



N-Channel JFETs

2N4391	PN4391	SST4391
2N4392	PN4392	SST4392
2N4393	PN4393	SST4393

PRODUCT SUMMARY				
Part Number	$V_{GS(off)}$ (V)	$r_{DS(on)}$ Max (Ω)	$I_{D(off)}$ Typ (pA)	t_{ON} Typ (ns)
2N/PN/SST4391	-4 to -10	30	5	4
2N/PN/SST4392	-2 to -5	60	5	4
2N/PN/SST4393	-0.5 to -3	100	5	4

FEATURES

- Low On-Resistance: 4391 < 30 Ω
- Fast Switching— t_{ON} : 4 ns
- High Off-Isolation: $I_{D(off)}$ with Low Leakage
- Low Capacitance: < 3.5 pF
- Low Insertion Loss

BENEFITS

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

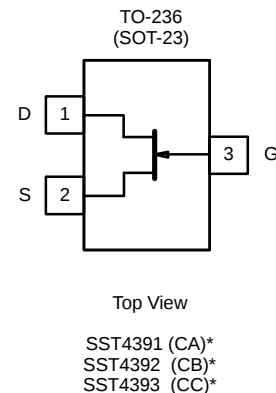
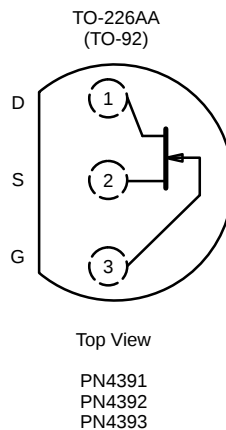
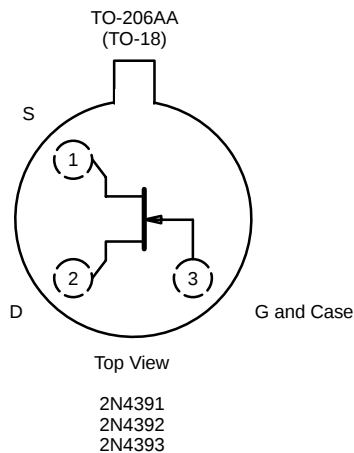
APPLICATIONS

- Analog Switches
- Choppers
- Sample-and-Hold
- Normally “On” Switches
- Current Limiters
- Commutators

DESCRIPTION

The 2N/PN/SST4391 series features many of the superior characteristics of JFETs which make it a good choice for demanding analog switching applications and for specialized amplifier circuits.

The 2N series hermetically-sealed TO-206AA (TO-18) can be available with processing per MIL-S-19500 (see Military Information). Both the PN, TO-226AA (TO-92), and SST, TO-236 (SOT-23), series are available in tape-and-reel for automated assembly (see Packaging Information). For similar dual products, see the 2N5564/5565/5566 data sheet.



*Marking Code for TO-236

For applications information see AN104 and AN106

ABSOLUTE MAXIMUM RATINGS

Gate-Drain, Gate-Source Voltage:

(2N/PN Prefixes) -40 V
(SST Prefix) -35 V

Gate Current 50 mA

Lead Temperature 300 °C

Storage Temperature : (2N Prefix) -65 to 200 °C
(PN/SST Prefixes) -55 to 150 °C

Operating Junction Temperature :

(2N Prefix) -55 to 200 °C
(PN/SST Prefixes) -55 to 150 °C

Power Dissipation :

