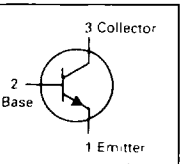
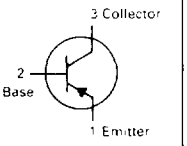
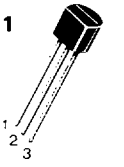
NPN MPSA05 MPSA06★



PNP(3) MPSA55 MPSA56★



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



AMPLIFIER TRANSISTORS

★These are Motorola designated preferred devices.

MAXIMUM RATINGS

Rating	Symbol	MPSA05 MPSA55	MPSA06 MPSA56	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	Vdc
Collector-Base Voltage	V_{CBO}	60	80	Vdc
Emitter-Base Voltage	V_{EBO}	4.0		Vdc
Collector Current — Continuous	I_C	500		mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0		mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12		Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$(1)	200	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W

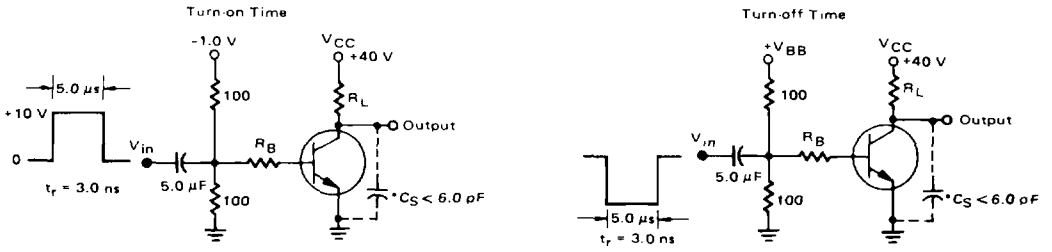
(1) $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage(1) (I_C = 1.0 mAdc, I_B = 0)	 MPSA05, MPSA55 MPSA06, MPSA56	$V_{(BR)CEO}$	 60 80	 — —	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)		$V_{(BR)EBO}$	4.0	—	Vdc
Collector Cutoff Current (V_{CE} = 60 Vdc, I_B = 0)		I_{CEO}	—	0.1	μAdc
Collector Cutoff Current (V_{CB} = 60 Vdc, I_E = 0) (V_{CB} = 80 Vdc, I_E = 0)	 MPSA05, MPSA55 MPSA06, MPSA56	I_{CBO}	 — —	 0.1 0.1	μAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 10 mAdc, V_{CE} = 1.0 Vdc) (I_C = 100 mAdc, V_{CE} = 1.0 Vdc)		h_{FE}	 100 100	 — —	—
Collector-Emitter Saturation Voltage (I_C = 100 mAdc, I_B = 10 mAdc)		$V_{CE(sat)}$	—	0.25	Vdc
Base-Emitter On Voltage (I_C = 100 mAdc, V_{CE} = 1.0 Vdc)		$V_{BE(on)}$	—	1.2	Vdc
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product(2) (I_C = 10 mA, V_{CE} = 2.0 V, f = 100 MHz) (I_C = 100 mAdc, V_{CE} = 1.0 Vdc, f = 100 MHz)	 MPSA05 MPSA06 MPSA55 MPSA56	f_T	 100 50	 — —	MHz

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
(2) f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.
(3) Voltage and Current are negative for PNP Transistors.

