General Purpose High Current NPN Transistor Arrays

CA3081 and CA3082 consist of seven high current (to 100mA) silicon NPN transistors on a common monolithic substrate. The CA3081 is connected in a common emitter configuration and the CA3082 is connected in a common collector configuration.

The CA3081 and CA3082 are capable of directly driving seven segment displays, and light emitting diode (LED) displays. These types are also well suited for a variety of other drive applications, including relay control and thyristor firing.

Ordering Information

PART NUMBER (BRAND)	TEMP. RANGE (^{o}C)	PACKAGE	PKG. NO.
CA3081	-55 to 125	16 Ld PDIP	E16.3
CA3081F	-55 to 125	16 Ld CERDIP	F16.3
CA3081M (3081)	-55 to 125	16 Ld SOIC	M16.15
CA3081M96 (3081)	-55 to 125	16 Ld SOIC Tape and Reel	M16.15
CA3082	-55 to 125	16 Ld PDIP	E16.3
CA3082M (3082)	-55 to 125	16 Ld SOIC	M16.15
CA3082M96 (3082)	-55 to 125	16 Ld SOIC Tape and Reel	M16.15

Features

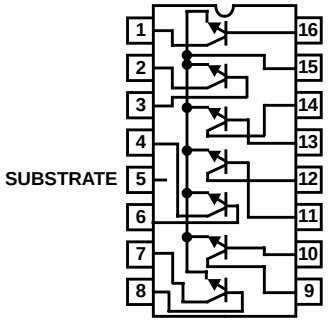
- CA3081 - Common Emitter Array
- CA3082 - Common Collector Array
- Directly Drive Seven Segment Incandescent Displays and Light Emitting Diode (LED) Display
- 7 Transistors Permit a Wide Range of Applications in Either a Common Emitter (CA3081) or Common Collector (CA3082) Configuration
- High I_C . . . . . 100mA (Max)
- Low V_{CESAT} (at 50mA) . . . . . 0.4V (Typ)

Applications

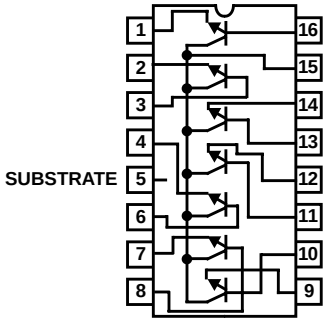
- Drivers for
  - Incandescent Display Devices
  - LED Displays
- Relay Control
- Thyristor Firing

Pinouts

CA3081
COMMON EMITTER CONFIGURATION
(PDIP, CERDIP, SOIC)
TOP VIEW



CA3082
COMMON COLLECTOR CONFIGURATION
(PDIP, SOIC)
TOP VIEW



Absolute Maximum Ratings $T_A = 25^oC$

Collector-to-Emitter Voltage (V_{CEO}) 16V
Collector-to-Base Voltage (V_{CBO}) 20V
Collector-to-Substrate Voltage (V_{CIO}, Note 1) 20V
Emitter-to-Base Voltage (V_{EBO}) 5V
Collector Current (I_C) 100mA
Base Current (I_B) 20mA

Operating Conditions

Temperature Range . . . . . -55^oC to 125^oC

Thermal Information

Thermal Resistance (Typical, Note 2)	θ_{JA} ($^oC/W$)	θ_{JC} ($^oC/W$)
CERDIP Package	135	65
PDIP Package	135	N/A
SOIC Package	200	N/A

Maximum Power Dissipation (Any One Transistor) 500mW
Maximum Junction Temperature (Ceramic Package) . . . . . 175^oC
Maximum Junction Temperature (Plastic Package) . . . . . 150^oC
Maximum Storage Temperature Range . . . . . -65^oC to 150^oC
Maximum Lead Temperature (Soldering 10s) . . . . . 300^oC
(SOIC - Lead Tips Only)

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTES:

1. The collector of each transistor of the CA3081 and CA3082 is isolated from the substrate by an integral diode. The substrate must be connected to a voltage which is more negative than any collector voltage in order to maintain isolation between transistors and provide normal transistor action. To avoid undesired coupling between transistors, the substrate terminal (5) should be maintained at either DC or signal (AC) ground. A suitable bypass capacitor can be used to establish a signal ground.
2. θ_{JA} is measured with the component mounted on an evaluation PC board in free air.

Electrical Specifications For Equipment Design at $T_A = 25^oC$

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 500µA, I_E = 0	20	60	-	V
Collector-to-Substrate Breakdown Voltage	$V_{(BR)CIO}$	I_C = 500µA, I_B = 0	20	60	-	V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 1mA, I_B = 0	16	24	-	V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_C = 500µA	5.0	6.9	-	V
DC Forward Current Transfer Ratio	h_{FE}	V_{CE} = 0.5V, I_C = 30mA	30	68	-	-
		V_{CE} = 0.8V, I_C = 50mA	40	70	-	-
Base-to-Emitter Saturation Voltage (Figure 4)	V_{BESAT}	I_C = 30mA, I_B = 1mA	-	0.87	1.2	V
Collector-to-Emitter Saturation Voltage	V_{CESAT}					
CA3081, CA3082		I_C = 30mA, I_B = 1mA	-	0.27	0.5	V
CA3081 (Figure 5)		I_C = 50mA, I_B = 5mA	-	0.4	0.7	V
CA3082 (Figure 5)		I_C = 50mA, I_B = 5mA	-	0.4	0.8	V
Collector Cutoff Current	I_{CEO}	V_{CE} = 10V, I_B = 0	-	-	10	µA
Collector Cutoff Current	I_{CBO}	V_{CB} = 10V, I_E = 0	-	-	1.0	µA

