SGS-THOMSON
MICROELECTRONICS

STP80N06-10

N - CHANNEL ENHANCEMENT MODE
## "ULTRA HIGH DENSITY" POWER MOS TRANSISTOR
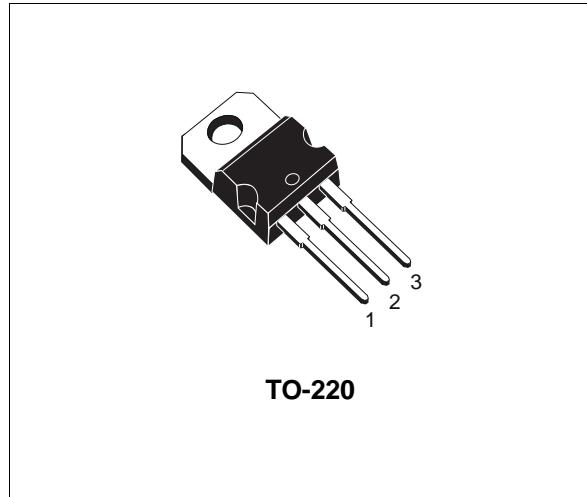
TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STP80N06-10	60 V	< 0.010 Ω	80 A
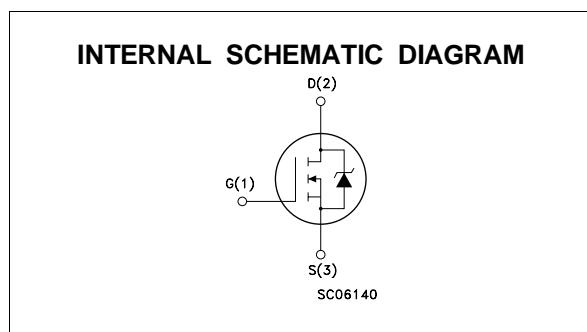
- TYPICAL $R_{DS(on)}$ = 8.5 mΩ
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCE TESTED
- HIGH CURRENT CAPABILITY
- 175 ^{o}C OPERATING TEMPERATURE
- HIGH dV/dt RUGGEDNESS
- APPLICATION ORIENTED CHARACTERIZATION

APPLICATIONS
- HIGH CURRENT, HIGH SPEED SWITCHING
- PWM MOTOR CONTROL
- DC-DC & DC-AC CONVERTER
- SYNCROUNOUS RECTIFICATION

TO-220

INTERNAL SCHEMATIC DIAGRAM

D(2)

G(1)

S(3)

SC06140

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	60	V
V_{DGR}	Drain- gate Voltage (R_{GS} = 20 kΩ)	60	V
V_{GS}	Gate-source Voltage	$\pm$ 20	V
I_D	Drain Current (continuous) at T_c = 25 ^{o}C	80	A
I_D	Drain Current (continuous) at T_c = 100 ^{o}C	60	A
$I_{DM}(\bullet)$	Drain Current (pulsed)	320	A
P_{tot}	Total Dissipation at T_c = 25 ^{o}C	150	W
	Derating Factor	1	W/^{o}C
dV/dt(1)	Peak Diode Recovery voltage slope	5	V/ns
T_{stg}	Storage Temperature	-65 to 175	^{o}C
T_j	Max. Operating Junction Temperature	175	^{o}C

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

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	1	$^oC/W$
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient	Max	62.5	$^oC/W$
$R_{thc\text{-}sink}$	Thermal Resistance Case-sink	Typ	0.5	$^oC/W$
T_l	Maximum Lead Temperature For Soldering Purpose		300	^oC

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, $\delta < 1\%$)	60	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25\ ^oC$, $I_D = I_{AR}$, $V_{DD} = 25\ V$)	600	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_j max, $\delta < 1\%$)	150	mJ
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive ($T_c = 100\ ^oC$, pulse width limited by T_j max, $\delta < 1\%$)	60	A

