

# TRANSISTOR ARRAY

## $\mu$ PA2001C, $\mu$ PA2002C, $\mu$ PA2003C, $\mu$ PA2004C

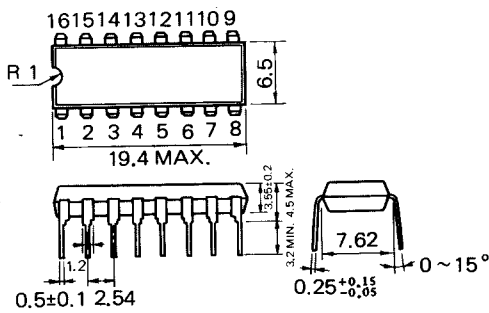
### NPN SILICON EPITAXIAL DARLINGTON TRANSISTOR ARRAY

#### DESCRIPTION

The  $\mu$ 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 PLASTIC DIP

Single Copy  
Handle With Care

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RES

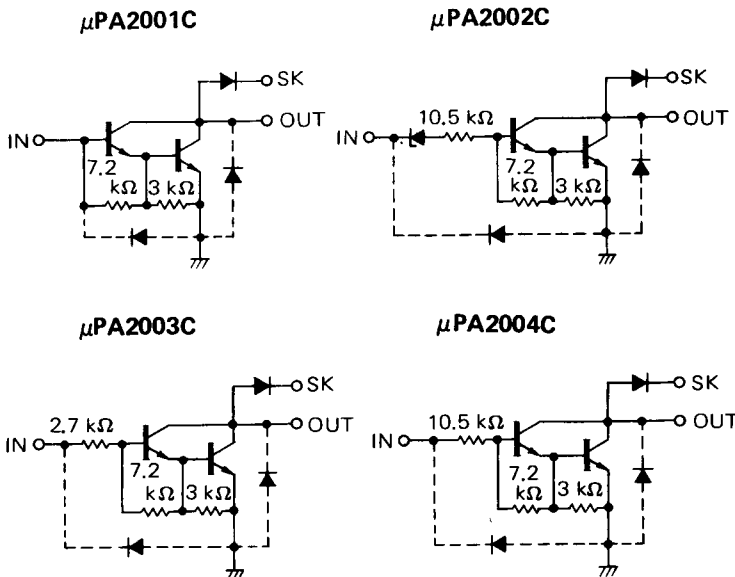
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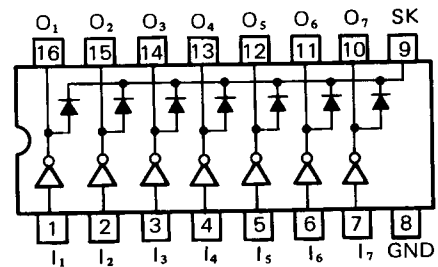
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NEC

