

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage MPS6601/6651 MPS6602/6652	V <sub>CEO</sub>	25 40	Vdc
Collector-Base Voltage MPS6601/6651 MPS6602/6652	V <sub>CBO</sub>	25 30	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	4.0	Vdc
Collector Current — Continuous	I <sub>C</sub>	1000	mAdc
Total Device Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	625 5.0	mW mW/°C
Total Device Dissipation @ T <sub>C</sub> = 25°C Derate above 25°C	P <sub>D</sub>	1.5 12	Watts mW/°C
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	83.3	°C/W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub> (1)	200	°C/W

(1) R<sub>θJA</sub> is measured with the device soldered into a typical printed circuit board.

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted.)**

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 1.0 mAdc, I <sub>B</sub> = 0)	MPS6601/6651 MPS6602/6652	V <sub>(BR)CEO</sub>	25 40	— —	Vdc
Collector-Base Breakdown Voltage (I <sub>C</sub> = 100 μAdc, I <sub>E</sub> = 0)	MPS6601/6651 MPS6602/6652	V <sub>(BR)CBO</sub>	25 40	— —	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 10 μAdc, I <sub>C</sub> = 0)		V <sub>(BR)EBO</sub>	4.0	—	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 25 Vdc, I <sub>B</sub> = 0) (V <sub>CE</sub> = 30 Vdc, I <sub>B</sub> = 0)	MPS6601/6651 MPS6602/6652	I <sub>CEO</sub>	— —	0.1 0.1	μAdc
Collector Cutoff Current (V <sub>CB</sub> = 25 Vdc, I <sub>E</sub> = 0) (V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0)	MPS6601/6651 MPS6602/6652	I <sub>CBO</sub>	— —	0.1 0.1	μAdc

**ON CHARACTERISTICS**

DC Current Gain (I <sub>C</sub> = 100 mAdc, V <sub>CE</sub> = 1.0 Vdc) (I <sub>C</sub> = 500 mAdc, V <sub>CE</sub> = 1.0 Vdc) (I <sub>C</sub> = 1000 mAdc, V <sub>CE</sub> = 1.0 Vdc)		h <sub>FE</sub>	50 50 30	— — —	—
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 1000 mAdc, I <sub>B</sub> = 100 mAdc)		V <sub>CE(sat)</sub>	—	0.6	Vdc
Base-Emitter On Voltage (I <sub>C</sub> = 500 mAdc, V <sub>CE</sub> = 1.0 Vdc)		V <sub>BE(on)</sub>	—	1.2	Vdc

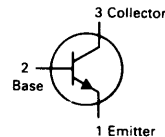
**SMALL-SIGNAL CHARACTERISTICS**

Current-Gain — Bandwidth Product (I <sub>C</sub> = 50 mAdc, V <sub>CE</sub> = 10 Vdc, f = 30 MHz)		f <sub>T</sub>	100	—	MHz
Output Capacitance (V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, f = 100 kHz)		C <sub>obo</sub>	—	30	pF

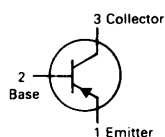
**SWITCHING CHARACTERISTICS**

Delay Time	(V <sub>CC</sub> = 40 Vdc, I <sub>C</sub> = 500 mAdc, I <sub>B1</sub> = 50 mAdc, t <sub>p</sub> ≥ 300 ns Duty Cycle)	t <sub>d</sub>	—	25	ns
Rise Time		t <sub>r</sub>	—	30	ns
Storage Time		t <sub>s</sub>	—	250	ns
Fall Time		t <sub>f</sub>	—	50	ns

