

N - CHANNEL ENHANCEMENT MODE FAST POWER MOS TRANSISTOR

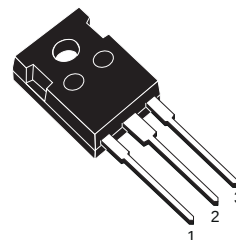
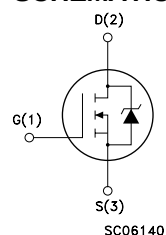
PRELIMINARY DATA

TYPE	V _{DSS}	R _{DS(on)}	I _D
STW6NA90	900 V	< 1.9 Ω	6 A

- TYPICAL R_{DS(on)} = 1.45 Ω
- ± 30 V GATE TO SOURCE VOLTAGE RATING
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW INTRINSIC CAPACITANCE
- GATE CHARGE MINIMIZED
- REDUCED VOLTAGE SPREAD

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SWITCH MODE POWER SUPPLY (SMPS)
- CONSUMER AND INDUSTRIAL LIGHTING
- DC-AC CONVERTER FOR WELDING EQUIPMENT AND UNINTERRUPTABLE POWER SUPPLY (UPS)


TO-247
INTERNAL SCHEMATIC DIAGRAM

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	900	V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 k Ω)	900	V
V _{GS}	Gate-source Voltage	± 30	V
I _D	Drain Current (continuous) at T _c = 25 °C	6	A
I _D	Drain Current (continuous) at T _c = 100 °C	3.8	A
I _{DM} (•)	Drain Current (pulsed)	24	A
P _{tot}	Total Dissipation at T _c = 25 °C	160	W
	Derating Factor	1.28	W/°C
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

$R_{thj-case}$	Thermal Resistance Junction-case	Max	0.78	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	30	$^{\circ}C/W$
$R_{thc-sink}$	Thermal Resistance Case-sink	Typ	0.1	$^{\circ}C/W$
T_l	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, $\delta < 1\%$)	6	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25^{\circ}C$, $I_D = I_{AR}$, $V_{DD} = 25 V$)	600	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	$I_D = 250 \mu A$ $V_{GS} = 0$	900			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating}$ $T_c = 100^{\circ}C$			25 250	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 30 V$			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250 \mu A$	2.25	3	3.75	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10 V$ $I_D = 3 A$		1.45	1.9	Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10 V$	6			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 3 A$	5	6.6		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{DS} = 25 V$ $f = 1 MHz$ $V_{GS} = 0$		1760 190 50	2480 270 75	pF pF pF

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 450\text{ V}$ $I_D = 3\text{ A}$		27	40	ns
t_r	Rise Time	$R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$		30	45	ns
Q_g	Total Gate Charge	$V_{DD} = 720\text{ V}$ $I_D = 6\text{ A}$ $V_{GS} = 10\text{ V}$		72	105	nC
Q_{gs}	Gate-Source Charge			10		nC
Q_{gd}	Gate-Drain Charge			34		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{DD} = 720\text{ V}$ $I_D = 6\text{ A}$		18	27	ns
t_f	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$		7	12	ns
t_c	Cross-over Time			31	47	ns

SOURCE DRAIN DIODE

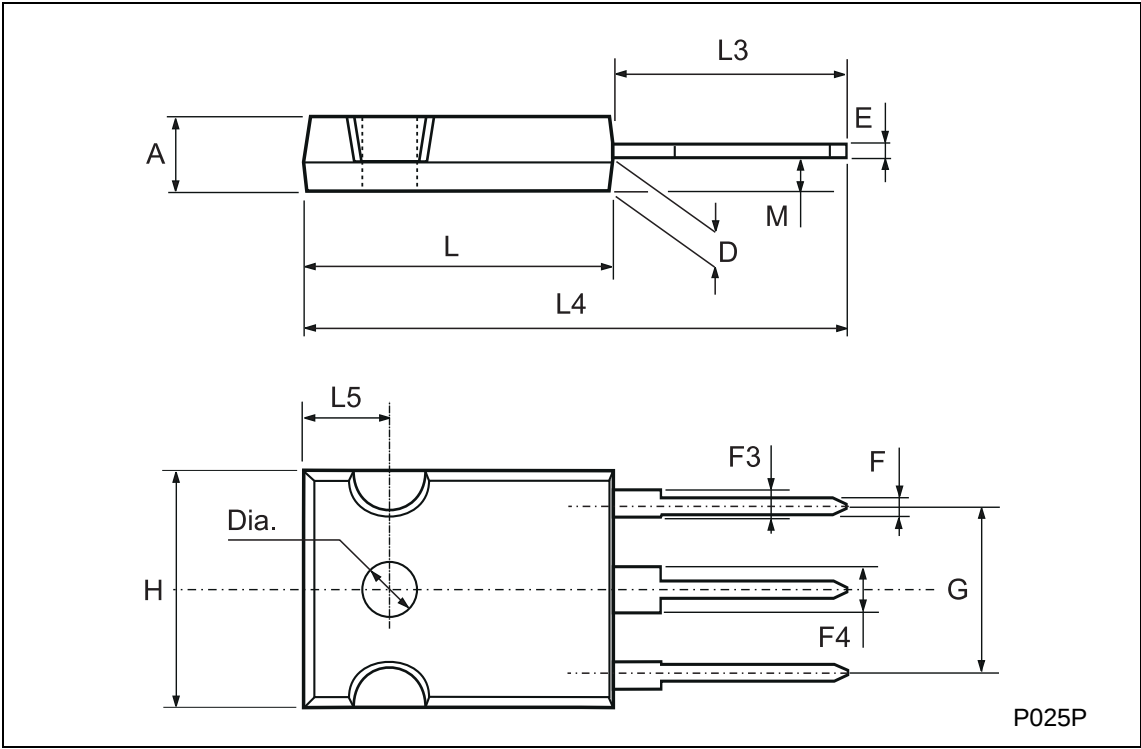
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				6	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				24	A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 6\text{ A}$ $V_{GS} = 0$			1.6	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 6\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 100\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$		830		ns
Q_{rr}	Reverse Recovery Charge			13.8		μC
I_{RRM}	Reverse Recovery Current			33		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



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.

© 1998 SGS-THOMSON Microelectronics - Printed in Italy - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A

...