# LINEAR SYSTEMS
Improved Standard Products®

3N190 3N191

P-CHANNEL DUAL MOSFET ENHANCEMENT MODE

FEATURES	
DIRECT REPLACEMENT FOR INTERSIL 3N190 & 3N191	
LOW GATE LEAKAGE CURRENT	$I_{GSS} \leq \pm 10pA$
LOW TRANSFER CAPACITANCE	$C_{rss} \leq 1.0pF$
ABSOLUTE MAXIMUM RATINGS[1] @ 25 °C (unless otherwise stated)	
Maximum Temperatures	
Storage Temperature	-65 to +150 °C
Operating Junction Temperature	-55 to +135 °C
Maximum Power Dissipation @ TA=25ºC	
Continuous Power Dissipation One Side	300mW
Continuous Power Dissipation Both Sides	525mW
Maximum Current	
Drain to Source[2]	50mA
Maximum Voltages	
Drain to Gate[2]	30V
Drain to Source[2]	30V
Gate to Gate	±80V

TO-78
TOP VIEW
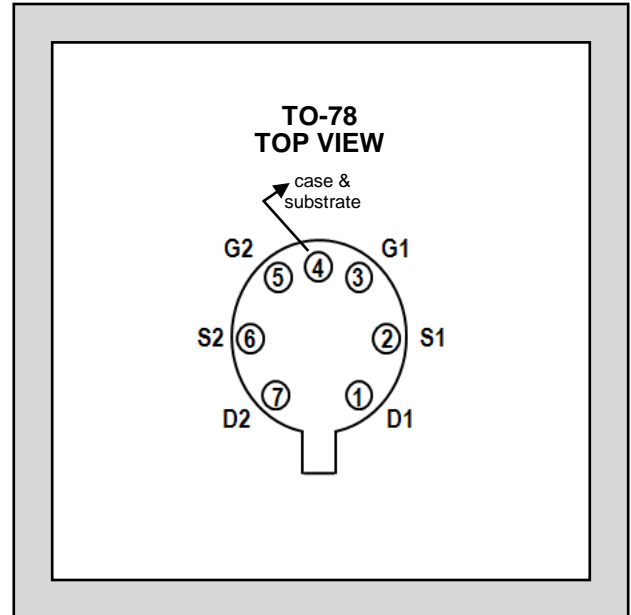
MATCHING CHARACTERISTICS @ 25 °C (unless otherwise stated) (V_{BS} = 0V unless otherwise stated)

SYMBOL	CHARACTERISTIC	MIN	TYP	MAX	UNITS	CONDITIONS
g_{fs1}/g_{fs2}	Forward Transconductance Ratio	0.85		1.0		V_{DS} = -15V, I_D = -500µA, f = 1kHz
V_{GS1-2}	Gate to Source Threshold Voltage Differential			100	mV	V_{DS} = -15V, I_D = -500µA
$\frac{\Delta V_{GS1-2}}{\Delta T}$	Gate to Source Threshold Voltage Differential with Temperature[4]			100	µV/°C	V_{DS} = -15V, I_D = -500µA T_S = -55 to +25 °C
$\frac{\Delta V_{GS1-2}}{\Delta T}$	Gate to Source Threshold Voltage Differential with Temperature[4]			100		V_{DS} = -15V, I_D = -500µA T_S = +25 to +125 °C

## ELECTRICAL CHARACTERISTICS @ 25 °C (unless otherwise stated) (V_{SB} = 0V unless otherwise stated)

SYMBOL	CHARACTERISTIC	MIN	TYP	MAX	UNITS	CONDITIONS
BV_{DSS}	Drain to Source Breakdown Voltage	-40				I_D = -10µA
BV_{SDS}	Source to Drain Breakdown Voltage	-40				I_S = -10µA, V_{BD} = 0V
V_{GS}	Gate to Source Voltage	-3.0		-6.5	V	V_{DS} = -15V, I_D = -500µA
$V_{GS(th)}$	Gate to Source Threshold Voltage	-2.0		-5.0		$V_{DS} = V_{GS}$, I_D = -10µA
$V_{GS(th)}$		-2.0		-5.0		V_{DS} = -15V, I_D = -500µA
I_{GSSR}	Reverse Gate Leakage Current			10		V_{GS} = 40V
I_{GSSF}	Forward Gate Leakage Current			-10	pA	V_{GS} = -40V
I_{DSS}	Drain Leakage Current "Off"			-200		V_{DS} = -15V
I_{SDS}	Source to Drain Leakage Current "Off"			-400		V_{SD} = -15V, V_{DB} = 0V
$I_{D(on)}$	Drain Current "On"[3]	-5.0		-30.0	mA	V_{DS} = -15V, V_{GS} = -10V
I_{G1G2}	Gate to Gate Isolation Current	-		±1.0	µA	V_{G1G2} = ±80V, I_D = I_S = 0 = mA