#### 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	$^\circ\text{C}$

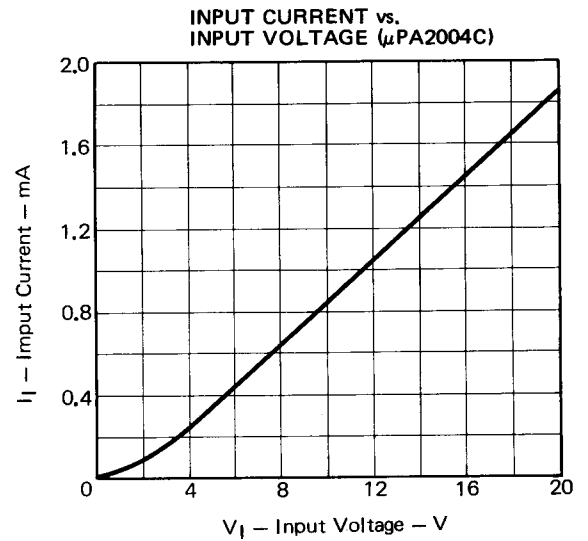
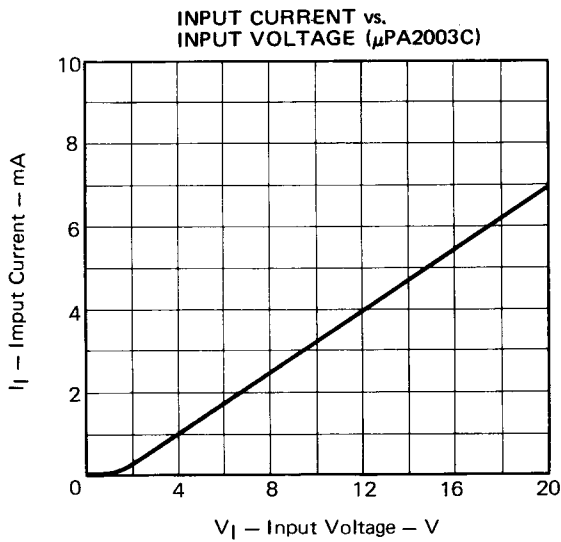
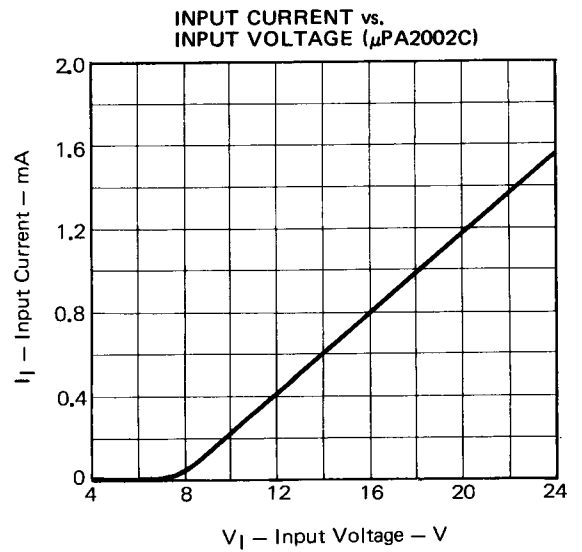
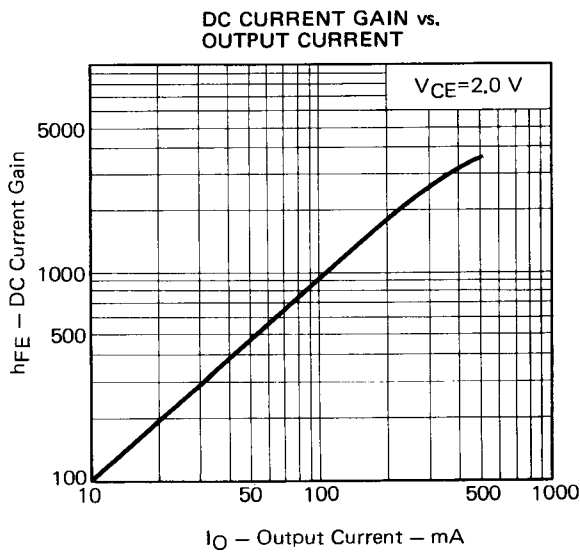
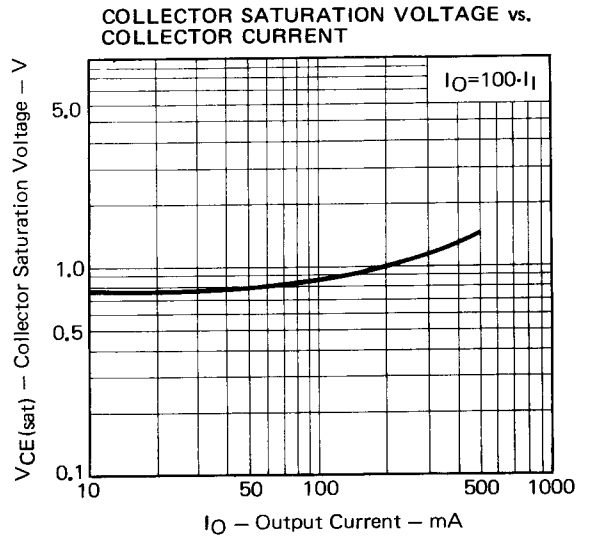
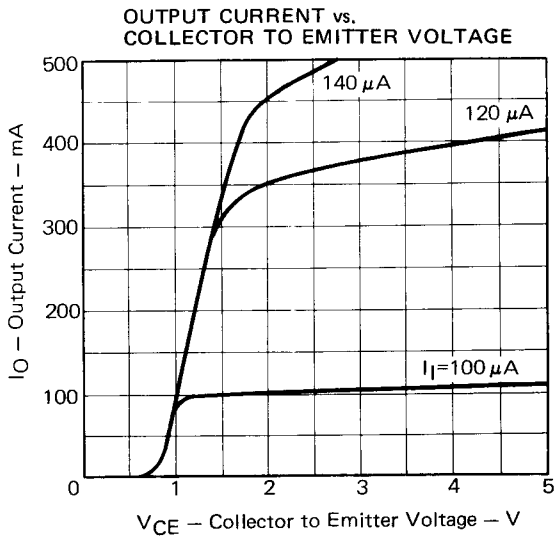
\*  $PW \leq 20\text{ ms}$ , duty cycle  $\leq 10\%$

