MOTOROLA
Semiconductors
BOX 20912 • PHOENIX, ARIZONA 85036

MPS-A70
MPS-K70, MPS-K71
MPS-K72

PNP SILICON ANNULAR◇ TRANSISTORS

. . . designed for general purpose use in audio, radio, and television applications.

- MPS-K70, MPS-K71 and MPS-K72 are 3, 5 and 9 transistor kits available in varied h_{FE} ranges — See page 4
- High Breakdown Voltage — BV_{CEO} = 40 Vdc (Min) @ I_C = 1.0 mAdc
- Low Collector-Emitter Saturation Voltage — $V_{CE(sat)}$ = 0.25 Vdc (Max) @ I_C = 10 mAdc
- Low Output Capacitance — C_{ob} = 4.0 pF (Max) @ V_{CB} = 10 Vdc
- One-Piece, Injection-Molded Unibloc△ Package

PNP SILICON AMPLIFIER TRANSISTORS

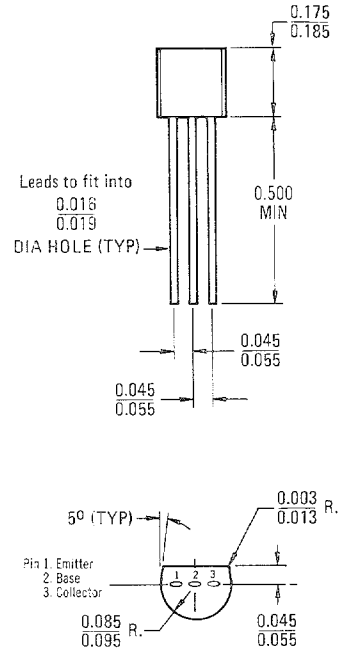
JUNE 1969 — DS 5364

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	40	Vdc
Emitter-Base Voltage	V_{EB}	4.0	Vdc
Collector Current — Continuous	I_C	100	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	300 2.73	mW mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +135	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	θ_{JA}	0.367	°C/mW



CASE 29 (1)
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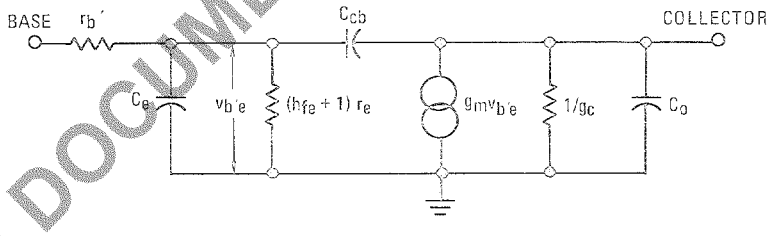
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (I_C = 1.0 mAdc, I_B = 0)	BV_{CEO}	40	-	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)	BV_{EBO}	4.0	-	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)	I_{CBO}	-	100	nAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 5.0 mAdc, V_{CE} = 10 Vdc)	h_{FE}	40	400	-
Collector-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1.0 mAdc)	$V_{CE(sat)}$	-	0.25	Vdc
DYNAMIC CHARACTERISTICS				
Current-Gain–Bandwidth Product (I_C = 5.0 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	f_T	125	-	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)	C_{ob}	-	4.0	pF

FIGURE 1 – SIMPLIFIED AC EQUIVALENT CIRCUIT (Common Emitter)



Note:

Data for MPS-A70 is presented in terms of the equivalent circuit shown in Figure 1. Values for its components may be found or calculated as follows:

r_b' – See Figure 8

$r_e = 26\ mV/I_E$

$C_e = \dfrac{1}{2\pi f_t r_e}$

$C_{cb} = C_{ob} - 0.2$ pF (See Figure 6)

$g_m = 1/r_e$

$g_c = (h_{fe}+1)\,h_{ob}$ (See Figures 2 & 7)

$C_o = 0.2$ pF

Low frequency h parameters may be found from:

