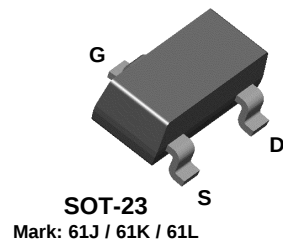
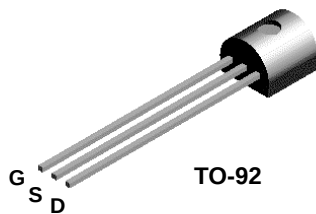


PN4091
PN4092
PN4093

MMBF4091
MMBF4092
MMBF4093



NOTE: Source & Drain
are interchangeable

N-Channel Switch

This device is designed for low level analog switching, sample and hold circuits and chopper stabilized 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."

PN4091 / 4092 / 4093 / MMBF4091 / 4092 / 4093

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	$I_G = 1.0 \mu A$, $V_{DS} = 0$	- 40		V
$V_{GS(off)}$	Gate-Source Cutoff Voltage	$V_{DS} = 20 V$, $I_D = 1.0 nA$	4091 4092 4093	- 5.0 - 2.0 - 1.0	V V V
I_{DGO}	Drain-Gate Leakage Current	$V_{DG} = 20 V$, $I_S = 0$ $V_{DG} = 20 V$, $I_S = 0$, $T_A = 150^\circ C$		- 200 - 400	pA nA
$I_{D(off)}$	Drain Cutoff Leakage Current	$V_{DS} = 20 V$, $V_{GS} = - 12 V$ 4091 $V_{DS} = 20 V$, $V_{GS} = - 8.0 V$ 4092 $V_{DS} = 20 V$, $V_{GS} = - 6.0 V$ 4093 $V_{DS} = 20 V$, $V_{GS} = - 12 V$, $T_A = 150^\circ C$ 4091 $V_{DS} = 20 V$, $V_{GS} = - 8.0 V$, $T_A = 150^\circ C$ 4092 $V_{DS} = 20 V$, $V_{GS} = - 6.0 V$, $T_A = 150^\circ C$ 4093		200 200 200 400 400 400	pA pA pA nA nA nA
ON CHARACTERISTICS					
I_{DSS}	Zero-Gate Voltage Drain Current*	$V_{DS} = 20 V$, $V_{GS} = 0$	4091 4092 4093	30 15 8.0	mA mA mA
$V_{DS(on)}$	Drain-Source On Voltage	$I_D = 6.6 mA$, $V_{GS} = 0$ 4091 $I_D = 4.0 mA$, $V_{GS} = 0$ 4092 $I_D = 2.5 mA$, $V_{GS} = 0$ 4093		0.2 0.2 0.2	V V V
$r_{DS(on)}$	Drain-Source On Resistance	$I_D = 1.0 mA$, $V_{GS} = 0$	4091 4092 4093	30 50 80	Ω Ω Ω
SMALL-SIGNAL CHARACTERISTICS					
$r_{ds(on)}$	Drain-Source On Resistance	$V_{DS} = V_{GS} = 0$, $f = 1.0 kHz$	4091 4092 4093	30 50 80	Ω Ω 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 $I_{D(on)} = 6.0 mA$ 4092 $I_{D(on)} = 3.0 mA$ 4093		25 35 60	ns ns ns
t_{off}	Turn-Off Time	$V_{GS(off)} = 12 V$ 4091 $V_{GS(off)} = 6.0 V$ 4092 $V_{GS(off)} = 3.0 V$ 4093		40 60 80	ns ns ns

*Pulse Test: Pulse Width $\leq 300 \mu s$, Duty Cycle $\leq 1.0\%$

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE [™]	FAST [™]	PowerTrench [®]	SyncFET [™]
Bottomless [™]	GlobalOptoisolator [™]	QFET [™]	TinyLogic [™]
CoolFET [™]	GTO [™]	QS [™]	UHC [™]
CROSSVOLT [™]	HiSeC [™]	QT Optoelectronics [™]	VCX [™]
DOVE [™]	ISOPANAR [™]	Quiet Series [™]	
E ² CMOS [™]	MICROWIRE [™]	SILENT SWITCHER [®]	
EnSigna [™]	OPTOLOGIC [™]	SMART START [™]	
FACT [™]	OPTOPLANAR [™]	SuperSOT [™] -3	
FACT Quiet Series [™]	PACMAN [™]	SuperSOT [™] -6	
FAST [®]	POP [™]	SuperSOT [™] -8	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.