(2N Prefix)^a (T_C = 25 °C) 1800 mW
(PN/SST Prefixes)^b 350 mW

Notes

a. Derate 10 mW/°C above 25 °C

b. Derate 2.8 mW/°C above 25 °C

SPECIFICATIONS (T_A = 25 °C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions		Typ ^a	Limits						Unit	
					4391		4392		4393			
					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} = 20 V	2N/PN: I _D = 1 nA		-4	-10	-2	-5	-0.5	-3		
		V _{DS} = 15 V	SST: I _D = 10 nA									
Saturation Drain Current ^b	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V		2N		50	150	25	75	5	30	mA
				PN		50	150	25	100	5	60	
				SST		50		25		5		
Gate Reverse Current	I _{GSS}	V _{GS} = -20 V V _{DS} = 0 V		2N/SST	-5		-100		-100		-100	pA
				PN	-5		-1000		-1000		-1000	
		2N: T _A = 150°C PN: T _A = 100°C SST: T _A = 125°C			-13		-200		-200		-200	nA
					-1		-200		-200		-200	
					-3							
Gate Operating Current	I _G	V _{DG} = 15 V, I _D = 10 mA		-5								
Drain Cutoff Current	I _{D(off)}	V _{DS} = 20 V		2N: V _{GS} = -5 V	5						100	pA
				2N: V _{GS} = -7 V	5				100			
				2N: V _{GS} = -12 V	5		100					
				PN: V _{GS} = -5 V	0.005						1	nA
				PN: V _{GS} = -7 V	0.005				1			
				PN: V _{GS} = -12 V	0.005		1					
		SST V _{DS} = 10 V, V _{GS} = -10 V		5		100		100		100	pA	
		V _{DS} = 20 V T _A = 150°C		2N: V _{GS} = -5 V	13						200	nA
				2N: V _{GS} = -7 V	13				200			
				2N: V _{GS} = -12 V	13		200					
		V _{DS} = 20 V T _A = 100°C		PN: V _{GS} = -5 V	1						200	
				PN: V _{GS} = -7 V	1				200			
				PN: V _{GS} = -12 V	1		200					
		V _{DS} = 10 V T _A = 125°C		SST: V _{GS} = -10 V	3							
Drain-Source On-Voltage	V _{DS(on)}	V _{GS} = 0 V		I _D = 3 mA	0.25						0.4	V
				I _D = 6 mA	0.3				0.4			
				I _D = 12 mA	0.35		0.4					
Drain-Source On-Resistance	r _{DS(on)}	V _{GS} = 0 V, I _D = 1 mA				30		60		100	Ω	
Gate-Source Forward Voltage	V _{GS(F)}	I _G = 1 mA V _{DS} = 0 V		2N	0.7		1		1		1	V
				PN/SST	0.7							