FIGURE 1 – SWITCHING TIME TEST CIRCUITS



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

2

FIGURE 2 — CURRENT-GAIN — BANDWIDTH PRODUCT

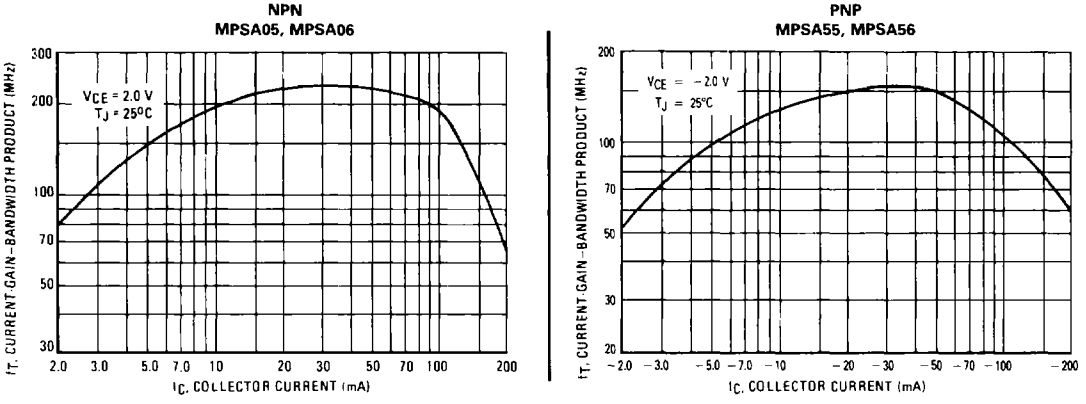


FIGURE 3 — CAPACITANCE

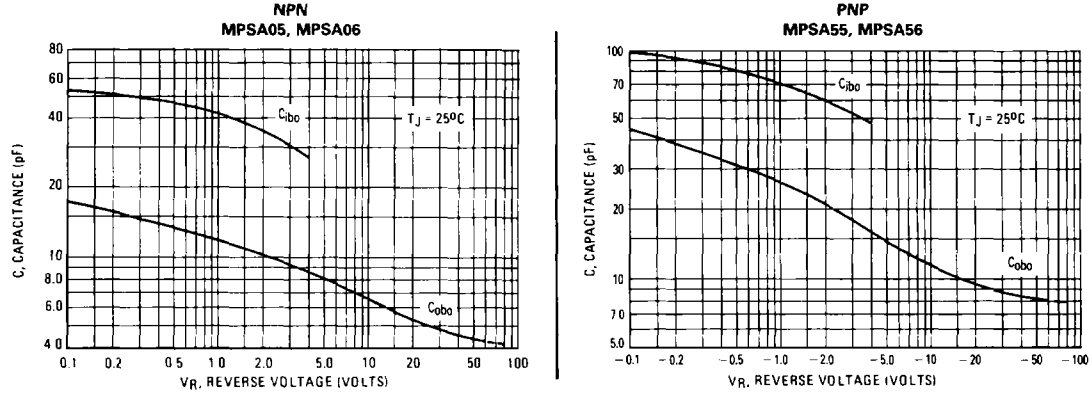
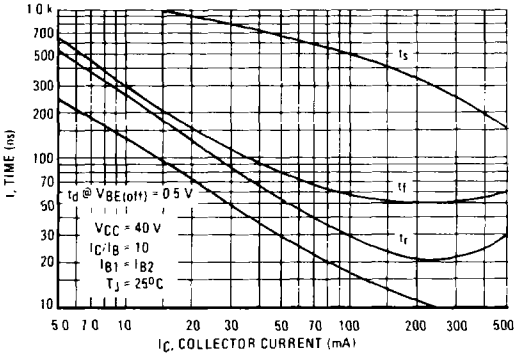


