

## N - CHANNEL ENHANCEMENT MODE LOW THRESHOLD POWER MOS TRANSISTOR

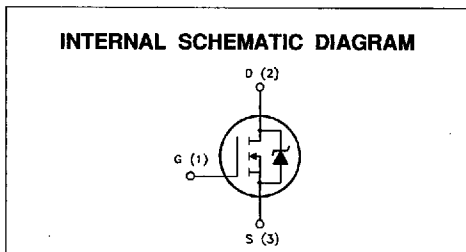
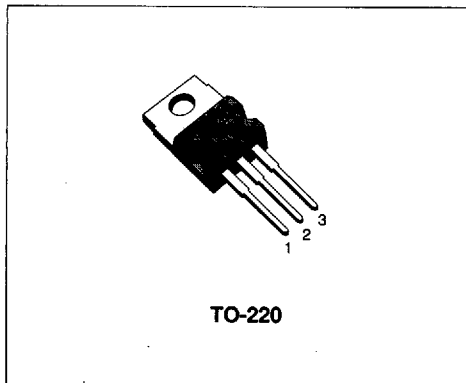
TENTATIVE DATA

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
STP19N05L	50 V	0.1 Ω	19 A
STP19N06L	60 V	0.1 Ω	19 A

- AVALANCHE RUGGEDNESS TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY
- LOGIC LEVEL COMPATIBLE INPUT
- 175°C OPERATING TEMPERATURE
- APPLICATION ORIENTED CHARACTERIZATION

**APPLICATIONS**

- HIGH CURRENT, HIGH SPEED SWITCHING
- SOLENOID AND RELAY DRIVERS
- REGULATORS
- DC-DC & DC-AC CONVERTERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- AUTOMOTIVE ENVIRONMENT (INJECTION, ABS, AIR-BAG, LAMPDRIVERS, Etc.)


**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value		Unit
		STP19N05L	STP19N06L	
V <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	50	60	V
V <sub>DGR</sub>	Drain- gate Voltage (R <sub>GS</sub> = 20 kΩ)	50	60	V
V <sub>GS</sub>	Gate-source Voltage	± 15		V
I <sub>D</sub>	Drain Current (continuous) at T <sub>c</sub> = 50 °C	19		A
I <sub>D</sub>	Drain Current (continuous) at T <sub>c</sub> = 100 °C	14		A
I <sub>DM</sub> (*)	Drain Current (pulsed)	76		A
P <sub>tot</sub>	Total Dissipation at T <sub>c</sub> = 25 °C	85		W
	Derating Factor	0.57		W/°C
T <sub>stg</sub>	Storage Temperature	-65 to 175		°C
T <sub>j</sub>	Max. Operating Junction Temperature	175		°C

(\*) Pulse width limited by safe operating area

## THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1.76	$^{\circ}\text{C}/\text{W}$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	62.5	$^{\circ}\text{C}/\text{W}$
$R_{thc-sink}$	Thermal Resistance Case-sink	Typ	0.5	$^{\circ}\text{C}/\text{W}$
$T_l$	Maximum Lead Temperature For Soldering Purpose		300	$^{\circ}\text{C}$

## AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
$I_{AR}$	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by $T_j$ max, $\delta < 1\%$ )	19	A
$E_{AS}$	Single Pulse Avalanche Energy (starting $T_j = 25^{\circ}\text{C}$ , $I_D = I_{AR}$ , $V_{DD} = 25\text{V}$ )	60	mJ
$E_{AR}$	Repetitive Avalanche Energy (pulse width limited by $T_j$ max, $\delta < 1\%$ )	15	mJ
$I_{AR}$	Avalanche Current, Repetitive or Not-Repetitive ( $T_c = 100^{\circ}\text{C}$ , pulse width limited by $T_j$ max, $\delta < 1\%$ )	11	A

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

## OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\ \mu\text{A}$ $V_{GS} = 0$ for STP19N05L for STP19N06L	50 60			V V
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating} \times 0.8$ $T_c = 125^{\circ}\text{C}$			250 1000	$\mu\text{A}$ $\mu\text{A}$
$I_{GSS}$	Gate-body Leakage Current ( $V_{DS} = 0$ )	$V_{GS} = \pm 15\text{V}$			$\pm 100$	nA

## ON (\*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\ \mu\text{A}$	1		2.5	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 5\text{V}$ $I_D = 9.5\text{A}$ $V_{GS} = 5\text{V}$ $I_D = 9.5\text{A}$ $T_c = 100^{\circ}\text{C}$			0.1 0.2	$\Omega$ $\Omega$
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 5\text{V}$	19			A

## DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 9.5\text{A}$		10		S
$C_{iss}$	Input Capacitance	$V_{DS} = 25\text{V}$ $f = 1\text{MHz}$ $V_{GS} = 0$		700		pF
$C_{oss}$	Output Capacitance			200		pF
$C_{rss}$	Reverse Transfer Capacitance			50		pF

**ELECTRICAL CHARACTERISTICS** (continued)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ $t_r$	Turn-on Time Rise Time	$V_{DD} = 30\text{ V}$ $I_D = 3\text{ A}$ $R_G = 50\ \Omega$ $V_{GS} = 5\text{ V}$ (see test circuit, figure 3)		25 80		ns ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 40\text{ V}$ $I_D = 19\text{ A}$ $R_G = 50\ \Omega$ $V_{GS} = 5\text{ V}$ (see test circuit, figure 5)		150		A/ $\mu$ s
$Q_g$	Total Gate Charge	$V_{DD} = 40\text{ V}$ $I_D = 19\text{ A}$ $V_{GS} = 5\text{ V}$		18		nC

**SWITCHING OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_r(V_{off})$ $t_f$ $t_c$	Off-voltage Rise Time Fall Time Cross-over Time	$V_{DD} = 40\text{ V}$ $I_D = 19\text{ A}$ $R_{GS} = 50\ \Omega$ $V_{GS} = 5\text{ V}$ (see test circuit, figure 5)		130 150 280		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)				19 76	A A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 19\text{ A}$ $V_{GS} = 0$			1.6	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 19\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 25\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ (see test circuit, figure 5)		120 0.2 3.5		ns $\mu$ C A

(\*) Pulsed: Pulse duration = 300  $\mu$ s, duty cycle 1.5 %

(\bullet) Pulse width limited by safe operating area