

3N163/3N164

P-Channel Enhancement-Mode MOSFET Transistors

Product Summary

Part Number	V _{(BR)DSS} Min (V)	V _{GS(th)} (V)	r _{DS(on)} Max (Ω)	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 Gate Breakdown Voltage: ±125 V
- Normally Off

Benefits

- High Input Impedance Isolation
- Minimize Handling ESD Problems
- High Off Isolation without Power

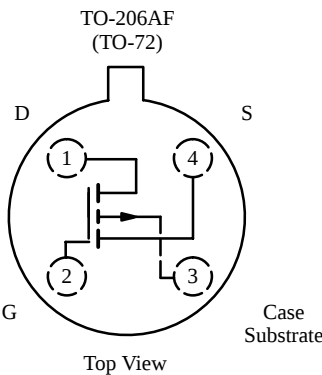
Applications

- 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°C Unless Otherwise Noted)

Drain-Source Voltage	(3N163) −40 V	Storage Temperature −65 to 200°C
	(3N164) −30 V	Operating Junction Temperature −55 to 150°C
Gate-Source Voltage	±30 V	Power Dissipation ^a 375 mW
Continuous Drain Current	−50 mA	Notes:
Lead Temperature (1/16" from case for 10 seconds)	300°C	a. Derate 3 mW/°C above 25°C

