

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

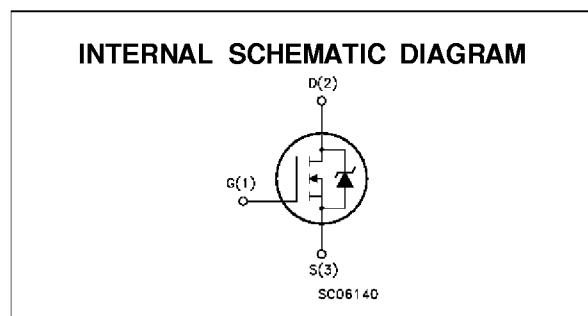
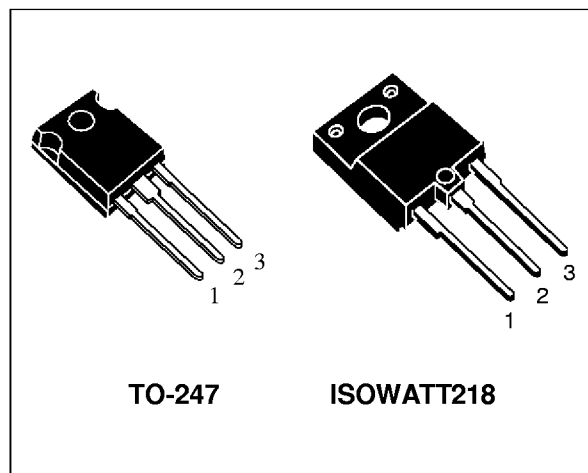
- TYPICAL R_{DS(on)} = 1.3 Ω
- ± 30V GATE TO SOURCE VOLTAGE RATING
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW INTRINSIC CAPACITANCES
- GATE CHARGE MINIMIZED
- REDUCED THRESHOLD VOLTAGE SPREAD

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



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

STW8NA80 STH8NA80FI

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, δ < 1%)	7.2	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 50 V)	260	mJ
E _{AR}	Repetitive Avalanche Energy (pulse width limited by T _j max, δ < 1%)	10	mJ
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (T _c = 100 °C, pulse width limited by T _j max, δ < 1%)	4.5	A

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

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	I _D = 250 μA V _{GS} = 0	800			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating x 0.8 T _c = 125 °C			250 1000	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 30 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 μA	2.25	3	3.75	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10V I _D = 4A V _{GS} = 10V I _D = 4A T _c = 100°C		1.3	1.5 3.2	Ω Ω
I _{D(on)}	On State Drain Current	V _{DS} > I _{D(on)} x R _{DS(on)max} V _{GS} = 10 V	7.2			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} > I _{D(on)} x R _{DS(on)max} I _D = 4 A	4.5	7.9		S
C _{iss}	Input Capacitance	V _{DS} = 25 V f = 1 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
$t_{d(on)}$	Turn-on Time	$V_{DD} = 400\text{ V}$		20	28	ns
t_r	Rise Time	$R_G = 4.7\ \Omega$ $I_D = 4\text{ A}$ $V_{GS} = 10\text{ V}$		28	38	ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 640\text{ V}$ $I_D = 8\text{ A}$ $R_G = 47\ \Omega$ $V_{GS} = 10\text{ V}$		170		A/ μ s
Q_g	Total Gate Charge			75	100	nC
Q_{gs}	Gate-Source Charge	$V_{DD} = 400\text{ V}$ $I_D = 8\text{ A}$ $V_{GS} = 10\text{ V}$		10		nC
Q_{gd}	Gate-Drain Charge			35		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{DD} = 640\text{ V}$ $I_D = 8\text{ A}$		18	25	ns
t_f	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$		20	28	ns
t_c	Cross-over Time			25	35	ns

