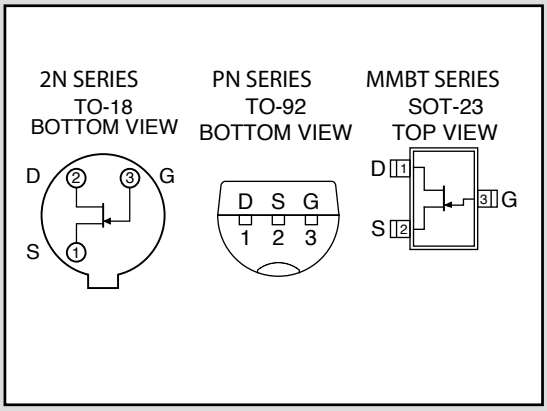
AMERICAN MICROSEMICONDUCTOR

2N3971/ PN4391,2,3 /MMBT4391 SERIES

SINGLE N-CHANNEL JFET SWITCH

FEATURES	
Replacement for Siliconix 2N3971 /PN/ 4391, 4392, & 4393	
LOW ON RESISTANCE	$r_{DS(on)} \leq 30\Omega$
FAST SWITCHING	$t_{ON} \leq 15ns$
ABSOLUTE MAXIMUM RATINGS [1]	
@ 25 °C (unless otherwise stated)	
Maximum Temperatures	
Storage Temperature (2N3971)	-65 to 200° C
Storage Temperature (PN/MMBT)	-55 to 150° C
Junction Operating Temperature 2N3971	-55 to 200° C
Junction Operating Temperature (PN 4391,2,3)	-55 to 150° C
Maximum Power Dissipation	
Continuous Power Dissipation 2N3971	1800mW
Continuous Power Dissipation (PN/MMBT)	350mW
Maximum Currents	
Gate Current	50mA
Maximum Voltages	
Gate to Drain or Source 2N3971	-40V
Gate to Drain or Source (MMBT)	-35V



STATIC ELECTRICAL CHARACTERISTICS @25 °C (unless otherwise stated)

SYM.	CHARACTERISTIC		TYP	2N3971		PN4392		PN4393		UNIT	CONDITIONS
				MIN	MAX	MIN	MAX	MIN	MAX		
BV_{GSS}	Gate to Source Breakdown Voltage	2N3971		-40		-40		-40		V	I_G = -1µA, V_{DS} = 0V
		MMBT		-35		-35		-35			
$V_{GS(off)}$	Gate to Source Cutoff Voltage	2N3971		-2	-5	-2	-5	-0.5	-3		V_{DS} = 20V, I_D = 1nA
		MMBT		-4	-10	-2	-5	-0.5	-3		V_{DS} = 15V, I_D = 10nA
$V_{GS(F)}$	Gate to Source Forward Voltage		0.7		1		1		1		I_G = 1mA, V_{DS} = 0V
$V_{DS(on)}$	Drain to Source On Voltage		0.25						0.4		V_{GS} = 0V, I_D = 3mA
			0.3				0.4				V_{GS} = 0V, I_D = 6mA
			0.35		0.4						V_{GS} = 0V, I_D = 12mA
I_{DSS}	Drain to Source Saturation Current [2]	2N3971		25	75	25	75	5	30	mA	V_{DS} = 20V, V_{GS} = 0V
		PN		50	100	25	100	5	60		
		MMBT		50		25		5			
I_{GSS}	Gate Leakage Current	2N3971	-5		-100		-100		-100	pA	V_{GS} = -20V, V_{DS} = 0V
		PN	-5		-1000		-1000		-1000		
I_G	Gate Operating Current		-5								V_{DG} = 15V, I_D = 10mA

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STATIC ELECTRICAL CHARACTERISTICS CONT. @25 °C (unless otherwise stated)

