



N-Channel JFETs

PRODUCT SUMMARY

Part Number	$V_{GS(off)}$ (V)	$V_{(BR)GSS}$ Min (V)	I_{DSS} Min (mA)	$r_{DS(on)}$ Max (Ω)	$I_{D(off)}$ Typ (pA)	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 $<25\ \Omega$
- Fast Switching— t_{ON} : 4 ns
- High Off-Isolation— $I_{D(off)}$: 5 pA
- 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

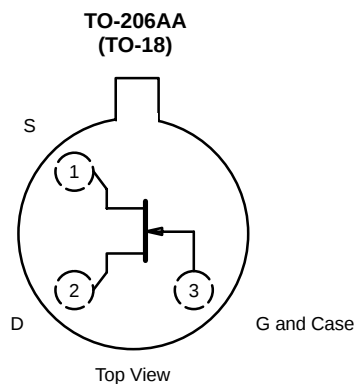
APPLICATIONS

- 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 ($1/16$ " from case for 10 seconds) 300 °C
 Storage Temperature -65 to 200 °C

Operating Junction Temperature -55 to 200 °C
 Power Dissipation^a 1.8 W

Notes

a. Derate 10 mW/°C for $T_J > 25$ °C

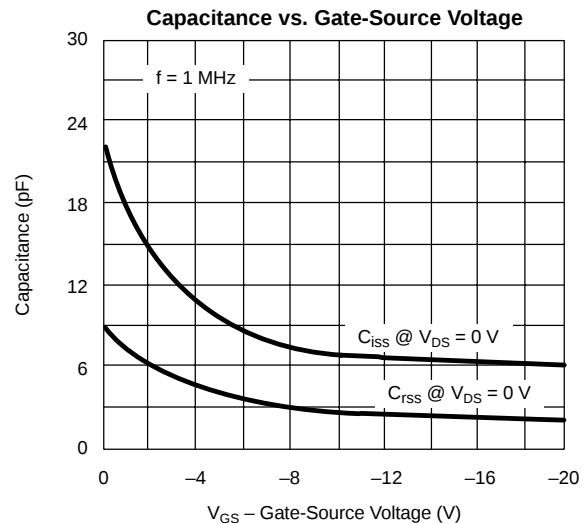
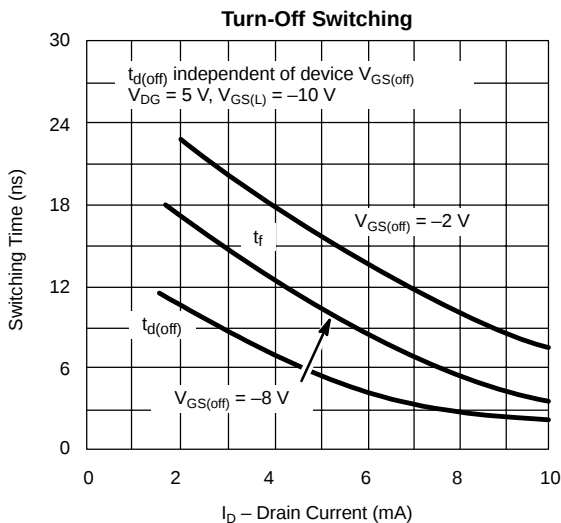
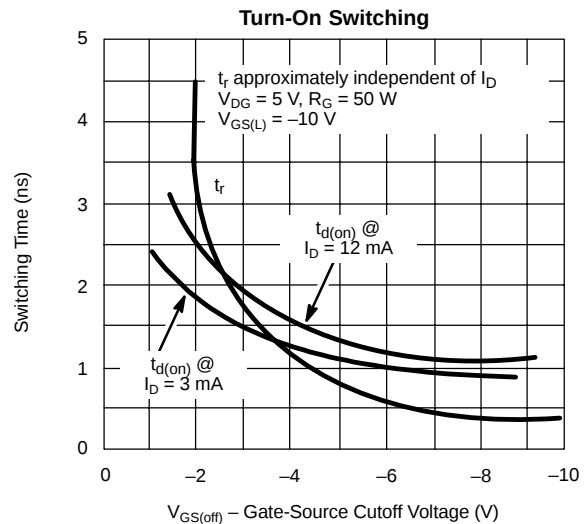
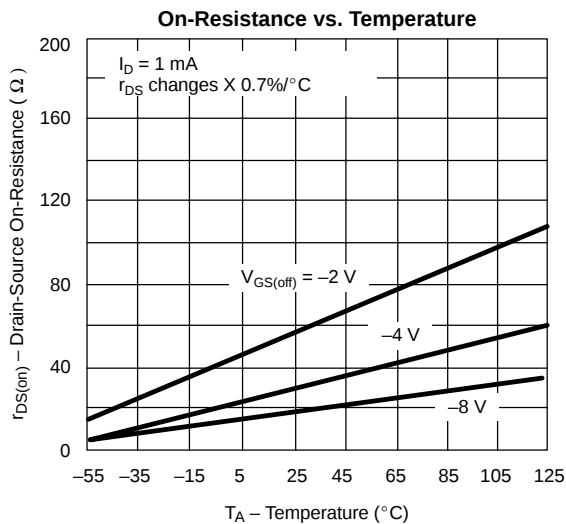
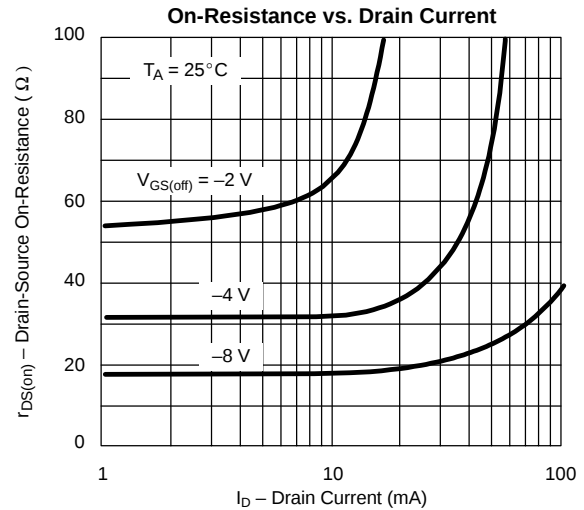
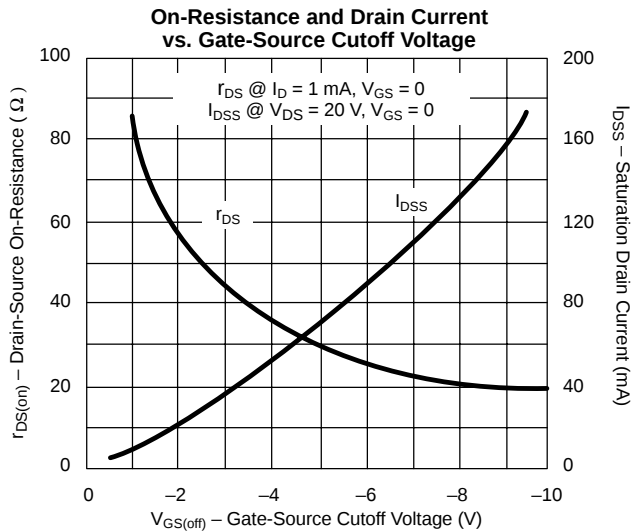
SPECIFICATIONS ($T_A = 25$ °C UNLESS OTHERWISE NOTED)