**NPN**  
**MPS6601**  
**MPS6602**



**PNP**  
**MPS6651**  
**MPS6652**

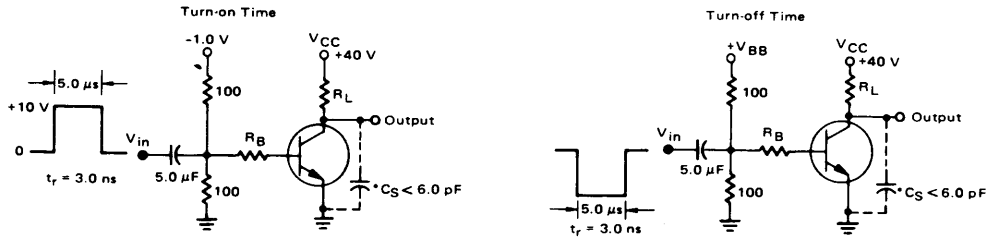


**CASE 29-04, STYLE 1**  
**TO-92 (TO-226AA)**



**AMPLIFIER TRANSISTOR**

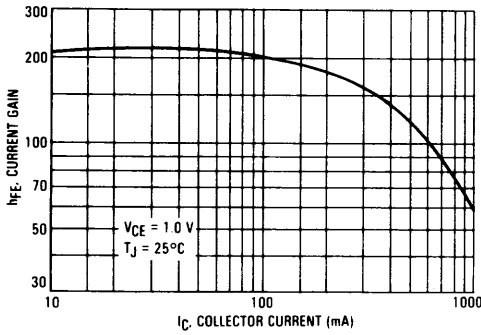
FIGURE 1 – SWITCHING TIME TEST CIRCUITS



\* Total Shunt Capacitance of Test Jig and Connectors  
For PNP Test Circuits, Reverse All Voltage Polarities

NPN

FIGURE 2 – MPS6601/6602 DC CURRENT GAIN



PNP

FIGURE 3 – MPS6651/6652 DC CURRENT GAIN

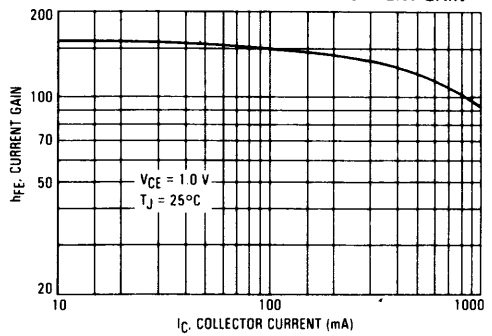


FIGURE 4 – CURRENT GAIN BANDWIDTH PRODUCT

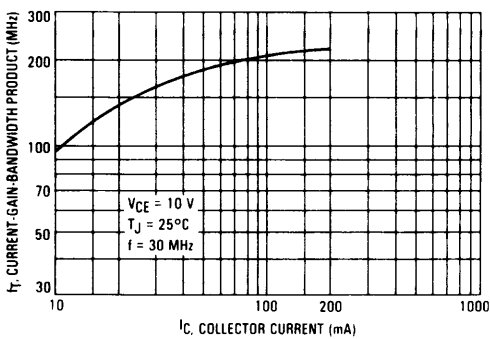
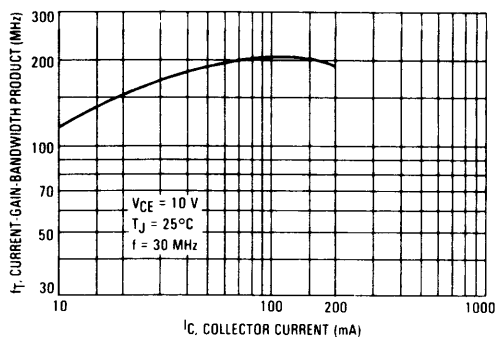