FIGURE 4 — SWITCHING TIME

NPN
MPSA05, MPSA06



PNP
MPSA55, MPSA56

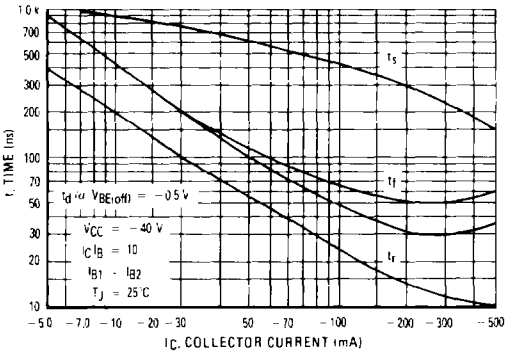


FIGURE 5 — THERMAL RESPONSE
MPSA05, MPSA06, MPSA55, MPSA56

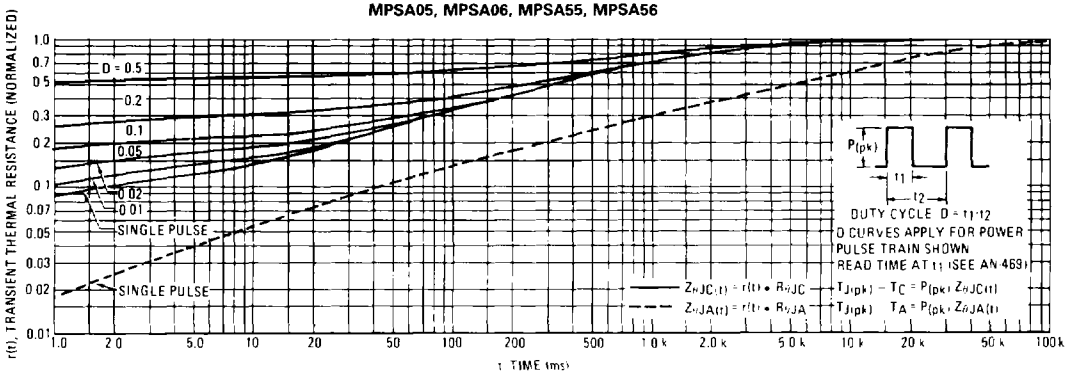
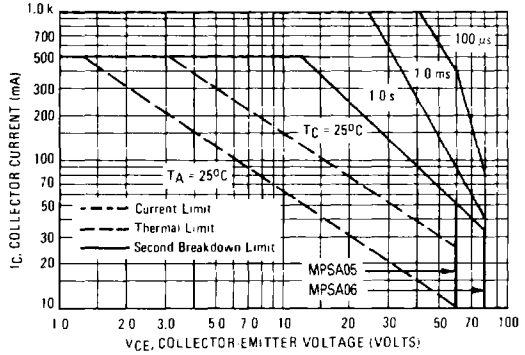
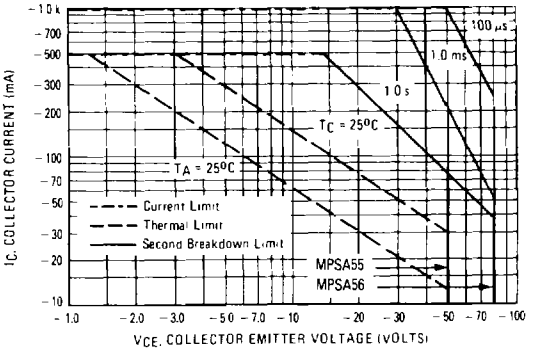