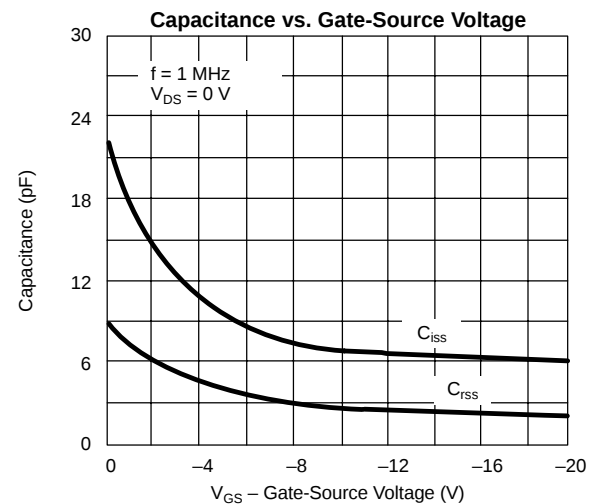
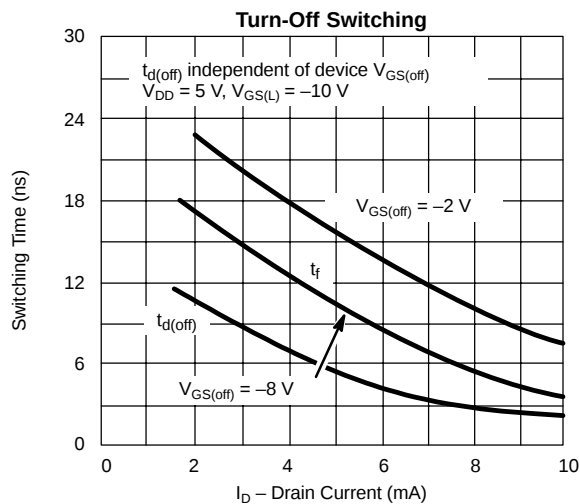
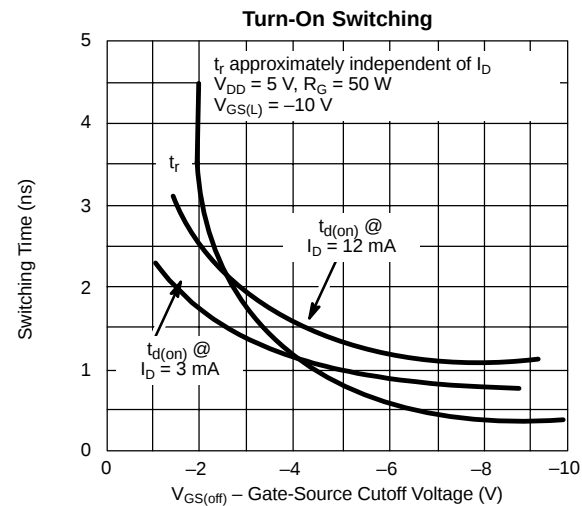
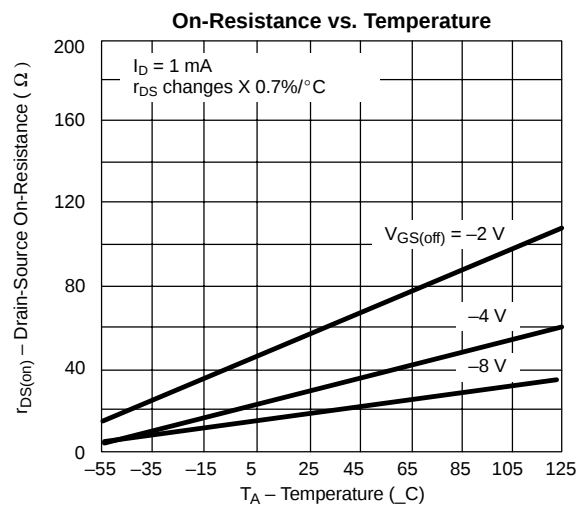
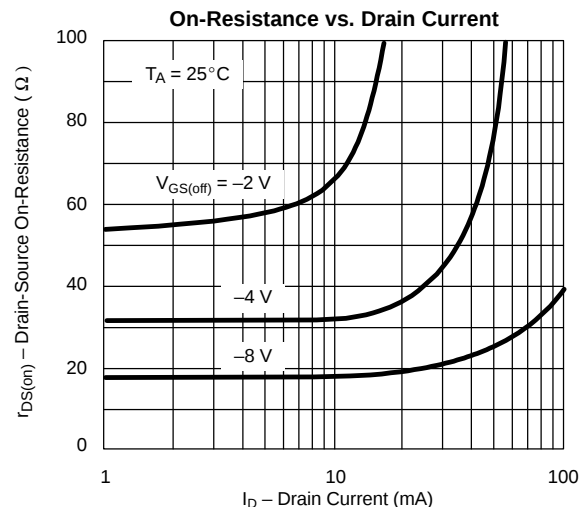
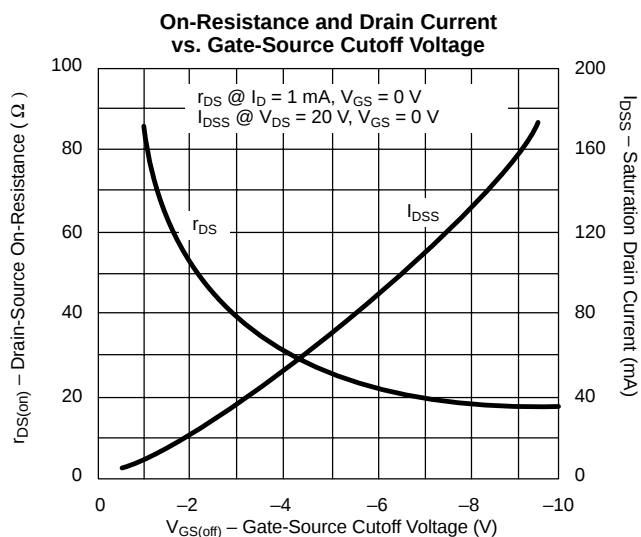
**SPECIFICATIONS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)**

