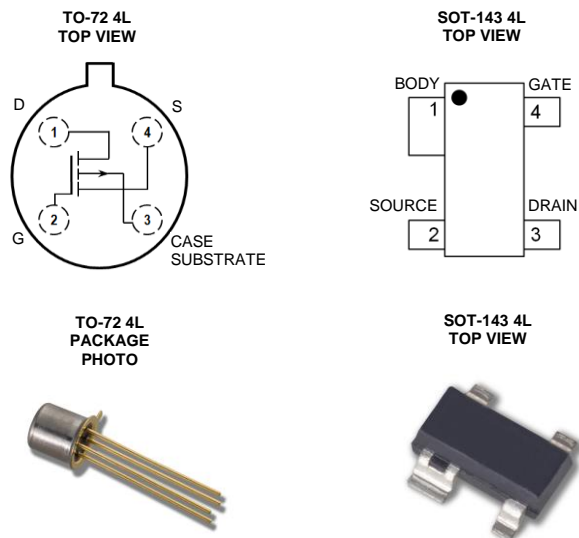


**VERY HIGH INPUT IMPEDANCE, HIGH GATE BREAKDOWN, FAST SWITCHING, LOW CAPACITANCE**

FEATURES	
VERY HIGH INPUT IMPEDANCE	
HIGH GATE BREAKDOWN	
ULTRA LOW LEAKAGE	
FAST SWITCHING	
LOW CAPACITANCE	
ABSOLUTE MAXIMUM RATINGS	
@ 25°C (unless otherwise stated)	
Drain-Source or Drain-Gate Voltage	
3N163	-40V
3N164	-30V
Drain Current	50mA
Storage Temperature	-55°C to +150°C
Power Dissipation TO-72 case	375mW <sup>2</sup>
Power Dissipation SOT-143 case	350mW <sup>3</sup>



#### ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise noted)

SYMBOL	CHARACTERISTIC	3N163		3N164		UNITS	CONDITIONS
		MIN	MAX	MIN	MAX		
I <sub>GSS</sub>	Gate Leakage Current		-10		-10	pA	V <sub>GS</sub> =-40V, V <sub>DS</sub> =0 (3N163), V <sub>SB</sub> =0V
		T <sub>A</sub> =+125°C	-25		-25		V <sub>GS</sub> =-30V, V <sub>DS</sub> =0 (3N164), V <sub>SB</sub> =0V
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	-40		-30		V	I <sub>D</sub> =-10μA V <sub>GS</sub> =0, V <sub>BS</sub> =0
BV <sub>SDS</sub>	Source-Drain Breakdown Voltage	-40		-30			I <sub>S</sub> =-10μA V <sub>GD</sub> =0, V <sub>BD</sub> =0
V <sub>GS(th)</sub>	Threshold Voltage	-2.0	-5.0	-2.0	-5.0	V	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =-10μA, V <sub>SB</sub> =0V
V <sub>GS</sub>	Gate Source Voltage (on)	-3.0	-6.5	-3.0	-6.5		V <sub>DS</sub> =-15V I <sub>D</sub> =-0.5mA, V <sub>SB</sub> =0V
I <sub>DSS</sub>	Zero Gate Voltage, Drain Current (off)		-200		-400	pA	V <sub>DS</sub> =-15V V <sub>GS</sub> =0, V <sub>SB</sub> =0V
I <sub>SDS</sub>	Zero Gate Voltage, Source Current		-400		-800		V <sub>SD</sub> =-15V V <sub>GS</sub> =0, V <sub>DB</sub> =0V
R <sub>DS(on)</sub>	Drain-Source on Resistance		250		300	ohms	V <sub>GS</sub> =-20V I <sub>D</sub> =-100μA, V <sub>SB</sub> =0V
I <sub>D(on)</sub>	On Drain Current	-5.0	-30	-3.0	-30	mA	V <sub>DS</sub> =-15V V <sub>GS</sub> =-10V, V <sub>SB</sub> =0V
g <sub>fs</sub>	Forward Transconductance	2.0	4.0	1.0	4.0	mS	V <sub>DS</sub> =-15V I <sub>D</sub> =-10mA f=1kHz
g <sub>og</sub>	Output Admittance		250		250	μS	
C <sub>iss</sub>	Input Capacitance-Output Shorted		3.5		3.5	pF	V <sub>DS</sub> =-15V I <sub>D</sub> =-10mA <sup>1</sup> f=1MHz
C <sub>rss</sub>	Reverse Transfer Capacitance		0.7		0.7		
C <sub>oss</sub>	Output Capacitance Input Shorted		3.0		3.0		