$h_{ie} = r_b' + (h_{fe}+1)\,r_e$

h_{fe} = See Figure 2

h_{re} = Negligible

$h_{oe} = (h_{fe}+1)\,h_{ob}$

FIGURE 2 – SMALL SIGNAL CURRENT GAIN

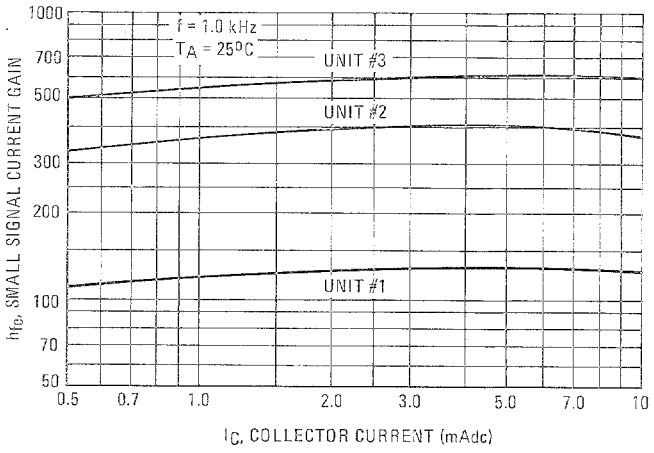


FIGURE 3 – NORMALIZED DC CURRENT GAIN

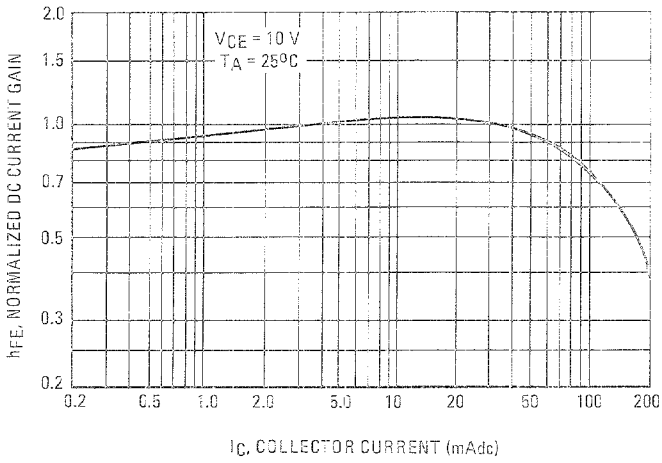


FIGURE 4 – "SATURATION" AND "ON" VOLTAGES

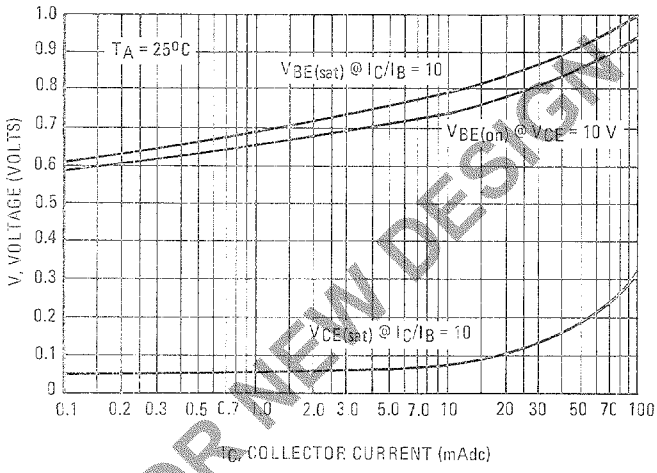


FIGURE 5 – CURRENT-GAIN–BANDWIDTH PRODUCT

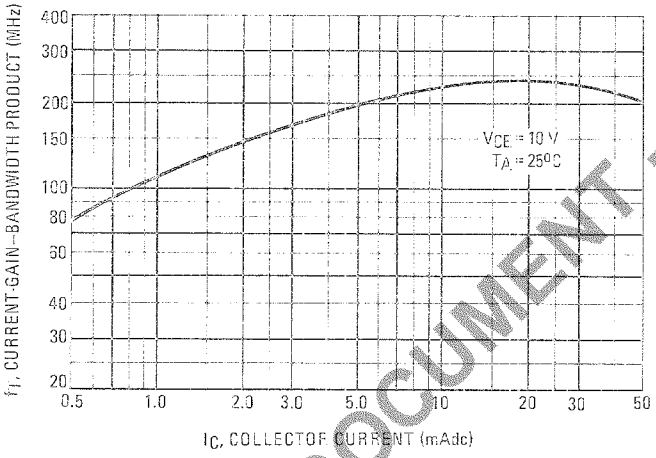


FIGURE 6 – CAPACITANCES

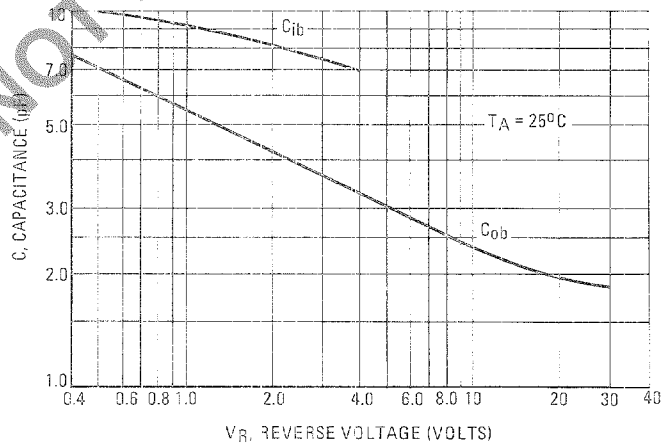


FIGURE 7 – OUTPUT ADMITTANCE

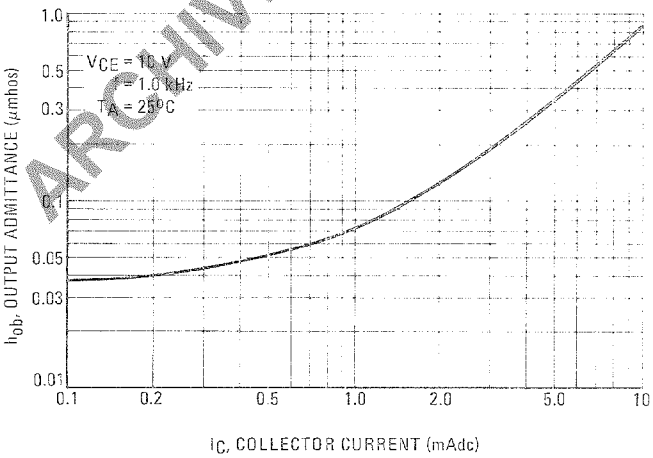
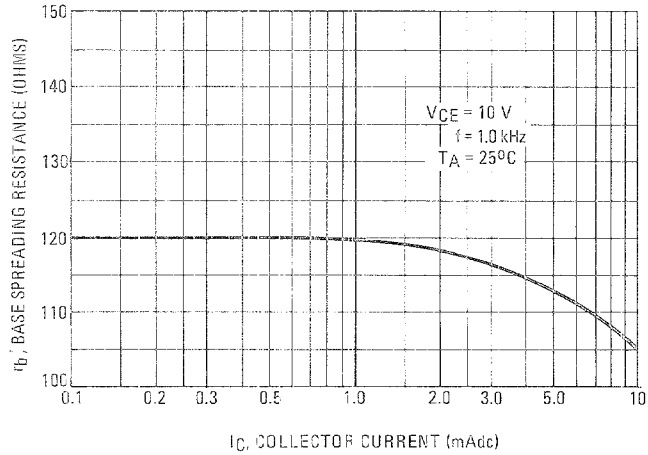


FIGURE 8 – BASE SPREADING RESISTANCE



MPS-K70, MPS-K71 and MPS-K72 are three, five and nine transistor kits consisting of MPS-A70's with various h_{FE} selections.

MPS-K70 — Three Transistor Kit

Quantity Per Kit	Color Code	h_{FE} @ I_C = 5.0 mAdc, V_{CE} = 10 Vdc Min	Max
1	Red	40	400
1	White	80	400
1	Blue	120	300

MPS-K71 — Five Transistor Kit

Quantity Per Kit	Color Code	h_{FE} @ I_C = 5.0 mAdc, V_{CE} = 10 Vdc Min	Max
3	Red	40	400
1	Green	100	200
1	Yellow	150	300

MPS-K72 — Nine Transistor Kit

Quantity Per Kit	Color Code	h_{FE} @ I_C = 5.0 mAdc, V_{CE} = 10 Vdc Min	Max
4	Red	40	400
2	White	80	400
2	Green	100	200
1	Yellow	150	300

MOTOROLA Semiconductor Products Inc.
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5024-1 PRINTED IN USA 10-71 IMPERIAL LITHO 825249 2500
DS 5364