MC3346

General Purpose Transistor Array One Differentially Connected Pair and Three Isolated Transistor Arrays

The MC3346 is designed for general purpose, low power applications for consumer and industrial designs.

- Guaranteed Base−Emitter Voltage Matching
- Operating Current Range Specified: 10 μA to 10 mA
- Five General Purpose Transistors in One Package

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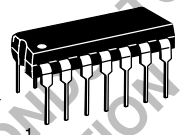
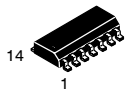
GENERAL PURPOSE TRANSISTOR ARRAY

SEMICONDUCTOR TECHNICAL DATA



P SUFFIX
PLASTIC PACKAGE
CASE 646

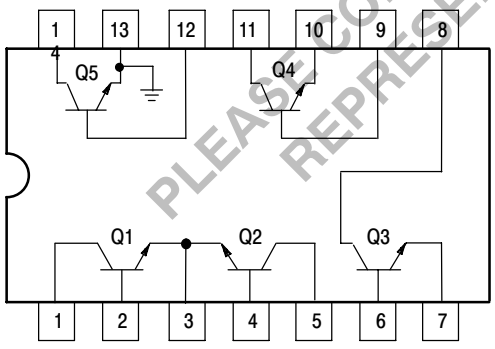


D SUFFIX
PLASTIC PACKAGE
CASE 751A
(SO−14)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}	15	Vdc
Collector−Base Voltage	V_{CBO}	20	Vdc
Emitter−Base Voltage	V_{EB}	5.0	Vdc
Collector−Substrate Voltage	V_{CIO}	20	Vdc
Collector Current − Continuous	I_C	50	mAdc
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	1.2 10	W mW/°C
Operating Temperature Range	T_A	−40 to +85	°C
Storage Temperature Range	T_{stg}	−65 to +150	°C

PIN CONNECTIONS



Pin 13 is connected to substrate and must remain at the lowest circuit potential.

ORDERING INFORMATION

Device	Operating Temperature Range	Package
MC3346D	T_A = −40° to +85°C	SO−14
MC3356P		Plastic DIP

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

Characteristics	Symbol	Min	Typ	Max	Unit
STATIC CHARACTERISTICS					
Collector−Base Breakdown Voltage (I_C = 10 μAdc)	$V_{(BR)CBO}$	20	60	–	Vdc
Collector−Emitter Breakdown Voltage (I_C = 1.0 mAdc)	$V_{(BR)CEO}$	15	–	–	Vdc
Collector−Substrate Breakdown Voltage (I_C = 10 μA)	$V_{(BR)CIO}$	20	60	–	Vdc
Emitter−Base Breakdown Voltage (I_E = 10 μAdc)	$V_{(BR)EBO}$	5.0	7.0	–	Vdc
Collector−Base Cutoff Current (V_{CB} = 10 Vdc, I_E = 0)	I_{CBO}	–	–	40	nAdc
DC Current Gain (I_C = 10 mAdc, V_{CE} = 3.0 Vdc) (I_C = 1.0 mAdc, V_{CE} = 3.0 Vdc) (I_C = 10 μAdc, V_{CE} = 3.0 Vdc)	h_{FE}	 – 40 –	 140 130 60	 – – –	–
Base−Emitter Voltage (V_{CE} = 3.0 Vdc, I_E = 1.0 mAdc) (V_{CE} = 3.0 Vdc, I_E = 10 mAdc)	V_{BE}	 – –	 0.72 0.8	 – –	Vdc
Input Offset Current for Matched Pair Q1 and Q2 (V_{CE} = 3.0 Vdc, I_C = 1.0 mAdc)	$\lvert I_{IO1} - I_{IO2} \rvert$	–	0.3	2.0	μAdc
Magnitude of Input Offset Voltage (V_{CE} = 3.0 Vdc, I_C = 1.0 mAdc)	–	–	0.5	5.0	mVdc
Temperature Coefficient of Base−Emitter Voltage (V_{CE} = 3.0 Vdc, I_C = 1.0 mAdc)	$\frac{\Delta V_{BE}}{D_T}$	–	−1.9	–	mV/°C
Temperature Coefficient	$\frac{\lvert \Delta V_{IO} \rvert}{D_T}$	–	1.0	–	μV/°C
Collector−Emitter Cutoff Current (V_{CE} = 10 Vdc, I_B = 0)	I_{CEO}	–	–	0.5	μAdc
DYNAMIC CHARACTERISTICS					
Low Frequency Noise Figure (V_{CE} = 3.0 Vdc, I_C = 100 μAdc, R_S = 1.0 kΩ, f = 1.0 kHz)	NF	–	3.25	–	dB
Forward Current Transfer Ratio (V_{CE} = 3.0 Vdc, I_C = 1.0 mAdc, f = 1.0 kHz)	h_{FE}	–	110	–	–
Short Circuit Input Impedance (V_{CE} = 3.0 Vdc, I_C = 1.0 mAdc)	h_{ie}	–	3.5	–	kΩ
Open Circuit Output Impedance (V_{CE} = 3.0 Vdc, I_C = 1.0 mAdc)	h_{oe}	–	15.6	–	μmhos
Reverse Voltage Transfer Ratio (V_{CE} = 3.0 Vdc, I_C = 1.0 mAdc)	h_{re}	–	1.8	–	$x10^{-4}$
Forward Transfer Admittance (V_{CE} = 3.0 Vdc, I_C = 1.0 mAdc, f = 1.0 MHz)	y_{fe}	–	31−j1.5	–	–
Input Admittance (V_{CE} = 3.0 Vdc, I_C = 1.0 mAdc, f = 1.0 MHz)	y_{ie}	–	0.3 + j0.04	–	–
Output Admittance (V_{CE} = 3.0 Vdc, I_C = 1.0 mAdc, f = 1.0 MHz)	y_{oe}	–	0.001 + j0.03	–	–
Current−Gain − Bandwidth Product (V_{CE} = 3.0 Vdc, I_C = 3.0 mAdc)	f_T	300	550	–	MHz
Emitter−Base Capacitance (V_{EB} = 3.0 Vdc, I_E = 0)	C_{eb}	–	0.6	–	pF
Collector−Base Capacitance (V_{CB} = 3.0 Vdc, I_C = 0)	C_{cb}	–	0.58	–	pF
Collector−Substrate Capacitance (V_{CS} = 3.0 Vdc, I_C = 0)	C_{CI}	–	2.8	–	pF

