

## N-Channel JFETs

<b>PRODUCT SUMMARY</b>						
Part Number	$V_{GS(off)}$ (V)	$V_{(BR)GSS}$ Min (V)	$I_{DSS}$ Min (mA)	$r_{DS(on)}$ Max ( $\Omega$ )	$I_{D(off)}$ Typ ( $\mu$ A)	$t_{ON}$ Typ (ns)
2N4856A	-4 to -10	-40	50	25	5	4
2N4857A	-2 to -6	-40	20	40	5	4
2N4858A	-0.8 to -4	-40	8	60	5	4

### FEATURES

- Low On-Resistance: 2N4856A <math><25 \Omega</math>
- Fast Switching— $t_{ON}$ : 4 ns
- High Off-Isolation— $I_{D(off)}$ : 5  $\mu$ A
- Low Capacitance: 3 pF
- Low Insertion Loss

### BENEFITS

- Low Error Voltage
- High-Speed Analog Circuit Performance
- Negligible "Off-Error," Excellent Accuracy
- Good Frequency Response
- Eliminates Additional Buffering

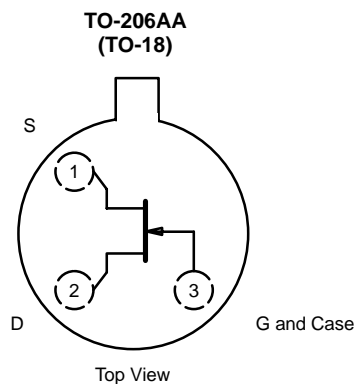
### APPLICATIONS

- Analog Switches
- Choppers
- Sample-and-Hold
- Normally "On" Switches
- Current Limiters

### DESCRIPTION

The 2N4856A/4857A/4858A all-purpose JFET analog switches offer low on-resistance, low capacitance, good isolation, and fast switching.

Hermetically-sealed TO-206AA (TO-18) packaging allows full military processing (see Military Information). For similar products in TO-226AA (TO-92) and SOT-23 packages, see the J/SST111 series data sheet. For similar duals, see the 2N5564/5565/5566 data sheet.





### ABSOLUTE MAXIMUM RATINGS

Gate-Drain, Gate-Source Voltage : (2N4856A-58A) ..... -40 V  
 Gate Current ..... 50 mA  
 Lead Temperature (<sup>1</sup>/<sub>16</sub>" from case for 10 seconds) ..... 300 °C  
 Storage Temperature ..... -65 to 200 °C

Operating Junction Temperature ..... -55 to 200 °C  
 Power Dissipation<sup>a</sup> ..... 1.8 W

