Dual P-Channel Enhancement Mode MOSFET General Purpose Amplifier

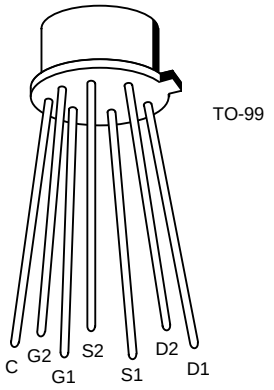
calogic CORPORATION

3N190 / 3N191

FEATURES

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

PIN CONFIGURATION



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ABSOLUTE MAXIMUM RATINGS

(T_A = 25°C unless otherwise specified)

Drain-Source or Drain-Gate Voltage (Note 1)
3N190, 3N191 . . . . . 40V
Transient Gate-Source Voltage (Note 1 and 2) . . . . . ±125V
Gate-Gate Voltage . . . . . ±80V
Drain Current (Note 1) 50mA
Storage Temperature . . . . . -65°C to +200°C
Operating Temperature . . . . . -55°C to +150°C
Lead Temperature (Soldering, 10sec) . . . . . +300°C
Power Dissipation
One Side 300mW
Both Sides 525mW
Total Derating above 25°C . . . . . 4.2mW/°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°C
X3N190-91	Sorted Chips in Carriers	-55°C to +150°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C and V_{BS} = 0 unless otherwise specified)

SYMBOL	PARAMETER	3N190/91 MIN	3N190/91 MAX	UNITS	TEST CONDITIONS
I_{GSSR}	Gate Reverse Current		10	pA	V_{GS} = 40V
I_{GSSF}	Gate Forward Current		-10	pA	V_{GS} = -40V
			-25	pA	V_{GS} = -40V, T_A = +125°C
BV_{DSS}	Drain-Source Breakdown Voltage	-40		V	I_D = -10µA
BV_{SDS}	Source-Drain Breakdown Voltage	-40		V	I_S = -10µA, V_{BD} = 0
$V_{GS(th)}$	Threshold Voltage	-2.0	-5.0	V	V_{DS} = -15V, I_D = -10µA
		-2.0	-5.0	V	V_{DS} = V_{GS}, I_D = -10µA
V_{GS}	Gate Source Voltage	-3.0	-6.5	V	V_{DS} = -15V, I_D = -500µA
I_{DSS}	Zero Gate Voltage Drain Current		-200	V	V_{DS} = -15V
I_{SDS}	Source Drain Current		-400	V	V_{SD} = -15V, V_{DB} = 0
$r_{DS(on)}$	Drain-Source on Resistance		300	ohms	V_{DS} = -20V, I_D = -100µA
$I_{D(on)}$	On Drain Current	-5.0	-30.0	mA	V_{DS} = -15V, V_{GS} = -10V

ELECTRICAL CHARACTERISTICS (Continued) (T_A = 25°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} = -15V, I_D = -10mA	f = 1kHz
Y_{os}	Output Admittance		300			
C_{iss}	Input Capacitance Output Shorted (Note 5)		4.5	pF		f = 1MHz
C_{rss}	Reverse Transfer Capacitance (Note 5)		1.0			
C_{oss}	Output Capacitance Input Shorted (Note 5)		3.0			

SWITCHING CHARACTERISTICS (T_A = 25°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} = -15V, I_D = -10mA, R_G = R_L = 1.4kΩ (Note 5)
t_r	Rise Time		30		
t_{off}	Turn Off Time		50		

MATCHING CHARACTERISTICS (T_A = 25°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} = -15V, I_D = -500µA, f = 1kHz
V_{GS1-2}	Gate Source Threshold Voltage Differential		100	mV	V_{DS} = -15V, I_D = -500µA
$\frac{\Delta V_{GS1-2}}{\Delta T}$	Gate Source Threshold Voltage Differential Change with Temperature (Note 4)		100	µV/°C	V_{DS} = -15V, I_D = -500µA, T = -55°C to +25°C
$\frac{\Delta V_{GS1-2}}{\Delta T}$	Gate Source Threshold Voltage Differential Change with Temperature (Note 4)		100	µV/°C	V_{DS} = -15V, I_D = -500µA T = +25°C to +125°C

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