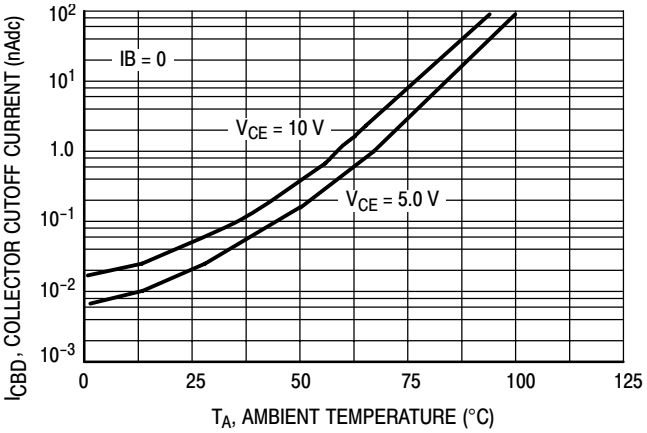


Figure 1. Collector Cutoff Current versus Temperature (Each Transistor)

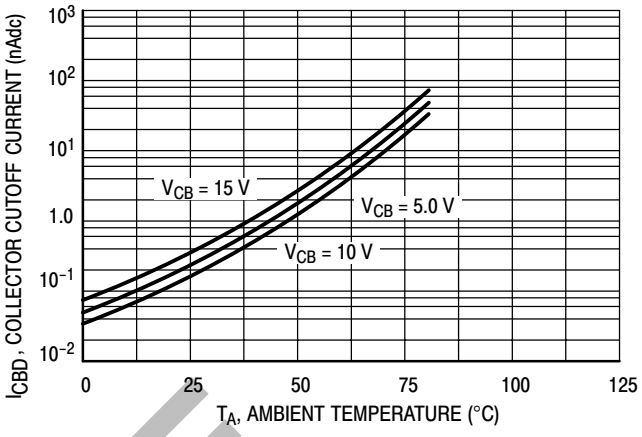


Figure 2. Collector Cutoff Current versus Temperature (Each Transistor)

