

N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTORS

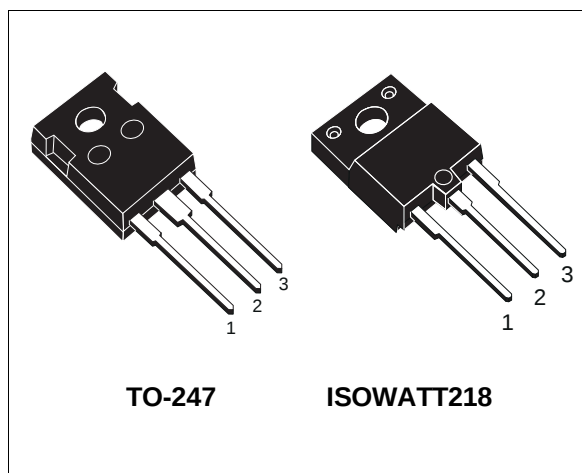
PRELIMINARY DATA

TYPE	V _{DSS}	R _{DS(on)}	I _D
STW5NA100	1000 V	< 3.5 Ω	4.6 A
STH5NA100FI	1000 V	< 3.5 Ω	2.9 A

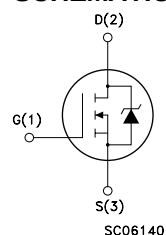
- TYPICAL R_{DS(on)} = 2.9 Ω
- ± 30V GATE TO SOURCE VOLTAGE RATING
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- GATE CHARGE MINIMISED
- REDUCED THRESHOLD VOLTAGE SPREAD

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
		STW5NA100	STH5NA100FI	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	1000		V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 kΩ)	1000		V
V _{GS}	Gate-source Voltage	± 30		V
I _D	Drain Current (continuous) at T _c = 25 °C	4.6	2.9	A
I _D	Drain Current (continuous) at T _c = 100 °C	2.9	1.8	A
I _{DM} (●)	Drain Current (pulsed)	18.4	18.4	A
P _{tot}	Total Dissipation at T _c = 25 °C	150	60	W
	Derating Factor	1.2	0.48	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

THERMAL DATA

				TO-247	ISOWATT218	
R _{thj-case}	Thermal Resistance Junction-case	Max		0.83	2.1	°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%)	4.2	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 50 V)	160	mJ

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	1000			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating T _c = 100 °C			50 250	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 = 2.1 A		2.9	3.5	Ω Ω
I _{D(on)}	On State Drain Current	V _{DS} > I _{D(on)} × R _{DS(on)max} V _{GS} = 10 V	4.2			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} > I _{D(on)} × R _{DS(on)max} I _D = 2.1 A	2	5.5		S
C _{iss}	Input Capacitance	V _{DS} = 25 V f = 1 MHz V _{GS} = 0		1650	2150	pF
C _{oss}	Output Capacitance			127	165	pF
C _{rss}	Reverse Transfer Capacitance			31	41	pF

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 500\text{ V}$ $I_D =$		14	20	ns
t_r	Rise Time	2.1 A $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$		12	16	ns
Q_g	Total Gate Charge	$V_{DD} = 800\text{ V}$ $I_D = 4.2\text{ A}$ $V_{GS} = 10\text{ V}$		59	83	nC
Q_{gs}	Gate-Source Charge			9.4		nC
Q_{gd}	Gate-Drain Charge			26.5		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{DD} = 800\text{ V}$ $I_D = 4.2\text{ A}$		94	132	ns
t_f	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$		30	42	ns
t_c	Cross-over Time			142	199	ns

