

P-Channel Enhancement Mode MOSFET General Purpose Amplifier Switch

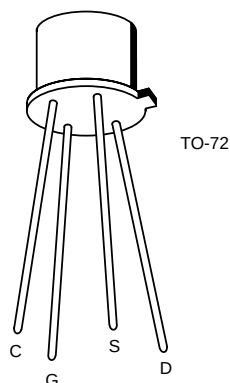


3N163 / 3N164

FEATURES

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

PIN CONFIGURATION



1503

ABSOLUTE MAXIMUM RATINGS (Note 1)

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

Drain-Source or Drain-Gate Voltage	
3N163.....	-40V
3N164.....	-30V
Static Gate-Source Voltage	
3N163.....	$\pm 40\text{V}$
3N164.....	$\pm 30\text{V}$
Transient Gate-Source Voltage (Note 2).....	$\pm 125\text{V}$
Drain Current.....	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.....	375mW
Derate above $+25^\circ\text{C}$	3.0mW/ $^\circ\text{C}$

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
3N163-64	Hermetic TO-72	-55°C to $+150^\circ\text{C}$
X3N163-64	Sorted Chips in Carriers	-55°C to $+150^\circ\text{C}$

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

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

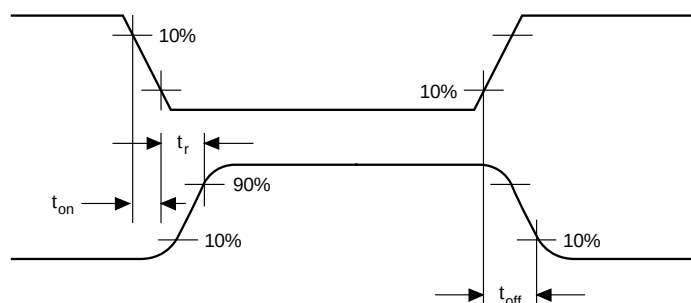
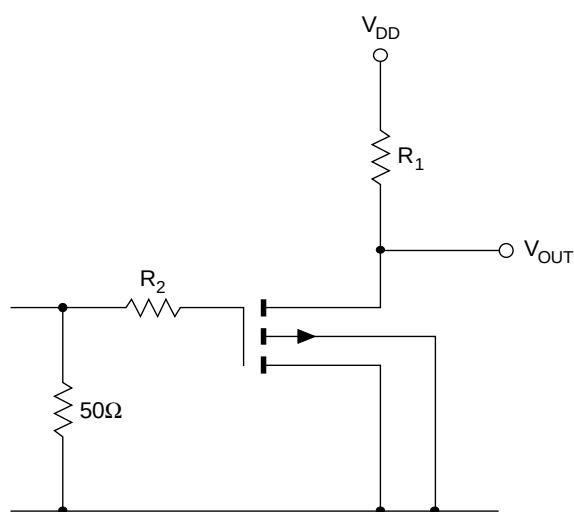
SYMBOL	PARAMETER	3N163		3N164		UNITS	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
g_{fs}	Forward Transconductance	2000	4000	1000	4000	μS	$V_{DS} = -15\text{V}$, $I_D = -10\text{mA}$, $f = 1\text{kHz}$
g_{os}	Output Admittance		250		250		
C_{iss}	Input Capacitance - Output Shorted		2.5		2.5	pF	$V_{DS} = -15\text{V}$, $I_D = -10\text{mA}$, $f = 1\text{MHz}$ (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 ($T_A = 25^\circ\text{C}$ 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	$V_{DD} = -15\text{V}$ $I_{D(on)} = -10\text{mA}$ (Note 1) $R_G = R_L = 1.4\text{k}\Omega$
t_r	Rise Time		24		24		
t_{off}	Turn-Off Delay Time		50		50		

SWITCHING TIMES TEST CIRCUIT



INPUT PULSE
RISE TIME $\leq 2\text{ns}$
PULSE WIDTH $\geq 200\text{ns}$

SAMPLING SCOPE
 $t_r \leq 0.2\text{ns}$
 $C_{IN} \leq 2\text{pF}$
 $R_{IN} \geq 10\text{M}\Omega$