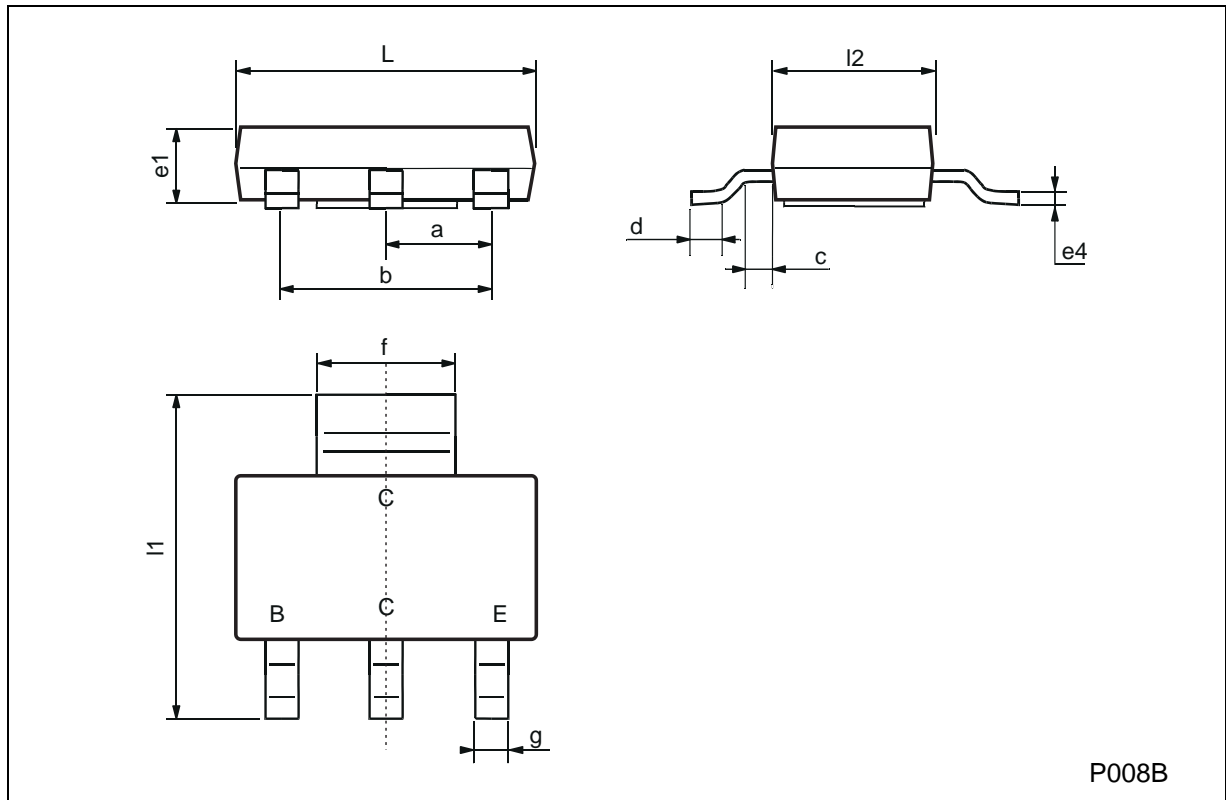
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain Current				2	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				8	A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 2\text{ A}$ $V_{GS} = 0$			1.5	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 7\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ (see test circuit, fig. 5)		75		ns
$Q_{rr}$	Reverse Recovery Charge			210		$\mu\text{C}$
$I_{RRM}$	Reverse Recovery Current			5.5		A

(\*) Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %

(\bullet) Pulse width limited by safe operating area

**SOT-223 MECHANICAL DATA**

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a	2.27	2.3	2.33	89.4	90.6	91.7
b	4.57	4.6	4.63	179.9	181.1	182.3
c	0.2	0.4	0.6	7.9	15.7	23.6
d	0.63	0.65	0.67	24.8	25.6	26.4
e1	1.5	1.6	1.7	59.1	63	66.9
e4			0.32			12.6
f	2.9	3	3.1	114.2	118.1	122.1
g	0.67	0.7	0.73	26.4	27.6	28.7
l1	6.7	7	7.3	263.8	275.6	287.4
l2	3.5	3.5	3.7	137.8	137.8	145.7
L	6.3	6.5	6.7	248	255.9	263.8



P008B

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a trademark of STMicroelectronics

© 1998 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.

<http://www.st.com>