μA3018 • μA3018A • μA3019 • μA3026 • μA3036
μA3039 • μA3045 • μA3046 • μA3054 • μA3086

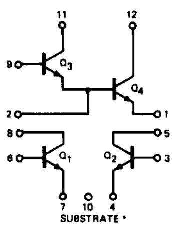
TRANSISTOR AND DIODE ARRAYS

FAIRCHILD LINEAR INTEGRATED CIRCUITS

GENERAL DESCRIPTION – Fairchild Transistor and Diode Arrays consist of general purpose integrated circuit devices constructed on a single substrate, using the Fairchild Planar* epitaxial process. These arrays are arranged to offer maximum flexibility in circuit design for applications from dc to 120 MHz. Excellent transistor and diode matching and temperature tracking allow circuit techniques unavailable when using discrete devices. Multiple devices in one package permit a greater packing density and cost saving than with individually packaged transistors.

- **PRECISION MONOLITHIC MATCHING**
- **DESIGN FLEXIBILITY**
- **CUSTOM APPLICATIONS**

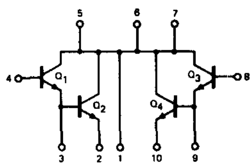
PACAKGE OUTLINE 5D
PACKAGE CODE H



ORDER INFORMATION

TYPE	PART NO.
μA3018	μA3018
μA3018A	μA3018AHM

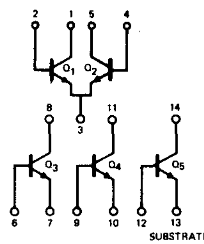
PACKAGE OUTLINE 5Q
PACKAGE CODE H



ORDER INFORMATION

TYPE	PART NO.
μA3036	μA3036HM

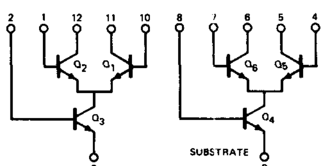
PACKAGE OUTLINE 6A
PACKAGE CODE D



ORDER INFORMATION

TYPE	PART NO.
μA3045	μA3045
μA3046	μA3046DC
μA3086	μA3086DM

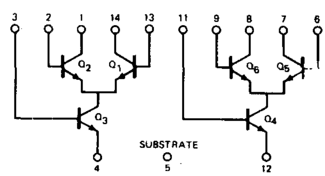
PACKAGE OUTLINE 5D
PACKAGE CODE H



ORDER INFORMATION

TYPE	PART NO.
μA3026	μA3026HM

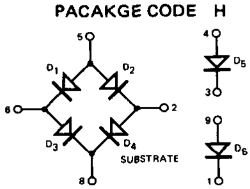
PACAKGE OUTLINE 6A
PACAKGE CODE D



ORDER INFORMATION

TYPE	PART NO.
μA3054	μA3054DC

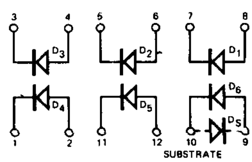
PACAKGE OUTLINE 5Q
PACAKGE CODE H



ORDER INFORMATION

TYPE	PART NO.
μA3039	μA3039HM

PACAKGE OUTLINE 5D
PACKAGE CODE H



ORDER INFORMATION

TYPE	PART NO.
μA3019	μA3019HM

*Planar is a patented Fairchild process.

μA3018/3018A

- MATCHED MONOLITHIC GENERAL PURPOSE TRANSISTORS
- h_{FE} MATCHED ±10%
- V_{BE} MATCHED ±2 mV 3018A (±5 mV 3018)
- OPERATION FROM DC TO 120 MHz
- WIDE OPERATING CURRENT RANGE
- 3018A PERFORMANCE CHARACTERISTICS CONTROLLED FROM 10 μA TO 10 mA
- LOW NOISE FIGURE – 3.2 dB TYPICAL AT 1 kHz
- FULL MILITARY TEMPERATURE RANGE CAPABILITY (–55 TO +125°C)

APPLICATIONS

- General Use in Signal Processing Systems in dc Through VHF Range
- Custom Design Differential Amplifiers
- Temperature Compensated Amplifiers

