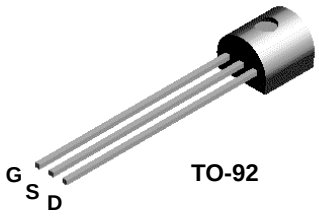
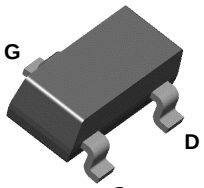
FAIRCHILD
SEMICONDUCTOR TM

PN4091
PN4092
PN4093

MMBF4091
MMBF4092
MMBF4093



TO-92



SOT-23
Mark: 61J / 61K / 61L

NOTE: Source & Drain are interchangeable

N-Channel Switch

This device is designed for low level analog switching, sample and hold circuits and chopper stabalized amplifiers. Sourced from Process 51. See J111 for characteristics.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{DG}	Drain-Gate Voltage	40	V
V_{GS}	Gate-Source Voltage	- 40	V
I_{GF}	Forward Gate Current	50	mA
T_J ,T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max		Units
		PN4091-4093	*MMBF4091-4093	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	350 2.8	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	125		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	556	°C/W

*Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

N-Channel Switch
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Max	Units
OFF CHARACTERISTICS						
$V_{(BR)GSS}$	Gate-Source Breakdown Voltage	I_G = 1.0 µA, V_{DS} = 0		- 40		V
$V_{GS(off)}$	Gate-Source Cutoff Voltage	V_{DS} = 20 V, I_D = 1.0 nA	**4091**	- 5.0	- 10	V
			4092	- 2.0	- 7.0	V
			4093	- 1.0	- 5.0	V
I_{DGO}	Drain-Gate Leakage Current	V_{DG} = 20 V, I_S = 0			- 200	pA
		V_{DG} = 20 V, I_S = 0, T_A = 150°C			- 400	nA
$I_{D(off)}$	Drain Cutoff Leakage Current	V_{DS} = 20 V, V_{GS} = - 12 V	**4091**		200	pA
		V_{DS} = 20 V, V_{GS} = - 8.0 V	**4092**		200	pA
		V_{DS} = 20 V, V_{GS} = - 6.0 V	**4093**		200	pA
		V_{DS} = 20 V, V_{GS} = -12 V, T_A = 150°C	**4091**		400	nA
		V_{DS} = 20 V, V_{GS}= - 8.0 V, T_A = 150°C	**4092**		400	nA
		V_{DS} = 20 V, V_{GS} = - 6.0 V, T_A = 150°C	**4093**		400	nA
ON CHARACTERISTICS						
I_{DSS}	Zero-Gate Voltage Drain Current*	V_{DS} = 20 V, V_{GS} = 0	**4091**	30		mA
			4092	15		mA
			4093	8.0		mA
$V_{DS(on)}$	Drain-Source On Voltage	I_D = 6.6 mA, V_{GS} = 0	**4091**		0.2	V
		I_D = 4.0 mA, V_{GS} = 0	**4092**		0.2	V
		I_D = 2.5 mA, V_{GS} = 0	**4093**		0.2	V
$r_{DS(on)}$	Drain-Source On Resistance	I_D = 1.0 mA, V_{GS} = 0	**4091**		30	Ω
			4092		50	Ω
			4093		80	Ω
SMALL-SIGNAL CHARACTERISTICS						
$r_{ds(on)}$	Drain-Source On Resistance	V_{DS} = V_{GS} = 0, f= 1.0 kHz	**4091**		30	Ω
			4092		50	Ω
			4093		80	Ω
C_{iss}	Input Capacitance	V_{DS} = 20, V_{GS} = 0, f = 1.0 MHz			16	pF
C_{rss}	Reverse Transfer Capacitance	V_{GS} = - 20 V, f = 1.0 MHz			5.0	pF
SWITCHING CHARACTERISTICS						
t_{on}	Turn-On Time	$I_{D(on)}$ = 12 mA	**4091**		25	ns
		$I_{D(on)}$ = 6.0 mA	**4092**		35	ns
		$I_{D(on)}$ = 3.0 mA	**4093**		60	ns
t_{off}	Turn-Off Time	$V_{GS(off)}$ = 12 V	**4091**		40	ns
		$V_{GS(off)}$ = 6.0 V	**4092**		60	ns
		$V_{GS(off)}$ = 3.0 V	**4093**		80	ns

*Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 1.0%

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Rev. G