



MOTOROLA

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

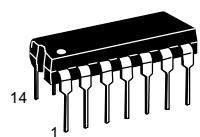
The MC3346 is designed for general purpose, low power applications for consumer and industrial designs.

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

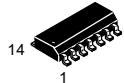
## MC3346

### GENERAL PURPOSE TRANSISTOR ARRAY

#### SEMICONDUCTOR TECHNICAL DATA



P SUFFIX  
PLASTIC PACKAGE  
CASE 646

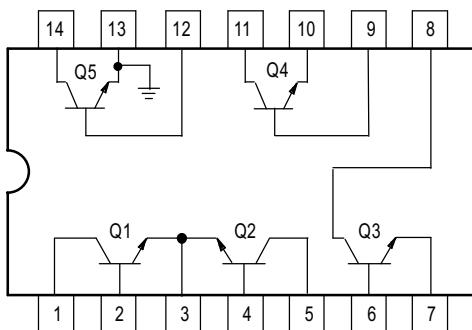


D SUFFIX  
PLASTIC PACKAGE  
CASE 751A  
(SO-14)

#### ORDERING INFORMATION

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

#### PIN CONNECTIONS



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

# MC3346

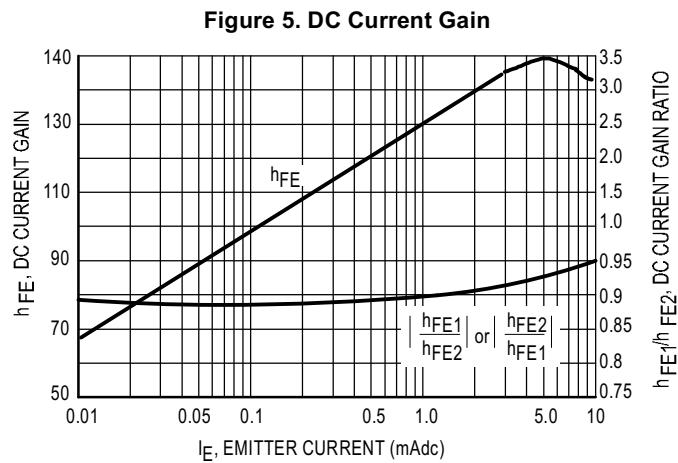
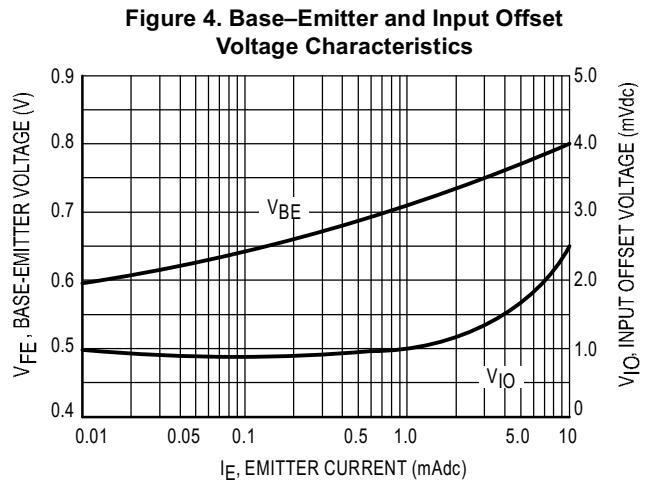
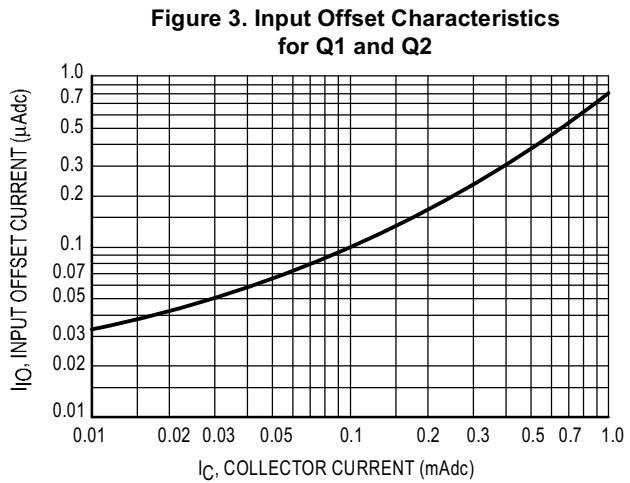
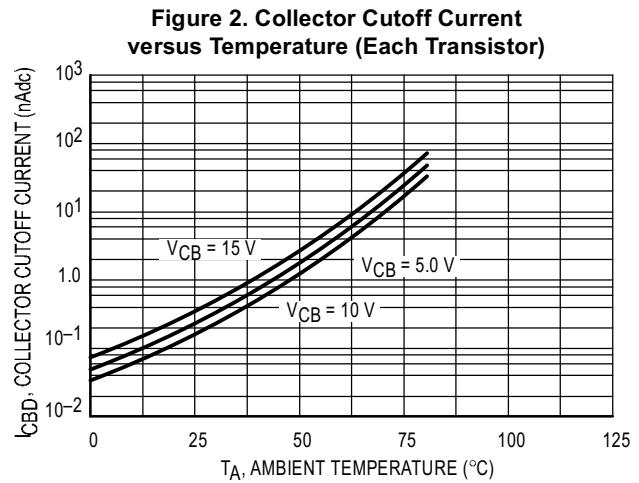
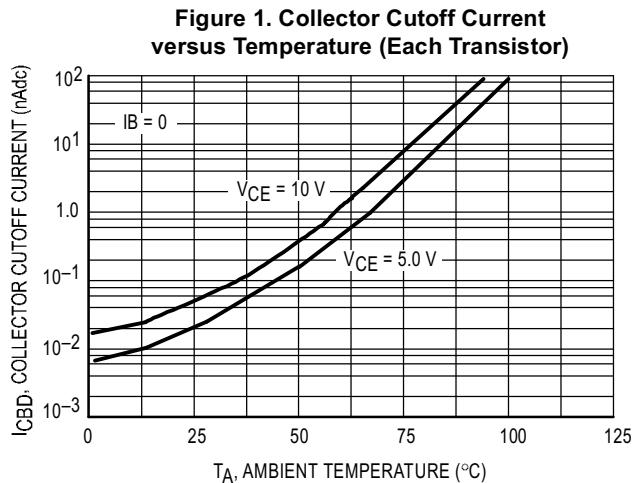
**ELECTRICAL CHARACTERISTICS** ( $T_A = +25^\circ\text{C}$ , unless otherwise noted.)