SYM.	CHARACTERISTIC		TYP	2N3971		PN4392		PN4393		UNIT	CONDITIONS
				MIN	MAX	MIN	MAX	MIN	MAX		
$I_{D(off)}$	Drain Cutoff Current	2N3941	5						100	pA	V_{DS} = 20V, V_{GS} = -5 V
			5				100				V_{DS} = 20V, V_{GS} = -7 V
			5		250						V_{DS} = 20V, V_{GS} = -12V
		PN4392,3	5						1000		V_{DS} = 20V, V_{GS} = -5 V
			5				1000				V_{DS} = 20V, V_{GS} = -7 V
			5		1000						V_{DS} = 20V, V_{GS} = -12V
		MMBT	5		100		100		100		V_{DS} = 10V, V_{GS} = -10V
$r_{DS(on)}$	Drain to Source On Resistance				30		60		100	Ω	V_{GS} = 0V, I_D = 1 mA

DYNAMIC ELECTRICAL CHARACTERISTICS @25 °C (unless otherwise stated)

SYM.	CHARACTERISTIC		TYP	2N3971		PN4392		PN4393		UNIT	CONDITIONS
				MIN	MAX	MIN	MAX	MIN	MAX		
g_{fs}	Forward Transconductance		6							mS	V_{DS} = 20V, I_D = 1mA f = 1 kHz
g_{os}	Output Conductance		25							µS	
$r_{ds(on)}$	Drain to Source On Resistance				30		60		100	Ω	V_{GS} = 0V, I_D = 0 A f = 1 kHz
C_{iss}	Input Capacitance	2N3971	12		14		14		14	pF	V_{DS} = 20V, V_{GS} = 0 V f = 1 MHz
		PN	12		16		16		16		
		MMBT	13								
C_{rss}	Reverse Transfer Capacitance	2N3971	3.3						3.5		V_{DS} = 0V, V_{GS} = -5V f = 1 MHz
		PN	3.5						5		
		MMBT	3.6								
		2N3971	3.2				3.5				V_{DS} = 0V, V_{GS} = -7V f = 1 MHz
		PN	3.4				5				
		MMBT	3.5								
		2N3971	2.8		3.5						V_{DS} = 0V, V_{GS} = -12V f = 1 MHz
		PN	3.0		5						
		MMBT	3.1								
e_n	Equivalent Input Noise Voltage		3							nV/√Hz	V_{DS} = 10V, I_D = 10mA f = 1 kHz

SWITCHING ELECTRICAL CHARACTERISTICS @25 °C (unless otherwise stated)

SYM.	CHARACTERISTIC		TYP	2N3971		4392		4393		UNIT	CONDITIONS
				MIN	MAX	MIN	MAX	MIN	MAX		
$t_{d(on)}$	Turn On Time	2N/PN	2		15		15		15	ns	V_{DD} = 10V, $V_{GS(H)}$ = 0 V
		MMBT	2								
t_r		2N/PN	2		5		5		5		
		MMBT	2								
$t_{d(off)}$	Turn Off Time	2N/PN	6		20		35		50		
		MMBT	6								
t_f		2N/PN	13		15		20		30		
		MMBT	13								

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SWITCHING CIRCUIT CHARACTERISTICS

SYM.	4391	4392	4393
$V_{GS(L)}$	-12V	-7V	-5V
R_L	800Ω	1600Ω	3200Ω
$I_{D(on)}$	12mA	6mA	3mA

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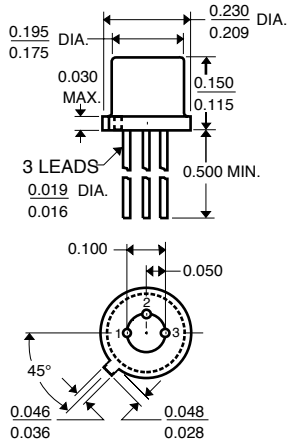
Three Lead



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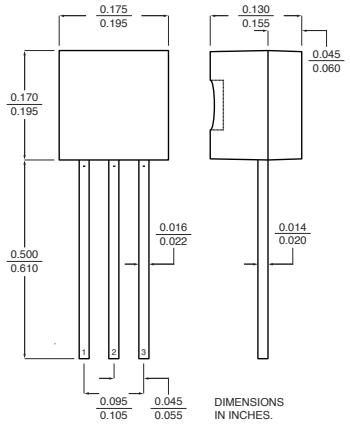

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