FIGURE 5 – CURRENT GAIN BANDWIDTH PRODUCT



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FIGURE 6 — ON VOLTAGES

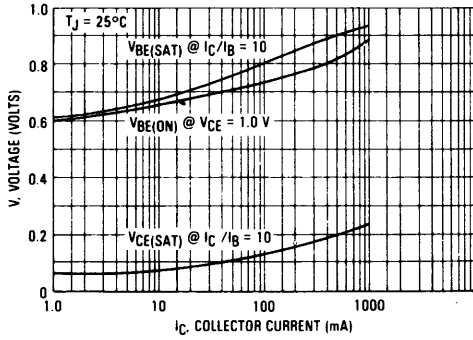
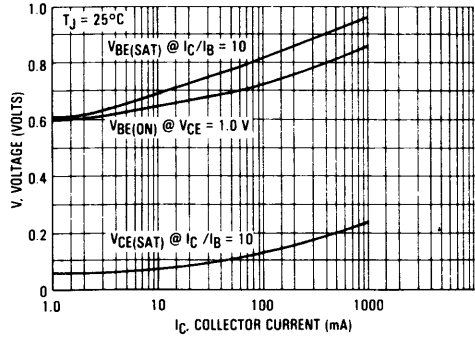
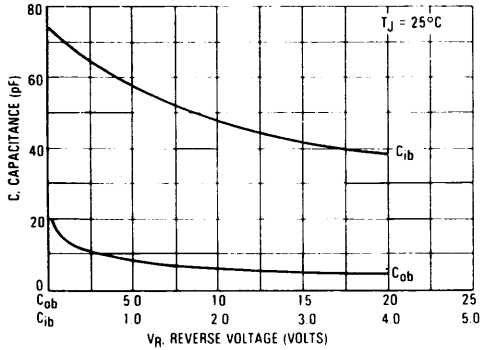


FIGURE 7 — ON VOLTAGES



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FIGURE 8 — CAPACITANCE



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FIGURE 9 — CAPACITANCE

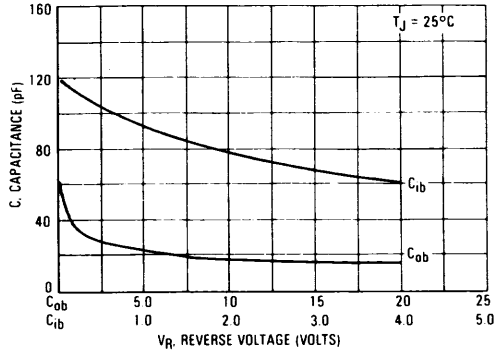


FIGURE 10 — MPS6601/6602 NOISE FIGURE

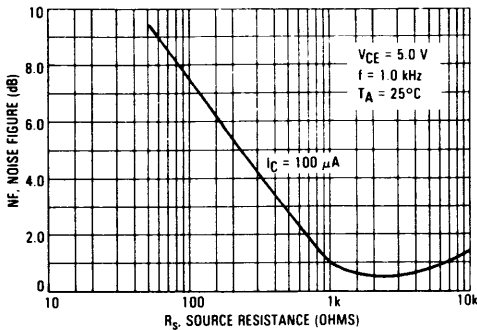
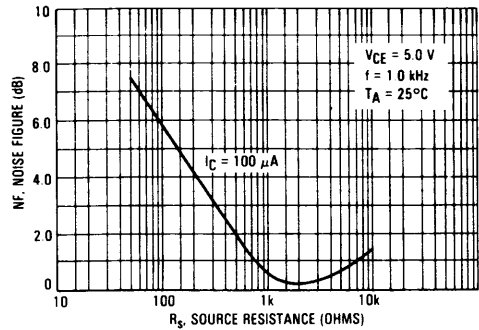
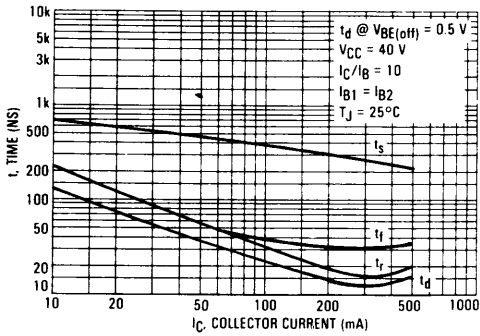