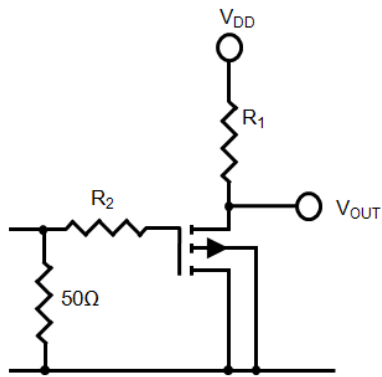
# 3N163 and 3N164

## P-Channel Enhancement Mode MOSFET

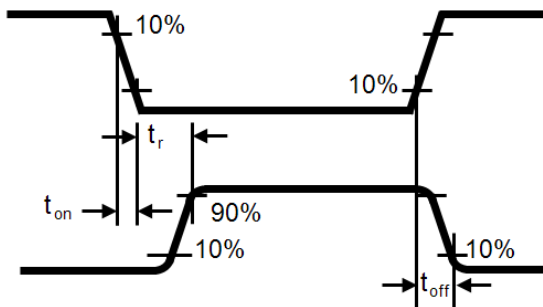
SWITCHING CHARACTERISTICS  $T_A=25^\circ\text{C}$  and  $V_{BS}=0$  (unless otherwise noted)

SYMBOL	CHARACTERISTIC	3N163		3N164		UNITS	CONDITIONS
		MIN	MAX	MIN	MAX		
$t_{on}$	Turn-On Delay Time		12		12	ns	$V_{DD}=-15\text{V}$ , $V_{SB}=0\text{V}$ $I_{D(on)}=-10\text{mA}^1$ $R_G=R_L=1.4\text{K}$
$t_r$	Rise Time		24		24		
$t_{off}$	Turn-Off Time		50		50		

### Switching Times Test Circuit



### TYPICAL SWITCHING WAVEFORM

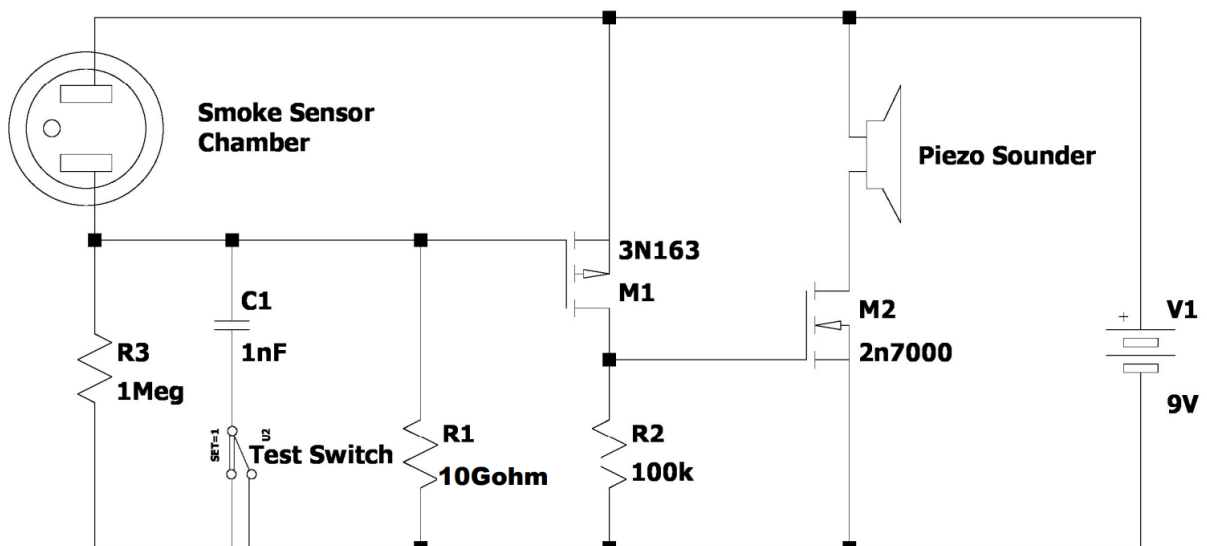


INPUT PULSE  
Rise Times  $\leq 2\text{ns}$   
Pulse Width  $\geq 200\text{ns}$

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

### Simplest Possible Smoke Detector

KRL 09/26/2021



# 3N163 and 3N164

## P-Channel Enhancement Mode MOSFET

### NOTES:

1. For design reference only, not 100% tested.
2. Derate 3mW/°C above 25°C
3. Derate 3.5mW/°C above 25°C
4. All min/max limits are absolute numbers. Negative signs indicate electrical polarity only.

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.

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.