ABSOLUTE MAXIMUM RATINGS

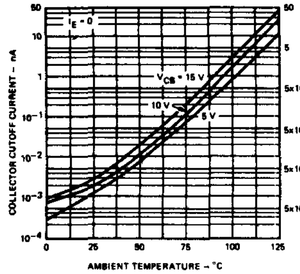
	μA3018	μA3018A
Power Dissipation (Note 1)		
Any One Transistor	300 mW	300 mW
Total Package	450 mW	450 mW
Temperature Range		
Operating Temperature	–55°C to +125°C	–55°C to +125°C
Storage Temperature	–65°C to +200°C	–65°C to +200°C
The following ratings apply for each transistor in the device:		
Collector-to-Emitter Voltage, V_{CEO}	15 V	15 V
Collector-to-Base Voltage, V_{CBO}	20 V	30 V
Collector-to-Substrate Voltage, V_{CIO} (Note 2)	20 V	40 V
Emitter-to-Base Voltage, V_{EBO}	5 V	5 V
Collector Current, I_C	50 mA	50 mA

ELECTRICAL CHARACTERISTICS FOR μA3018A (T_A = 25°C unless otherwise specified)

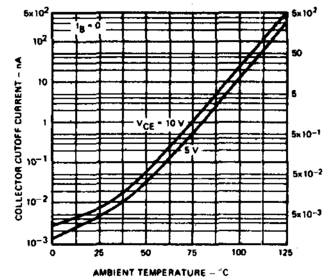
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
I_{CBO}	Collector Cutoff Current	V_{CB} = 10 V, I_E = 0		0.002	40	nA
I_{CEO}	Collector Cutoff Current	V_{CE} = 10 V, I_B = 0		See Curve	0.5	μA
I_{CEOD}	Collector Cutoff Current Darlington Pair	V_{CE} = 10 V, I_B = 0			5.0	μA
$V_{(BR)CEO}$	Collector-to-Emitter Breakdown Voltage	I_C = 1 mA, I_B = 0	15	24		V
$V_{(BR)CBO}$	Collector-to-Base Breakdown Voltage	I_C = 10 μA, I_E = 0	30	60		V
$V_{(BR)EBO}$	Emitter-to-Base Breakdown Voltage	I_E = 10 μA, I_C = 0	5.0	7.0		V
$V_{(BR)CIO}$	Collector-to-Substrate Breakdown Voltage	I_C = 10 μA, I_{CI} = 0	40	60		V
V_{CES}	Collector-to-Emitter Saturation Voltage	I_B = 1 mA, I_C = 10 mA		0.23	0.5	V
h_{FE}	Static Forward Current Transfer Ratio	V_{CE} = 3 V { I_C = 10 mA I_C = 1 mA I_C = 10 μA	50 60 30	100 100 54		
	Magnitude of Static-Beta Ratio (Isolated Transistors Q_1 and Q_2)	V_{CE} = 3 V, I_{C1} = I_{C2} = 1 mA	0.9	0.97		
h_{FED}	Static Forward Current Transfer Ratio Darlington Pair (Q_3 & Q_4)	V_{CE} = 3 V { I_C = 1 mA I_C = 100 μA	2000 1000	5400 2800		
V_{BE}	Base-to-Emitter Voltage	V_{CE} = 3 V { I_E = 1 mA I_E = 10 mA	0.600	0.715 0.800	0.800 0.900	V
$\|V_{BE1}\| - \|V_{BE2}\|$	Input Offset Voltage	V_{CE} = 3 V, I_E = 1 mA		0.48	2.0	mV
$\frac{\Delta V_{BE}}{\Delta T}$	Temperature Coefficient: Base-to-Emitter Voltage Q_1, Q_2	V_{CE} = 3 V, I_E = 1 mA		−1.9		mV/°C
V_{BED} (V_{9-1})	Base (Q_3)-to-Emitter (Q_4) Voltage-Darlington Pair	V_{CE} = 3 V { I_E = 10 mA I_E = 1 mA	 1.10	1.46 1.32	1.60 1.50	V
$\frac{\Delta V_{BED}}{\Delta T}$	Temperature Coefficient: Base-to-Emitter Voltage Darlington Pair-Q_3,Q_4	V_{CE} = 3 V, I_E = 1 mA		4.4		mV/°C
$\frac{V_{BE1}-V_{BE2}}{\Delta T}$	Temperature Coefficient: Magnitude of Input-Offset Voltage	V_{CC} = +6 V, V_{EE} = −6 V		10		μV/°C
NF	Low Frequency Noise Figure	f = 1 kHz, V_{CE} = 3 V, I_C = 100 μA Source resistance = 1 kΩ		3.25		dB
	Low Frequency, Small-Signal Equivalent Circuit Characteristics:					
h_{fe} h_{ie} h_{oe} h_{re}	Forward Current-Transfer Ratio Short Circuit Input Resistance Open Circuit Output Conductance Open Circuit Reverse Voltage-Transfer Ratio	f = 1 kHz, V_{CE} = 3 V, I_C = 1 mA		110 3.5 15.6 1.8×10^{-4}		 kΩ μmho
	Admittance Characteristics:					
Y_{fe} Y_{ie} Y_{oe} Y_{re}	Forward Transfer Admittance Input Admittance Output Admittance Reverse Transfer Admittance	f = 1 MHz, V_{CE} = 3 V, I_C = 1 mA		31 −j 1.5 0.3+j 0.04 0.001+j 0.03 See Curve		mmho mmho mmho mmho
f_T	Gain-Bandwidth Product	V_{CE} = 3 V, I_C = 3 mA		500		MHz
C_{eb}	Emitter-to-Base Capacitance	V_{EB} = 3 V, I_E = 0		0.6		pF
C_{cb}	Collector-to-Base Capacitance	V_{CB} = 3 V, I_C = 0		0.58		pF
C_{CI}	Collector-to-Substrate Capacitance	V_{CI} = 3 V, I_C = 0		2.8		pF