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

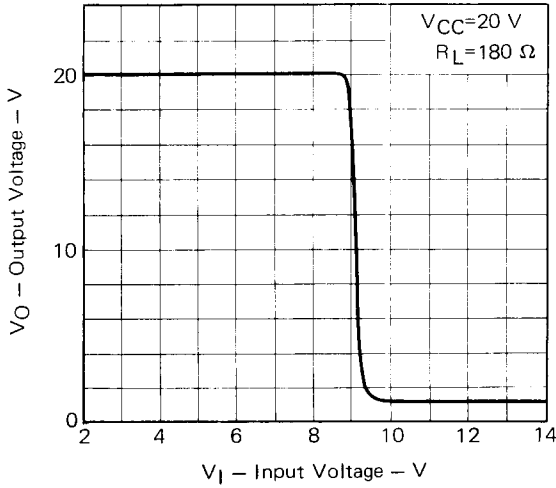
CHARACTERISTIC		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Leakage Current		$I_L$			10	$\mu\text{A}$	$V_{CE}=50\text{ V}$
					100	$\mu\text{A}$	$V_{CE}=50\text{ V}$ , $T_a=70\text{ }^\circ\text{C}$
DC Current Gain		$h_{FE}$	1000	2800			$V_{CE}=2.0\text{ V}$ , $I_O=350\text{ mA}$
Collector Saturation 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	$\mu\text{A}$	$V_R=50\text{ V}$
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.

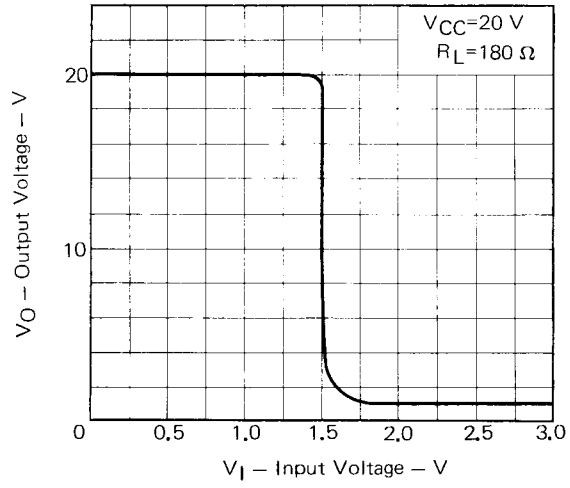
TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )



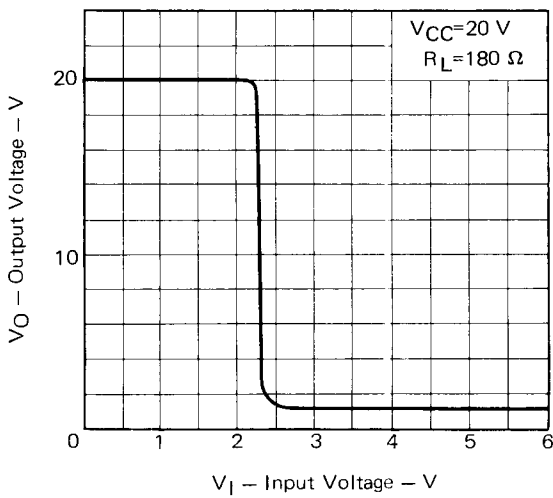
OUTPUT VOLTAGE vs. INPUT VOLTAGE ( $\mu$ PA2002C)



OUTPUT VOLTAGE vs. INPUT VOLTAGE ( $\mu$ PA2003C)



OUTPUT VOLTAGE vs. INPUT VOLTAGE ( $\mu$ PA2004C)



**$V_O$ - $V_I$  TEST CIRCUIT**