#### Notes

a. Derate 10 mW/°C for T<sub>C</sub> > 25 °C

SPECIFICATIONS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)										
Parameter	Symbol	Test Conditions	Typ <sup>a</sup>	Limits						Unit
				2N4856A		2N4857A		2N4858A		
				Min	Max	Min	Max	Min	Max	
<b>Static</b>										
Gate-Source Breakdown Voltage	V <sub>(BR)GSS</sub>	I <sub>G</sub> = -1 μA, V <sub>DS</sub> = 0 V	-55	-40		-40		-40		V
Gate-Source Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 0.5 nA		-4	-10	-2	-6	-0.8	-4	
Saturation Drain Current <sup>b</sup>	I <sub>DSS</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V		50		20	100	8	80	mA
Gate Reverse Current	I <sub>GSS</sub>	V <sub>GS</sub> = -20 V, V <sub>DS</sub> = 0 V	-5		-250		-250		-250	pA
			T <sub>A</sub> = 150 °C	-13		-500		-500		-500
Gate Operating Current <sup>c</sup>	I <sub>G</sub>	V <sub>DG</sub> = 15 V, I <sub>D</sub> = 10 mA	-5							pA
Drain Cutoff Current	I <sub>D(off)</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = -10 V	5		250		250		250	
			T <sub>A</sub> = 150 °C	13		500		500		500
Drain-Source On-Voltage	V <sub>DS(on)</sub>	V <sub>GS</sub> = 0 V	I <sub>D</sub> = 5 mA	0.25					0.5	
			I <sub>D</sub> = 10 mA	0.35			0.5			
			I <sub>D</sub> = 20 mA	0.5		0.75				
Drain-Source On-Resistance <sup>c</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 1 mA			25		40		60	Ω
Gate-Source Forward Voltage <sup>c</sup>	V <sub>GS(F)</sub>	I <sub>G</sub> = 1 mA, V <sub>DS</sub> = 0 V	0.7							V
<b>Dynamic</b>										
Common-Source Forward Transconductance <sup>c</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 20 V, I <sub>D</sub> = 1 mA f = 1 kHz	6							mS
			25							μS
Common-Source Output Conductance <sup>c</sup>	g <sub>os</sub>									μS
Drain-Source On-Resistance	r <sub>ds(on)</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 0 mA f = 1 kHz			25		40		60	Ω
Common-Source Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = -10 V f = 1 MHz	7		10		10		10	pF
Common-Source Reverse Transfer Capacitance	C <sub>rss</sub>		3		4		3.5		3.5	
Equivalent Input Noise Voltage <sup>c</sup>	e <sub>n</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 10 mA f = 1 kHz	3							nV/ √Hz
<b>Switching</b>										
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 10 V, V <sub>GSH</sub> = 0 V See Switching Circuit	2		5		6		8	ns
	t <sub>r</sub>		2		3		4		8	
Turn-Off Time	t <sub>OFF</sub>		12		20		40		80	