TYPICAL PERFORMANCE CURVES FOR μA3018/3018A

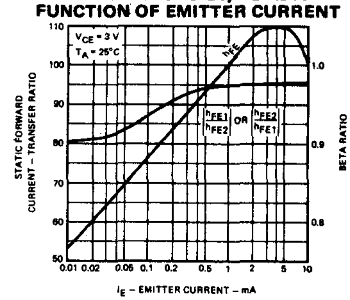
COLLECTOR-TO-BASE CUTOFF CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE FOR EACH TRANSISTOR



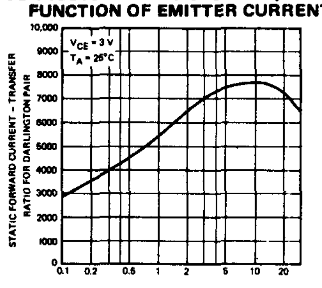
COLLECTOR-TO-EMITTER CUTOFF CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE FOR EACH TRANSISTOR



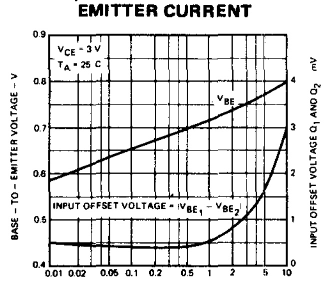
STATIC FORWARD CURRENT-TRANSFER AND BETA RATIO FOR TRANSISTORS Q1, Q2 AS A FUNCTION OF EMITTER CURRENT



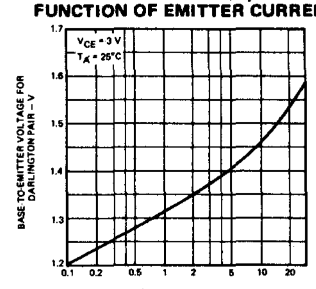
STATIC FORWARD CURRENT-TRANSFER RATIO FOR DARLINGTON CONNECTED TRANSISTORS Q3, Q4 AS A FUNCTION OF EMITTER CURRENT



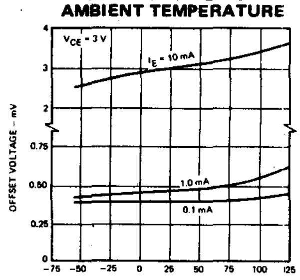
STATIC BASE-TO-EMITTER VOLTAGE AND INPUT OFFSET VOLTAGE FOR Q1, Q2 AS A FUNCTION OF EMITTER CURRENT



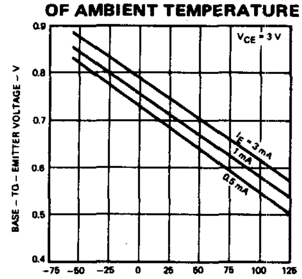
STATIC INPUT VOLTAGE FOR DARLINGTON PAIR Q3, Q4 AS A FUNCTION OF EMITTER CURRENT