Parameter	Symbol	Test Conditions		Typ ^a	Limits						Unit		
					4391		4392		4393				
					Min	Max	Min	Max	Min	Max			
Dynamic													
Common-Source Forward Transconductance	g_{fs}	$V_{DS} = 20\text{ V}$, $I_D = 1\text{ mA}$, $f = 1\text{ kHz}$		6							mS		
Common-Source Output Conductance	g_{os}			25						μS			
Drain-Source On-Resistance	$r_{DS(on)}$	$V_{GS} = 0\text{ V}$, $I_D = 0\text{ mA}$, $f = 1\text{ kHz}$				30		60		100	Ω		
Common-Source Input Capacitance	C_{iss}	$V_{DS} = 20\text{ V}$, $V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$		2N	12		14		14		14	pF	
				PN	12		16		16		16		
				SST	13								
Common-Source Reverse Transfer Capacitance	C_{rss}	$V_{DS} = 0\text{ V}$ $f = 1\text{ MHz}$		2N: $V_{GS} = -5\text{ V}$	3.3						3.5		
				2N: $V_{GS} = -7\text{ V}$	3.2				3.5				
				2N: $V_{GS} = -12\text{ V}$	2.8		3.5						
				PN: $V_{GS} = -5\text{ V}$	3.5						5		
				PN: $V_{GS} = -7\text{ V}$	3.4				5				
				PN: $V_{GS} = -12\text{ V}$	3.0		5						
				SST: $V_{GS} = -5\text{ V}$	3.6								
				SST: $V_{GS} = -7\text{ V}$	3.5								
				SST: $V_{GS} = -12\text{ V}$	3.1								
Equivalent Input Noise Voltage	$\bar{e}_n$	$V_{DS} = 10\text{ V}$, $I_D = 10\text{ mA}$ $f = 1\text{ kHz}$		3							nV/ $\sqrt{\text{Hz}}$		
Switching													
Turn-On Time	$t_{d(on)}$	$V_{DD} = 10\text{ V}$ $V_{GS(H)} = 0\text{ V}$ See Switching Circuit		2N/PN	2		15		15		15	ns	
				SST	2								
	t_r			2N/PN	2		5		5		5		
				SST	2								
Turn-Off Time	$t_{d(off)}$			2N/PN	6		20		35		50		
				SST	6								
	t_f			2N/PN	13		15		20		30		
				SST	13								

