



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

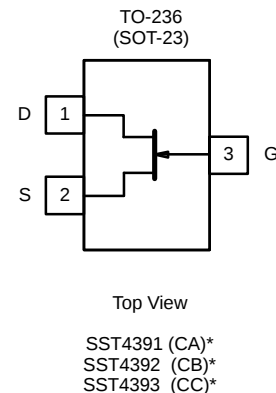
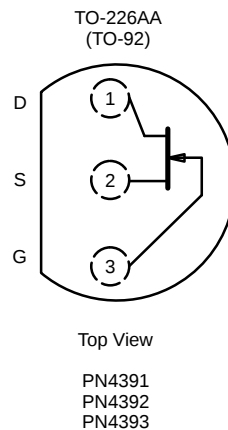
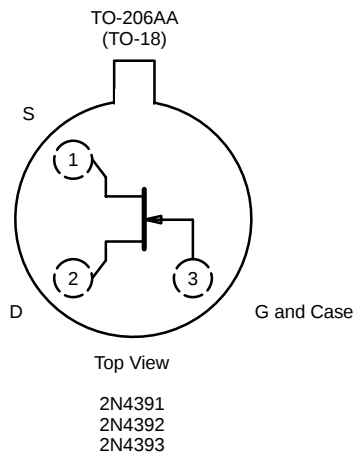
APPLICATIONS

