

STP6NA80
STP6NA80FI

**N - CHANNEL ENHANCEMENT MODE
 FAST POWER MOS TRANSISTOR**

TYPE	V _{DSS}	R _{DS(on)}	I _D
STP6NA80	800 V	< 1.9 Ω	5.7 A
STP6NA80FI	800 V	< 1.9 Ω	3.4 A

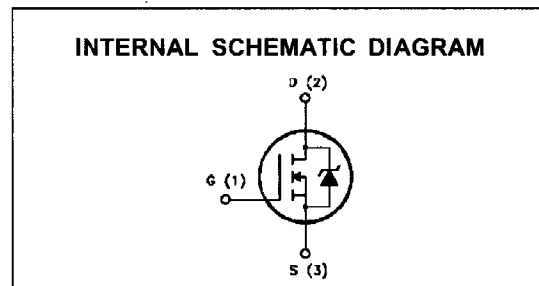
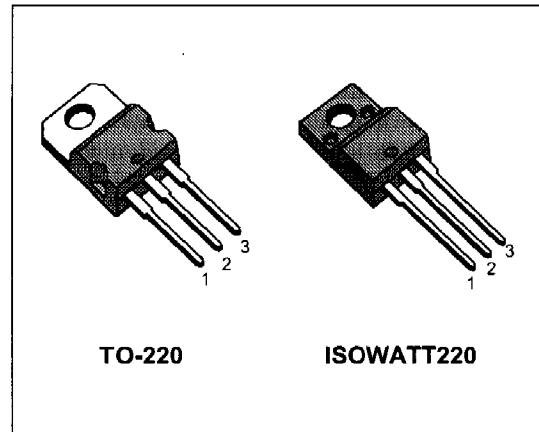
- TYPICAL R_{DS(on)} = 1.68 Ω
- ± 30V GATE TO SOURCE VOLTAGE RATING
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW INTRINSIC CAPACITANCES
- GATE CHARGE MINIMIZED
- REDUCED THRESHOLD VOLTAGE SPREAD

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

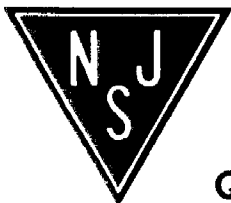


ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STP6NA80	STP6NA80FI	
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	5.7	3.4	A
I _D	Drain Current (continuous) at T _c = 100 °C	3.6	2.1	A
I _{DM} (*)	Drain Current (pulsed)	23	23	A
P _{tot}	Total Dissipation at T _c = 25 °C	125	45	W
	Derating Factor	1	0.36	W/°C
V _{ISO}	Insulation Withstand Voltage (DC)	—	2000	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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STP6NA80/FI

THERMAL DATA

		TO-220	ISOWATT220		
R _{thj-case}	Thermal Resistance Junction-case	Max	1	2.78	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max	62.5		°C/W
R _{thc-sink}	Thermal Resistance Case-sink	Typ	0.5		°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%)	5.7	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 50 V)	165	mJ
E _{AR}	Repetitive Avalanche Energy (pulse width limited by T _j max, δ < 1%)	6.5	mJ
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (T _c = 100 °C, pulse width limited by T _j max, δ < 1%)	3.6	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			25 250	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 = 3 A		1.68	1.9	Ω
I _{D(on)}	On State Drain Current	V _{DS} > I _{D(on)} × 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)} × R _{DS(on)max} I _D = 3 A	4	6.1		S
C _{iss}	Input Capacitance	V _{DS} = 25 V f = 1 MHz V _{GS} = 0		1330	1750	pF
C _{oss}	Output Capacitance			160	210	pF
C _{rss}	Reverse Transfer Capacitance			40	55	pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Time Rise Time	$V_{DD} = 400\text{ V}$ $I_D = 3\text{ A}$ $R_G = 47\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 3)		35 95	45 125	ns ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 640\text{ V}$ $I_D = 6\text{ A}$ $R_G = 47\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 5)		170		A/ μ s
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 640\text{ V}$ $I_D = 6\text{ A}$ $V_{GS} = 10\text{ V}$		58 8 27	78	nC nC nC

SWITCHING OFF

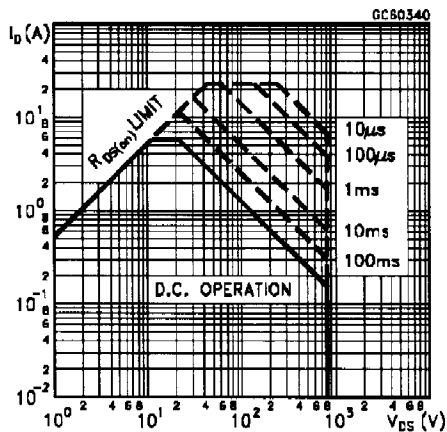
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$ t_f	Off-voltage Rise Time Fall Time	$V_{DD} = 640\text{ V}$ $I_D = 6\text{ A}$ $R_G = 47\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 5)		90 25	120 35	ns ns
t_c	Cross-over Time	(see test circuit, figure 5)		125	165	ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} $I_{SDM}(\bullet)$	Source-drain Current Source-drain Current (pulsed)				5.7 23	A A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 6\text{ A}$ $V_{GS} = 0$			1.6	V
t_{rr} Q_{rr}	Reverse Recovery Time Reverse Recovery Charge	$I_{SD} = 6\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 100\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ (see test circuit, figure 5)		850 15		ns μ C
I_{RRM}	Reverse Recovery Current			35		A

(*) Pulsed: Pulse duration = 300 μ s, duty cycle 1.5 %
 (•) Pulse width limited by safe operating area

Safe Operating Areas for TO-220



Safe Operating Areas for ISOWATT220

