

TRANSISTOR ARRAY

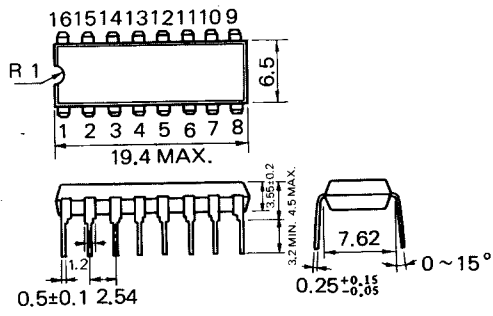
μ PA2001C, μ PA2002C, μ PA2003C, μ PA2004C

NPN SILICON EPITAXIAL DARLINGTON TRANSISTOR ARRAY

DESCRIPTION

The μ PA2001C, 2002C, 2003C and 2004C are monolithic arrays of seven darlington transistors. These devices are especially suited for driving relays, solenoids, LED, lamps, and other devices with up to 0.3 A output current per unit.

PACKAGE DIMENSIONS
in millimeters



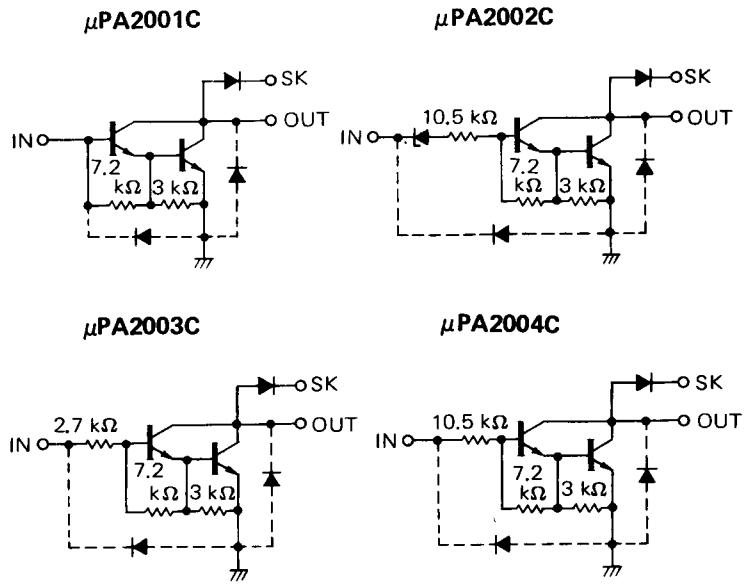
FEATURES

- Transient Protected Outputs
- High DC Current Gain
- High Output Drive Current
- High Output Voltage
- Package is 16 pin PLCC

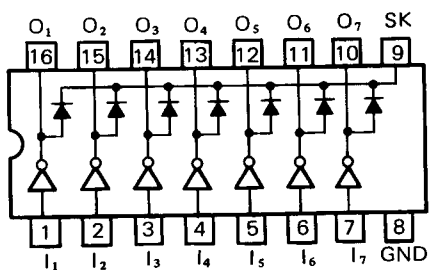
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65 RES ORIG
003535
3535 NEC

EQUIVALENT CIRCUIT (1 Unit)



CONNECTION DIAGRAM (Top View)



- I : Input (Base)
- O : Output (Collector)
- GND : (Common Emitter)
- SK : Surge Killer

ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Currents ($T_a = 25\text{ }^\circ\text{C}$)

| | | | |
|---|-----------|-------------|-----------|
| Output Voltage | V_O | 60 | V |
| Input Voltage (except $\mu\text{PA2001C}$) | V_I | -0.5 to +30 | V |
| Input Current (only $\mu\text{PA2001C}$) | I_I | 25 | mA/unit |
| Output Current | I_O | 500 | mA/unit |
| Output Current | I_{O^*} | 2.3 | A/package |
| Reverse Voltage (Clamp Diode) | V_R | 60 | V |
| Forward Current (Clamp Diode) | I_F | 500 | mA/unit |

Maximum Power Dissipation

| | | | |
|-------------------------|-----------|-----|------------|
| Total Power Dissipation | P_d | 900 | mW/package |
| Total Power Dissipation | P_{d^*} | 2.5 | W/package |

Maximum Temperature

| | | | |
|-----------------------|-----------|-------------|------------------|
| Operating Temperature | T_{opt} | -30 to +75 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