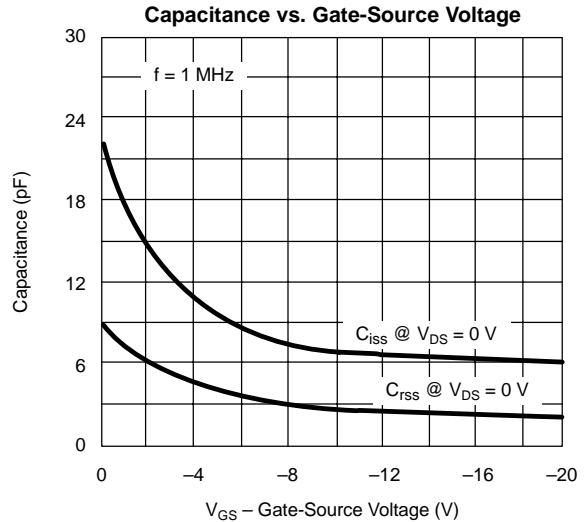
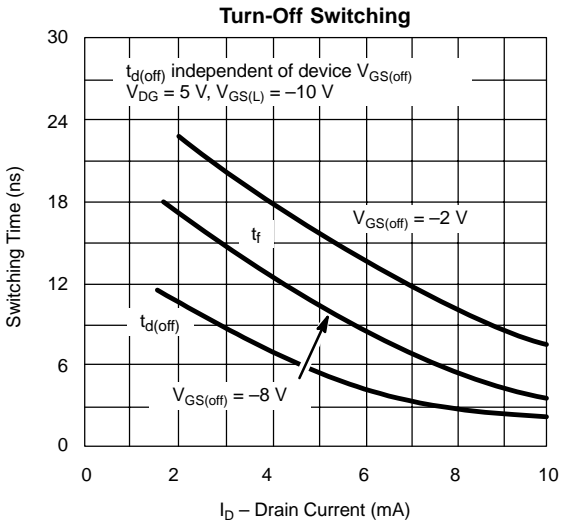
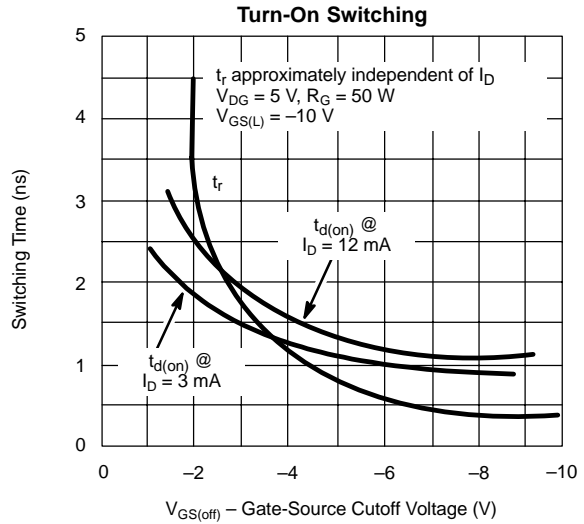
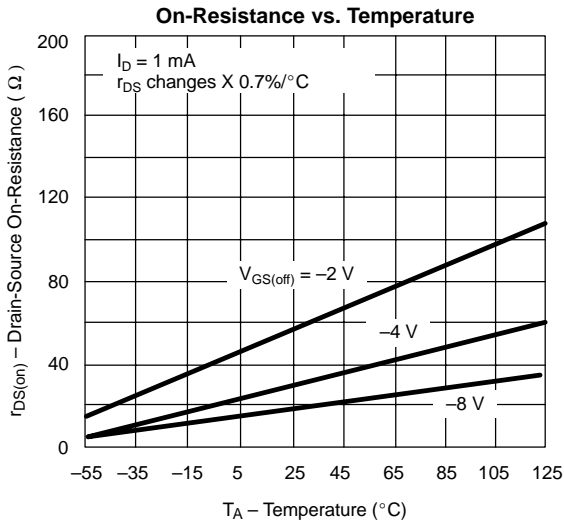
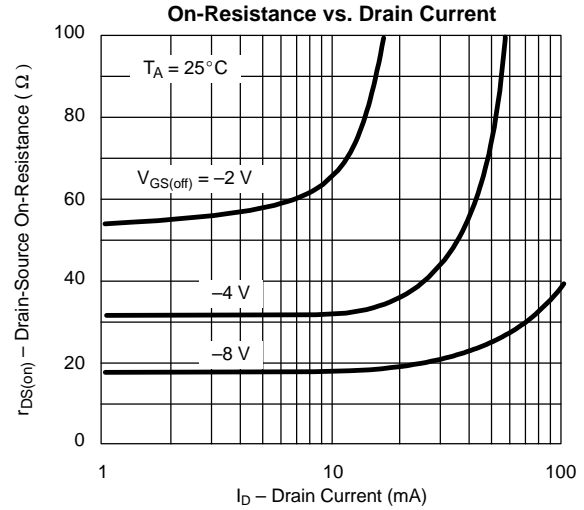
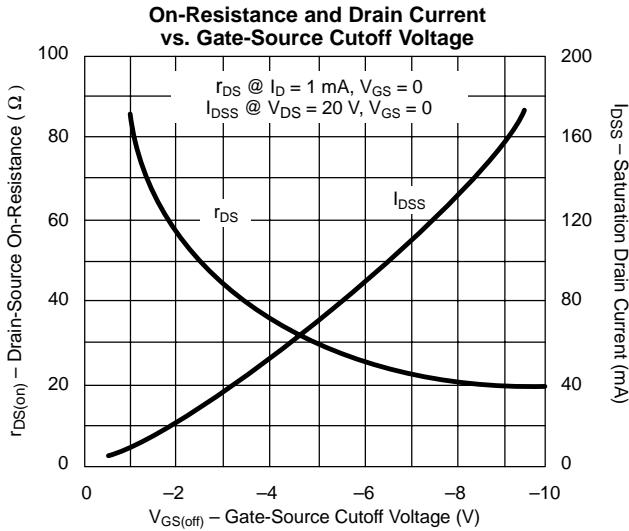
#### Notes

- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: PW ≤ 100 μs duty cycle ≤ 10%.
- This parameter not registered with JEDEC.

