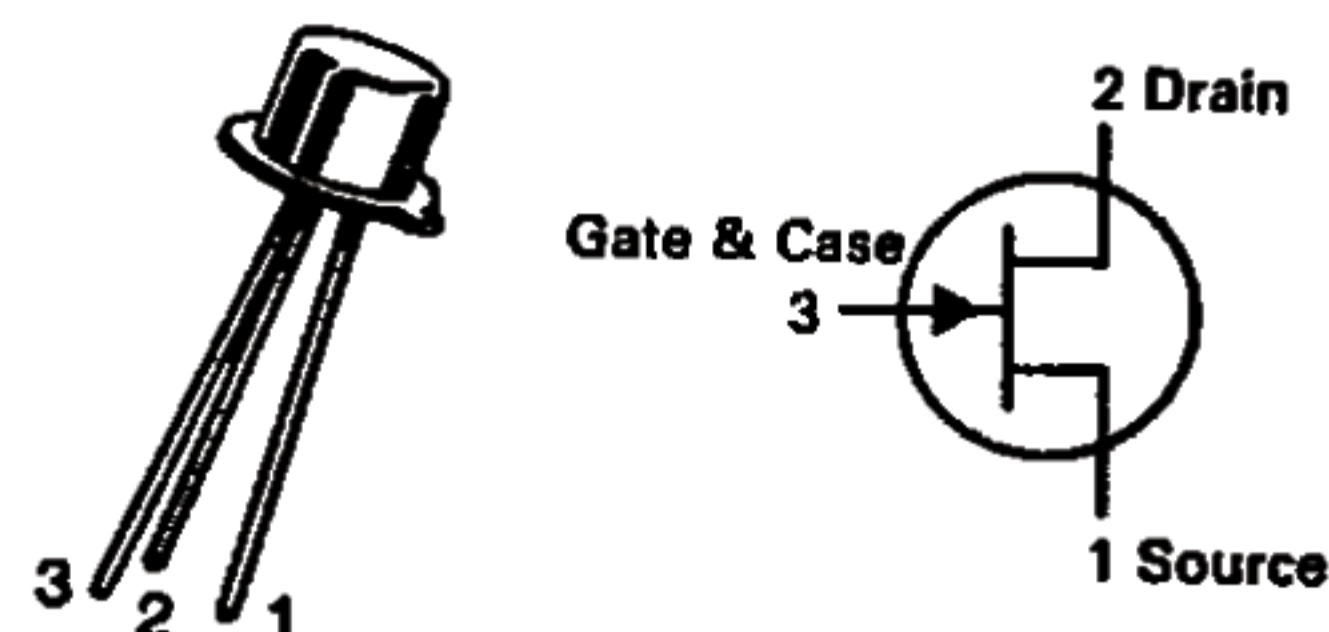


# 2N4856, A thru 2N4861, A

2N4856, 2N4857, 2N4858  
JAN, JTX, JTXV AVAILABLE

CASE 22-03, STYLE 4  
TO-18 (TO-206AA)



**JFET  
SWITCHING**

**N-CHANNEL — DEPLETION**

### MAXIMUM RATINGS

Rating	Symbol	2N4856,A 2N4857,A 2N4858,A	2N4859,A 2N4860,A 2N4861,A	Unit
Drain-Source Voltage	V <sub>DS</sub>	+40	+30	Vdc
Drain-Gate Voltage	V <sub>DG</sub>	+40	+30	Vdc
Reverse Gate-Source Voltage	V <sub>GSR</sub>	-40	-30	Vdc
Forward Gate Current	I <sub>GF</sub>	50		mAdc
Total Device Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	360 2.4		mW mW/°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +175		°C

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Gate-Source Breakdown Voltage (I <sub>G</sub> = 1.0 μAdc, V <sub>DS</sub> = 0)	V <sub>(BR)GSS</sub>	-40 -30	—	Vdc
Gate Reverse Current (V <sub>GS</sub> = -20 Vdc, V <sub>DS</sub> = 0)	I <sub>GSS</sub>	—	0.25	nAdc
(V <sub>GS</sub> = -15 Vdc, V <sub>DS</sub> = 0)		—	0.25	μAdc
(V <sub>GS</sub> = -20 Vdc, V <sub>DS</sub> = 0, T <sub>A</sub> = 150°C)		—	0.5	μAdc
(V <sub>GS</sub> = -15 Vdc, V <sub>DS</sub> = 0, T <sub>A</sub> = 150°C)		—	0.5	μAdc
Gate Source Cutoff Voltage (V <sub>DS</sub> = 15 Vdc, I <sub>D</sub> = 0.5 nAdc)	V <sub>GS(off)</sub>	-4.0 -2.0 -0.8	-10 -6.0 -4.0	Vdc
Drain Cutoff Current (V <sub>DS</sub> = 15 Vdc, V <sub>GS</sub> = -10 Vdc)	I <sub>D(off)</sub>	—	0.25	nAdc
(V <sub>DS</sub> = 15 Vdc, V <sub>GS</sub> = -10 Vdc, T <sub>A</sub> = 150°C)		—	0.5	μAdc
<b>ON CHARACTERISTICS</b>				
Zero-Gate-Voltage Drain Current(1) (V <sub>DS</sub> = 15 Vdc, V <sub>GS</sub> = 0)	I <sub>DSS</sub>	50 20 8.0	— 100 80	mAdc
Drain-Source On-Voltage (I <sub>D</sub> = 20 mAdc, V <sub>GS</sub> = 0)	V <sub>DS(on)</sub>	—	0.75	Vdc
(I <sub>D</sub> = 10 mAdc, V <sub>GS</sub> = 0)		—	0.5	
(I <sub>D</sub> = 5.0 mAdc, V <sub>GS</sub> = 0)		—	0.5	
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Drain-Source "ON" Resistance (V <sub>GS</sub> = 0, I <sub>D</sub> = 0, f = 1.0 kHz)	r <sub>ds(on)</sub>	—	25 40 60	Ohms
Input Capacitance (V <sub>DS</sub> = 0, V <sub>GS</sub> = -10 Vdc, f = 1.0 MHz)	C <sub>iss</sub>	—	18 10	pF
Reverse Transfer Capacitance (V <sub>DS</sub> = 0, V <sub>GS</sub> = -10 Vdc, f = 1.0 MHz)	C <sub>rss</sub>	—	8.0 4.0 3.5	pF