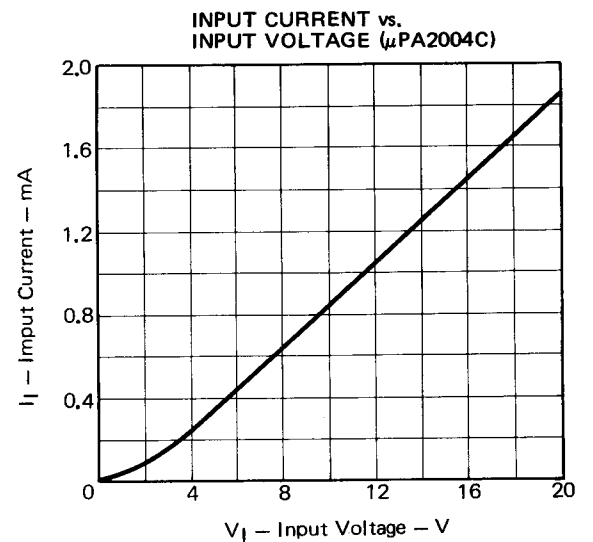
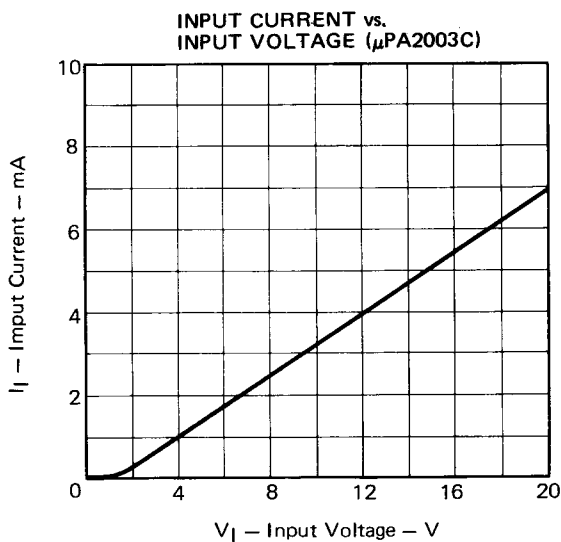
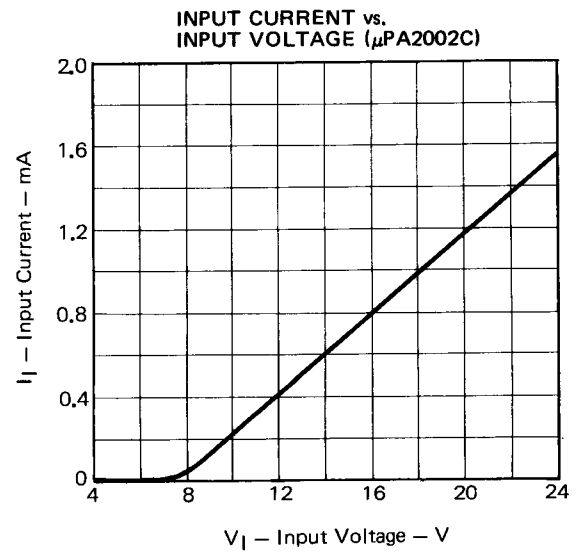
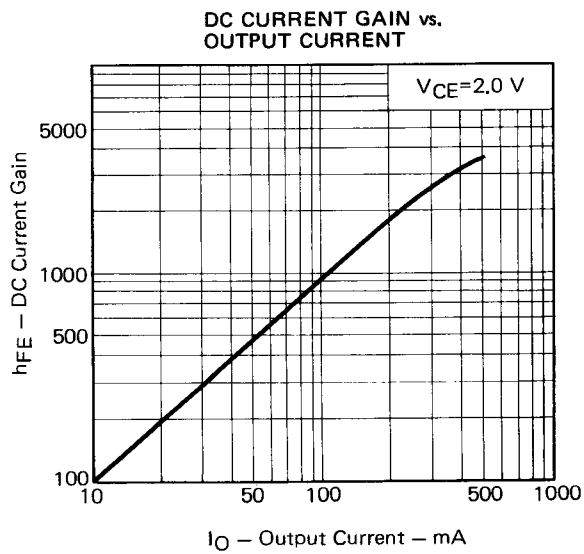
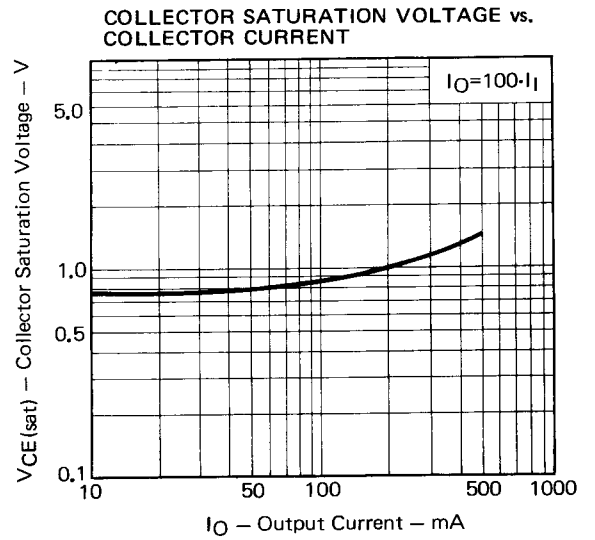
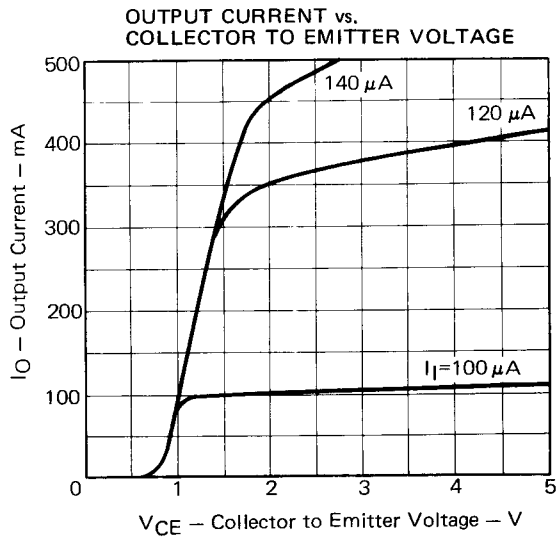
* $PW \leq 20\text{ ms}$, duty cycle $\leq 10\%$