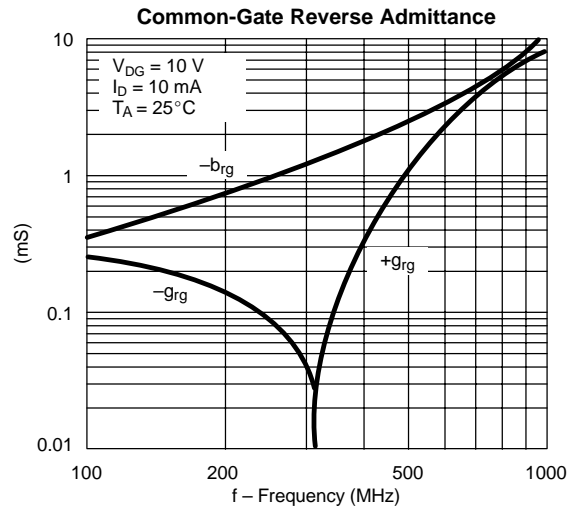
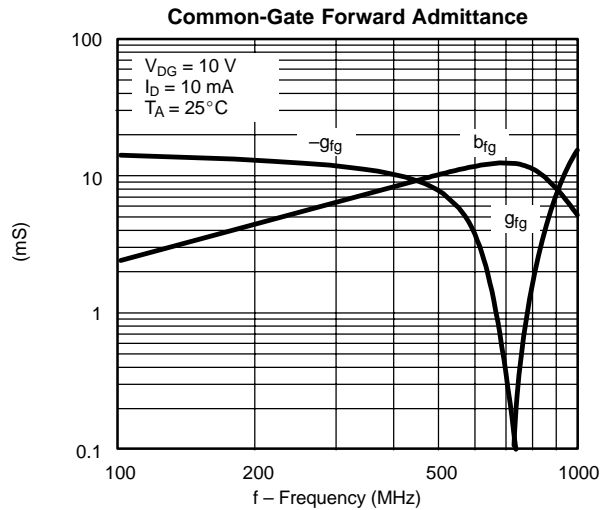
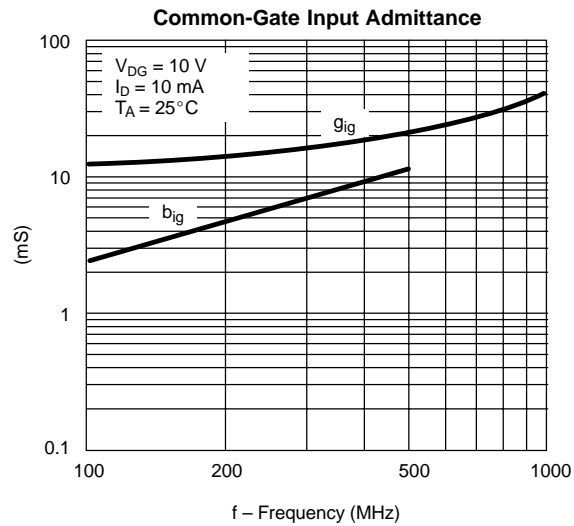
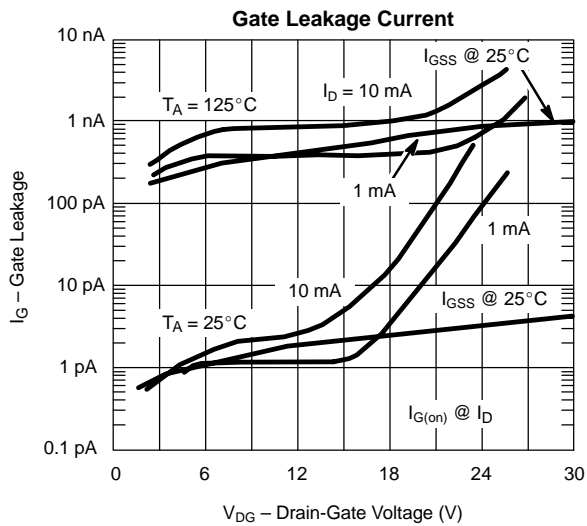
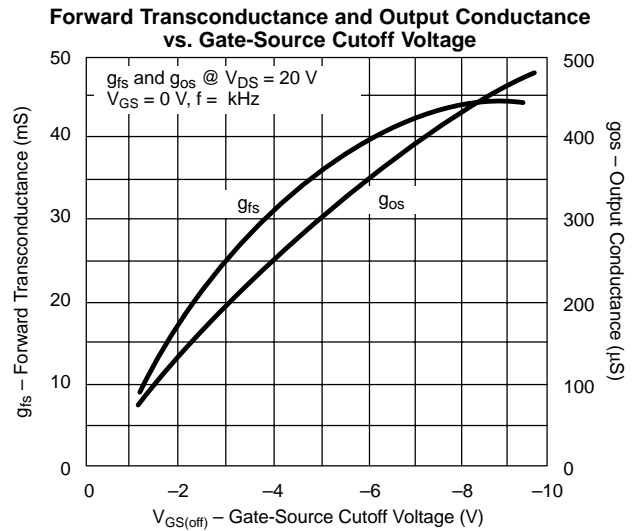
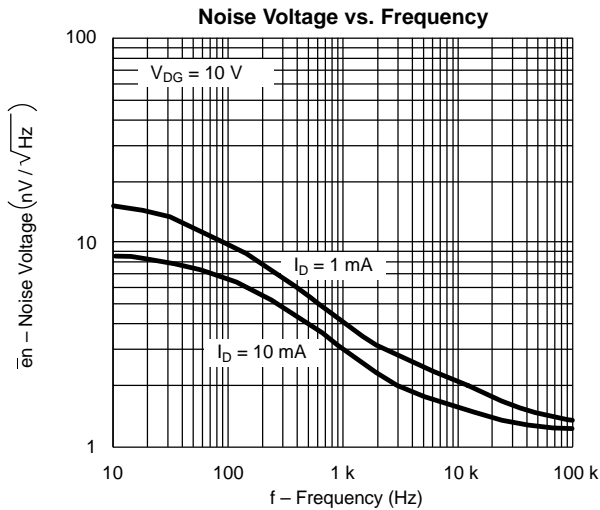
NCB



