

2N4391 (SILICON)

2N4392

2N4393



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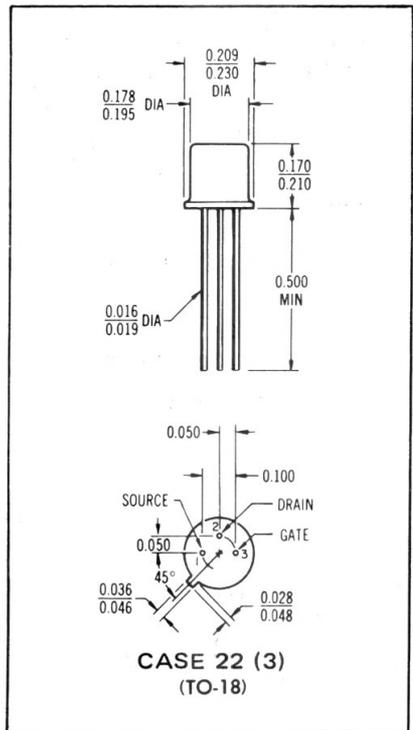
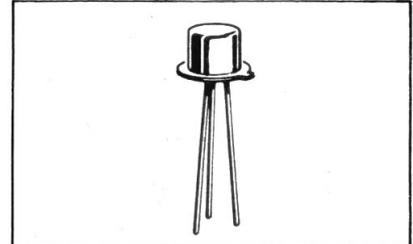
SILICON N-CHANNEL
JUNCTION FIELD-EFFECT TRANSISTORS

Depletion Mode (Type A) Junction Field-Effect Transistors designed for chopper and high-speed switching applications.

- Low Drain-Source "On" Resistance –
 $r_{ds(on)} = 30 \text{ Ohms (Max) @ } f = 1.0 \text{ kHz (2N4391)}$
- Low Gate Reverse Current –
 $I_{GSS} = 0.1 \text{ nAdc (Max) @ } V_{GS} = 20 \text{ Vdc}$
- Guaranteed Switching Characteristics

N-CHANNEL
JUNCTION FIELD-EFFECT
TRANSISTORS

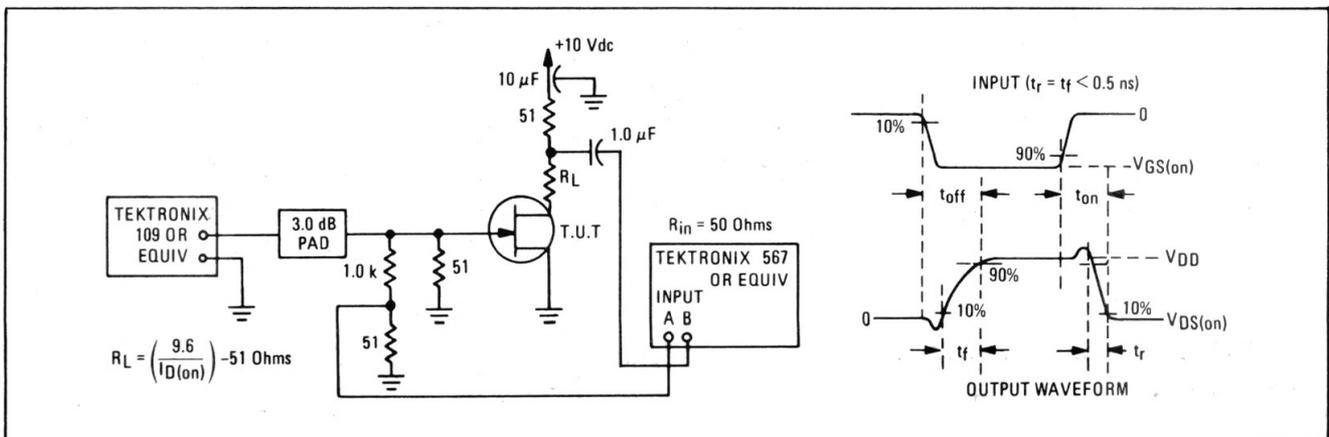
(Type A)



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	Vdc
Drain-Gate Voltage	V_{DG}	40	Vdc
Gate-Source Voltage	V_{GS}	40	Vdc
Forward Gate Current	$I_{G(f)}$	50	mAdc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.8 10	Watts mW/ $^\circ\text{C}$
Operating Junction Temperature Range	T_J	-65 to +175	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +200	$^\circ\text{C}$

