P-Channel Enhancement-Mode MOSFET Transistors

Product Summary

Part Number	V _{(BR)DSS} Min (V)	V _{GS(th)} (V)	$r_{ extbf{DS(on)}} \operatorname{Max} \ (\Omega)$	I _{D(on)} Min (mA)	C _{rss} Max (pF)	t _{ON} Typ (ns)
3N163	-40	−2 to −5	250	- 5	0.7	18
3N164	-30	−2 to −5	300	-3	0.7	18

Features

• Ultra-Low Input Leakage: 0.02 pA Typ. • High Input Impedance Isolation

- High Gate Breakdown Voltage: ± 125 V
- Normally Off

Benefits

- Minimize Handling ESD Problems
- High Off Isolation without Power

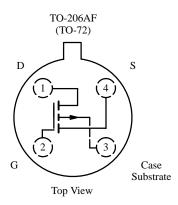
Applications

- Ultra-High Input Impedance Amplifier
- Smoke Detectors
- Electrometers
- Analog Switching
- Digital Switching

Description

The 3N163/164 are lateral p-channel MOSFETs designed for analog switch and preamplifier applications where high speed and low parasitic capacitances are required.

The hermetic TO-206AF package is compatible with military processing per military standards (see Military information).



Absolute Maximum Ratings ($T_A = 25^{\circ}C$ Unless Otherwise Noted)

Drain-Source Voltage Gate-Source Voltage	` '	$ \begin{array}{ccc} \text{Storage Temperature} & -65 \text{ to } 200^{\circ}\text{C} \\ \text{Operating Junction Temperature} & -55 \text{ to } 150^{\circ}\text{C} \\ \text{Power Dissipation}^{\text{a}} & 375 \text{ mW} \end{array} $

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70228.

Specifications^a

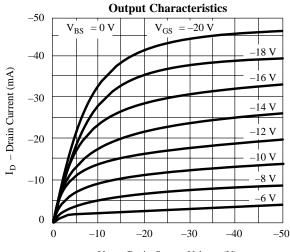
		Test Conditions		Турь	Limits				
					3N163		3N164		
Parameter	Symbol				Min	Max	Min	Max	Unit
Static	•			•	•	•	•	•	
Drain-Source Breakdown Voltage	V _{(BR)DSS}	$I_D = -10 \mu A, V_{DS} = 0 V$		-70	-40		-30		
Source-Drain Breakdown Voltage	V _{(BR)SDS}	$I_S = -10 \mu A, V_{GD} = V_{BD} = 0 V$		-70	-40		-30		
Gate-Threshold Voltage	V _{GS(th)}	$I_D = -10 \ \mu\text{A}, \ V_{GS} = V_{DS}$		-2.5	-2	-5	-2	-5	V
Gate-Source Voltage	V_{GS}	$I_D = -0.5 \text{ mA}, V_{DS} = -15 \text{ V}$		-3.5	-3	-6.5	-2.5	-6.5	1
	$I_{ m GSS}$	$V_{GS} = -40 \text{ V}, V_{DS} = 0 \text{ V}$		<-1		-10			
Cata Dada I ada a			$T_A = 125^{\circ}C^d$	-1					pА
Gate-Body Leakage		$V_{GS} = -30 \text{ V}, \text{ V}$	$V_{\rm DS} = 0 \text{ V}$	<-1				-10	
			$T_A=125^{\circ}C^d$	-1					
Zana Cata Waltana Dunin Communt	I _{DSS}	$V_{DS} = -15 \text{ V}, \text{ V}$	$V_{GS} = 0 \text{ V}$	-8		-200		-400	1
Zero-Gate Voltage Drain Current			$T_A = 125^{\circ}C^d$	-20					nA
Zana Cata Valtaga Caumaa Cummant	I_{SDS}	$V_{GD} = V_{BD} = 0 \text{ V},$	$V_{SD} = -20 \text{ V}$	-10		-400		-800	pA
Zero-Gate Voltage Source Current			$T_A = 125^{\circ}C^d$	-25					nA
On-State Drain Current ^c	$I_{D(on)}$	$V_{DS} = -15 \text{ V}, V_{GS} = -10 \text{ V}$		-10	-5	-30	-3	-30	mA
	r _{DS(on)}	$V_{GS} = -20 \text{ V}, I_D$	$=-100~\mu A$	180		250		300	Ω
Drain-Source On-Resistance			$T_A = 125^{\circ}C^d$	270					
Dynamic									
Forward Transconductance ^c	gfs	$V_{DS} = -15 \text{ V}, I_{D} = -10 \text{ mA}$ f = 1 kHz		2.7	2	4	1	4	mS
Common-Source Output Conductance ^c	g _{os}			150		250		250	μS
Input Capacitance	C _{iss}	$V_{DS} = -15 \text{ V}, I_D = -10 \text{ mA}$ f = 1 MHz		2.4		3.5		3.5	
Output Capacitance	C _{oss}			2.5		3		3	pF
Reverse Transfer Capacitance	C _{rss}			0.5		0.7		0.7	
Switchinge									
T. O. T.	t _{d(on)}	$V_{DD} = -15 \text{ V}, R_L = 1500 \Omega$ $I_D \cong -10 \text{ mA}, V_{GEN} = -12 \text{ V}$ $R_G = 50 \Omega$		5		12		12	ns
Turn-On Time	t _r			13		24		24	
Turn-Off Time	$t_{ m d(off)}$			25		50		50	

