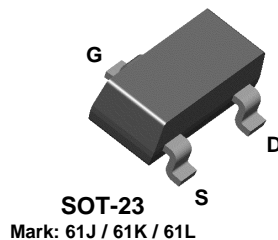
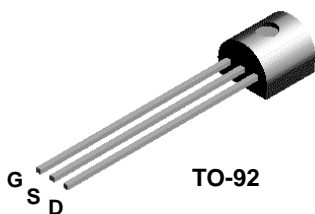


**PN4091  
PN4092  
PN4093**

**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 <sub>DG</sub>	Drain-Gate Voltage	40	V
V <sub>GS</sub>	Gate-Source Voltage	- 40	V
I <sub>GF</sub>	Forward Gate Current	50	mA
T <sub>J</sub> , T <sub>stg</sub>	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 <sub>D</sub>	Total Device Dissipation	625	350	mW
	Derate above 25°C	5.0	2.8	mW/°C
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	125		°C/W
R <sub>θJA</sub>	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
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#### OFF CHARACTERISTICS

V <sub>(BR)GSS</sub>	Gate-Source Breakdown Voltage	I <sub>G</sub> = 1.0 μA, V <sub>DS</sub> = 0		- 40	V
V <sub>GS(off)</sub>	Gate-Source Cutoff Voltage	V <sub>DS</sub> = 20 V, I <sub>D</sub> = 1.0 nA	<b>4091</b>	- 5.0	- 10
			<b>4092</b>	- 2.0	- 7.0
			<b>4093</b>	- 1.0	- 5.0
I <sub>DGO</sub>	Drain-Gate Leakage Current	V <sub>DG</sub> = 20 V, I <sub>S</sub> = 0		- 200	pA
		V <sub>DG</sub> = 20 V, I <sub>S</sub> = 0, T <sub>A</sub> = 150°C		- 400	nA
I <sub>D(off)</sub>	Drain Cutoff Leakage Current	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = - 12 V	<b>4091</b>		200
		V <sub>DS</sub> = 20 V, V <sub>GS</sub> = - 8.0 V	<b>4092</b>		200
		V <sub>DS</sub> = 20 V, V <sub>GS</sub> = - 6.0 V	<b>4093</b>		200
		V <sub>DS</sub> = 20 V, V <sub>GS</sub> = - 12 V, T <sub>A</sub> = 150°C	<b>4091</b>		400
		V <sub>DS</sub> = 20 V, V <sub>GS</sub> = - 8.0 V, T <sub>A</sub> = 150°C	<b>4092</b>		400
		V <sub>DS</sub> = 20 V, V <sub>GS</sub> = - 6.0 V, T <sub>A</sub> = 150°C	<b>4093</b>		400

#### ON CHARACTERISTICS

I <sub>DSS</sub>	Zero-Gate Voltage Drain Current*	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0	<b>4091</b>	30		mA
			<b>4092</b>	15		mA
			<b>4093</b>	8.0		mA
V <sub>DS(on)</sub>	Drain-Source On Voltage	I <sub>D</sub> = 6.6 mA, V <sub>GS</sub> = 0	<b>4091</b>		0.2	V
			<b>4092</b>		0.2	V
			<b>4093</b>		0.2	V
r <sub>DS(on)</sub>	Drain-Source On Resistance	I <sub>D</sub> = 1.0 mA, V <sub>GS</sub> = 0	<b>4091</b>		30	Ω
			<b>4092</b>		50	Ω
			<b>4093</b>		80	Ω

#### SMALL-SIGNAL CHARACTERISTICS

r <sub>ds(on)</sub>	Drain-Source On Resistance	V <sub>DS</sub> = V <sub>GS</sub> = 0, f = 1.0 kHz	<b>4091</b>		30	Ω
			<b>4092</b>		50	Ω
			<b>4093</b>		80	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 20, V <sub>GS</sub> = 0, f = 1.0 MHz			16	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	V <sub>GS</sub> = - 20 V, f = 1.0 MHz			5.0	pF

#### SWITCHING CHARACTERISTICS

t <sub>on</sub>	Turn-On Time	I <sub>D(on)</sub> = 12 mA	<b>4091</b>		25	ns
		I <sub>D(on)</sub> = 6.0 mA	<b>4092</b>		35	ns
		I <sub>D(on)</sub> = 3.0 mA	<b>4093</b>		60	ns
t <sub>off</sub>	Turn-Off Time	V <sub>GS(off)</sub> = 12 V	<b>4091</b>		40	ns
		V <sub>GS(off)</sub> = 6.0 V	<b>4092</b>		60	ns
		V <sub>GS(off)</sub> = 3.0 V	<b>4093</b>		80	ns

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

PN4091 / 4092 / 4093 / MMBF4091 / 4092 / 4093

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