2N4856, A thru 2N4861, A

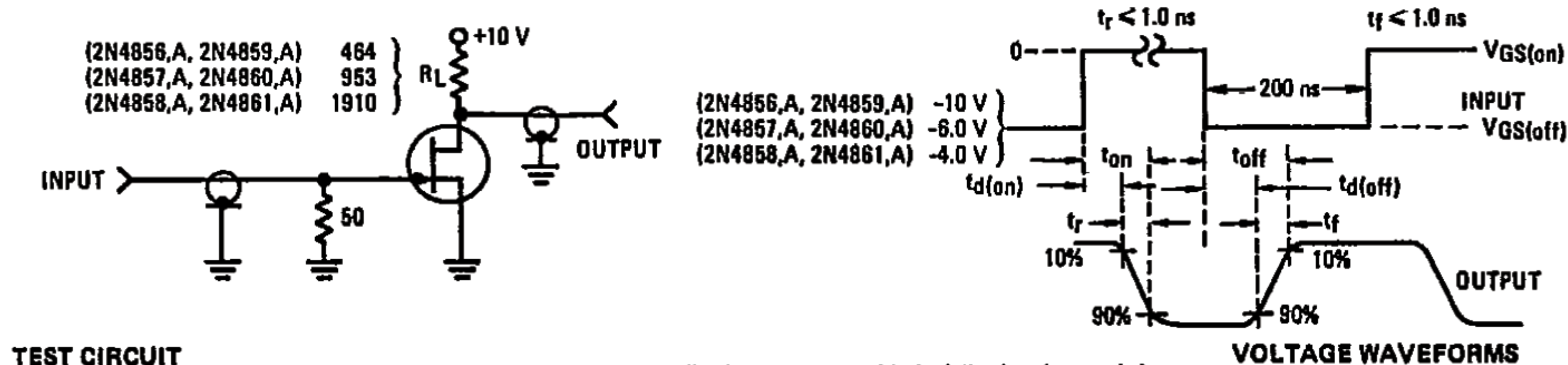
ELECTRICAL CHARACTERISTICS (continued) (T<sub>A</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit		
<b>SWITCHING CHARACTERISTICS (See Figure 1) (2)</b>						
Turn-On Delay Time	Conditions for 2N4856,A, 2N4859,A: 2N4856, 2N4859 2N4856A, 2N4859A 2N4857, 2N4860 2N4857A, 2N4860A 2N4858, 2N4861 2N4858A, 2N4861A (V <sub>DD</sub> = 10 Vdc, I <sub>D(on)</sub> = 20 mAdc, V <sub>GS(on)</sub> = 0, V <sub>GS(off)</sub> = -10 Vdc)	t <sub>d(on)</sub>	—	6.0	ns	
Rise Time		Conditions for 2N4857,A, 2N4860,A: 2N4856,A, 2N4859,A 2N4857,A, 2N4860,A 2N4858, 2N4861 2N4858A, 2N4861A (V <sub>DD</sub> = 10 Vdc, I <sub>D(on)</sub> = 10 mAdc, V <sub>GS(on)</sub> = 0, V <sub>GS(off)</sub> = -6.0 Vdc)	t <sub>r</sub>	—	3.0	ns
Turn-Off Time			Conditions for 2N4858,A, 2N4861,A: 2N4856, 2N4859 2N4856A, 2N4859A 2N4857, 2N4860 2N4857A, 2N4860A 2N4858, 2N4861 2N4858A; 2N4861A (V <sub>DD</sub> = 10 Vdc, I <sub>D(on)</sub> = 5.0 mAdc, V <sub>GS(on)</sub> = 0, V <sub>GS(off)</sub> = -4.0 Vdc)	t <sub>off</sub>	—	25
				—	20	
				—	50	
			—	40		
			—	100		
			—	80		

(1) Pulse Test: Pulse Width = 100 ms, Duty Cycle ≤ 10%.

(2) The I<sub>D(on)</sub> values are nominal; exact values vary slightly with transistor parameters.

FIGURE 1 — SWITCHING TIMES TEST CIRCUIT



- NOTES: a. The input waveforms are supplied by a generator with the following characteristics:  
 Z<sub>out</sub> = 50 ohms, Duty Cycle ≈ 2.0%.  
 b. Waveforms are monitored on an oscilloscope with the following characteristics:  
 t<sub>r</sub> < 0.75 ns, R<sub>in</sub> > 1.0 megohm, C<sub>in</sub> < 2.5 pF.