

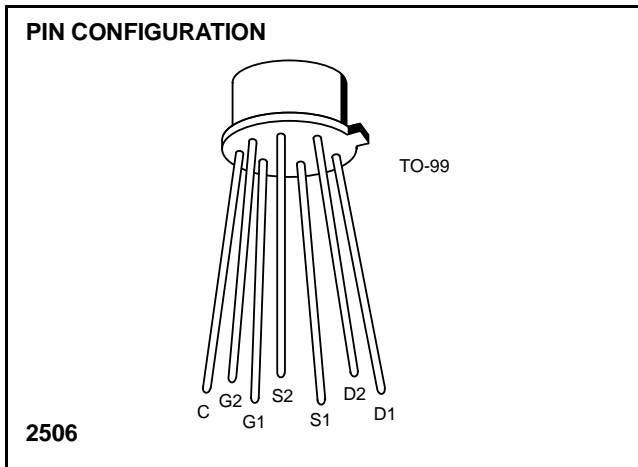
Dual P-Channel Enhancement Mode MOSFET General Purpose Amplifier



3N190 / 3N191

FEATURES

- Very High Input Impedance
- High Gate Breakdown 3N190-3N191
- Low Capacitance



ABSOLUTE MAXIMUM RATINGS

($T_A = 25^\circ\text{C}$ unless otherwise specified)

Drain-Source or Drain-Gate Voltage (Note 1)	
3N190, 3N191	40V
Transient Gate-Source Voltage (Note 1 and 2)	$\pm 125\text{V}$
Gate-Gate Voltage	$\pm 80\text{V}$
Drain Current (Note 1)	50mA
Storage Temperature	-65°C to $+200^\circ\text{C}$
Operating Temperature	-55°C to $+150^\circ\text{C}$
Lead Temperature (Soldering, 10sec)	$+300^\circ\text{C}$
Power Dissipation	
One Side	300mW
Both Sides	525mW
Total Derating above 25°C	4.2mW/ $^\circ\text{C}$

NOTE: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ORDERING INFORMATION

Part	Package	Temperature Range
3N190-91	Hermetic TO-99	-55°C to $+150^\circ\text{C}$
X3N190-91	Sorted Chips in Carriers	-55°C to $+150^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ and $V_{BS} = 0$ unless otherwise specified)

SYMBOL	PARAMETER	3N190/91		UNITS	TEST CONDITIONS
		MIN	MAX		
I_{GSSR}	Gate Reverse Current		10	pA	$V_{GS} = 40\text{V}$ $V_{GS} = -40\text{V}$ $T_A = +125^\circ\text{C}$
I_{GSSF}	Gate Forward Current		-10		
			-25		
BV_{DSS}	Drain-Source Breakdown Voltage	-40		V	$I_D = -10\mu\text{A}$
BV_{SDS}	Source-Drain Breakdown Voltage	-40			$I_S = -10\mu\text{A}, V_{BD} = 0$
$V_{GS(th)}$	Threshold Voltage	-2.0	-5.0		$V_{DS} = -15\text{V}, I_D = -10\mu\text{A}$
		-2.0	-5.0		$V_{DS} = V_{GS}, I_D = -10\mu\text{A}$
V_{GS}	Gate Source Voltage	-3.0	-6.5		$V_{DS} = -15\text{V}, I_D = -500\mu\text{A}$
I_{DSS}	Zero Gate Voltage Drain Current		-200		$V_{DS} = -15\text{V}$
I_{SDS}	Source Drain Current		-400		$V_{SD} = -15\text{V}, V_{DB} = 0$
$r_{DS(on)}$	Drain-Source on Resistance		300		ohms
$I_{D(on)}$	On Drain Current	-5.0	-30.0	mA	$V_{DS} = -15\text{V}, V_{GS} = -10\text{V}$

ELECTRICAL CHARACTERISTICS (Continued) ($T_A = 25^\circ\text{C}$ and $V_{BS} = 0$ unless otherwise specified)

SYMBOL	PARAMETER	3N190/91		UNITS	TEST CONDITIONS
		MIN	MAX		
g_{fs}	Forward Transconductance (Note 3)	1500	4000	μS	$V_{DS} = -15\text{V}, I_D = -10\text{mA}$ $f = 1\text{kHz}$
Y_{os}	Output Admittance		300		
C_{iss}	Input Capacitance Output Shorted (Note 5)		4.5	pF	$V_{DS} = -15\text{V}, I_D = -10\text{mA}$ $f = 1\text{MHz}$
C_{rss}	Reverse Transfer Capacitance (Note 5)		1.0		
C_{oss}	Output Capacitance Input Shorted (Note 5)		3.0		

SWITCHING CHARACTERISTICS ($T_A = 25^\circ\text{C}$ and $V_{BS} = 0$ unless otherwise specified)

SYMBOL	PARAMETER	MIN	MAX	UNITS	TEST CONDITIONS
$t_{d(on)}$	Turn On Delay Time		15	ns	$V_{DD} = -15\text{V}, I_D = -10\text{mA}, R_G = R_L = 1.4\text{k}\Omega$ (Note 5)
t_r	Rise Time		30		
t_{off}	Turn Off Time		50		

MATCHING CHARACTERISTICS ($T_A = 25^\circ\text{C}$ and $V_{BS} = 0$ unless otherwise specified) 3N188 and 3N190

SYMBOL	PARAMETER	MIN	MAX	UNITS	TEST CONDITIONS
Y_{fs1} / Y_{fs2}	Forward Transconductance Ratio	0.85	1.0		$V_{DS} = -15\text{V}, I_D = -500\mu\text{A}, f = 1\text{kHz}$
V_{GS1-2}	Gate Source Threshold Voltage Differential		100	mV	$V_{DS} = -15\text{V}, I_D = -500\mu\text{A}$
$\frac{\Delta V_{GS1-2}}{\Delta T}$	Gate Source Threshold Voltage Differential Change with Temperature (Note 4)		100	$\mu\text{V}/^\circ\text{C}$	$V_{DS} = -15\text{V}, I_D = -500\mu\text{A}, T = -55^\circ\text{C} \text{ to } +25^\circ\text{C}$
$\frac{\Delta V_{GS1-2}}{\Delta T}$	Gate Source Threshold Voltage Differential Change with Temperature (Note 4)		100	$\mu\text{V}/^\circ\text{C}$	$V_{DS} = -15\text{V}, I_D = -500\mu\text{A}, T = +25^\circ\text{C} \text{ to } +125^\circ\text{C}$

- NOTES:**
1. Per transistor.
 2. Approximately doubles for every 10°C increase in T_A .
 3. Pulse test duration = $300\mu\text{s}$; duty cycle $\leq 3\%$.
 4. Measured at end points, T_A and T_B .
 5. For design reference only, not 100% tested.