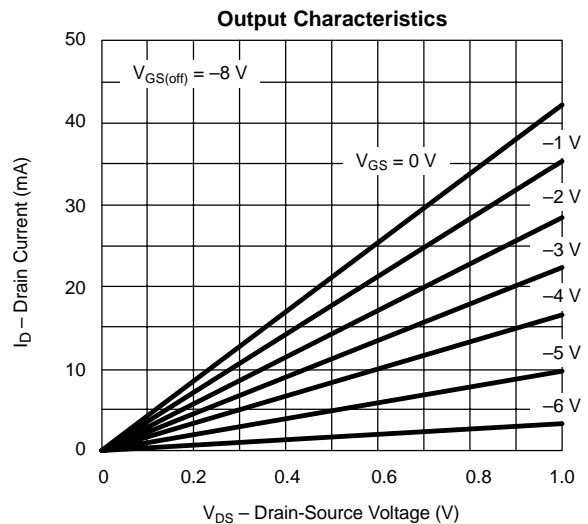
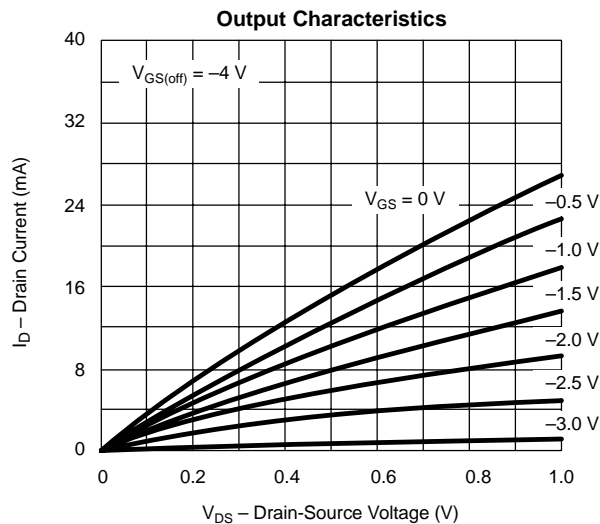
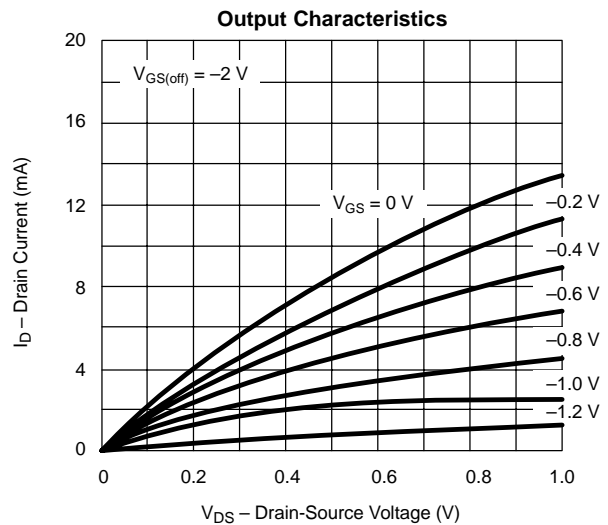
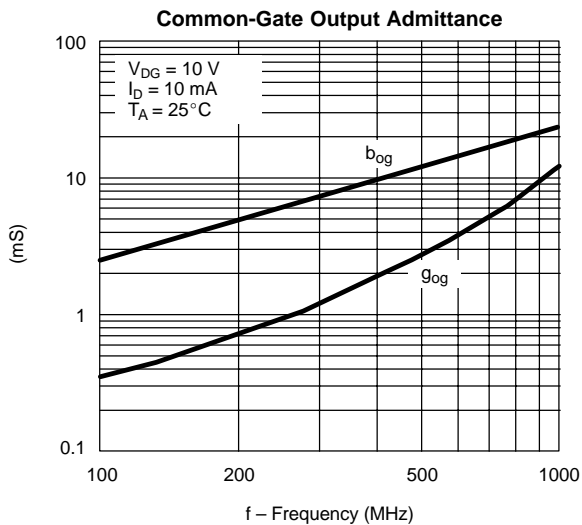
**TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)**



### TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



### TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



SWITCHING TIME TEST CIRCUIT			
	2N4856A	2N4857A	2N4858A
$V_{GS(L)}$	-10 V	-6 V	-4 V
$R_L^*$	464 $\Omega$	953 $\Omega$	1910 $\Omega$
$I_{D(on)}$	20 mA	10 mA	5 mA

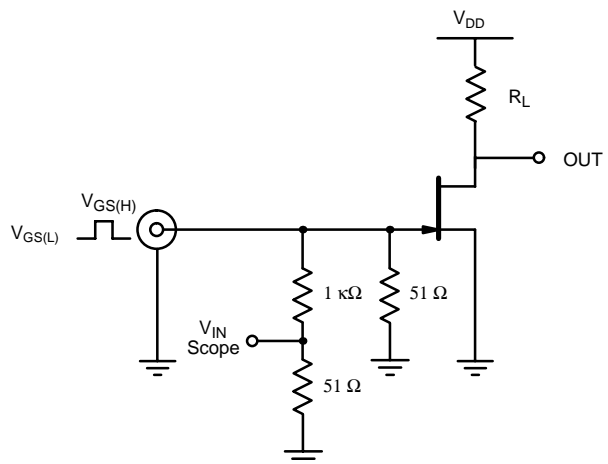
\*Non-inductive

#### INPUT PULSE

Rise Time < 1 ns  
Fall Time < 1 ns  
Pulse Width 100 ns  
PRF 1 MHz

#### SAMPLING SCOPE

Rise Time 0.4 ns  
Input Resistance 10 M $\Omega$   
Input Capacitance 1.5 pF





## Disclaimer

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