P-Channel Enhancement Mode MOSFET General Purpose Amplifier Switch

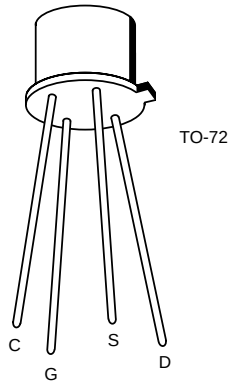
calogic LLC

3N163 / 3N164

FEATURES

- **Very High Input Impedance**
- **High Gate Breakdown**
- **Fast Switching**
- **Low Capacitance**

PIN CONFIGURATION



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ABSOLUTE MAXIMUM RATINGS (Note 1)

(T_A = 25°C unless otherwise specified)

Drain-Source or Drain-Gate Voltage
- 3N163 . . . . . -40V
- 3N164 . . . . . -30V

Static Gate-Source Voltage
- 3N163 . . . . . ±40V
- 3N164 . . . . . ±30V

Transient Gate-Source Voltage (Note 2) . . . . . ±125V
Drain Current 50mA
Storage Temperature . . . . . -65°C to +200°C
Operating Temperature . . . . . -55°C to +150°C
Lead Temperature (Soldering, 10sec) . . . . . +300°C
Power Dissipation 375mW
- Derate above +25°C . . . . . 3.0mW/°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
3N163-64	Hermetic TO-72	-55°C to +150°C
X3N163-64	Sorted Chips in Carriers	-55°C to +150°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

SYMBOL	PARAMETER	3N163		3N164		UNITS	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
I_{GSS}	Gate-Body Leakage Current		-10		-10	pA	V_{GS} = -40V, V_{DS} = 0 (3N163) V_{GS} = -30V, V_{DS} = 0 (3N164)
			-25		-25		T_A = +125°C
BV_{DSS}	Drain-Source Breakdown Voltage	-40		-30		V	I_D = -10µA, V_{GS} = 0
BV_{SDS}	Source-Drain Breakdown Voltage	-40		-30			I_S = -10µA, V_{GD} = 0, V_{BD} = 0
$V_{GS(th)}$	Threshold Voltage	-2.0	-5.0	-2.0	-5.0		V_{DS} = V_{GS}, I_D = -10µA
$V_{GS(th)}$	Threshold Voltage	-2.0	-5.0	-2.0	-5.0		V_{DS} = -15V, I_D = -10µA
V_{GS}	Gate Source Voltage	-2.5	-6.5	-2.5	-6.5		V_{DS} = -15V, I_D = -0.5mA
I_{DSS}	Zero Gate Voltage Drain Current		200		400	pA	V_{DS} = -15V, V_{GS} = 0
I_{SDS}	Source Drain Current		400		800		V_{SD} = 15V, V_{GS} = V_{DB} = 0
$r_{DS(on)}$	Drain-Source on Resistance		250		300	ohms	V_{GS} = -20V, I_D = -100µA
$I_{D(on)}$	On Drain Current	-5.0	-30.0	-3.0	-30.0	mA	V_{DS} = +15V, V_{GS} = -10V

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

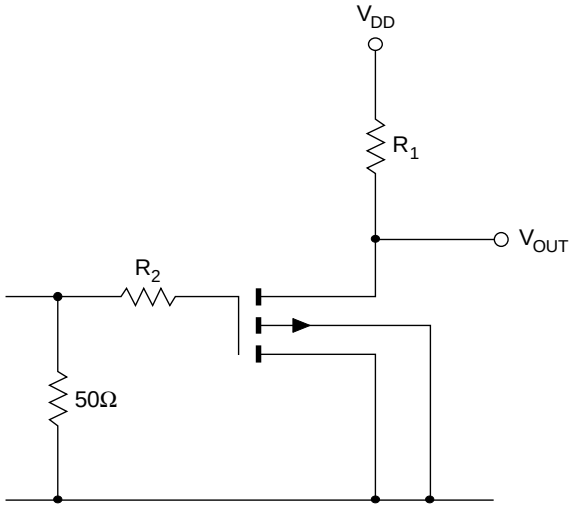
SYMBOL	PARAMETER	3N163		3N164		UNITS	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
g_{fs}	Forward Transconductance	2000	4000	1000	4000	µS	V_{DS} = -15V, I_D = -10mA, f = 1kHz
g_{os}	Output Admittance		250		250		
C_{iss}	Input Capacitance - Output Shorted		2.5		2.5	pF	V_{DS} = -15V, I_D = -10mA, f = 1MHz (Note 1)
C_{rss}	Reverse Transfer Capacitance		0.7		0.7		
C_{oss}	Output Capacitance - Input Shorted		3.0		3.0		

NOTE 1: For design reference only, not 100% tested.

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

SYMBOL	PARAMETER	3N163		3N164		UNITS	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
t_{on}	Turn-On Delay Time		12		12	ns	V_{DD} = -15V $I_{D(on)}$ = -10mA (Note 1) R_G = R_L = 1.4kΩ
t_r	Rise Time		24		24		
t_{off}	Turn-Off Delay Time		50		50		

SWITCHING TIMES TEST CIRCUIT



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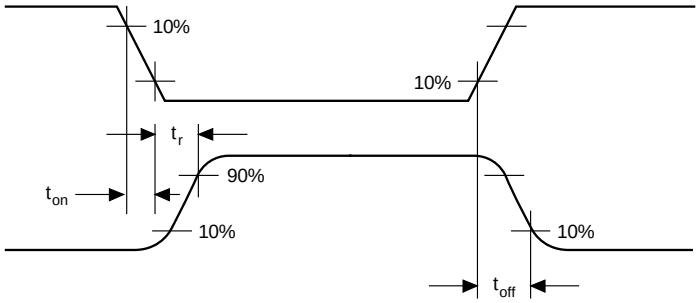

INPUT PULSE

RISE TIME ≤ 2ns
PULSE WIDTH ≥ 200ns

SAMPLING SCOPE

t_r ≤ 0.2ns
C_{IN} ≤ 2pF
R_{IN} ≥ 10MΩ

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