SOURCE DRAIN DIODE

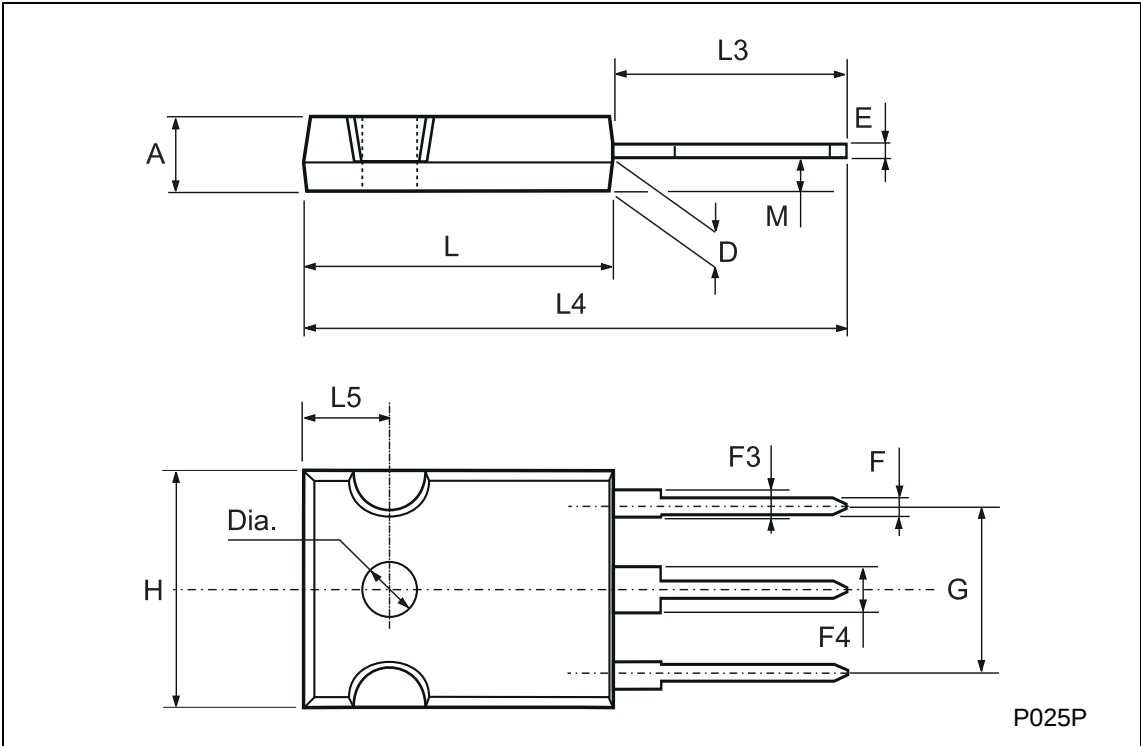
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				4.6	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				18.4	A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 4.2\text{ A}$ $V_{GS} = 0$			1.6	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 4.2\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$		1000		ns
Q_{rr}	Reverse Recovery Charge			14		μC
I_{RRM}	Reverse Recovery Current			28		A

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

(\bullet) Pulse width limited by safe operating area

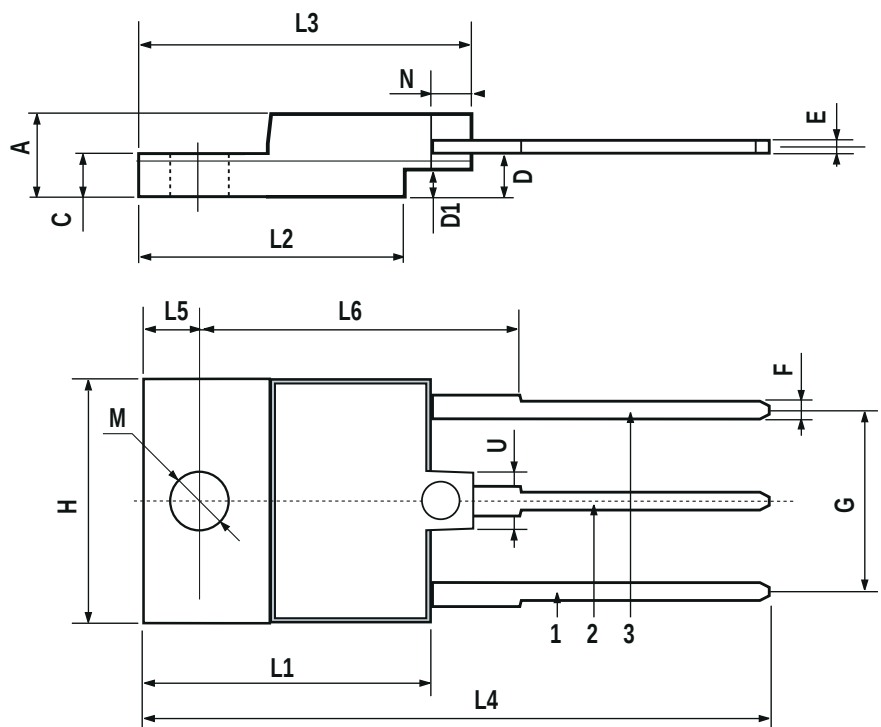
TO-247 MECHANICAL DATA

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	0.413	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



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	0.75		1	0.029		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	



P025C

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.

© 1997 SGS-THOMSON Microelectronics - Printed in Italy - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES
Australia - Brazil - Canada - China - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A
...