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

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\ \mu A$ $V_{GS} = 0$	60			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	V_{DS} = Max Rating V_{DS} = Max Rating x 0.8 $T_c = 125\ ^oC$			250 1000	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 20\ V$			± 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	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10V$ $I_D = 40\ A$ $V_{GS} = 10V$ $I_D = 40\ A$ $T_c = 100^oC$		0.0085	0.01 0.02	Ω Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)}$ x $R_{DS(on)max}$ $V_{GS} = 10\ V$	80			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} ($*$)	Forward Transconductance	$V_{DS} > I_{D(on)}$ x $R_{DS(on)max}$ $I_D = 40\ A$		25		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{DS} = 25\ V$ $f = 1\ MHz$ $V_{GS} = 0$		5900 900 230		pF pF pF

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ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Time Rise Time	$V_{DD} = 30$ V $\quad I_D = 40$ A $R_G = 4.7$ Ω $\quad V_{GS} = 10$ V (see test circuit, figure 3)		32 160	42 200	ns ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 48$ V $\quad I_D = 80$ A $R_G = 50$ Ω $\quad V_{GS} = 10$ V (see test circuit, figure 5)		240		A/μs
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 40$ V $\quad I_D = 80$ A $\quad V_{GS} = 10$ V		230 30 60	280	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	$V_{DD} = 48$ V $\quad I_D = 40$ A $R_G = 4.7$ Ω $\quad V_{GS} = 10$ V (see test circuit, figure 5)		35 175 240	46 230 300	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)				80 320	A A
V_{SD} (∗)	Forward On Voltage	$I_{SD} = 80$ A $\quad V_{GS} = 0$			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 80$ A $\quad\quad di/dt = 100$ A/μs $V_R = 30$ V $\quad\quad T_j = 150$ ^{o}C (see test circuit, figure 5)		125 0.6 10		ns μC A
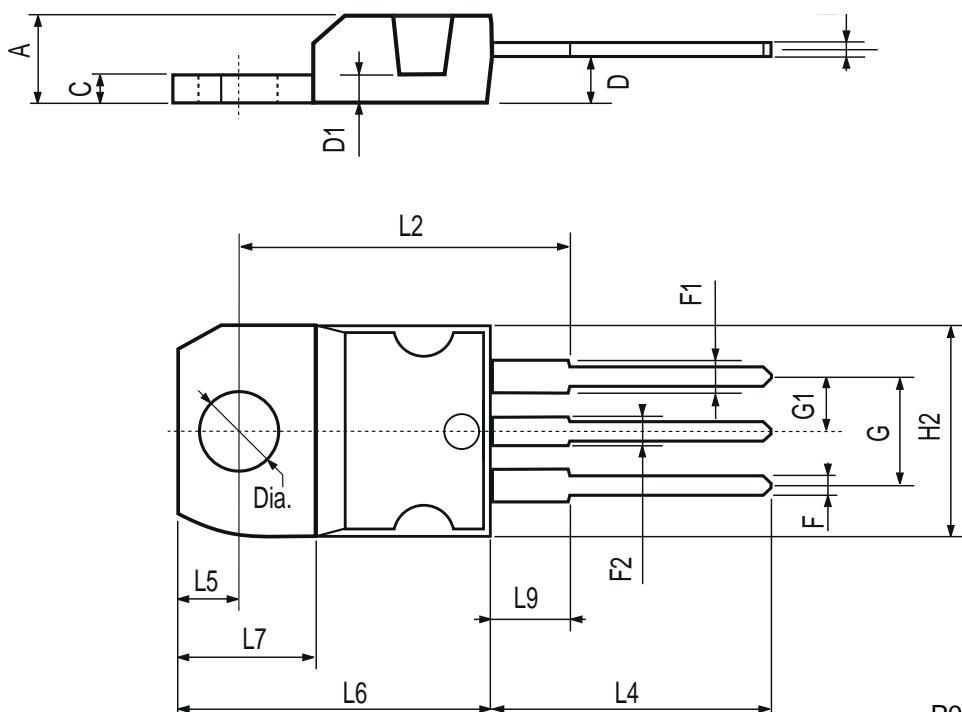
(∗) Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %

(•) Pulse width limited by safe operating area

(1) $I_{SD} \le 60$ A, $di/dt \le 200$ A/μs, $V_{DD} \le V_{(BR)DSS}$, $T_J \le T_{JMAX}$

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TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151

P011C

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