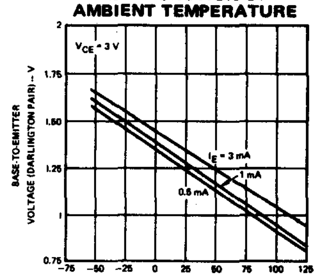
OFFSET VOLTAGE CHARACTERISTIC AS A FUNCTION OF AMBIENT TEMPERATURE



BASE-TO-EMITTER VOLTAGE CHARACTERISTIC FOR EACH TRANSISTOR AS A FUNCTION OF AMBIENT TEMPERATURE

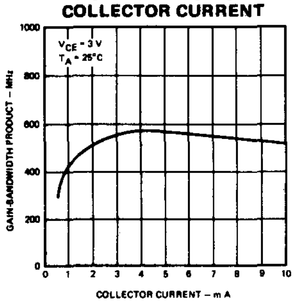


STATIC INPUT VOLTAGE FOR DARLINGTON PAIR (Q_3, Q_4) AS A FUNCTION OF AMBIENT TEMPERATURE

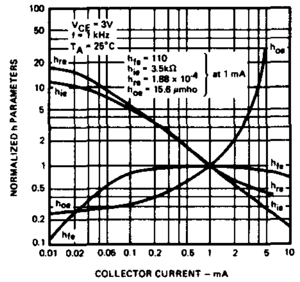


TYPICAL AC CHARACTERISTICS FOR EACH TRANSISTOR

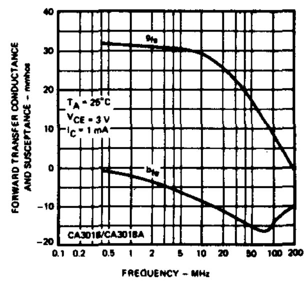
GAIN-BANDWIDTH PRODUCT (f_T) AS A FUNCTION OF COLLECTOR CURRENT



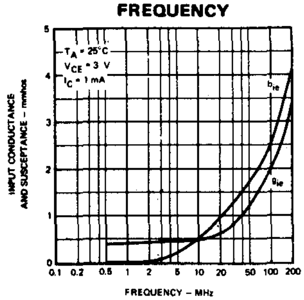
NORMALIZED h PARAMETERS AS A FUNCTION OF COLLECTOR CURRENT



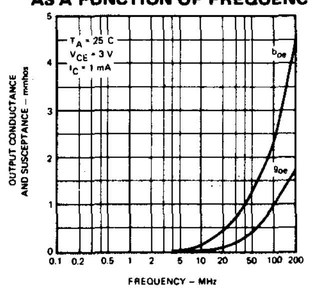
FORWARD TRANSFER ADMITTANCE (Y_{fe}) AS A FUNCTION OF FREQUENCY



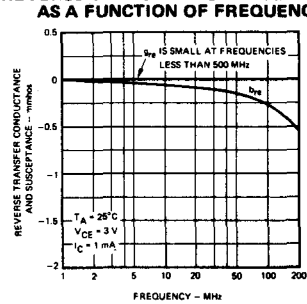
INPUT ADMITTANCE (Y_{ie}) AS A FUNCTION OF FREQUENCY



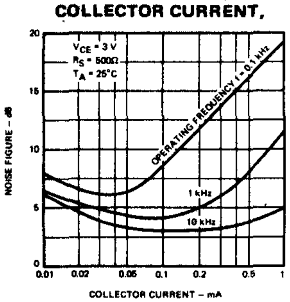
OUTPUT ADMITTANCE (Y_{oe}) AS A FUNCTION OF FREQUENCY



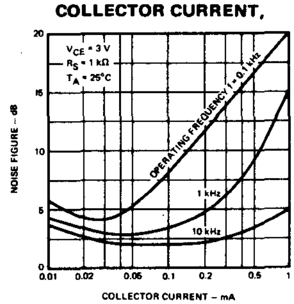
REVERSE TRANSFER ADMITTANCE (Y_{re}) AS A FUNCTION OF FREQUENCY



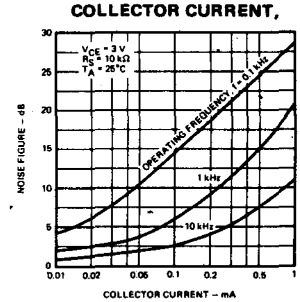
NOISE FIGURE AS A FUNCTION OF COLLECTOR CURRENT,



NOISE FIGURE AS A FUNCTION OF COLLECTOR CURRENT,



NOISE FIGURE AS A FUNCTION OF COLLECTOR CURRENT,



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