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

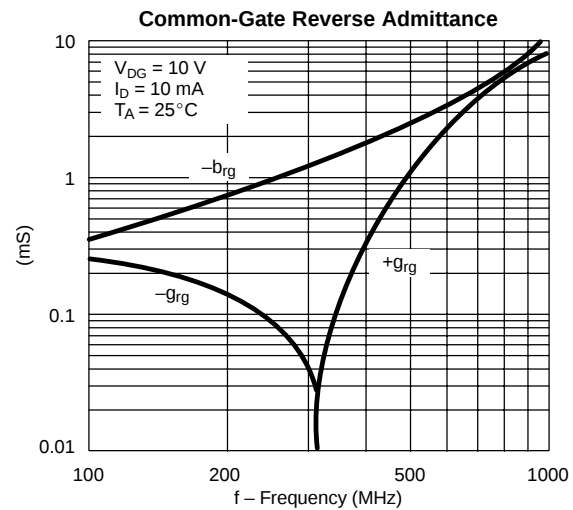
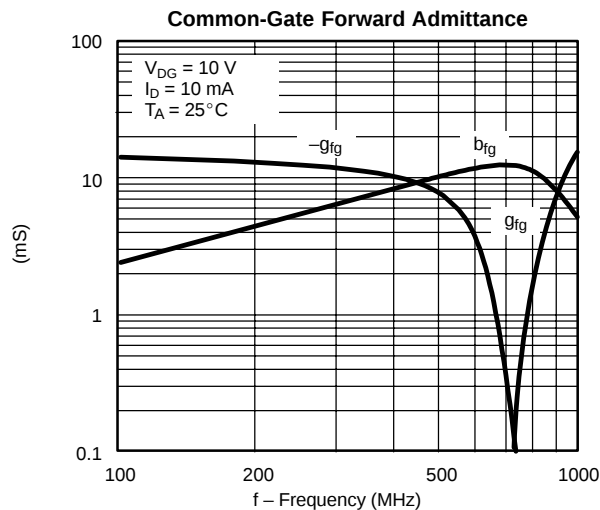
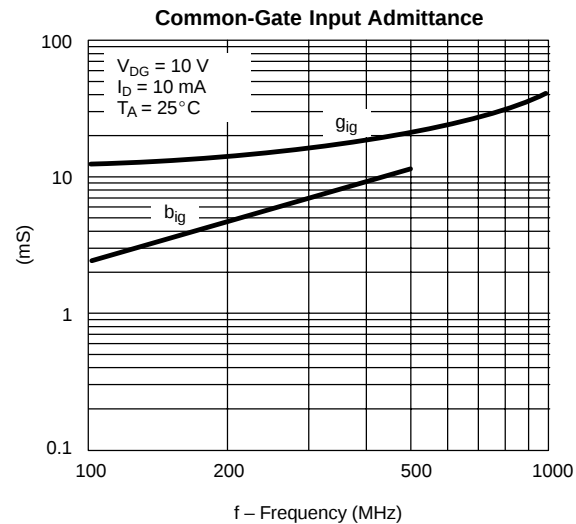
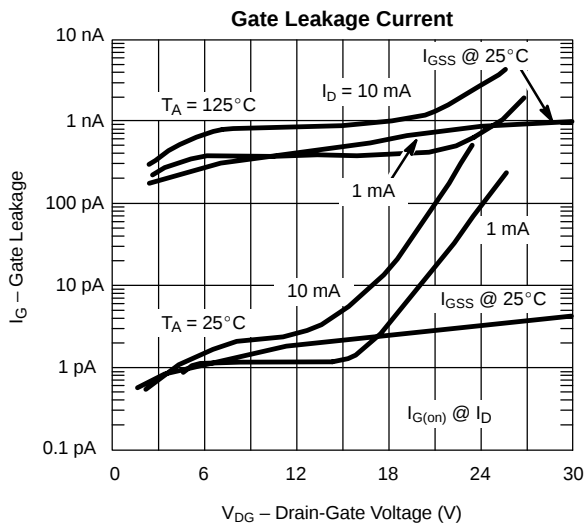
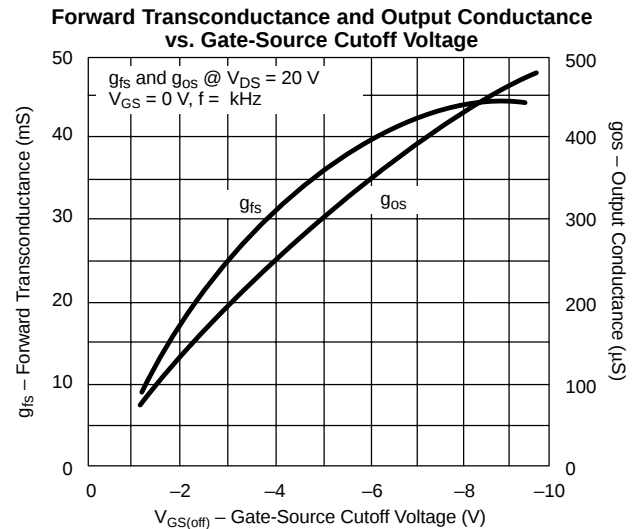
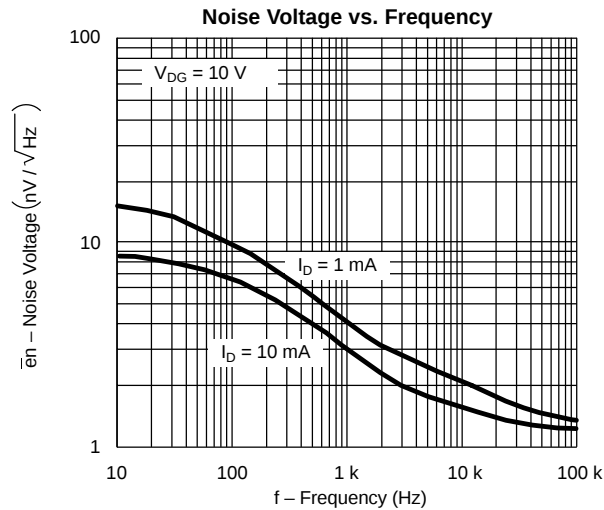
Notes

- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
 b. Pulse test: $PW \leq 100 \mu s$ duty cycle $\leq 10\%$.
 c. This parameter not registered with JEDEC.