Notes

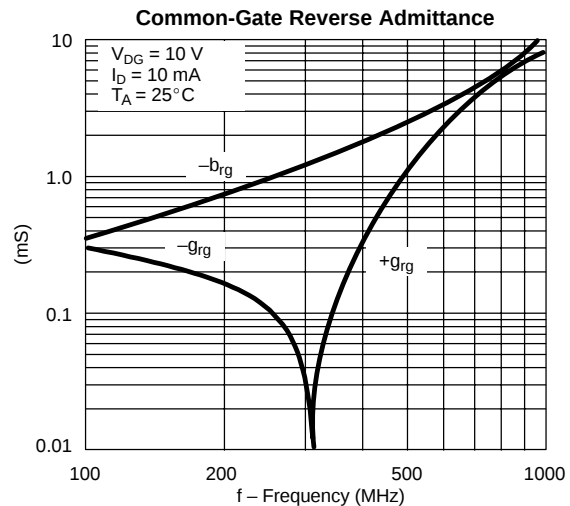
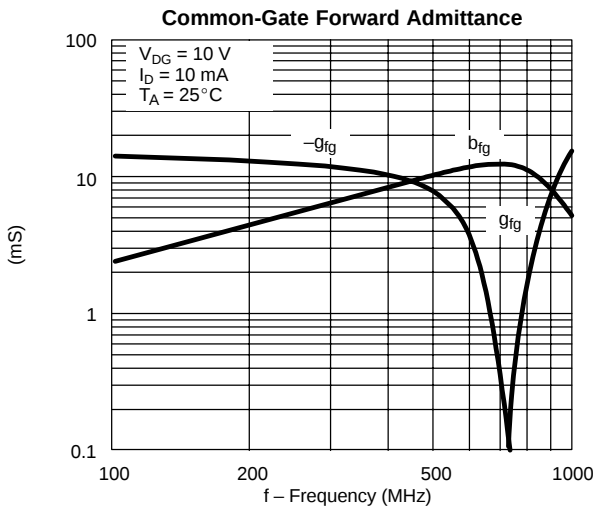
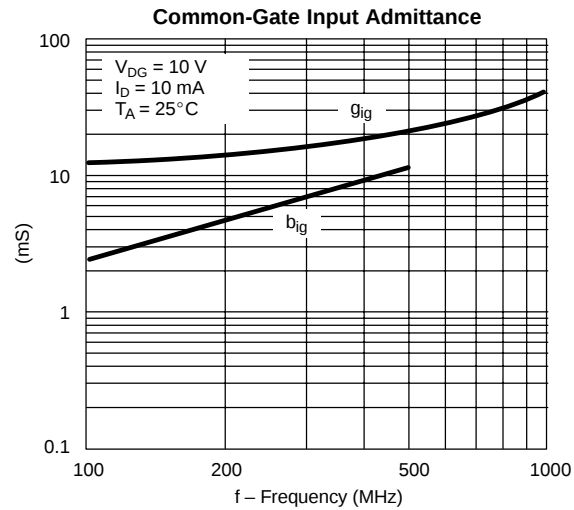
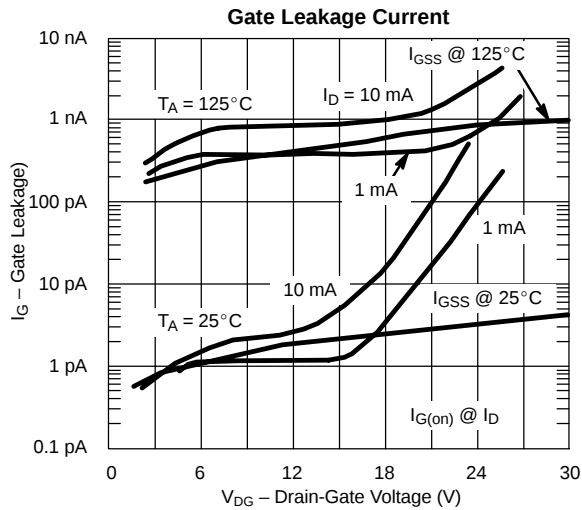
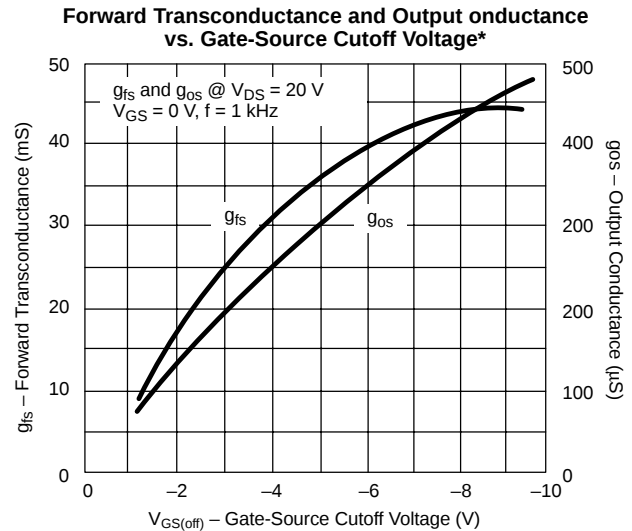
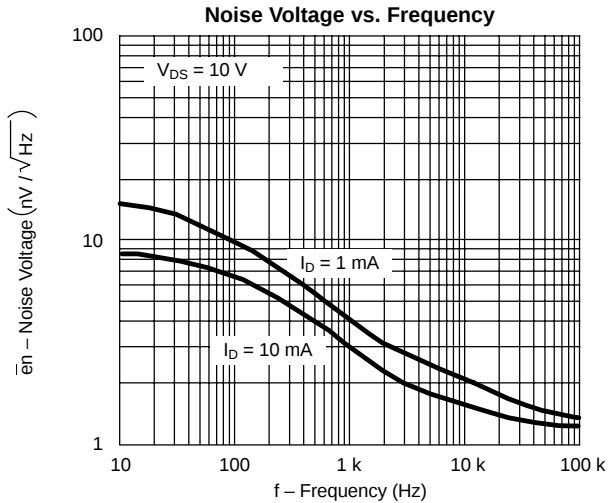
- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
b. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 3\%$.