- 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							

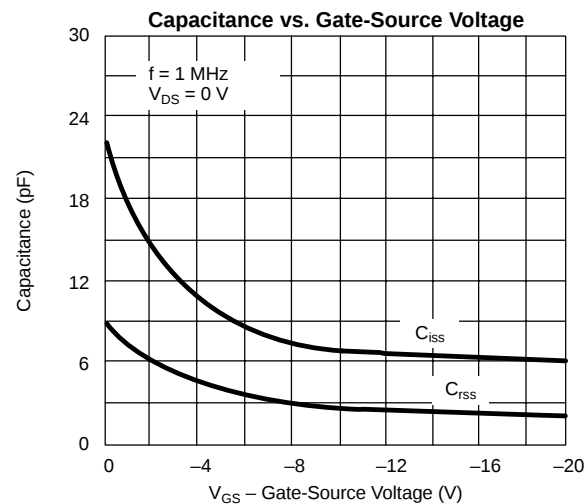
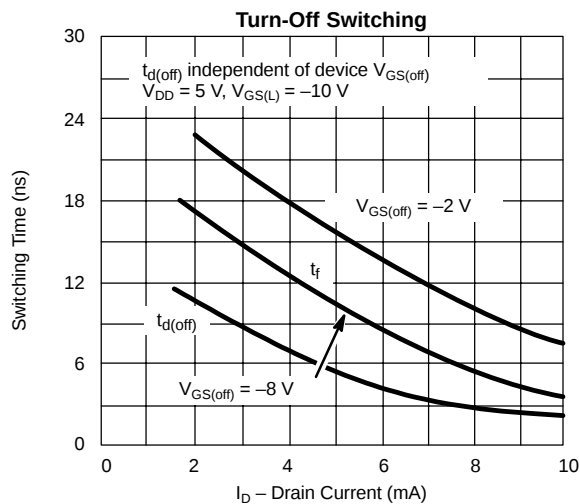
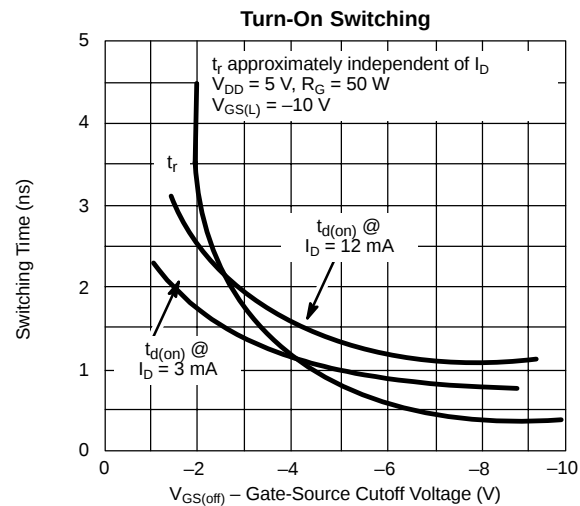
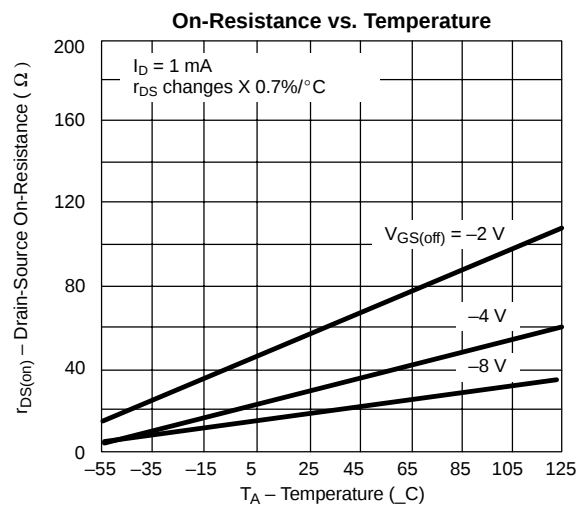
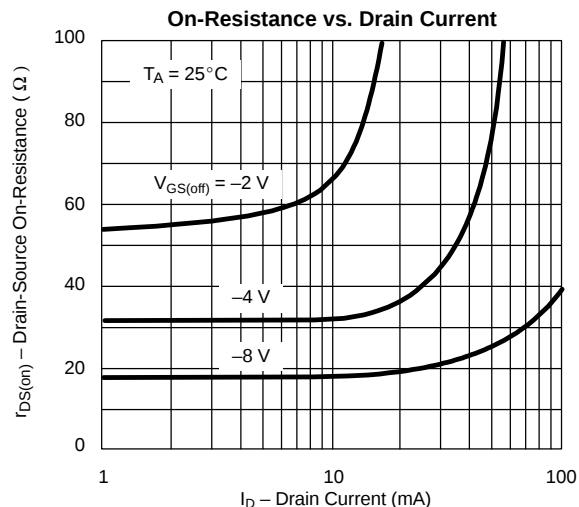
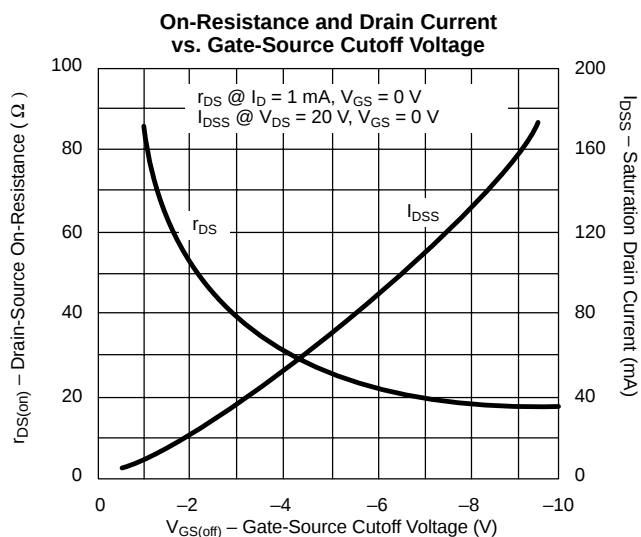


