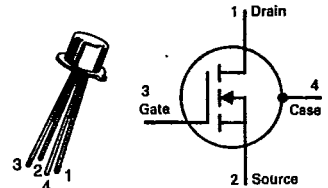


3N169 thru 3N171

CASE 20-03, STYLE 2
TO-72 (TO-206AF)



MOSFETs SWITCHING

N-CHANNEL — ENHANCEMENT

Refer to 2N4351 for graphs.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	25	Vdc
Drain-Gate Voltage	V_{DG}	± 35	Vdc
Gate-Source Voltage	V_{GS}	± 35	Vdc
Drain Current	I_D	30	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300 1.7	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	800 4.56	mW mW/ $^\circ\text{C}$
Junction Temperature Range	T_J	175	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +175	$^\circ\text{C}$

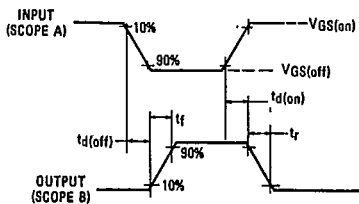
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit	
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage ($I_D = 10 \mu\text{Adc}$, $V_{GS} = 0$)	$V_{(BR)DSX}$	25	—	Vdc	
Zero-Gate-Voltage Drain Current ($V_{DS} = 10 \text{Vdc}$, $V_{GS} = 0$) ($V_{DS} = 10 \text{Vdc}$, $V_{GS} = 0$, $T_A = 125^\circ\text{C}$)	I_{DSS}	— —	10 1.0	nAdc μAdc	
Gate Reverse Current ($V_{GS} = -35 \text{Vdc}$, $V_{DS} = 0$) ($V_{GS} = -35 \text{Vdc}$, $V_{DS} = 0$, $T_A = 125^\circ\text{C}$)	I_{GSS}	— —	10 100	pAdc	
ON CHARACTERISTICS					
Gate Threshold Voltage ($V_{DS} = 10 \text{Vdc}$, $I_D = 10 \mu\text{Adc}$)	$V_{GS(Th)}$	3N169 3N170 3N171	0.5 1.0 1.5	1.5 2.0 3.0	Vdc
Drain-Source On-Voltage ($I_D = 10 \text{mAdc}$, $V_{GS} = 10 \text{Vdc}$)	$V_{DS(on)}$	—	2.0	Vdc	
On-State Drain Current ($V_{GS} = 10 \text{Vdc}$, $V_{DS} = 10 \text{Vdc}$)	$I_{D(on)}$	10	—	mAdc	
SMALL-SIGNAL CHARACTERISTICS					
Drain-Source Resistance ($V_{GS} = 10 \text{Vdc}$, $I_D = 0$, $f = 1.0 \text{kHz}$)	$r_{ds(on)}$	—	200	Ohms	
Forward Transfer Admittance ($V_{DS} = 10 \text{Vdc}$, $I_D = 2.0 \text{mAdc}$, $f = 1.0 \text{kHz}$)	$ y_{fs} $	1000	—	μmhos	
Input Capacitance ($V_{DS} = 10 \text{Vdc}$, $V_{GS} = 0$, $f = 1.0 \text{MHz}$)	C_{iss}	—	5.0	pF	
Reverse Transfer Capacitance ($V_{DS} = 0$, $V_{GS} = 0$, $f = 1.0 \text{MHz}$)	C_{rss}	—	1.3	pF	
Drain-Substrate Capacitance ($V_{D(SUB)} = 10 \text{Vdc}$, $f = 1.0 \text{MHz}$)	$C_{d(sub)}$	—	5.0	pF	
SWITCHING CHARACTERISTICS					
Turn-On Delay Time	(VDD = 10 Vdc, $I_{D(on)} = 10 \text{mAdc}$, $V_{GS(on)} = 10 \text{Vdc}$, $V_{GS(off)} = 0$, $R_G' = 50 \text{Ohms}$ See Figure 1	$t_{d(on)}$	—	3.0	ns
Rise Time		t_r	—	10	ns
Turn-Off Delay Time		$t_{d(off)}$	—	3.0	ns
Fall Time		t_f	—	15	ns

T-3525

FIGURE 1 — SWITCHING TIME TEST CIRCUIT

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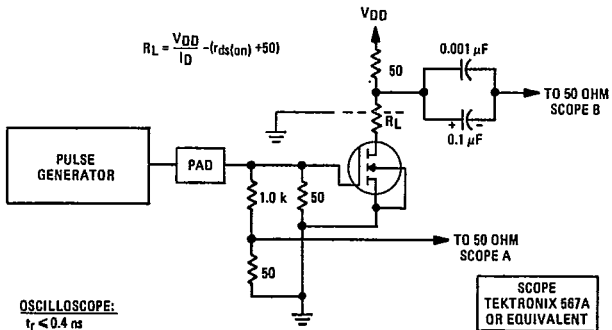
INPUT PULSE:

- $t_r < 0.33$ ns
- $t_f < 0.33$ ns
- PW = 0.4 μ s
- Duty Cycle $< 1.0\%$

OSCILLOSCOPE:

- $t_r < 0.4$ ns
- $Z_{in} < 50$ Ohms

$$R_L = \frac{V_{DD}}{I_D} - (r_{ds(on)} + 50)$$



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