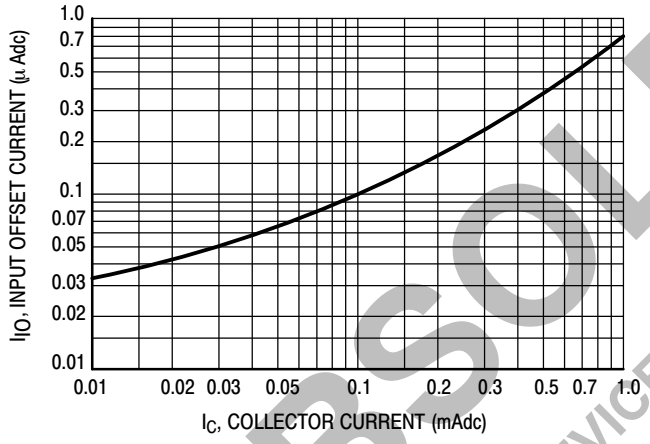


Figure 3. Input Offset Characteristics for Q1 and Q2

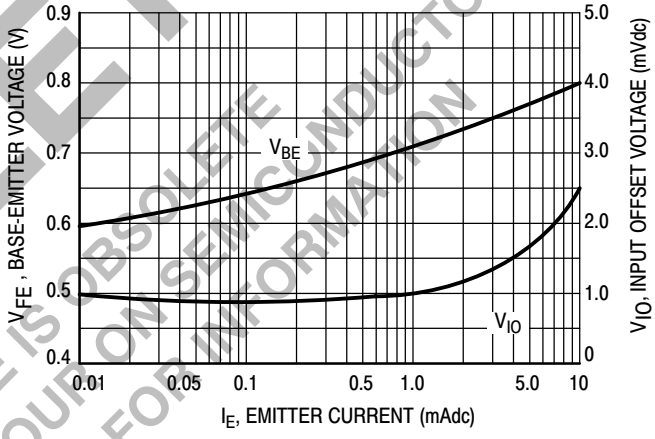


Figure 4. Base−Emitter and Input Offset Voltage Characteristics

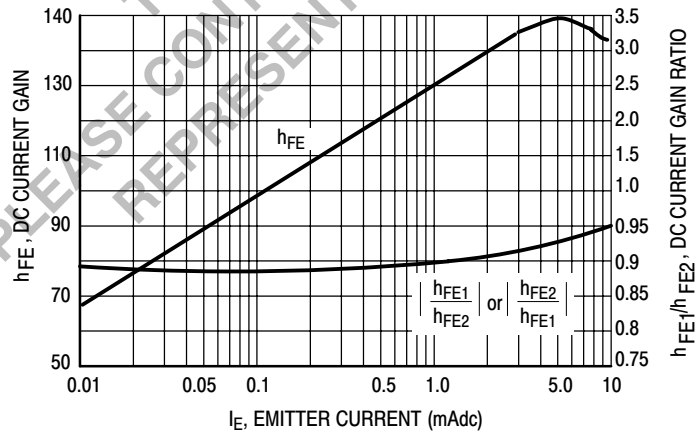
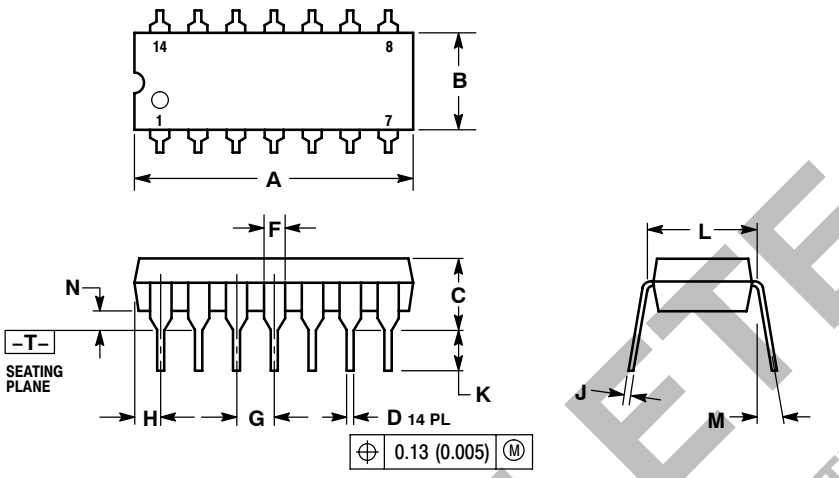


Figure 5. DC Current Gain

PACKAGE DIMENSIONS

P SUFFIX
PLASTIC PACKAGE
CASE 646–06
ISSUE M

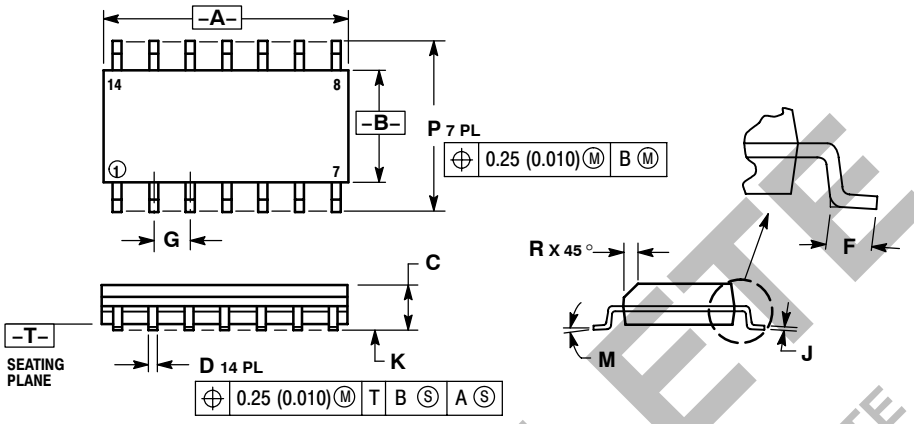


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.715	0.770	18.16	18.80
B	0.240	0.260	6.10	6.60
C	0.145	0.185	3.69	4.69
D	0.015	0.021	0.38	0.53
F	0.040	0.070	1.02	1.78
G	0.100 BSC		2.54 BSC	
H	0.052	0.095	1.32	2.41
J	0.008	0.015	0.20	0.38
K	0.115	0.135	2.92	3.43
L	0.290	0.310	7.37	7.87
M	---	10°	---	10°
N	0.015	0.039	0.38	1.01

PACKAGE DIMENSIONS

D SUFFIX
PLASTIC PACKAGE
CASE 751A–03
(SO–8)
ISSUE F



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	8.55	8.75	0.337	0.344
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0 °	7 °	0 °	7 °
P	5.80	6.20	0.228	0.244
R	0.25	0.50	0.010	0.019

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