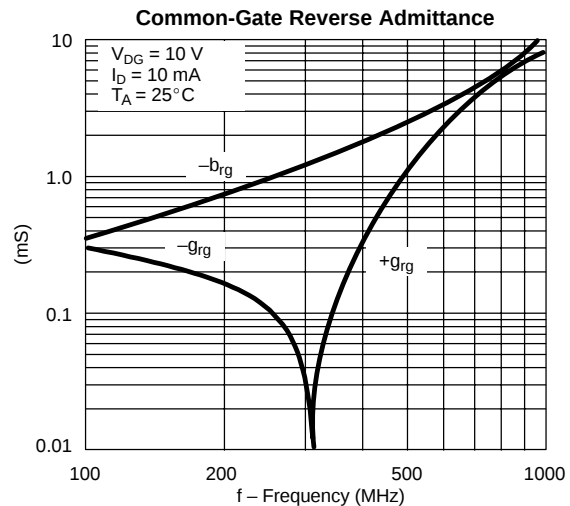
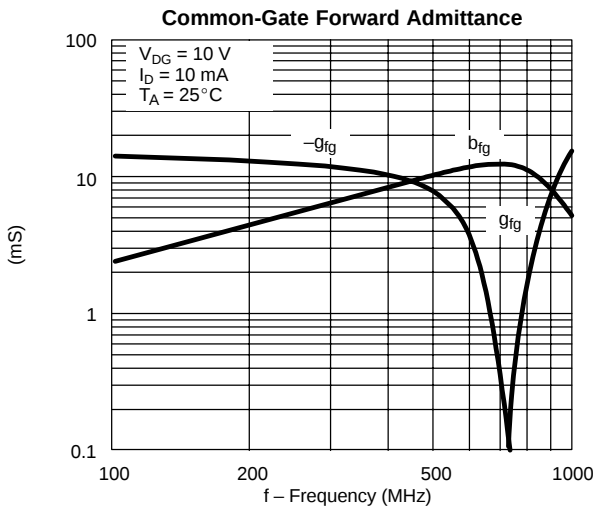
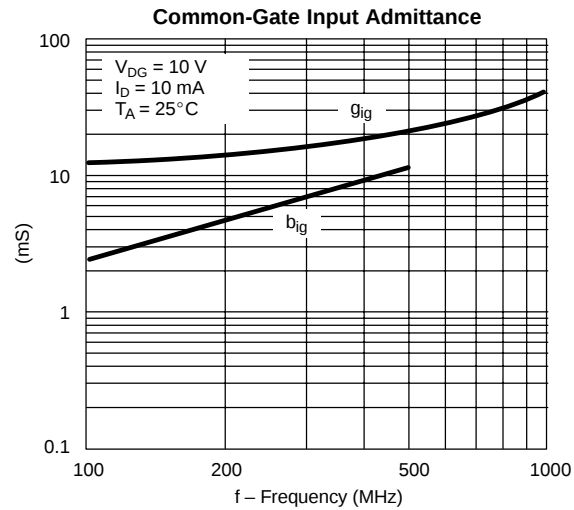
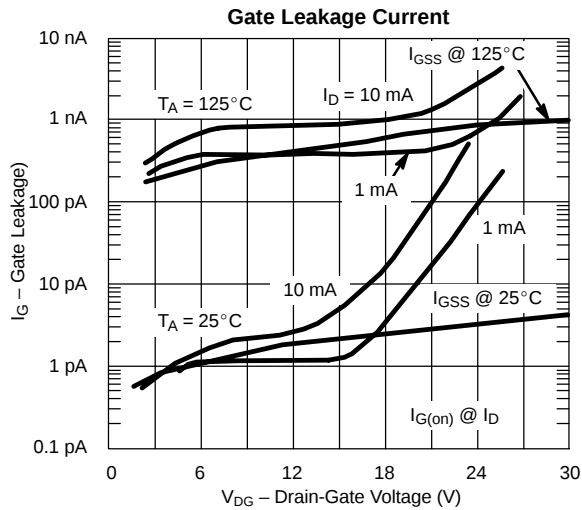
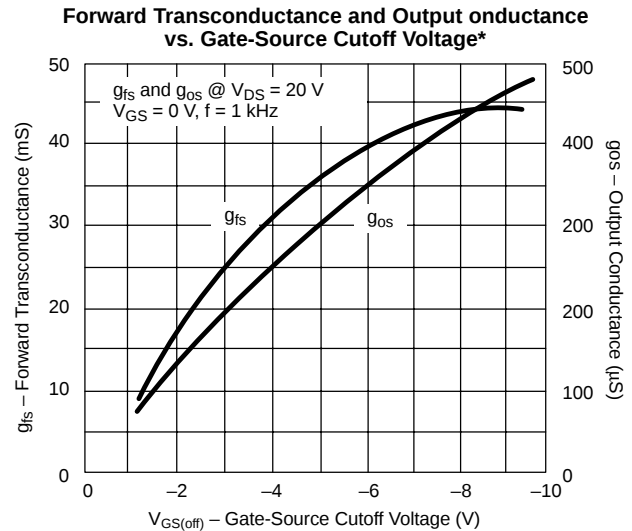
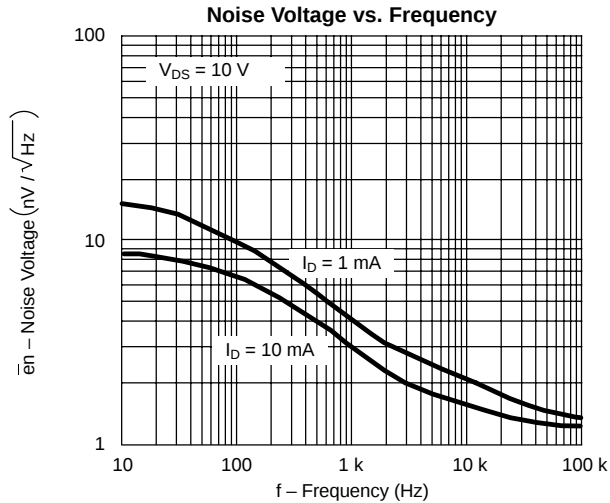
SPECIFICATIONS (T _A = 25 °C UNLESS OTHERWISE NOTED)												
Parameter	Symbol	Test Conditions		Typ ^a	Limits						Unit	
					4391		4392		4393			
					Min	Max	Min	Max	Min	Max		
Dynamic												
Common-Source Forward Transconductance	g _{fs}	V _{DS} = 20 V, I _D = 1 mA, f = 1 kHz		6							mS	
Common-Source Output Conductance	g _{os}			25							μS	
Drain-Source On-Resistance	r _{DS(on)}	V _{GS} = 0 V, I _D = 0 mA , f = 1 kHz			30		60		100	Ω		
Common-Source Input Capacitance	C _{iss}	V _{DS} = 20 V, V _{GS} = 0 V f = 1 MHz		2N	12	14		14		14	pF	
				PN	12	16		16		16		
				SST	13							
Common-Source Reverse Transfer Capacitance	C _{rss}	V _{DS} = 0 V f = 1 MHz		2N: V _{GS} = -5 V	3.3					3.5		
				2N: V _{GS} = -7 V	3.2			3.5				
				2N: V _{GS} = -12 V	2.8	3.5						
				PN: V _{GS} = -5 V	3.5					5		
				PN: V _{GS} = -7 V	3.4			5				
				PN: V _{GS} = -12 V	3.0	5						
				SST: V _{GS} = -5 V	3.6							
				SST: V _{GS} = -7 V	3.5							
SST: V _{GS} = -12 V	3.1											
Equivalent Input Noise Voltage	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 _{GS(H)} = 0 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

