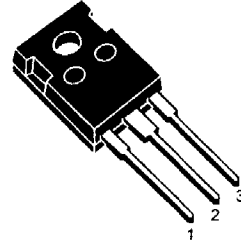


## STW7NA100

### N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTORS



TO-247

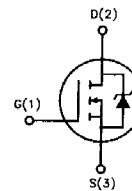
TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
STW7NA100	1000 V	< 1.7 Ω	7 A

- TYPICAL R<sub>DS(on)</sub> = 1.45 Ω
- ± 30V GATE TO SOURCE VOLTAGE RATING
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- GATE CHARGE MINIMISED
- REDUCED THRESHOLD VOLTAGE SPREAD

#### APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SWITCH MODE POWER SUPPLY (SMPS)
- DC-AC CONVERTERS FOR WELDING EQUIPMENT AND UNINTERRUPTIBLE POWER SUPPLIES AND MOTOR DRIVE

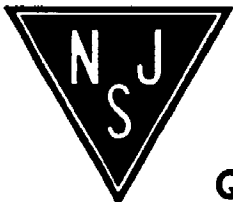
#### INTERNAL SCHEMATIC DIAGRAM



#### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
		STW7NA100	
V <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	1000	V
V <sub>DGR</sub>	Drain- gate Voltage (R <sub>GS</sub> = 20 kΩ)	1000	V
V <sub>GS</sub>	Gate-source Voltage	± 30	V
I <sub>D</sub>	Drain Current (continuous) at T <sub>c</sub> = 25 °C	7	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>c</sub> = 100 °C	4.4	A
I <sub>DM</sub> (*)	Drain Current (pulsed)	28	A
P <sub>tot</sub>	Total Dissipation at T <sub>c</sub> = 25 °C	190	W
	Derating Factor	1.52	W/°C
V <sub>ISO</sub>	Insulation Withstand Voltage (DC)	—	V
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



## THERMAL DATA

			TO-247	
$R_{thj-case}$	Thermal Resistance Junction-case	Max	0.65	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	30	$^{\circ}C/W$
$R_{thc-sink}$	Thermal Resistance Case-sink	Typ	0.1	$^{\circ}C/W$
$T_j$	Maximum Lead Temperature For Soldering Purpose		300	$^{\circ}C$

## AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
$I_{AR}$	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by $T_j$ max, $\delta < 1\%$ )	7	A
$E_{AS}$	Single Pulse Avalanche Energy (starting $T_j = 25^{\circ}C$ , $I_D = I_{AR}$ , $V_{DD} = 50 V$ )	800	mJ

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

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250 \mu A$ $V_{GS} = 0$	1000			V
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating}$ $T_c = 100^{\circ}C$			50 250	$\mu A$ $\mu A$
$I_{GSS}$	Gate-body Leakage Current ( $V_{DS} = 0$ )	$V_{GS} = \pm 30 V$			$\pm 100$	nA

ON (\*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250 \mu A$	2.25	3	3.75	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10V$ $I_D = 3.5 A$		1.45	1.7	$\Omega$ $\Omega$
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10 V$	7			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 3.5 A$	5	7		S
$C_{iss}$	Input Capacitance	$V_{DS} = 25 V$ $f = 1 MHz$ $V_{GS} = 0$		3170	4100	pF
$C_{oss}$	Output Capacitance			270	351	pF
$C_{rss}$	Reverse Transfer Capacitance			76	99	pF

**ELECTRICAL CHARACTERISTICS** (continued)

**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 500\text{ V}$ $I_D =$		28	40	ns
$t_r$	Rise Time	3.5 A $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$		19	27	ns
$Q_g$	Total Gate Charge	$V_{DD} = 800\text{ V}$ $I_D = 7\text{ A}$ $V_{GS} = 10\text{ V}$		125	150	nC
$Q_{gs}$	Gate-Source Charge			17		nC
$Q_{gd}$	Gate-Drain Charge			58		nC

**SWITCHING OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{DD} = 800\text{ V}$ $I_D = 7\text{ A}$		35	50	ns
$t_f$	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$		15	21	ns
$t_c$	Cross-over Time			55	77	ns

**SOURCE DRAIN DIODE**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain Current				7	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				28	A
$V_{SD}(\ast)$	Forward On Voltage	$I_{SD} = 7\text{ A}$ $V_{GS} = 0$			1.6	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 7\text{ A}$ $V_{DD} = 100\text{ V}$ $di/dt = 100\text{ A}/\mu\text{s}$ $T_j = 150\text{ }^\circ\text{C}$		835		ns
$Q_{rr}$	Reverse Recovery Charge			14		$\mu\text{C}$
$I_{RRM}$	Reverse Recovery Current			33		A

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

( $\bullet$ ) Pulse width limited by safe operating area

**TO-247 MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.7		5.3	0.185		0.209
D	2.2		2.6	0.087		0.102
E	0.4		0.8	0.016		0.031
F	1		1.4	0.039		0.055
F3	2		2.4	0.079		0.094
F4	3		3.4	0.118		0.134
G		10.9			0.429	
H	15.3		15.9	0.602		0.626
L	19.7		20.3	0.776		0.779
L3	14.2		14.8	0.559		0.582
L4		34.6			1.362	
L5		5.5			0.217	
M	2		3	0.079		0.118
Dia	3.55		3.65	0.140		0.144

