

N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTOR

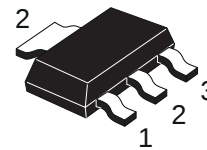
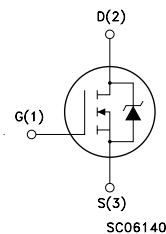
ADVANCE DATA

TYPE	V _{DSS}	R _{DS(on)}	I _D CONT
STN2N10L	100 V	< 0.5 Ω	2 A

- TYPICAL R_{DS(on)} = 0.35 Ω
- AVALANCHE RUGGED TECHNOLOGY
- SOT-223 CAN BE WAVE OR REFLOW SOLDERED
- AVAILABLE IN TAPE AND REEL ON REQUEST
- 150 °C OPERATING TEMPERATURE
- APPLICATION ORIENTED CHARACTERIZATION

APPLICATIONS

- HARD DISK DRIVERS
- SMALL MOTOR CURRENT SENSE CIRCUITS
- DC-DC CONVERTERS AND POWER SUPPLIES


SOT-223
INTERNAL SCHEMATIC DIAGRAM

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	100	V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 k Ω)	100	V
V _{GS}	Gate-source Voltage	± 15	V
I _D (*)	Drain Current (continuous) at T _c = 25 °C	2	A
I _D (*)	Drain Current (continuous) at T _c = 100 °C	1.3	A
I _{DM} (•)	Drain Current (pulsed)	8	A
P _{tot}	Total Dissipation at T _c = 25 °C	2.7	W
	Derating Factor	0.022	W/°C
T _{stg}	Storage Temperature	-65 to 150	°C
T _j	Max. Operating Junction Temperature	150	°C

(•) Pulse width limited by safe operating area (*) Limited by package

STN2N10L

THERMAL DATA

$R_{thj-pcb}$	Thermal Resistance Junction-PC Board	Max	46	$^{\circ}\text{C/W}$
$R_{thj-amb}$	Thermal Resistance Junction-ambient (Surface Mounted)	Max	60	$^{\circ}\text{C/W}$
T_l	Maximum Lead Temperature For Soldering Purpose		260	$^{\circ}\text{C}$

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, $\delta < 1\%$)	2	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25^{\circ}\text{C}$, $I_D = I_{AR}$, $V_{DD} = 25\text{ V}$)	20	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_j max, $\delta < 1\%$)	5	mJ
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive ($T_c = 100^{\circ}\text{C}$, pulse width limited by T_j max, $\delta < 1\%$)	1.3	A

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified) OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\text{ }\mu\text{A}$ $V_{GS} = 0$	100			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating} \times 0.8$ $T_c = 125^{\circ}\text{C}$			250 1000	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 15\text{ V}$			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\text{ }\mu\text{A}$	1	1.8	2.5	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 5\text{ V}$ $I_D = 1\text{ A}$ $V_{GS} = 5\text{ V}$ $I_D = 1\text{ A}$ $T_c = 100^{\circ}\text{C}$		0.35	0.5 1	Ω Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10\text{ V}$	2			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 1\text{ A}$	1	2.5		S
C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$ $V_{GS} = 0\text{ V}$		340	450	pF
C_{oss}	Output Capacitance			65	100	pF
C_{rss}	Reverse Transfer Capacitance			20	30	pF

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 50\text{ V}$ $I_D = 4\text{ A}$		6	10	ns
t_r	Rise Time	$R_G = 4.7\ \Omega$ $V_{GS} = 5\text{ V}$		20	30	ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 80\text{ V}$ $I_D = 8\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 5\text{ V}$		380		A/ μ s
Q_g	Total Gate Charge	$V_{DD} = 80\text{ V}$ $I_D = 8\text{ A}$ $V_{GS} = 5\text{ V}$		10	15	nC
Q_{gs}	Gate-Source Charge			6		nC
Q_{gd}	Gate-Drain Charge			3		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{DD} = 80\text{ V}$ $I_D = 8\text{ A}$		10	15	ns
t_f	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 5\text{ V}$		10	15	ns
t_c	Cross-over Time			20	30	ns

SOURCE DRAIN DIODE

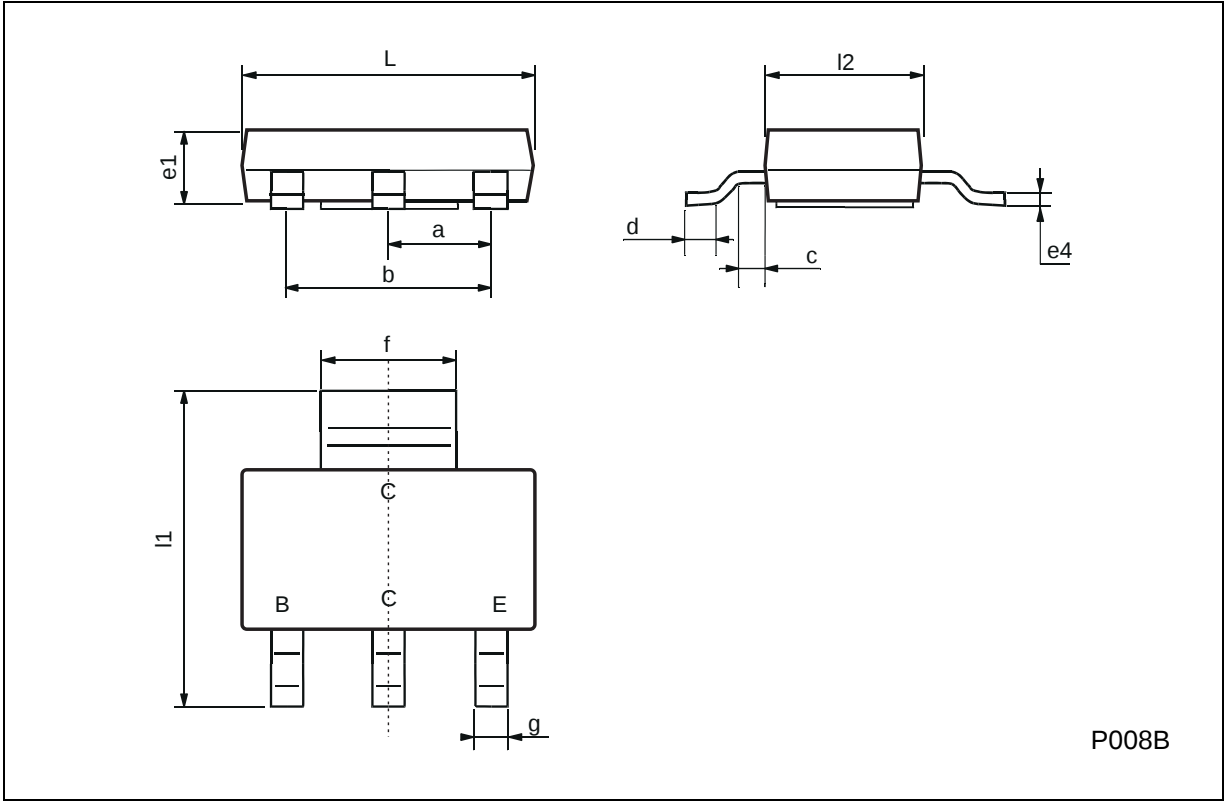
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				2	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				8	A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 2\text{ A}$ $V_{GS} = 0$			1.5	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 8\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$		90		ns
Q_{rr}	Reverse Recovery Charge			0.27		μC
I_{RRM}	Reverse Recovery Current			6		A

(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

(\bullet) Pulse width limited by safe operating area

SOT223 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



Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics 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 SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1995 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

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