Linear Integrated Systems

ELECTRICAL CHARACTERISTICS CONT. @ 25 °C (unless otherwise stated) (V$_{SB}$ = 0V unless otherwise stated)

SYMBOL	CHARACTERISTIC	MIN	TYP	MAX	UNITS	CONDITIONS
g$_{fs}$	Forward Transconductance[4]	1500		4000	μS	V$_{DS}$ = -15V, I$_D$ = -5mA, f = 1kHz
g$_{os}$	Output Admittance			300		
r$_{ds(on)}$	Drain to Source "On" Resistance			300	Ω	V$_{DS}$ = -20V, I$_D$ = -100µA
C$_{rss}$	Reverse Transfer Capacitance			1.0		
C$_{iss}$	Input Capacitance Output Shorted			4.5	pF	V$_{DS}$ = -15V, I$_D$ = -5mA, f = 1MHz
C$_{oss}$	Output Capacitance Input Shorted			3.0		

SWITCHING CHARACTERISTICS

SYMBOL	CHARACTERISTIC	MIN	TYP	MAX	UNITS	CONDITIONS
t$_{d(on)}$	Turn On Delay Time			15		
t$_r$	Turn On Rise Time			30	ns	V$_{DD}$ = -15V, I$_{D(on)}$ = -5mA, R$_G$ = R$_L$ = 1.4kΩ
t$_{off}$	Turn Off Time			50		

TO-78
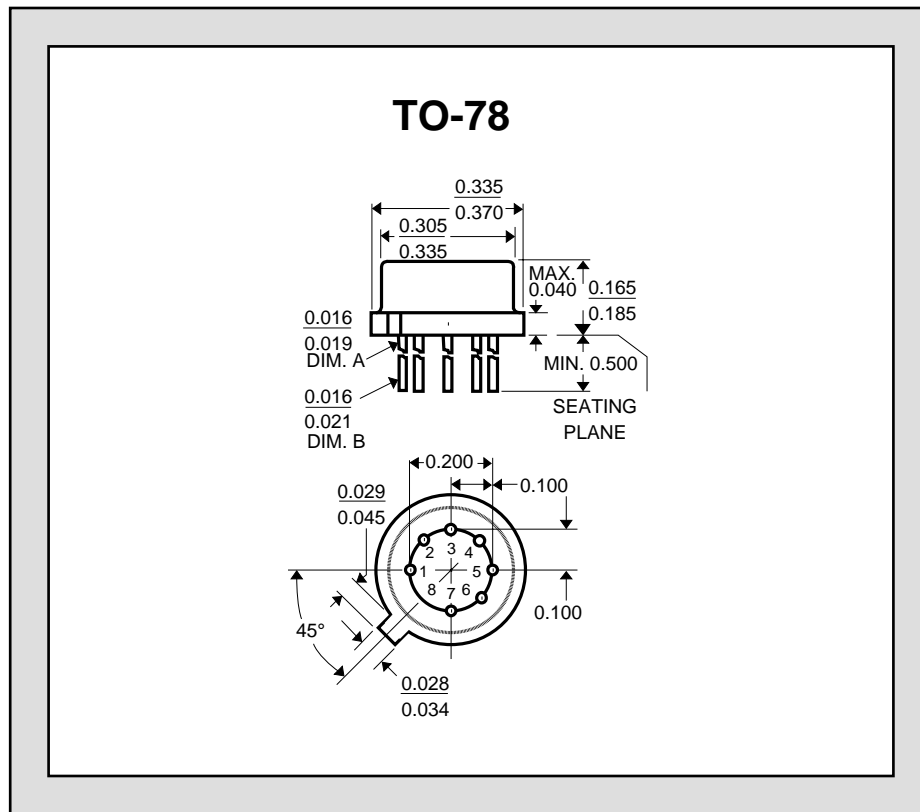
NOTES

1. Absolute maximum ratings are limiting values above which serviceability may be impaired.
2. Per transistor.
3. Pulse: t = 300µs, Duty Cycle ≤ 3%
4. Measured at end points, T$_A$ and T$_B$.

Information furnished by Linear Integrated Systems is believed to be accurate and reliable. However, no responsibility is assumed for its use; nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Linear Integrated Systems.

Linear Integrated Systems develops and produces the highest performance semiconductors of their kind in the industry. Linear Systems, founded in 1987, uses patented and proprietary processes and designs to create its high performance discrete semiconductors. Expertise brought to the company is based on processes and products developed at Amelco, Union Carbide, Intersil and Micro Power Systems by company founder John H. Hall.

Linear Integrated Systems