SOURCE DRAIN DIODE

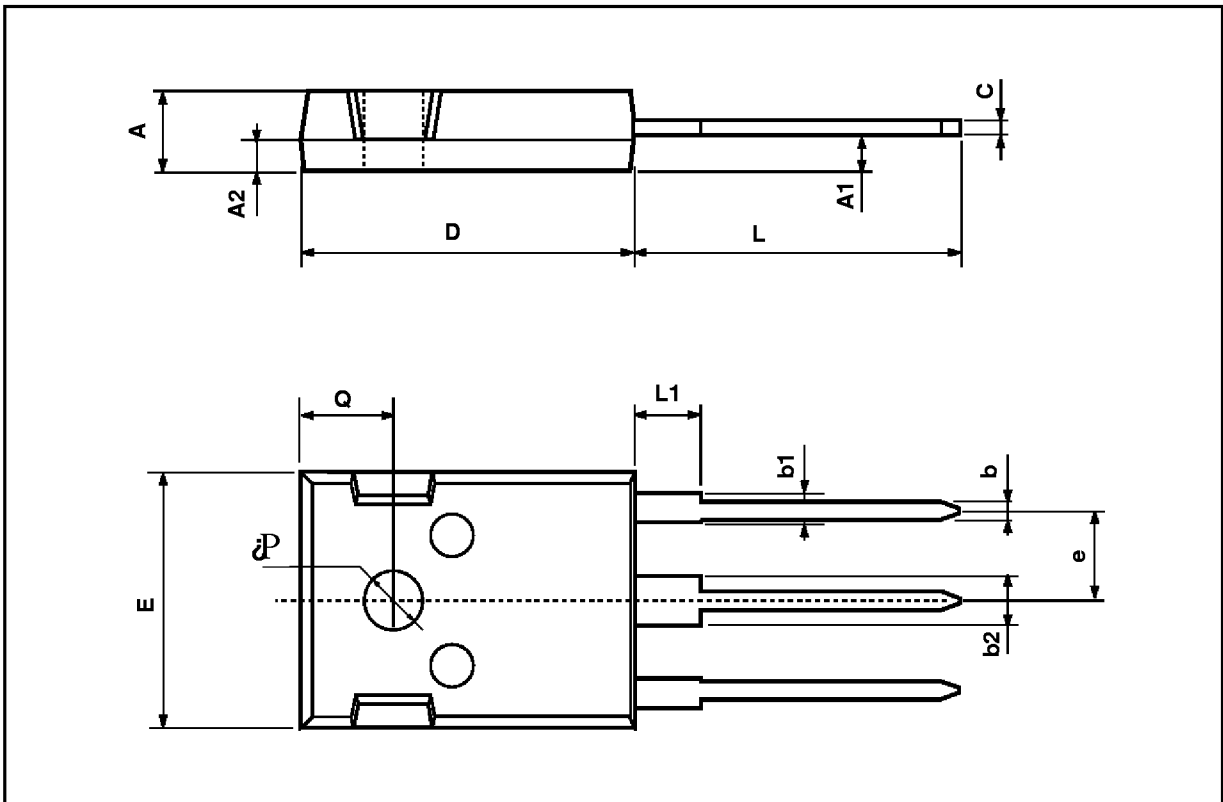
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				7.2	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				28.8	A
$V_{SD}(\ast)$	Forward On Voltage	$I_{SD} = 7.2\text{ A}$ $V_{GS} = 0$			1.6	V
t_{rr}	Reverse Recovery Time			850		ns
Q_{rr}	Reverse Recovery Charge	$I_{SD} = 7.5\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 100\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$		17		μ C
I_{RRM}	Reverse Recovery Current			40		A

(\ast) Pulsed: Pulse duration = 300 μ 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		0.208
A1			2.87			0.113
A2	1.5		2.5	0.059		0.098
b	1		1.4	0.039		0.055
b1			2.25			0.088
b2	3.05		3.43	0.120		0.135
C	0.4		0.8	0.015		0.031
D	20.4		21.18	0.803		0.833
e	5.43		5.47	0.213		0.215
E	15.3		15.95	0.602		0.628
L	15.57			0.613		
L1	3.7		4.3	0.145		0.169
Q	5.3		5.84	0.208		0.230
P	3.5		3.71	0.137		0.146



ISOWATT218 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	5.35		5.65	0.210		0.222
C	3.3		3.8	0.130		0.149
D	2.9		3.1	0.114		0.122
D1	1.88		2.08	0.074		0.081
E	0.45		1	0.017		0.039
F	1.05		1.25	0.041		0.049
G	10.8		11.2	0.425		0.441
H	15.8		16.2	0.622		0.637
L1	20.8		21.2	0.818		0.834
L2	19.1		19.9	0.752		0.783
L3	22.8		23.6	0.897		0.929
L4	40.5		42.5	1.594		1.673
L5	4.85		5.25	0.190		0.206
L6	20.25		20.75	0.797		0.817
M	3.5		3.7	0.137		0.145
N	2.1		2.3	0.082		0.090
U		4.6			0.181	

