

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

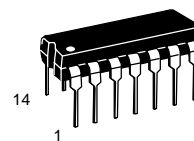
The MC3346 is designed for general purpose, low power applications for consumer and industrial designs.

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

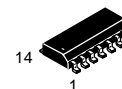
MC3346

GENERAL PURPOSE TRANSISTOR ARRAY

SEMICONDUCTOR TECHNICAL DATA



P SUFFIX
PLASTIC PACKAGE
CASE 646



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

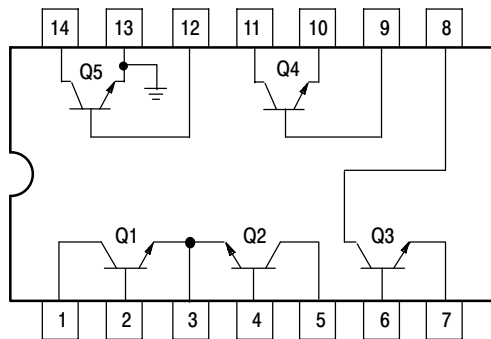
MAXIMUM RATINGS

| 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 @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 1.2 10 | W mW/ $^\circ\text{C}$ |
| Operating Temperature Range | T_A | -40 to $+85$ | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -65 to $+150$ | $^\circ\text{C}$ |

ORDERING INFORMATION

| Device | Operating Temperature Range | Package |
|---------|--|-------------|
| MC3346D | $T_A = -40^\circ$ to $+85^\circ\text{C}$ | SO-14 |
| MC3356P | | Plastic DIP |

PIN CONNECTIONS



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

MC3346

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) | I _{IO1} – I _{IO2} | – | 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 | $\frac{ \Delta V_{IO} }{D_T}$ | – | 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 | – | μmos |
| 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 _{Cl} | – | 2.8 | – | pF |

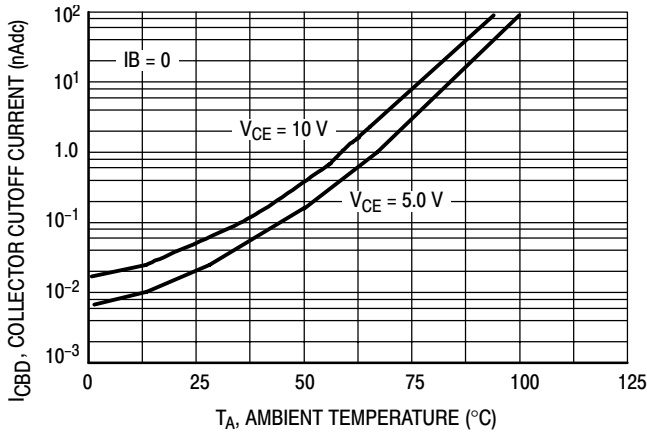


Figure 1. Collector Cutoff Current versus Temperature (Each Transistor)

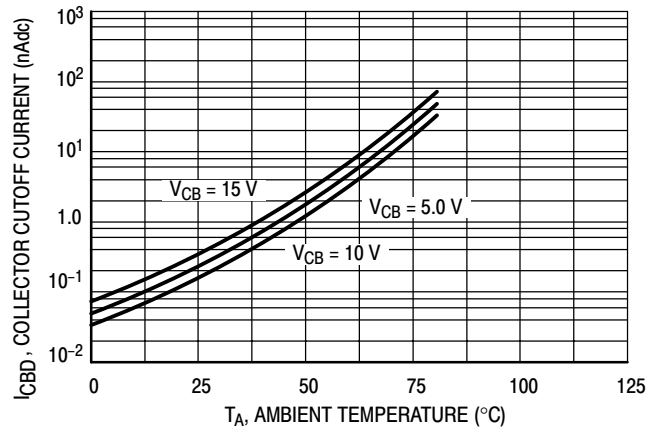


Figure 2. Collector Cutoff Current versus Temperature (Each Transistor)