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

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Specifications^a

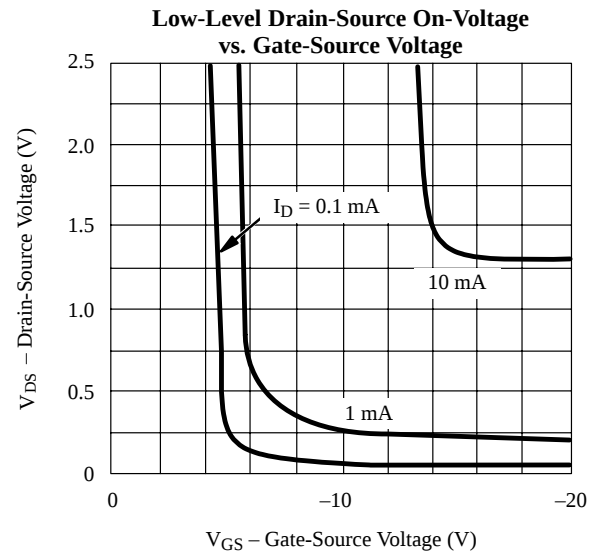
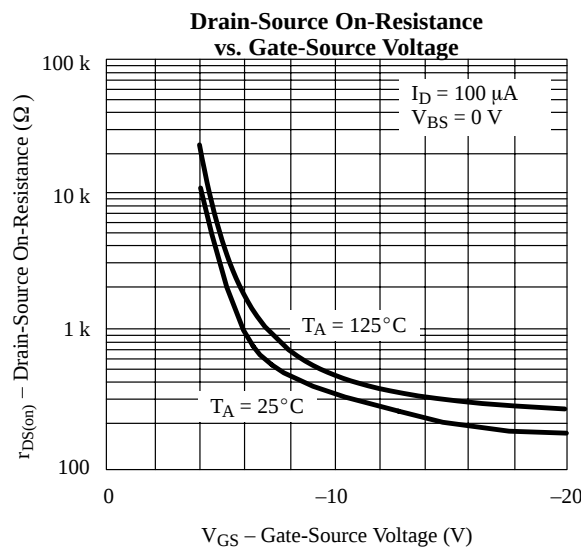
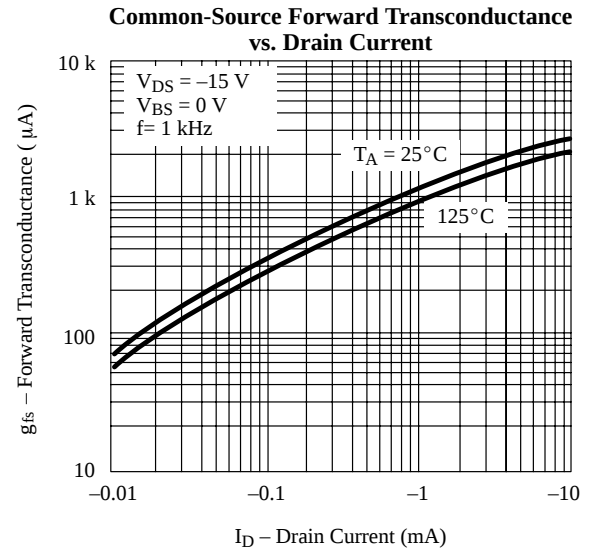
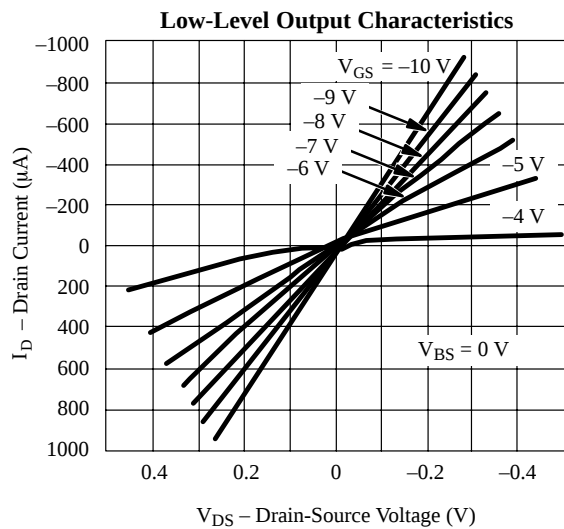
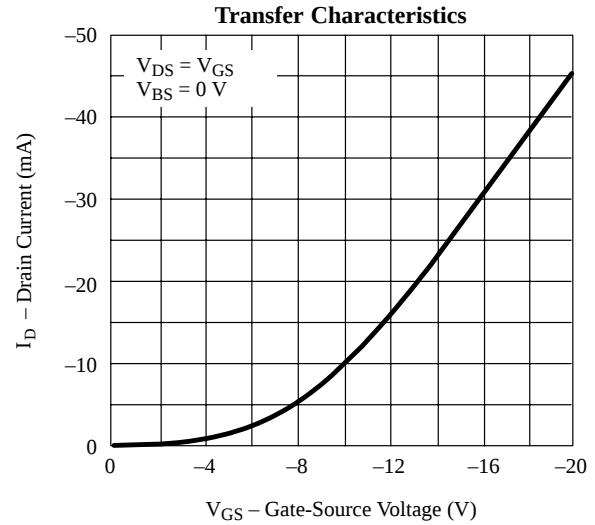
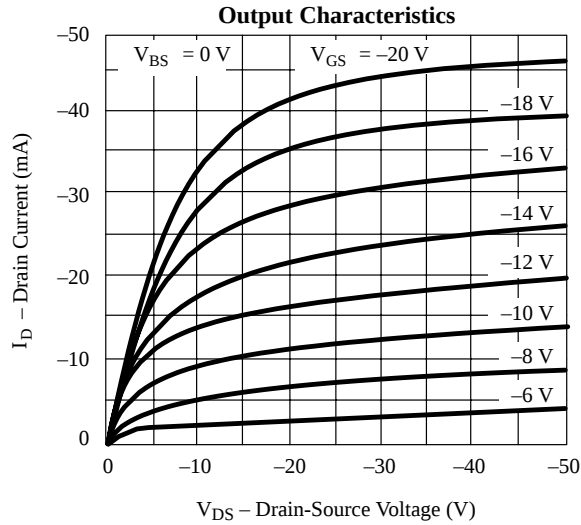
Parameter	Symbol	Test Conditions	Typ ^b	Limits				Unit	
				3N163		3N164			
				Min	Max	Min	Max		
Static									
Drain-Source Breakdown Voltage	V _{(BR)DSS}	I _D = -10 μA, V _{DS} = 0 V	-70	-40		-30		V	
Source-Drain Breakdown Voltage	V _{(BR)SDS}	I _S = -10 μA, V _{GD} = V _{BD} = 0 V	-70	-40		-30			
Gate-Threshold Voltage	V _{GS(th)}	I _D = -10 μA, V _{GS} = V _{DS}	-2.5	-2	-5	-2	-5		
Gate-Source Voltage	V _{GS}	I _D = -0.5 mA, V _{DS} = -15 V	-3.5	-3	-6.5	-2.5	-6.5		
Gate-Body Leakage	I _{GSS}	V _{GS} = -40 V, V _{DS} = 0 V	<-1		-10			pA	
		T _A = 125°C ^d	-1						
		V _{GS} = -30 V, V _{DS} = 0 V	<-1				-10		
		T _A = 125°C ^d	-1						
Zero-Gate Voltage Drain Current	I _{DSS}	V _{DS} = -15 V, V _{GS} = 0 V	-8		-200		-400	nA	
		T _A = 125°C ^d	-20						
Zero-Gate Voltage Source Current	I _{SDS}	V _{GD} = V _{BD} = 0 V, V _{SD} = -20 V	-10		-400		-800	pA	
		T _A = 125°C ^d	-25					nA	
On-State Drain Current ^c	I _{D(on)}	V _{DS} = -15 V, V _{GS} = -10 V	-10	-5	-30	-3	-30	mA	
Drain-Source On-Resistance	r _{DS(on)}	V _{GS} = -20 V, I _D = -100 μA	180		250		300	Ω	
		T _A = 125°C ^d	270						
Dynamic									
Forward Transconductance ^c	g _{fs}	V _{DS} = -15 V, I _D = -10 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 V, I _D = -10 mA f = 1 MHz	2.4		3.5		3.5	pF	
Output Capacitance	C _{oss}		2.5		3		3		
Reverse Transfer Capacitance	C _{rss}		0.5		0.7		0.7		
Switching ^e									
Turn-On Time	t _{d(on)}	V _{DD} = -15 V, R _L = 1500 Ω I _D ≅ -10 mA, V _{GEN} = -12 V R _G = 50 Ω	5		12		12	ns	
	t _r		13		24		24		
Turn-Off Time	t _{d(off)}		25		50		50		

Notes:

- $T_A = 25^\circ C$ unless otherwise noted.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: $PW \leq 300\ \mu s$ duty cycle $\leq 3\%$.
- This parameter not registered with JEDEC.
- Switching time is essentially independent of operating temperature.

