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3N169
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SWITCHING

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TO-72

MAXIMUM RATINGS N-CHANNEL — ENHANCEMENT

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 (at T _A = 25°C Derate above 25°C)	P _D	300 1.7	mW mW/°C
Total Device Dissipation (at T _C = 25°C Derate above 25°C)	P _D	800 4.56	mW mW/°C
Junction Temperature Range	T _J	175	°C
Storage Temperature Range	T _{stg}	-65 to +175	°C

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Drain-Source Breakdown Voltage (I _D = 10 μAdc, V _{GS} = 0)	V _{(BR)DSX}	25	—	Vdc
Zero-Gate-Voltage Drain Current (V _{DS} = 10 Vdc, V _{GS} = 0) (V _{DS} = 10 Vdc, V _{GS} = 0, T _A = 125°C)	I _{DSS}	—	10 1.0	nAdc μAdc
Gate Reverse Current (V _{GS} = -35 Vdc, V _{DS} = 0) (V _{GS} = -35 Vdc, V _{DS} = 0, T _A = 125°C)	I _{GSS}	—	10 100	pAdc

ON CHARACTERISTICS

Gate Threshold Voltage (V _{DS} = 10 Vdc, I _D = 10 μAdc)	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 mAdc, V _{GS} = 10 Vdc)	V _{DS(on)}		—	2.0	Vdc
On-State Drain Current (V _{GS} = 10 Vdc, V _{DS} = 10 Vdc)	I _{D(on)}		10	—	mAdc

SMALL-SIGNAL CHARACTERISTICS

Drain-Source Resistance (V _{GS} = 10 Vdc, I _D = 0, f = 1.0 kHz)	r _{ds(on)}		—	200	Ohms
Forward Transfer Admittance (V _{DS} = 10 Vdc, I _D = 2.0 mAdc, f = 1.0 kHz)	y _{fs}		1000	—	μmhos
Input Capacitance (V _{DS} = 10 Vdc, V _{GS} = 0, f = 1.0 MHz)	C _{iss}		—	5.0	pF
Reverse Transfer Capacitance (V _{DS} = 0, V _{GS} = 0, f = 1.0 MHz)	C _{rss}		—	1.3	pF
Drain-Substrate Capacitance (V _{D(SUB)} = 10 Vdc, f = 1.0 MHz)	C _{d(sub)}		—	5.0	pF

SWITCHING CHARACTERISTICS

Turn-On Delay Time	(V _{DD} = 10 Vdc, I _{D(on)} = 10 mAdc, V _{GS(on)} = 10 Vdc, V _{GS(off)} = 0, R _{G'} = 50 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

3N169, 3N170, 3N171 (continued)

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

Substrate connected to source.

Characteristic	Figure No.	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Drain-Source Breakdown Voltage ($I_D = 10 \mu\text{Adc}$, $V_{GS} = 0$)	—	$V_{(BR)DSS}$	25	—	Vdc
*Gate Leakage 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
*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

*ON CHARACTERISTICS

Gate-Source Threshold Voltage ($V_{DS} = 10 \text{ Vdc}$, $I_D = 10 \mu\text{Adc}$)	3N169 3N170 3N171	—	$V_{GS(th)}$	0.5 1.0 1.5	1.5 2.0 3.0	Vdc
"ON" Drain Current ($V_{GS} = 10 \text{ Vdc}$, $V_{DS} = 10 \text{ Vdc}$)	3	—	$I_{D(on)}$	10	—	mAdc
Drain-Source "ON" Voltage ($I_D = 10 \text{ mAdc}$, $V_{GS} = 10 \text{ Vdc}$)	—	—	$V_{DS(on)}$	—	2.0	Vdc

SMALL SIGNAL CHARACTERISTICS

*Drain-Source Resistance ($V_{GS} = 10 \text{ Vdc}$, $I_D = 0$, $f = 1.0 \text{ kHz}$)	4	—	$r_{d(on)}$	—	200	Ohms
Forward Transfer Admittance ($V_{DS} = 10 \text{ Vdc}$, $I_D = 2.0 \text{ mAdc}$, $f = 1.0 \text{ kHz}$)	1	—	$ Y_{fs} $	1000	—	μmhos
*Reverse Transfer Capacitance ($V_{DS} = 0$, $V_{GS} = 0$, $f = 1.0 \text{ MHz}$)	2	—	C_{rss}	—	1.3	pF
*Input Capacitance ($V_{DS} = 10 \text{ Vdc}$, $V_{GS} = 0$, $f = 1.0 \text{ MHz}$)	2	—	C_{iss}	—	5.0	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	$V_{DD} = 10 \text{ Vdc}$, $I_{D(on)} = 10 \text{ mAdc}$, $V_{GS(on)} = 10 \text{ Vdc}$, $V_{GS(off)} = 0$, $R_G = 50 \text{ Ohms}$	6,10	$t_{d(on)}$	—	3.0	ns
Rise Time		7,10	t_r	—	10	ns
Turn-Off Delay Time		8,10	$t_{d(off)}$	—	3.0	ns
Fall Time		9,10	t_f	—	15	ns

*Indicates JEDEC Registered Data.

FIGURE 1 – FORWARD TRANSFER ADMITTANCE

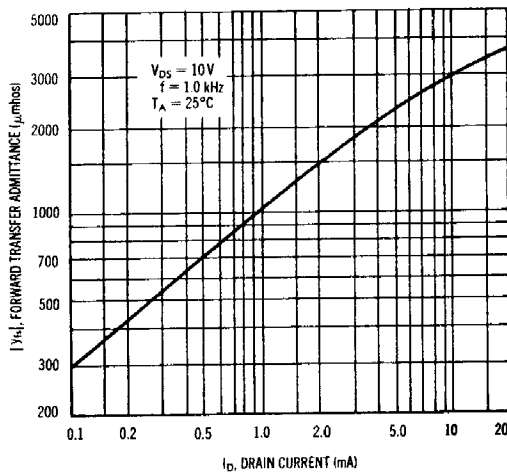


FIGURE 2 – CAPACITANCE