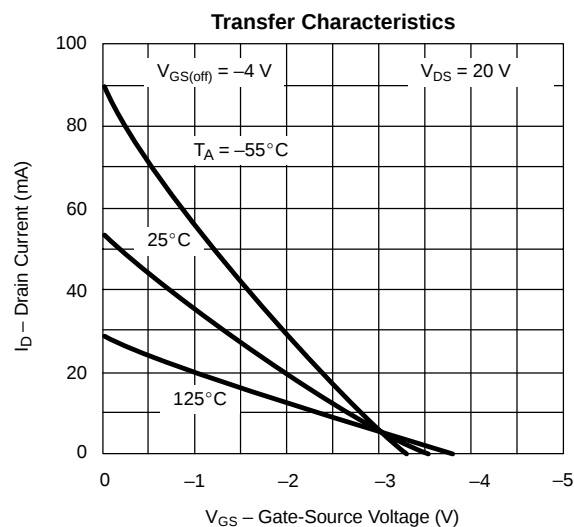
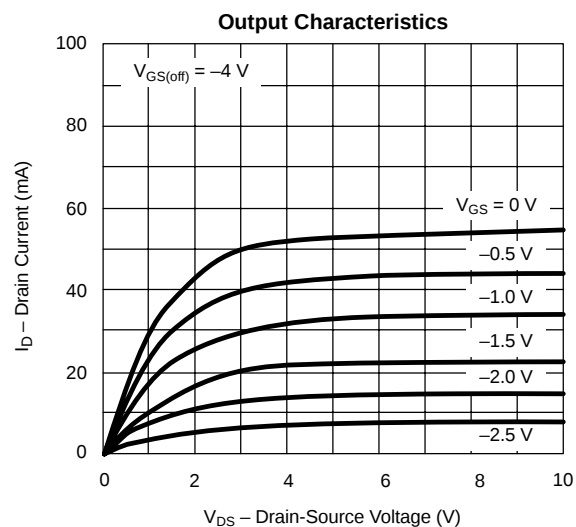
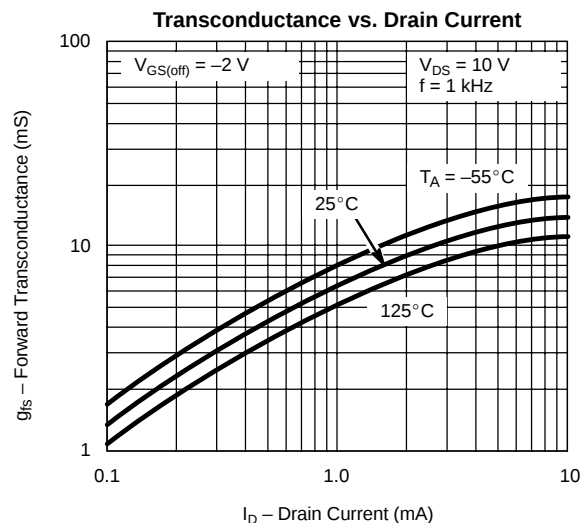
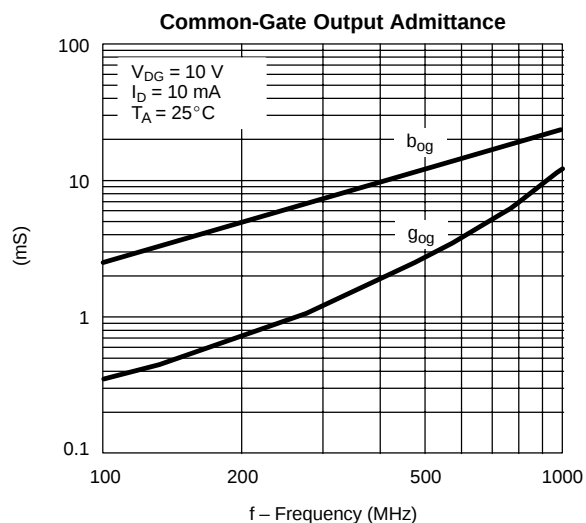
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: PW ≤ 300 μs duty cycle ≤ 3%.

NCB

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


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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.