NCB

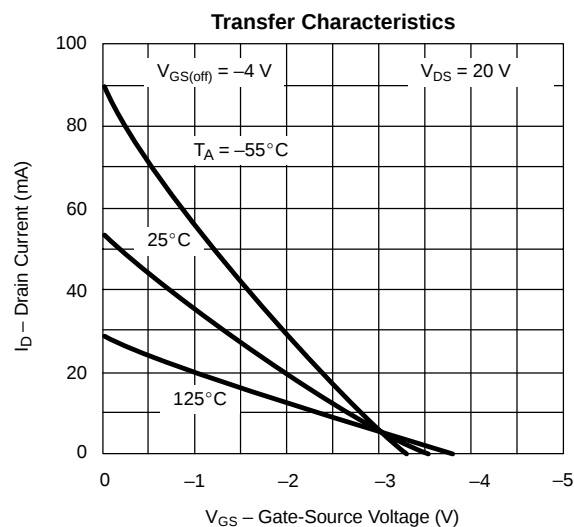
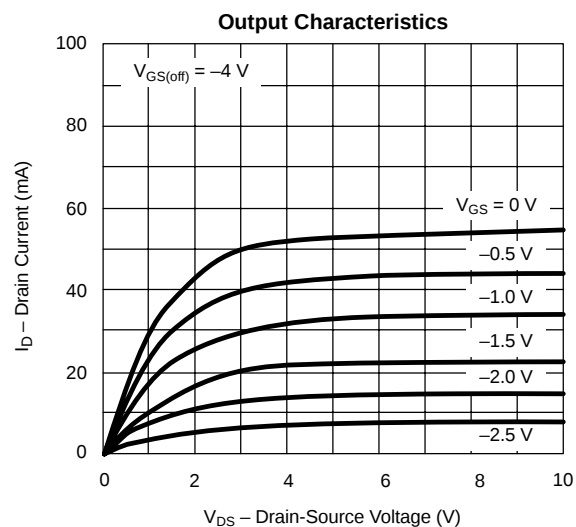
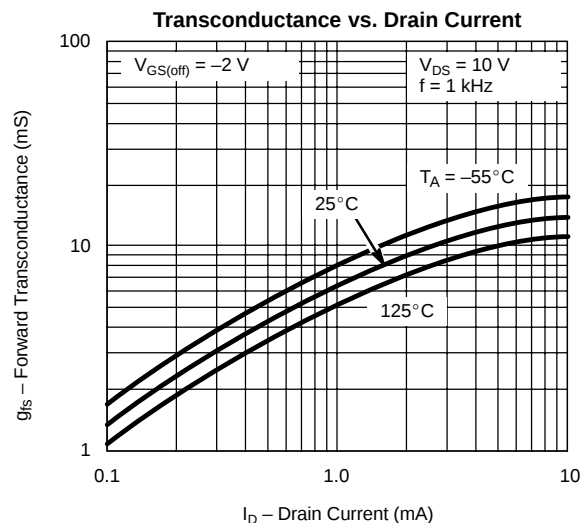
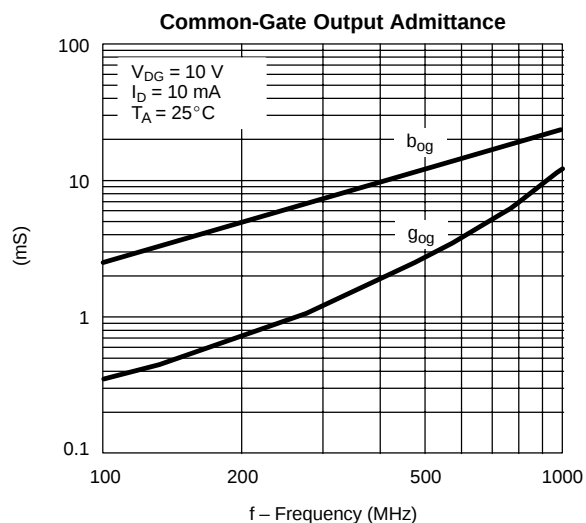
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)




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

	4391	4392	4393
$V_{GS(L)}$	-12 V	-7 V	-5 V
R_L^*	800 Ω	1600 Ω	3000 Ω
$I_{D(on)}$	12 mA	6 mA	3 mA

*Non-inductive

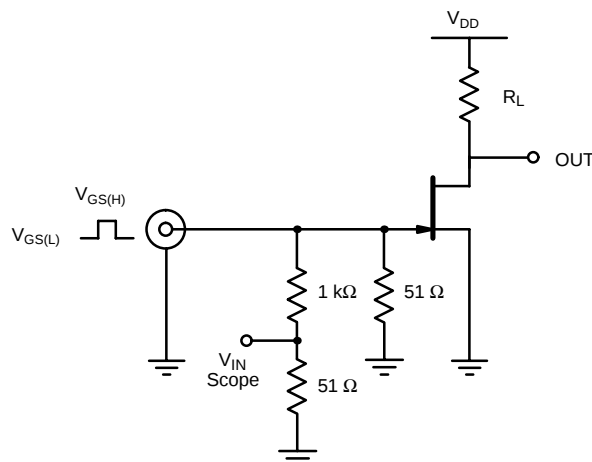
INPUT PULSE

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

See Typical Characteristics curves for changes.





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.