MRA

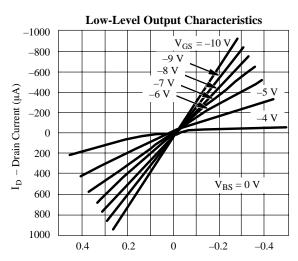
- a. T_A = 25°C unless otherwise noted.
 b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
 c. Pulse test: PW ≤ 300 µs duty cycle ≤ 3%.

- d. This parameter not registered with JEDEC.
 e. Switching time is essentially independent of operating temperature.

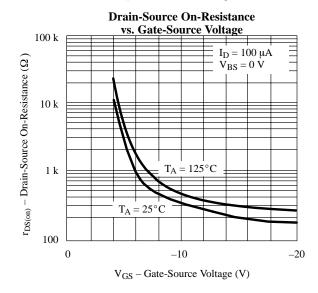
Typical Characteristics



V_{DS} – Drain-Source Voltage (V)

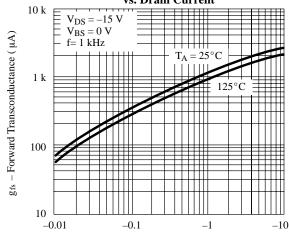


V_{DS} – Drain-Source Voltage (V)

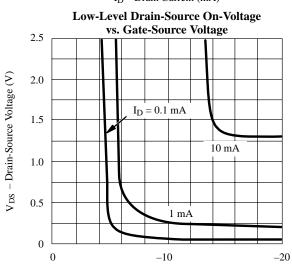


 V_{GS} – Gate-Source Voltage (V)

Common-Source Forward Transconductance vs. Drain Current

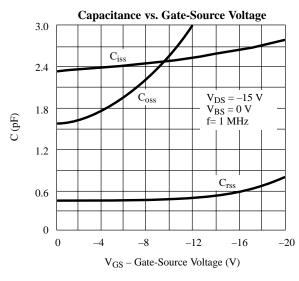


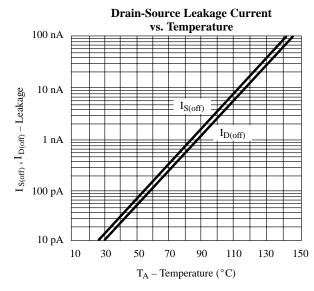
I_D - Drain Current (mA)

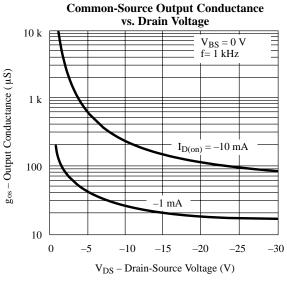


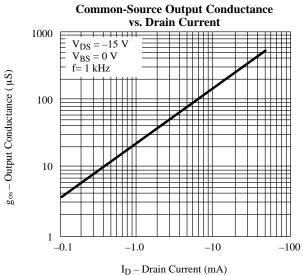
V_{GS} – Gate-Source Voltage (V)

Typical Characteristics (Cont'd)

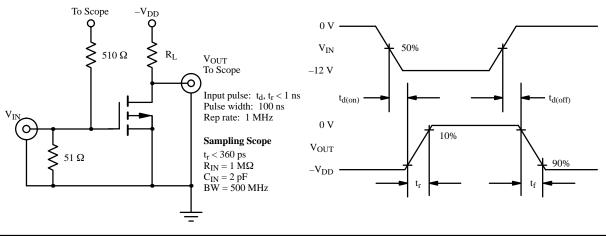








Switching Time Test Circuit





Vishay

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