Characteristics	Symbol	Min	Typ	Max	Unit
<b>STATIC CHARACTERISTICS</b>					
Collector–Base Breakdown Voltage ( $I_C = 10 \mu\text{Adc}$ )	$V_{(\text{BR})\text{CBO}}$	20	60	—	Vdc
Collector–Emitter Breakdown Voltage ( $I_C = 1.0 \text{ mAdc}$ )	$V_{(\text{BR})\text{CEO}}$	15	—	—	Vdc
Collector–Substrate Breakdown Voltage ( $I_C = 10 \mu\text{A}$ )	$V_{(\text{BR})\text{CIO}}$	20	60	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}$ )	$V_{(\text{BR})\text{EBO}}$	5.0	7.0	—	Vdc
Collector–Base Cutoff Current ( $V_{CB} = 10 \text{ Vdc}, I_E = 0$ )	$I_{\text{CBO}}$	—	—	40	nAdc
DC Current Gain ( $I_C = 10 \text{ mAdc}, V_{CE} = 3.0 \text{ Vdc}$ ) ( $I_C = 1.0 \text{ mAdc}, V_{CE} = 3.0 \text{ Vdc}$ ) ( $I_C = 10 \mu\text{Adc}, V_{CE} = 3.0 \text{ Vdc}$ )	$h_{FE}$	— 40 —	140 130 60	—	—
Base–Emitter Voltage ( $V_{CE} = 3.0 \text{ Vdc}, I_E = 1.0 \text{ mAdc}$ ) ( $V_{CE} = 3.0 \text{ Vdc}, I_E = 10 \text{ mAdc}$ )	$V_{BE}$	— —	0.72 0.8	—	Vdc
Input Offset Current for Matched Pair Q1 and Q2 ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}$ )	$ I_{IO1} - I_{IO2} $	—	0.3	2.0	μAdc
Magnitude of Input Offset Voltage ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}$ )	—	—	0.5	5.0	mVdc
Temperature Coefficient of Base–Emitter Voltage ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}$ )	$\frac{\Delta V_{BE}}{D_T}$	—	-1.9	—	mV/°C
Temperature Coefficient	$\frac{ \Delta V_{IO} }{D_T}$	—	1.0	—	μV/°C
Collector–Emitter Cutoff Current ( $V_{CE} = 10 \text{ Vdc}, I_B = 0$ )	$I_{\text{CEO}}$	—	—	0.5	μAdc

## DYNAMIC CHARACTERISTICS

Low Frequency Noise Figure ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 100 \mu\text{Adc}, R_S = 1.0 \text{ kΩ}, f = 1.0 \text{ kHz}$ )	NF	—	3.25	—	dB
Forward Current Transfer Ratio ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}, f = 1.0 \text{ kHz}$ )	$h_{FE}$	—	110	—	—
Short Circuit Input Impedance ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}$ )	$h_{ie}$	—	3.5	—	kΩ
Open Circuit Output Impedance ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}$ )	$h_{oe}$	—	15.6	—	μmhos
Reverse Voltage Transfer Ratio ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}$ )	$h_{re}$	—	1.8	—	$\times 10^{-4}$
Forward Transfer Admittance ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}, f = 1.0 \text{ MHz}$ )	$y_{fe}$	—	31-j1.5	—	—
Input Admittance ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}, f = 1.0 \text{ MHz}$ )	$y_{ie}$	—	0.3 + j0.04	—	—
Output Admittance ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}, f = 1.0 \text{ MHz}$ )	$y_{oe}$	—	0.001 + j0.03	—	—
Current–Gain – Bandwidth Product ( $V_{CE} = 3.0 \text{ Vdc}, I_C = 3.0 \text{ mAdc}$ )	$f_T$	300	550	—	MHz
Emitter–Base Capacitance ( $V_{EB} = 3.0 \text{ Vdc}, I_E = 0$ )	$C_{eb}$	—	0.6	—	pF
Collector–Base Capacitance ( $V_{CB} = 3.0 \text{ Vdc}, I_C = 0$ )	$C_{cb}$	—	0.58	—	pF
Collector–Substrate Capacitance ( $V_{CS} = 3.0 \text{ Vdc}, I_C = 0$ )	$C_{Cl}$	—	2.8	—	pF

## MC3346



# MC3346

## OUTLINE DIMENSIONS

P SUFFIX PLASTIC PACKAGE CASE 646-06 ISSUE L																																																																										
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