FIGURE 1 SWITCHING TIMES TEST CIRCUIT





ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Gate-Source Breakdown Voltage (I _G = 1.0 μAdc, V _{DS} = 0)	V _{(BR)GSS}	40	-	Vdc
Gate-Source Forward Voltage (I _G = 1.0 mAdc, V _{DS} = 0)	V _{GS(f)}	-	1.0	Vdc
Gate-Source Voltage (V _{DS} = 20 Vdc, I _D = 1.0 nAdc)	V _{GS}	4.0 2.0 0.5	10 5.0 3.0	Vdc
Gate Reverse Current (V _{GS} = 20 Vdc, V _{DS} = 0)	I _{GSS}	-	0.1	nAdc
(V _{GS} = 20 Vdc, V _{DS} = 0, T _A = 150°C)		-	0.2	μAdc
Drain-Cutoff Current (V _{DS} = 20 Vdc, V _{GS} = 12 Vdc)	I _{D(off)}	-	0.1	nAdc
(V _{DS} = 20 Vdc, V _{GS} = 7.0 Vdc)		-	0.1	
(V _{DS} = 20 Vdc, V _{GS} = 5.0 Vdc)		-	0.1	
(V _{DS} = 20 Vdc, V _{GS} = 12 Vdc, T _A = 150°C)		-	0.2	μAdc
(V _{DS} = 20 Vdc, V _{GS} = 7.0 Vdc, T _A = 150°C)		-	0.2	
(V _{DS} = 20 Vdc, V _{GS} = 5.0 Vdc, T _A = 150°C)		-	0.2	
ON CHARACTERISTICS				
Zero-Gate Voltage Drain Current* (V _{DS} = 20 Vdc, V _{GS} = 0)	I _{DSS} *	50 25 5.0	150 75 30	mAdc
Drain-Source "ON" Voltage (I _D = 12 mAdc, V _{GS} = 0)	V _{DS(on)}	-	0.4	Vdc
(I _D = 6.0 mAdc, V _{GS} = 0)		-	0.4	
(I _D = 3.0 mAdc, V _{GS} = 0)		-	0.4	
Static Drain-Source "ON" Resistance (I _D = 1.0 mAdc, V _{GS} = 0)	r _{DS(on)}	-	30 60 100	Ohms
SMALL-SIGNAL CHARACTERISTICS				
Drain-Source "ON" Resistance (V _{GS} = 0, I _D = 0, f = 1.0 kHz)	r _{ds(on)}	-	30 60 100	Ohms
Input Capacitance (V _{DS} = 20 Vdc, V _{GS} = 0, f = 1.0 MHz)	C _{iss}	-	14	pF
Reverse Transfer Capacitance (V _{DS} = 0, V _{GS} = 12 Vdc, f = 1.0 MHz)	C _{rss}	-	3.5	pF
(V _{DS} = 0, V _{GS} = 7.0 Vdc, f = 1.0 MHz)		-	3.5	
(V _{DS} = 0, V _{GS} = 5.0 Vdc, f = 1.0 MHz)		-	3.5	
SWITCHING CHARACTERISTICS				
Turn-On Time (See Figure 1) (I _{D(on)} = 12 mAdc)	t _{on}	-	15	ns
(I _{D(on)} = 6.0 mAdc)		-	15	
(I _{D(on)} = 3.0 mAdc)		-	15	
Rise Time (See Figure 1) (I _{D(on)} = 12 mAdc)	t _r	-	5.0	ns
(I _{D(on)} = 6.0 mAdc)		-	5.0	
(I _{D(on)} = 3.0 mAdc)		-	5.0	
Turn-Off Time (See Figure 1) (V _{GS(off)} = 12 Vdc)	t _{off}	-	20	ns
(V _{GS(off)} = 7.0 Vdc)		-	35	
(V _{GS(off)} = 5.0 Vdc)		-	50	
Fall Time (See Figure 1) (V _{GS(off)} = 12 Vdc)	t _f	-	15	ns
(V _{GS(off)} = 7.0 Vdc)		-	20	
(V _{GS(off)} = 5.0 Vdc)		-	30	

*Pulse Test: Pulse Width ≤ 100 μs, Duty Cycle ≤ 1.0%.