NCB

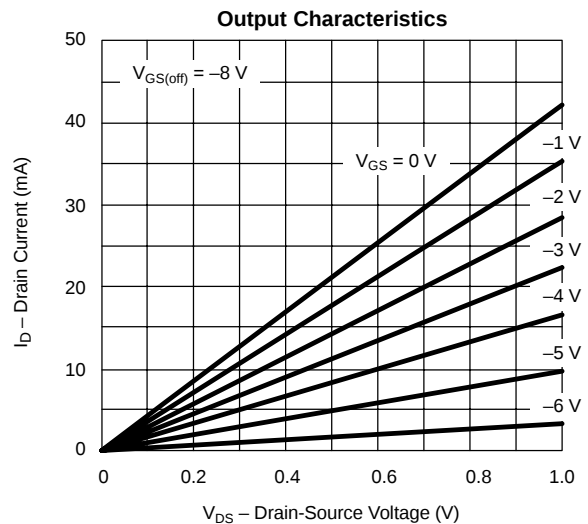
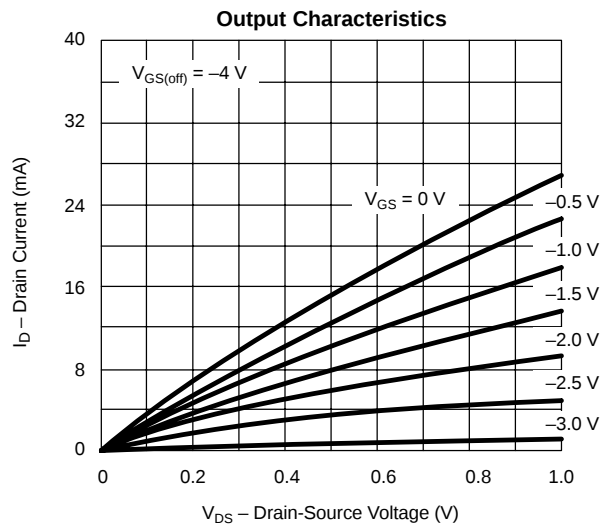
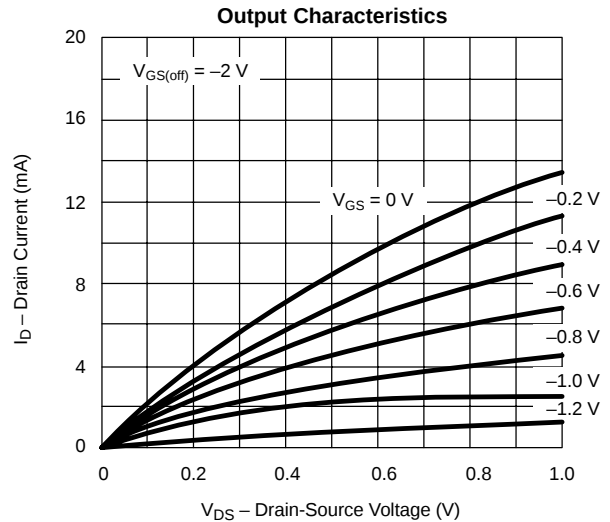
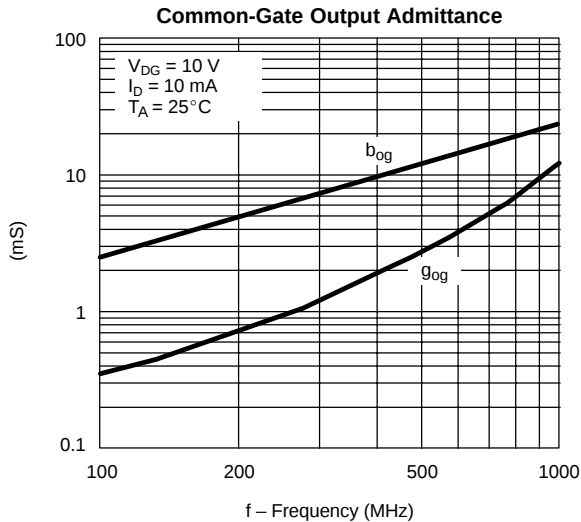
**TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)**

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SWITCHING TIME TEST CIRCUIT

	2N4856A	2N4857A	2N4858A
$V_{GS(L)}$	-10 V	-6 V	-4 V
R_L^*	464 Ω	953 Ω	1910 Ω
$I_{D(on)}$	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 Ω
 Input Capacitance 1.5 pF

