

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 (μ 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 μ 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

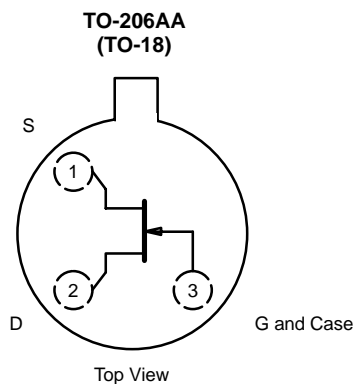
APPLICATIONS

- 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 ($1/16$ " 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 $T_C > 25$ °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	$V_{(BR)GSS}$	$I_G = -1 \mu A, V_{DS} = 0 V$	-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	pA
			$T_A = 150$ °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	\bar{e}_n	$V_{DS} = 10 V, I_D = 10 mA$ $f = 1 kHz$	3							nV/ \sqrt{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		

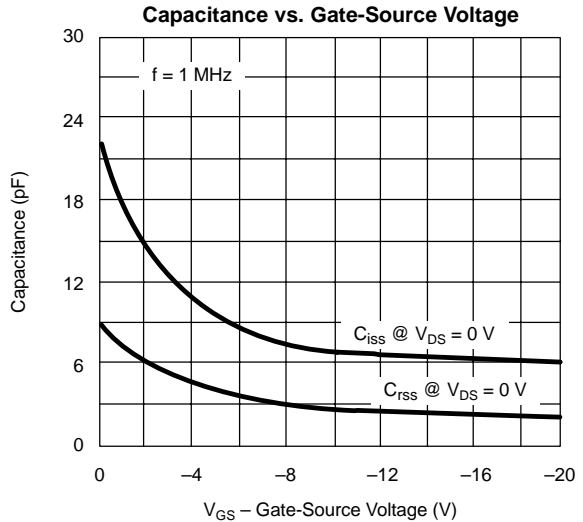
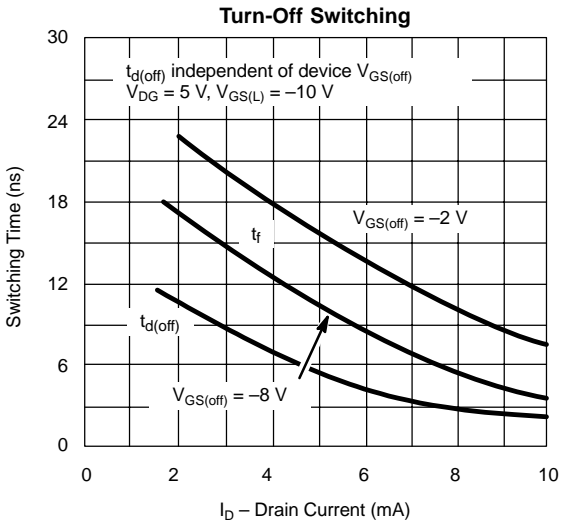
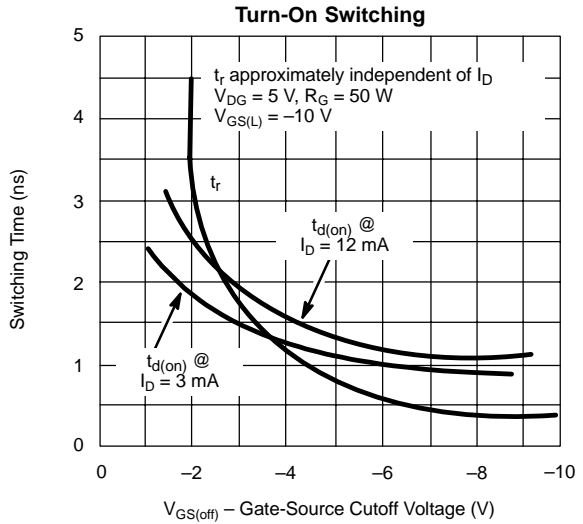
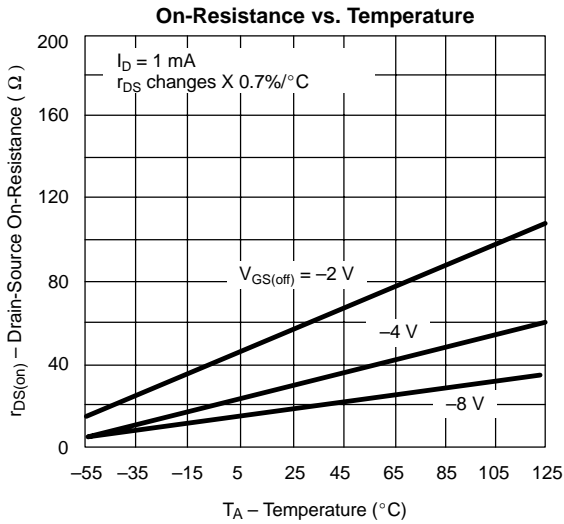
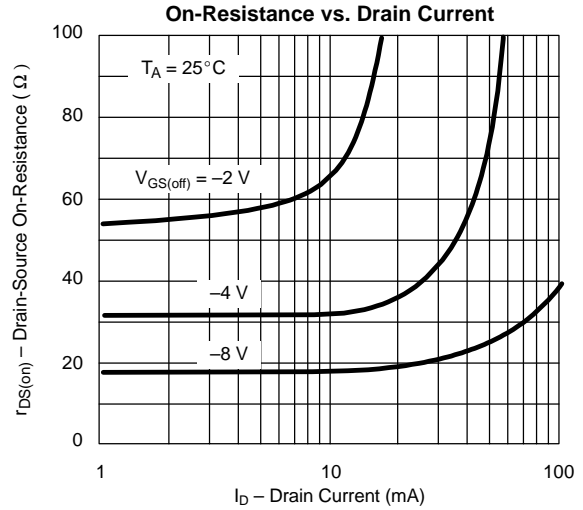
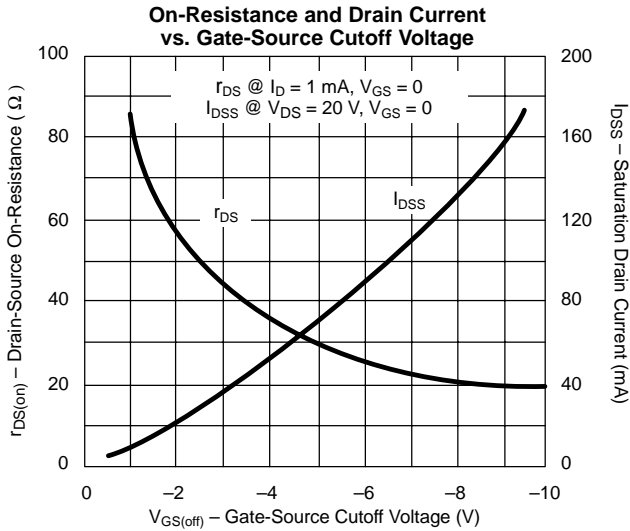
Notes