Typical Read - Out Driver Applications

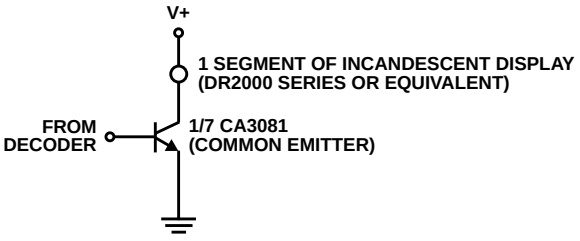
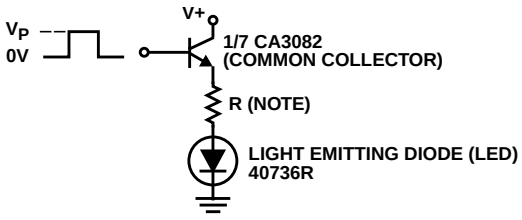


FIGURE 1. SCHEMATIC DIAGRAM SHOWING ONE TRANSISTOR OF THE CA3081 DRIVING ONE SEGMENT OF AN INCANDESCENT DISPLAY



NOTE: The Resistance for R is determined by the relationship:

$$R = \frac{V_P - V_{BE} - V_F(LED)}{I(LED)}$$

$$R = 0 \text{ for } V_P = V_{BE} + V_F(LED)$$

Where: V_P = Input Pulse Voltage
V_F = Forward Voltage Drop Across the Diode

FIGURE 2. SCHEMATIC DIAGRAM SHOWING ONE TRANSISTOR OF THE CA3082 DRIVING A LIGHT EMITTING DIODE (LED)

Typical Performance Curves

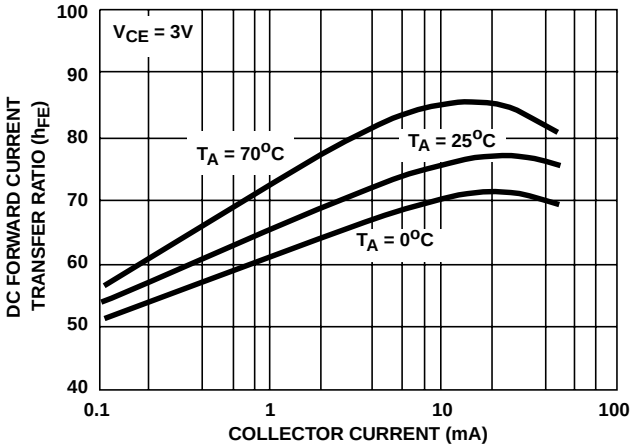


FIGURE 3. DC FORWARD CURRENT TRANSFER RATIO vs COLLECTOR CURRENT

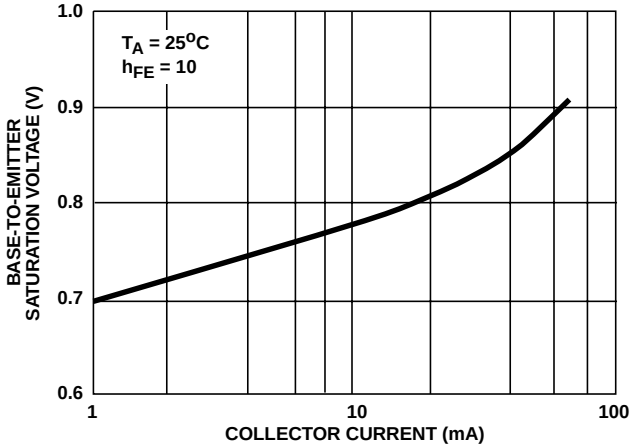


FIGURE 4. BASE-TO-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

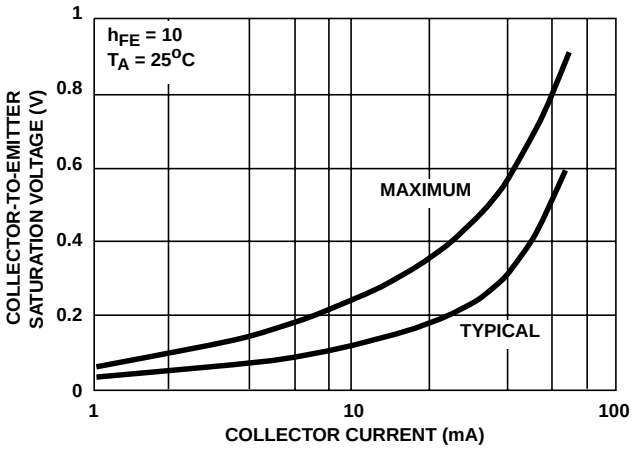


FIGURE 5. COLLECTOR-TO-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

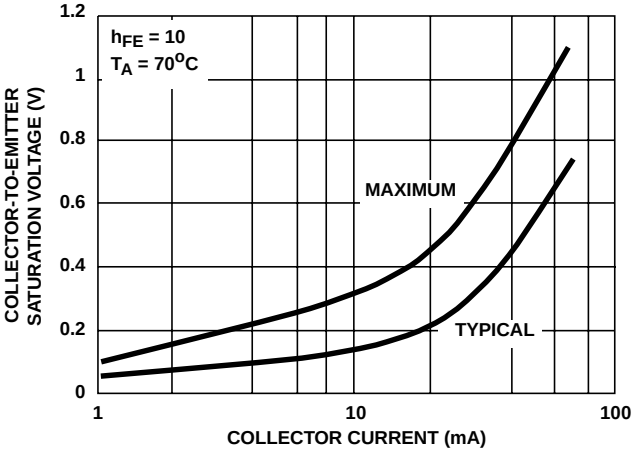


FIGURE 6. COLLECTOR-TO-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT