

FEATURES

- Very High Input Impedance
- Low Capacitance
- High Gate Breakdown 3N190-3N191
- Zener Protected gate 3N188-3N189
- $V_g$  & (TH) Matched
- $V_g$  & (TH) Tracking

DUAL MATCHED  
P-CHANNEL  
ENHANCEMENT  
MODE MOS FETS  
**3N188 3N189**  
**3N190 3N191**

MAXIMUM RATINGS (@ 25°C ambient unless noted)		ORDERING INFORMATION			PACKAGE DIMENSIONS	
$V_{GSS}$	Static Gate to Source Voltage	3N188 3N189	3N190 3N191	TO99	WAFER	CHIP
		±40V	-40V	3N188		
$V_{GSS}^{(1)}$	Transient Gate to Source Voltage	±40V	±125V	3N189		
$V_{DSS}$	Drain to Source Voltage	-40V	-40V	3N190	3N190/W	3N190/D
$V_{SDS}$	Source to Drain Voltage	-40V	-40V	3N191	3N191/W	3N191/D
$I_D$	Drain Current	50 mA	50 mA			
$P_D$	Power Dissipation (each side)	300 mW				
	(both sides)	525 mW				
	Total Derating Factor	4.2 mW/°C				
$T_j$	Operating Junction Temperature	-55 to +150°C				
$T_{stg}$	Storage Temperature	-65 to +200°C				
$T_l$	Lead Temperature 1/16" from Case for 10 sec max	+300°C				
(1) Device must not be tested at b125V more than once or for longer than 300 ms.						

ELECTRICAL CHARACTERISTICS (@ 25°C and  $V_{BS} = 0$  unless noted)

	3N188 3N189		3N190 3N191		UNITS	TEST CONDITIONS
	MIN	MAX	MIN	MAX		
$I_{GSS}$			10		pA	$V_{GS} = 40V$
$I_{G(f)}$			-10		pA	$V_{GS} = -40V$
$I_{G(f)}$			-25		pA	$V_{GS} = -40V$
$BV_{DSS}$	-40		-40		V	$I_D = -10\mu A$
$BV_{SDS}$	-40		-40		V	$I_S = -10\mu A, V_{DB} = 0$
$V_{GS(th)}$	-2.0	-5.0	-2.0	-5.0	V	$V_{DS} = -15V, I_D = -10\mu A$
$V_{GS(th)}$	-2.0	-5.0	-2.0	-5.0	V	$V_{DS} = V_{GS}, I_D = -10\mu A$
$V_{GS}$	-3.0	-6.5	-3.0	-6.5	V	$V_{DS} = -15V, I_D = -500\mu A$
$I_{DSS}$	-200		-200		pA	$V_{DS} = -15V$
$I_{DSS}$	-400		-400		pA	$V_{GS} = -15V, V_{DB} = 0$
$I_{SDS}$	300		300		ohms	$V_{DS} = -20V, I_D = -100\mu A$
$r_{ds(on)}$	-5.0	-30.0	-5.0	-30.0	mA	$V_{DS} = -15V, V_{GS} = -10V$
$I_{D(on)}$			4000		$\mu$ hos	$V_{DS} = -15V, I_D = -5\text{ mA}, f = 1\text{ kHz}$
$Y_{fs}$	1500	4000	1500	4000	$\mu$ hos	$V_{DS} = -15V, I_D = -5\text{ mA}, f = 1\text{ kHz}$
$Y_{OS}$	300		300		$\mu$ hos	$V_{DS} = -15V, I_D = -5\text{ mA}, f = 1\text{ MHz}$
$C_{iss}$	4.5		4.5		pF	$V_{DS} = -15V, I_D = -5\text{ mA}, f = 1\text{ MHz}$
$C_{rss}$	1.5		1.0		pF	$V_{DS} = -15V, I_D = -5\text{ mA}, f = 1\text{ MHz}$
$C_{oss}$	3.0		3.0		pF	$V_{DS} = -15V, I_D = -5\text{ mA}, f = 1\text{ MHz}$
$RE(Y_{fs})$	1200		1200		$\mu$ hos	$V_{DS} = -15V, I_D = -5\text{ mA}, f = 100\text{ MHz}$

SWITCHING CHARACTERISTICS (@ 25°C and  $V_{BS} = 0$  unless noted)

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

MATCHING CHARACTERISTICS (@ 25°C and  $V_{BS} = 0$  unless noted) 3N188 and 3N190

	MIN	MAX	UNITS	TEST CONDITIONS
$Y_{fs1}/Y_{fs2}$ Forward Transconductance Ratio	0.85	1.0		$V_{DS} = -15V, I_D = -500\mu A, f = 1\text{ kHz}$
$V_{GS1-2}$ Gate Source Threshold Voltage Differential		100	mV	$V_{DS} = -15V, I_D = -500\mu A$
$\Delta V_{GS1-2}$ Gate Source Threshold Voltage Differential Change with Temperature		8	mV	$V_{DS} = -15V, I_D = -500\mu A, T = -55^\circ\text{C to } +25^\circ\text{C}$
$\frac{\Delta V_{GS1-2}}{\Delta T}$ Gate Source Threshold Voltage Differential Change with Temperature		10	mV	$V_{DS} = -15V, I_D = -500\mu A, T = +25^\circ\text{C to } +125^\circ\text{C}$