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

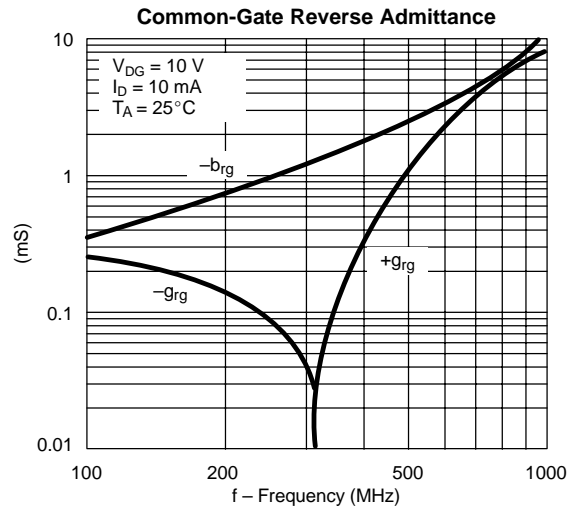
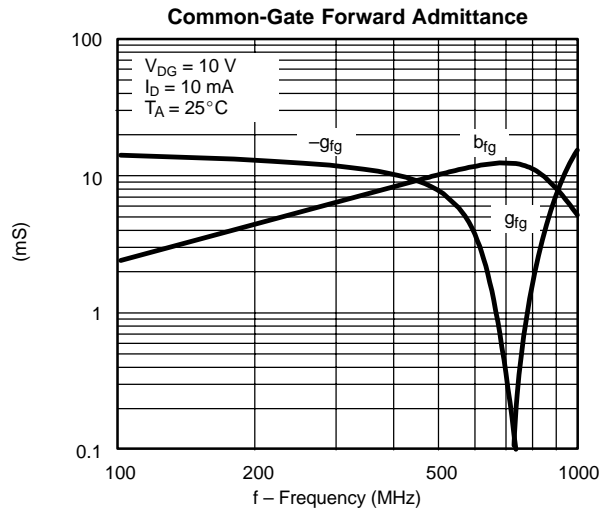
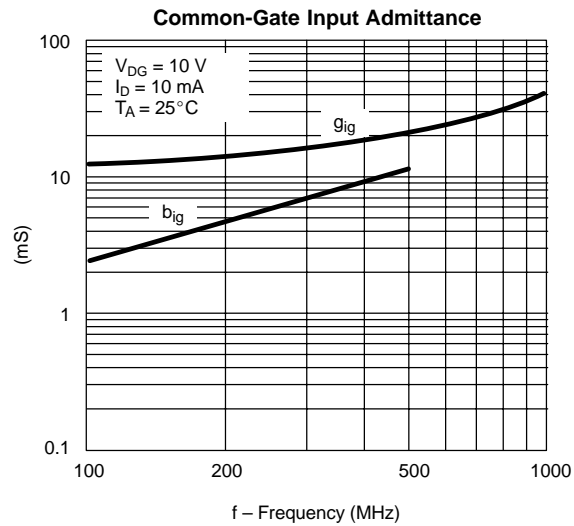
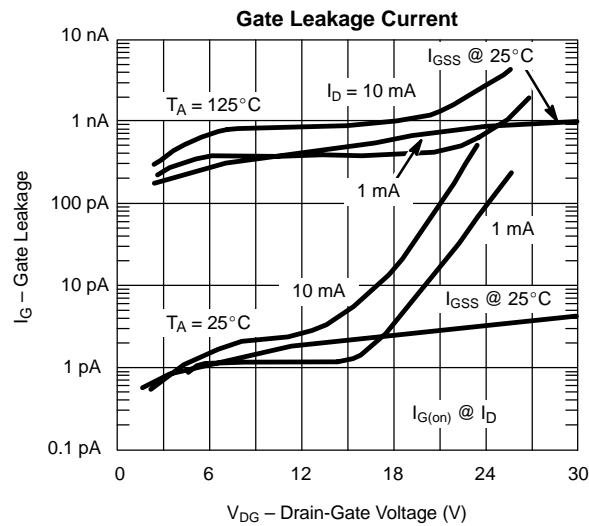
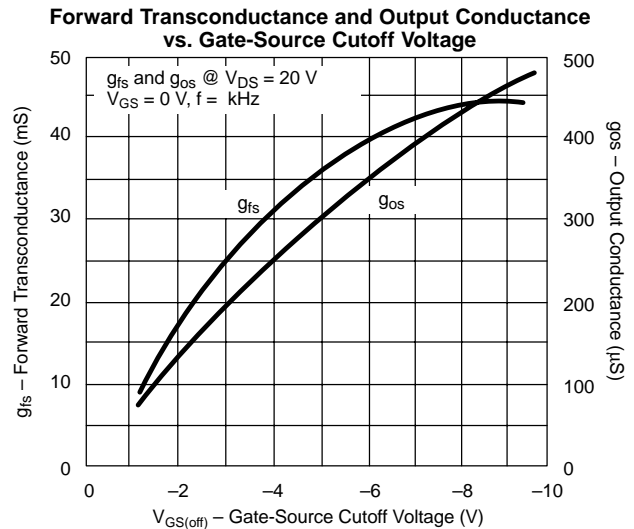
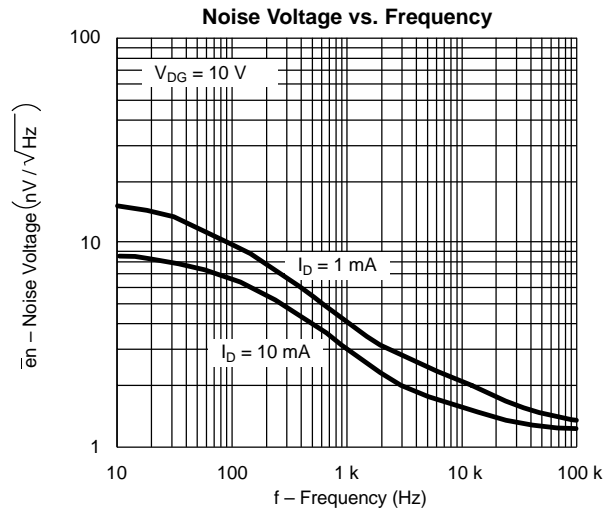
NCB

