

## N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTOR

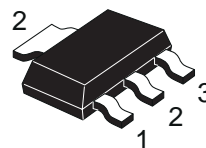
### ADVANCE DATA

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub> CONT
STN2N10L	100 V	< 0.5 $\Omega$	2 A

- TYPICAL R<sub>DS(on)</sub> = 0.35  $\Omega$
- 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

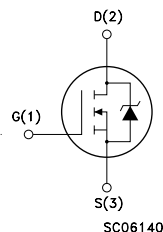
### APPLICATIONS

- 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 <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	$\pm 15$	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	2.7	W
	Derating Factor	0.022	W/°C
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 (\*) 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	$\mu\text{A}$ $\mu\text{A}$
$I_{GSS}$	Gate-body Leakage Current ( $V_{DS} = 0$ )	$V_{GS} = \pm 15\text{ V}$			$\pm 100$	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	$\Omega$ $\Omega$
$I_{D(on)}$	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
$t_{d(on)}$ $t_r$	Turn-on Time Rise Time	$V_{DD} = 50\text{ V}$ $I_D = 4\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 5\text{ V}$		6 20	10 30	ns 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/ $\mu$ s
$Q_g$ $Q_{gs}$ $Q_{gd}$	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 80\text{ V}$ $I_D = 8\text{ A}$ $V_{GS} = 5\text{ V}$		10 6 3	15	nC nC nC

**SWITCHING OFF**

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

**SOURCE DRAIN DIODE**

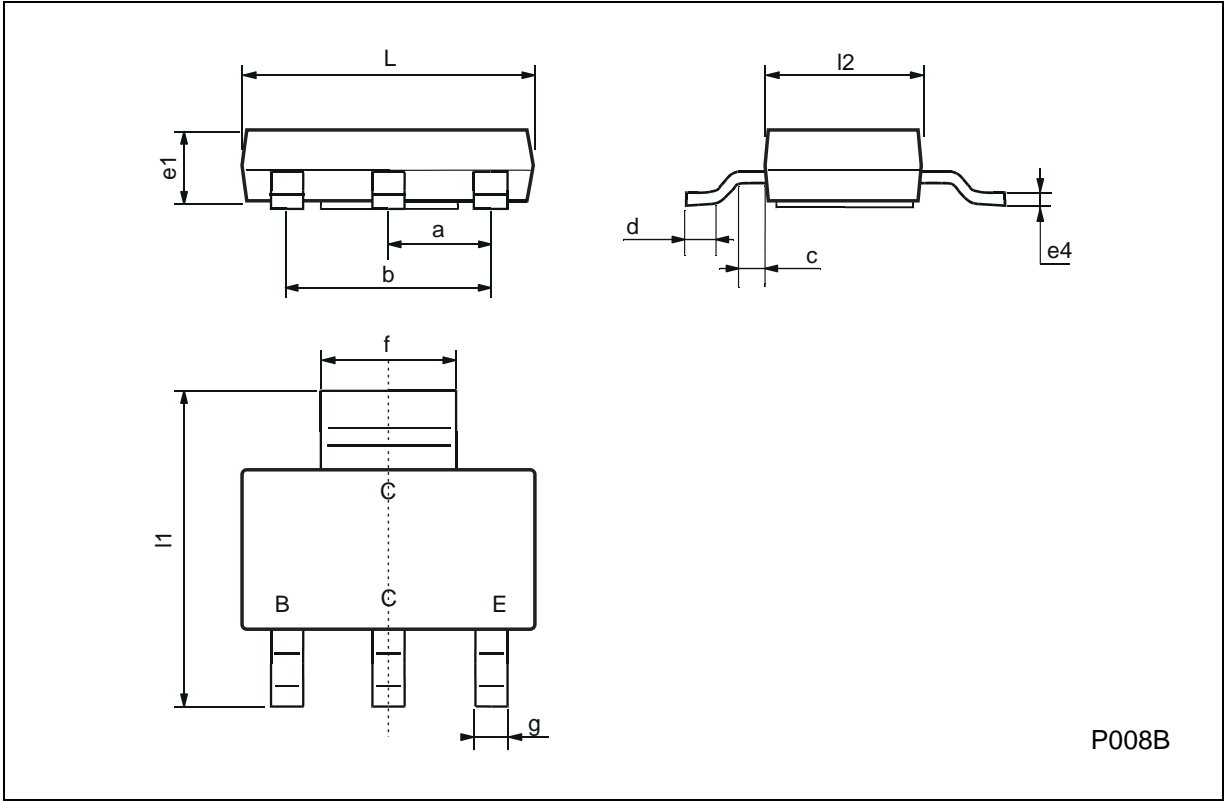
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$ $I_{SDM}(\bullet)$	Source-drain Current Source-drain Current (pulsed)				2 8	A A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 2\text{ A}$ $V_{GS} = 0$			1.5	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery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

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

(•) 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



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