ELECTRICAL CHARACTERISTICS ($T_a = 25\text{ }^\circ\text{C}$)

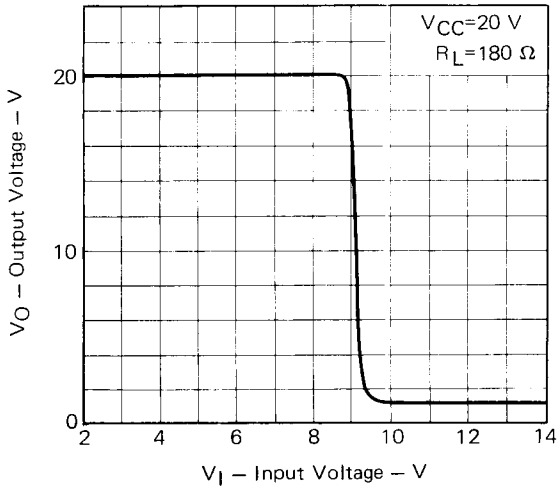
| CHARACTERISTIC | | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|-------------------------------|---------------------|---------------|------|------|------|---------------|---|
| Output Leakage Current | | I_L | | | 10 | μA | $V_{CE}=50\text{ V}$ |
| | | | | | 100 | μA | $V_{CE}=50\text{ V}$, $T_a=70\text{ }^\circ\text{C}$ |
| DC Current Gain | | h_{FE} | 1000 | 2800 | | | $V_{CE}=2.0\text{ V}$, $I_O=350\text{ mA}$ |
| Collector Saturation Voltage | | $V_{CE(sat)}$ | | 0.9 | 1.1 | V | $I_O=100\text{ mA}$, $I_I=250\text{ }\mu\text{A}$ |
| | | | | 1.0 | 1.3 | V | $I_O=200\text{ mA}$, $I_I=350\text{ }\mu\text{A}$ |
| | | | | 1.2 | 1.6 | V | $I_O=350\text{ mA}$, $I_I=500\text{ }\mu\text{A}$ |
| Input Voltage | $\mu\text{PA2002C}$ | V_I | | | 11 | V | $V_{CE}=2.0\text{ V}$, $I_O=100\text{ mA}$ |
| | | | | | 12 | V | $V_{CE}=2.0\text{ V}$, $I_O=200\text{ mA}$ |
| | | | | | 13.5 | V | $V_{CE}=2.0\text{ V}$, $I_O=350\text{ mA}$ |
| | $\mu\text{PA2003C}$ | | | | 2.0 | V | $V_{CE}=2.0\text{ V}$, $I_O=100\text{ mA}$ |
| | | | | | 2.4 | V | $V_{CE}=2.0\text{ V}$, $I_O=200\text{ mA}$ |
| | | | | | 3.4 | V | $V_{CE}=2.0\text{ V}$, $I_O=350\text{ mA}$ |
| | $\mu\text{PA2004C}$ | | | | 5.0 | V | $V_{CE}=2.0\text{ V}$, $I_O=100\text{ mA}$ |
| | | | | | 6.0 | V | $V_{CE}=2.0\text{ V}$, $I_O=200\text{ mA}$ |
| | | | | | 8.0 | V | $V_{CE}=2.0\text{ V}$, $I_O=350\text{ mA}$ |
| Input Current | $\mu\text{PA2002C}$ | I_I | | | 1.3 | mA | $V_I=17\text{ V}$ |
| | $\mu\text{PA2003C}$ | | | | 1.35 | mA | $V_I=3.85\text{ V}$ |
| | $\mu\text{PA2004C}$ | | | | 1.0 | mA | $V_I=5.0\text{ V}$ |
| Reverse Current (Clamp Diode) | | I_R | | | 50 | μA | $V_R=50\text{ V}$ |
| Forward Voltage (Clamp Diode) | | V_F | | | 2.0 | V | $I_F=350\text{ mA}$ |
| Terminal Capacitance | | C_t | | 15 | | pF | $V_I=0$, $f=1.0\text{ MHz}$ |