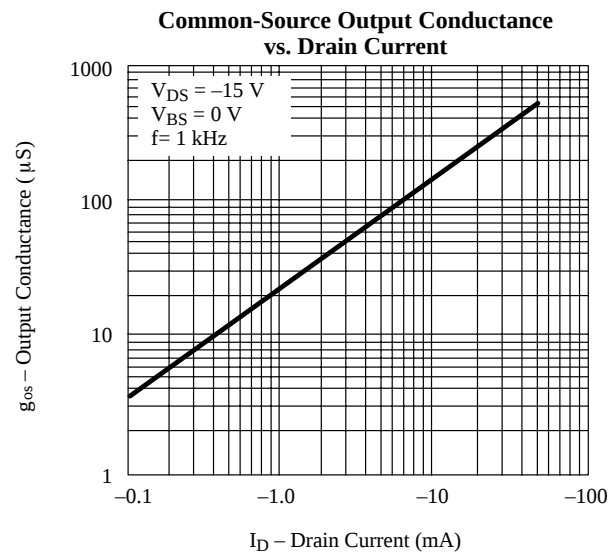
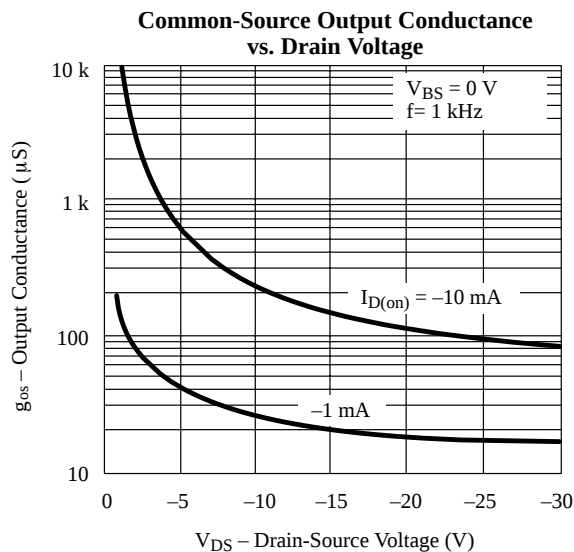
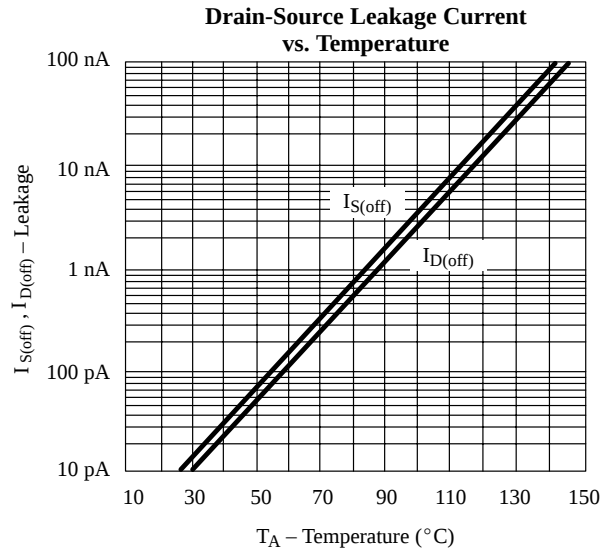
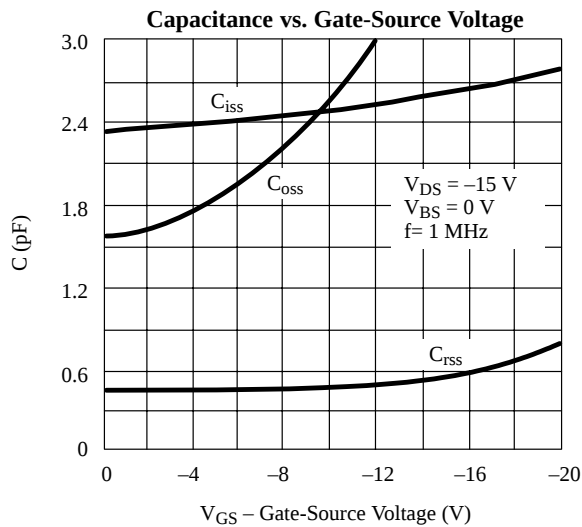
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Typical Characteristics



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Typical Characteristics (Cont'd)



Switching Time Test Circuit