FIGURE 11 — MPS6651/6652 NOISE FIGURE

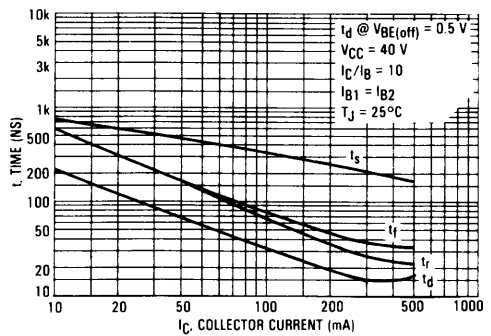


**NPN MPS6601, MPS6602, PNP MPS6651, MPS6652**

**FIGURE 12 — MPS6601/6602 SWITCHING TIMES**

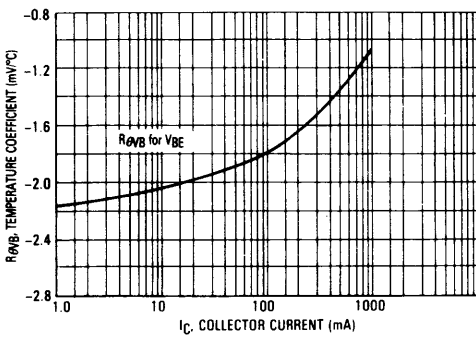


**FIGURE 13 — MPS6651/6652 SWITCHING TIMES**



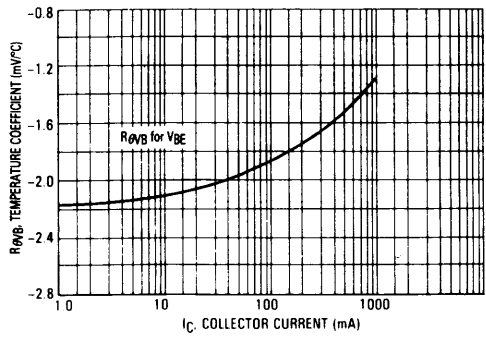
**NPN**

**FIGURE 14 — BASE-EMITTER TEMPERATURE COEFFICIENT**

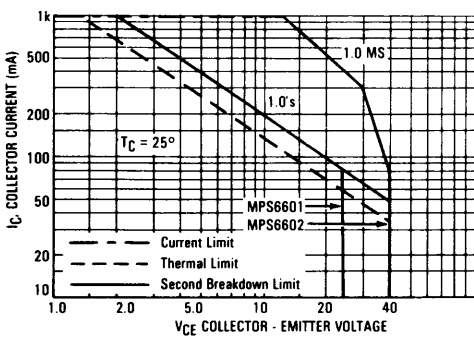


**PNP**

**FIGURE 15 — BASE-EMITTER TEMPERATURE COEFFICIENT**



**FIGURE 16 — SAFE OPERATING AREA**



**FIGURE 17 — SAFE OPERATING AREA**

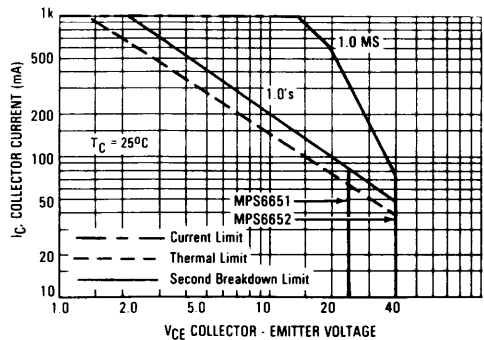


FIGURE 18 — MPS6601/6602 SATURATION REGION

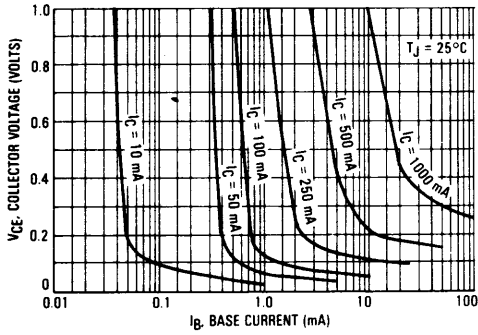


FIGURE 19 — MPS6651/6652 SATURATION REGION

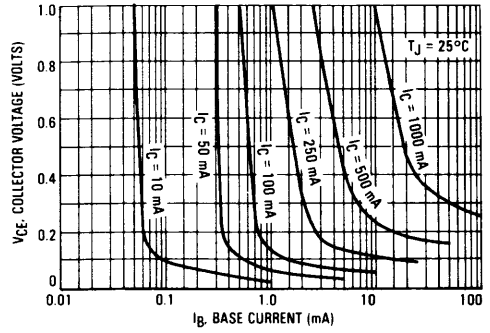


FIGURE 20 — THERMAL RESPONSE

