

STW8NA80 STH8NA80FI

N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTORS

PRELIMINARY DATA

TYPE	V _{DSS}	R _{DS(on)}	I _D
STW8NA80	800 V	< 1.50 Ω	7.2 A
STH8NA80FI	800 V	< 1.50 Ω	4.5 A

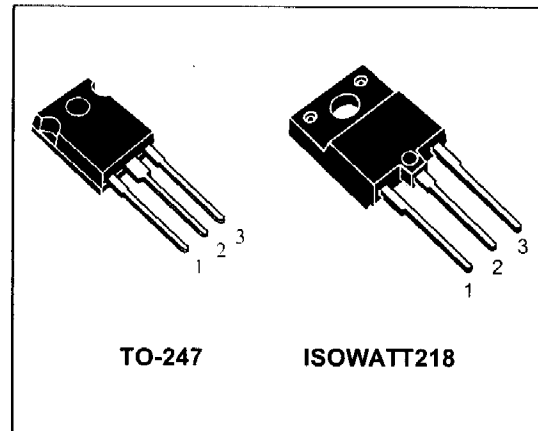
- TYPICAL R_{DS(on)} = 1.3 Ω
- ± 30V GATE TO SOURCE VOLTAGE RATING
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW INTRINSIC CAPACITANCES
- GATE CHARGE MINIMIZED
- REDUCED THRESHOLD VOLTAGE SPREAD

DESCRIPTION

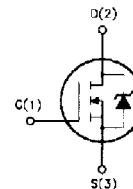
This series of POWER MOSFETS represents the most advanced high voltage technology. The optimized cell layout coupled with a new proprietary edge termination concur to give the device low R_{DS(on)} and gate charge, unequalled ruggedness and superior switching performance.

APPLICATIONS

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



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STW8NA80	STH8NA80FI	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	800		V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 kΩ)	800		V
V _{GS}	Gate-source Voltage	± 30		V
I _D	Drain Current (continuous) at T _c = 25 °C	7.2	4.5	A
I _D	Drain Current (continuous) at T _c = 100 °C	4.5	2.8	A
I _{DM} (•)	Drain Current (pulsed)	28.8	28.8	A
P _{tot}	Total Dissipation at T _c = 25 °C	175	70	W
	Derating Factor	1.4	0.56	W/°C
V _{ISO}	Insulation Withstand Voltage (DC)	—	4000	V
T _{stg}	Storage Temperature	-65 to 150		°C
T _J	Max. Operating Junction Temperature	150		°C

(•) Pulse width limited by safe operating area

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THERMAL DATA

		TO-247	ISOWATT218	
$R_{thj-case}$	Thermal Resistance Junction-case Max	0.71	1.78	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient Max	30		°C/W
$R_{thc-sink}$	Thermal Resistance Case-sink Typ	0.1		°C/W
T_l	Maximum Lead Temperature For Soldering Purpose	300		°C

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, $\delta < 1\%$)	7.2	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25\text{ °C}$, $I_D = I_{AR}$, $V_{DD} = 50\text{ V}$)	700	mJ

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

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\text{ }\mu\text{A}$ $V_{GS} = 0$	800			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating}$ $T_c = 100\text{ °C}$			50 500	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 30\text{ V}$			100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\text{ }\mu\text{A}$	2.25	3	3.75	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10\text{ V}$ $I_D = 4\text{ A}$		1.3	1.5	Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10\text{ V}$	7.2			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 4\text{ A}$	4.5	7.9		S
C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$ $V_{GS} = 0$		1750	2300	pF
C_{oss}	Output Capacitance			188	245	pF
C_{rss}	Reverse Transfer Capacitance			50	70	pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Time Rise Time	$V_{DD} = 400\text{ V}$ $R_G = 4.7\ \Omega$ $I_D = 4\text{ A}$ $V_{GS} = 10\text{ V}$		20 28	28 38	ns ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 640\text{ V}$ $R_G = 47\ \Omega$ $I_D = 8\text{ A}$ $V_{GS} = 10\text{ V}$		170		A/ μ s
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 400\text{ V}$ $I_D = 8\text{ A}$ $V_{GS} = 10\text{ V}$		75 10 35	100	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	$V_{DD} = 640\text{ V}$ $R_G = 4.7\ \Omega$ $I_D = 8\text{ A}$ $V_{GS} = 10\text{ V}$		18 20 25	25 28 35	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)				7.2 28.8	A A
$V_{SD}(\ast)$	Forward On Voltage	$I_{SD} = 7.2\text{ A}$ $V_{GS} = 0$			1.6	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 7.5\text{ A}$ $V_{DD} = 100\text{ V}$ $di/dt = 100\text{ A}/\mu\text{s}$ $T_J = 150\text{ }^\circ\text{C}$		850 17 40		ns μ C A

(\ast) Pulsed: Pulse duration = 300 μ s, duty cycle 1.5%

(\bullet) Pulse width limited by safe operating area