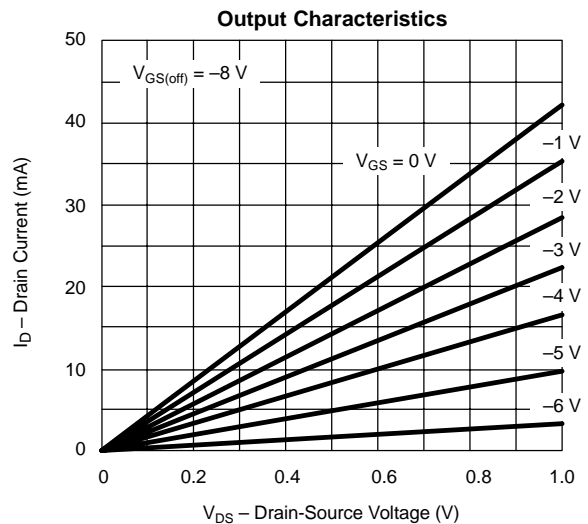
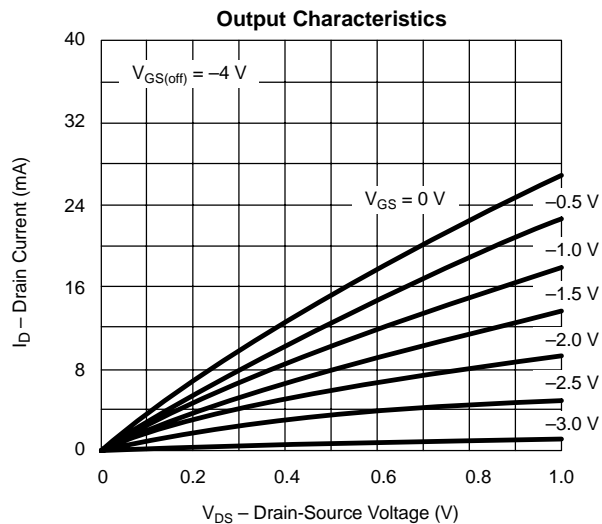
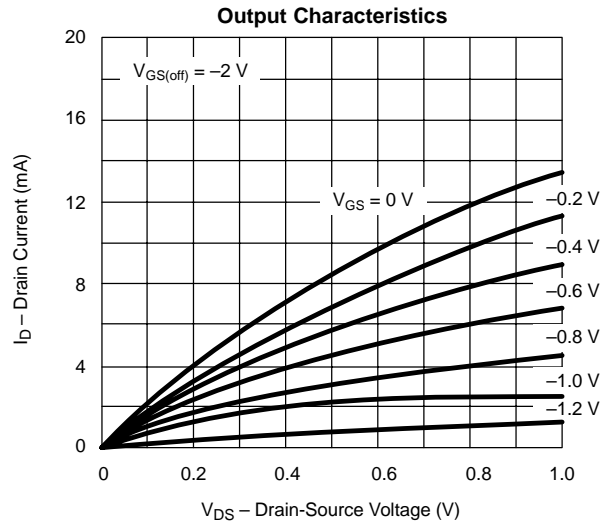
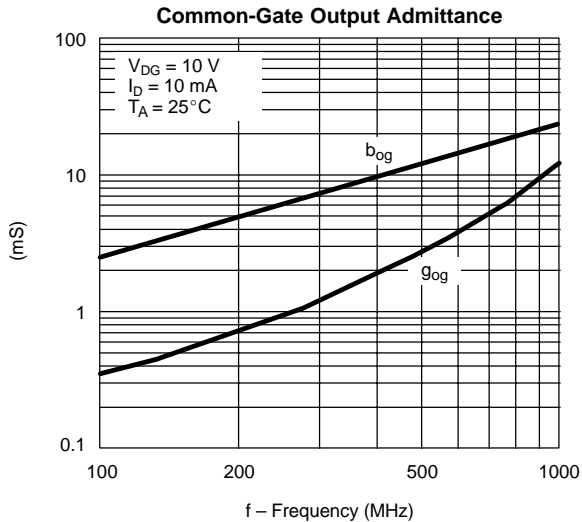


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)



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 Ω	953 Ω	1910 Ω
$I_{D(on)}$	20 mA	10 mA	5 mA

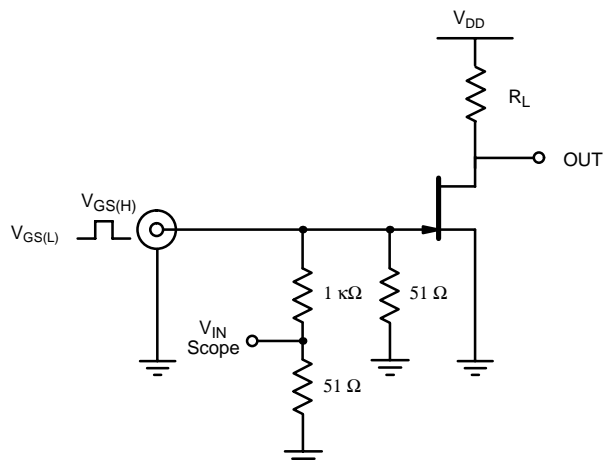
*Non-inductive

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





Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.