Note: Input Voltage and Current of the $\mu\text{PA2001C}$ depend on external resistor.

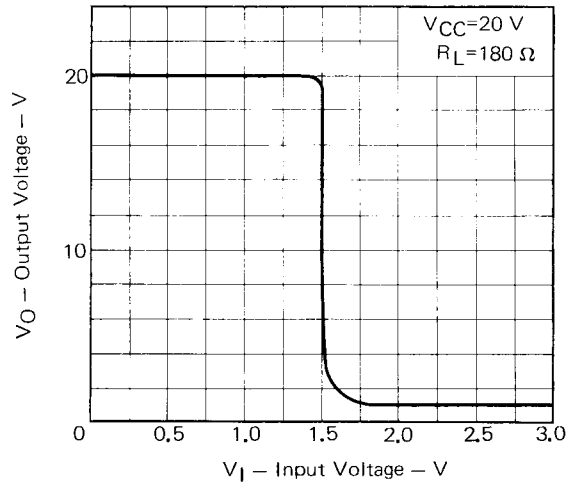
TYPICAL CHARACTERISTICS (Ta = 25 °C)



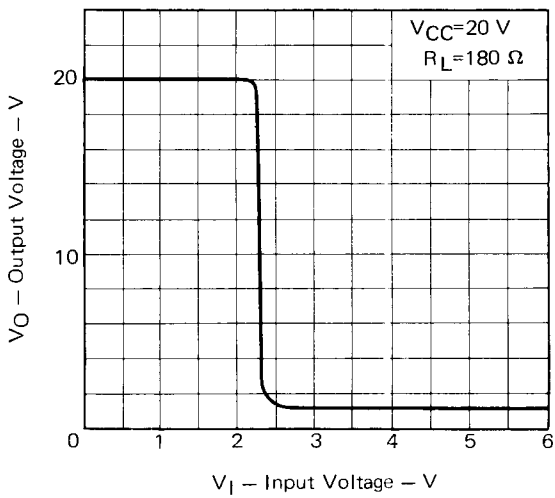
OUTPUT VOLTAGE vs. INPUT VOLTAGE (μ PA2002C)



OUTPUT VOLTAGE vs. INPUT VOLTAGE (μ PA2003C)



OUTPUT VOLTAGE vs. INPUT VOLTAGE (μ PA2004C)



V_O - V_I TEST CIRCUIT

