2N3970
2N3971
2N3972

CASE 22-03, STYLE 4
TO-18 (TO-206AA)

JFET
SWITCHING

N-CHANNEL — DEPLETION

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	Vdc
Drain-Gate Voltage	V_{DG}	40	Vdc
Reverse Gate-Source Voltage	V_{GSR}	40	Vdc
Forward Gate Current	I_{GF}	50	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	1.8 10	Watts mW/°C
Storage Temperature Range	T_{stg}	−65 to +200	°C

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_{GS} = 0)		$V_{(BR)GSS}$	40	—	Vdc
Gate Reverse Current (V_{GS} = 20 Vdc, V_{DS} = 0)		I_{GSS}	—	250	pAdc
Drain Reverse Current (V_{DG} = 20 Vdc, I_S = 0) (V_{DG} = 20 Vdc, I_S = 0, T_A = 150°C)		I_{DGO}	— —	250 500	pAdc nAdc
Drain Cutoff Current (V_{DS} = 20 Vdc, V_{GS} = −12 Vdc) (V_{DS} = 20 Vdc, V_{GS} = −12 Vdc, T_A = 150°C)		$I_{D(off)}$	— —	250 500	pAdc nAdc
Gate Source Voltage (V_{DS} = 20 Vdc, I_D = 1.0 nAdc)	2N3970 2N3971 2N3972	V_{GS}	4.0 2.0 0.5	10 5.0 3.0	Vdc
ON CHARACTERISTICS					
Zero-Gate-Voltage Drain Current(1) (V_{DS} = 20 Vdc, V_{GS} = 0)	2N3970 2N3971 2N3972	I_{DSS}	50 25 5.0	150 75 30	mAdc
Drain-Source On-Voltage (I_D = 20 mAdc, V_{GS} = 0) (I_D = 10 mAdc, V_{GS} = 0) (I_D = 5.0 mAdc, V_{GS} = 0)	2N3970 2N3971 2N3972	$V_{DS(on)}$	— — —	1.0 1.5 2.0	Vdc
Static Drain-Source On Resistance (I_D = 1.0 mAdc, V_{GS} = 0)	2N3970 2N3971 2N3972	$r_{DS(on)}$	— — —	30 60 100	Ohms
SMALL-SIGNAL CHARACTERISTICS					
Drain-Source "ON" Resistance (V_{GS} = 0, I_D = 0, f = 1.0 kHz)	2N3970 2N3971 2N3972	$r_{ds(on)}$	— — —	30 60 100	Ohms
Input Capacitance (V_{DS} = 20 Vdc, V_{GS} = 0, f = 1.0 MHz)		C_{iss}	—	25	pF
Reverse Transfer Capacitance (V_{DS} = 0, V_{GS} = −12 Vdc, f = 1.0 MHz)		C_{rss}	—	6.0	pF
SWITCHING CHARACTERISTICS					
Turn-On Delay Time — Test Condition for 2N3970: (V_{DD} = 10 Vdc, $V_{GS(on)}$ = 0, $I_{D(on)}$ = 20 mAdc, $V_{GS(off)}$ = 10 Vdc)	2N3970 2N3971 2N3972	$t_{d(on)}$	— — —	10 15 40	ns
Rise Time — Test Condition for 2N3971: (V_{DD} = 10 Vdc, $V_{GS(on)}$ = 0, $I_{D(on)}$ = 10 mAdc, $V_{GS(on)}$ = 5.0 Vdc)	2N3970 2N3971 2N3972	t_r	— — —	10 15 40	ns
Turn-Off Time — Test Condition for 2N3972: (V_{DD} = 10 Vdc, $V_{GS(on)}$ = 0, $I_{D(on)}$ = 5.0 mAdc, $V_{GS(off)}$ = 3.0 Vdc)	2N3970 2N3971 2N3972	t_{off}	— — —	30 60 100	ns

(1) Pulse Test: Pulse Width = 300 μs, Duty Cycle = 3.0%.