FIGURE 6 — ACTIVE — REGION SAFE OPERATING AREA

NPN
MPSA05, MPSA06



PNP
MPSA55, MPSA56



NPN
MPSA05, MPSA06

FIGURE 7 – DC CURRENT GAIN

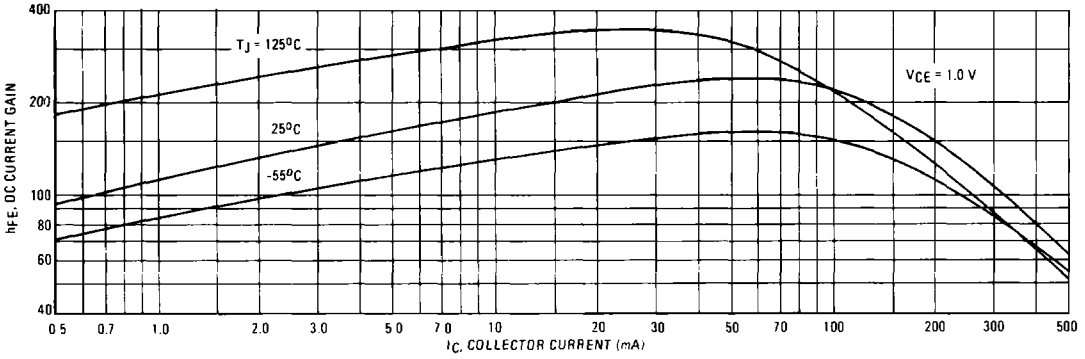


FIGURE 8 – "ON" VOLTAGES

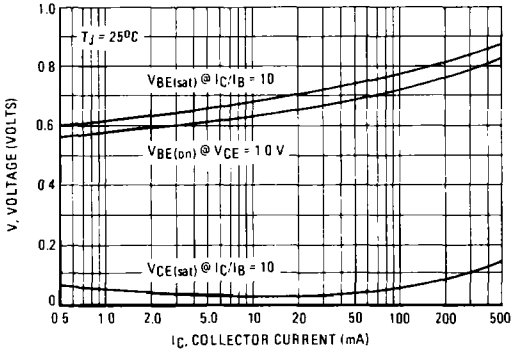


FIGURE 9 – COLLECTOR SATURATION REGION

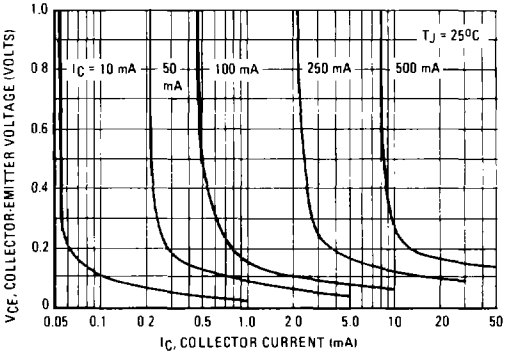
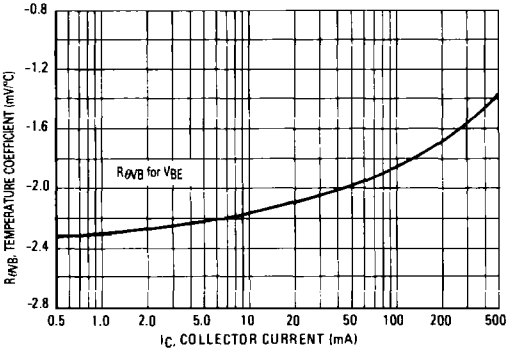


FIGURE 10 – BASE-EMITTER TEMPERATURE COEFFICIENT



PNP
MPSA55, MPSA56

FIGURE 11 – DC CURRENT GAIN

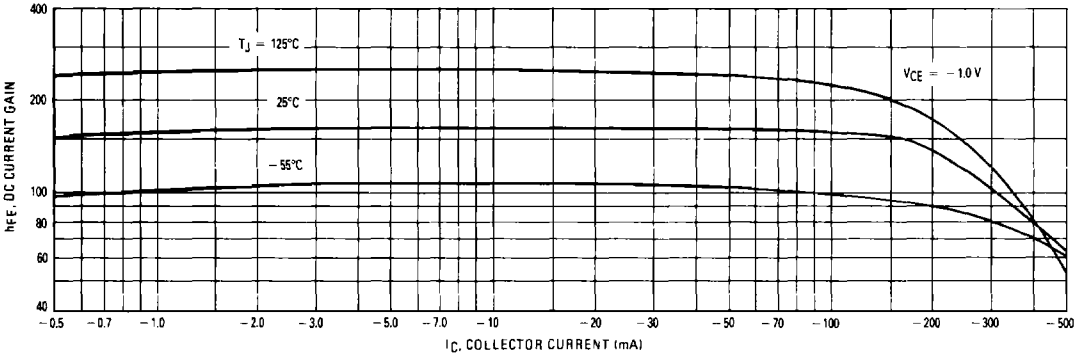


FIGURE 12 – "ON" VOLTAGES

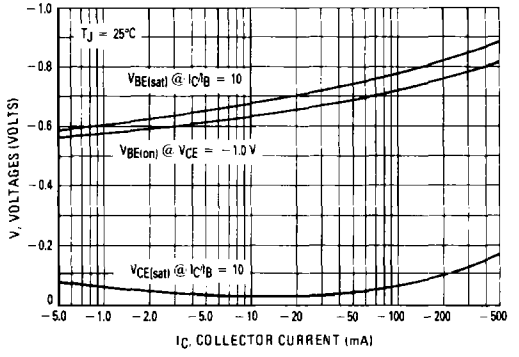


FIGURE 13 – COLLECTOR SATURATION REGION

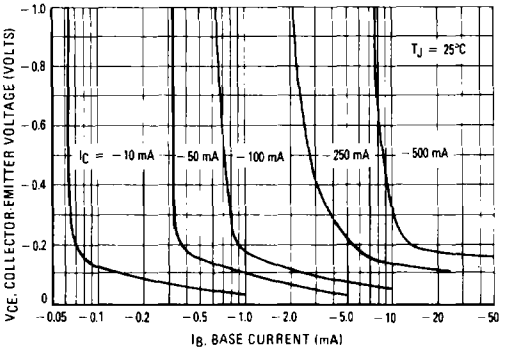


FIGURE 14 – BASE-EMITTER TEMPERATURE COEFFICIENT