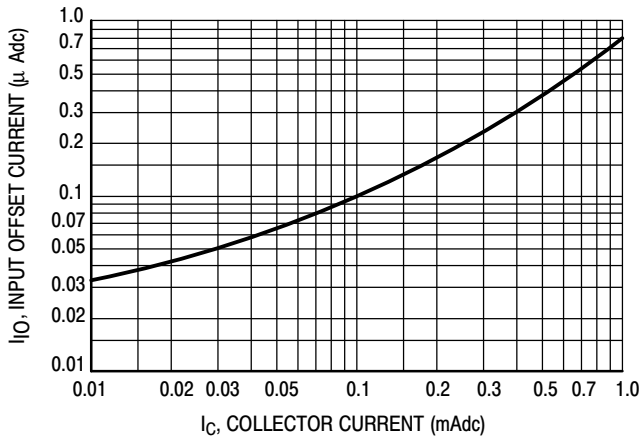


Figure 3. Input Offset Characteristics for Q1 and Q2

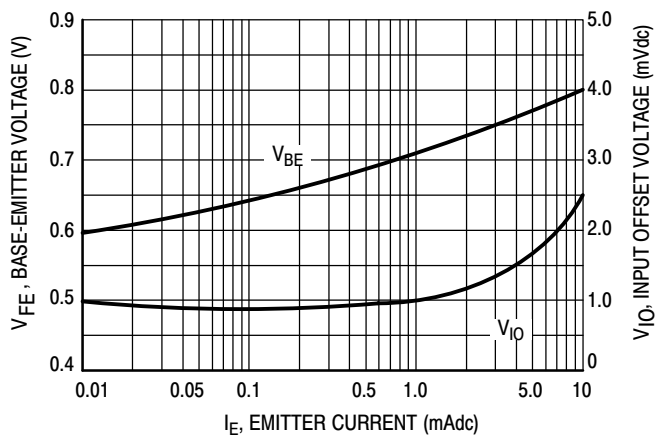


Figure 4. Base-Emitter and Input Offset Voltage Characteristics

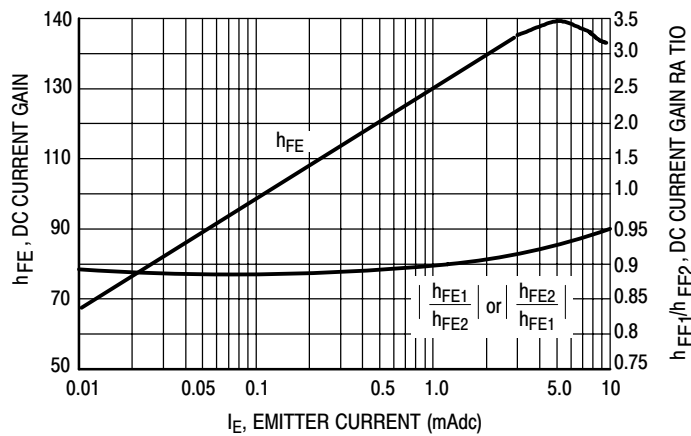
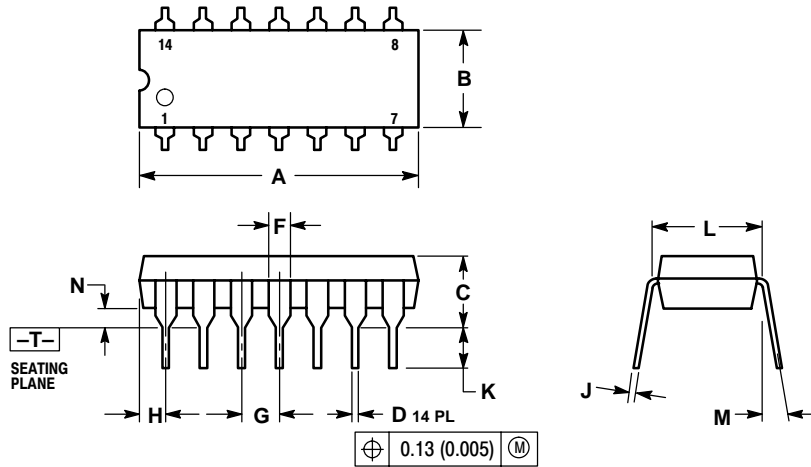


Figure 5. DC Current Gain

MC3346

PACKAGE DIMENSIONS

P SUFFIX
 PLASTIC PACKAGE
 CASE 646-06
 ISSUE M



NOTES:

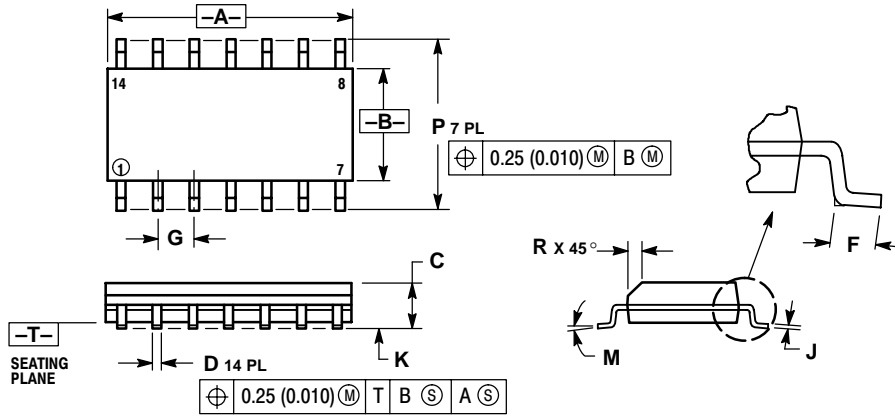
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | 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° | |
| N | 0.015 | 0.039 | 0.38 | 1.01 |

MC3346

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.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|-----------|-------|
| | 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 |

Notes

Notes

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