

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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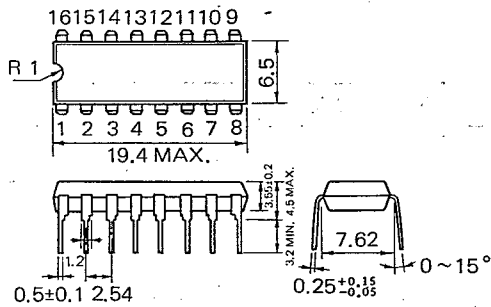
### NPN SILICON EPITAXIAL DARLINGTON TRANSISTOR ARRAY

#### 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

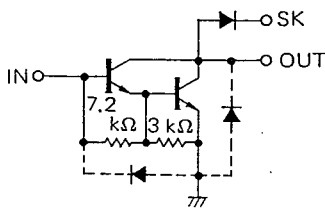


#### FEATURES

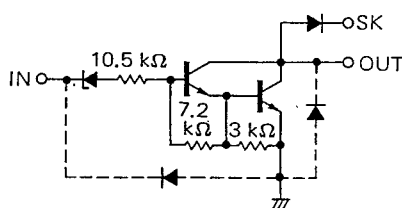
- Transient Protected Outputs
- High DC Current Gain
- High Output Drive Current
- High Output Voltage
- Package is 16 pin PLASTIC DIP.

#### EQUIVALENT CIRCUIT (1 Unit)

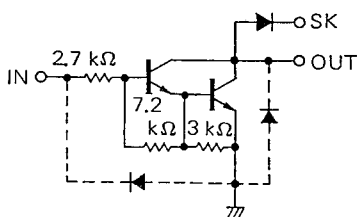
$\mu$ PA2001C



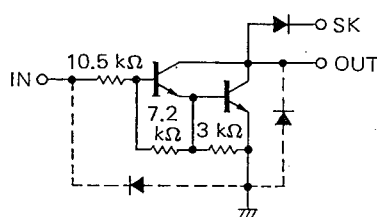
$\mu$ PA2002C



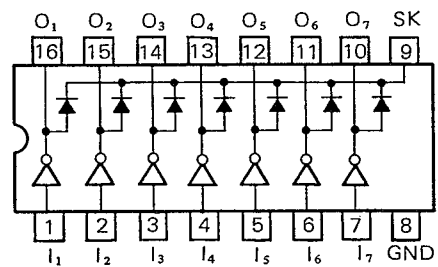
$\mu$ PA2003C



$\mu$ PA2004C



#### CONNECTION DIAGRAM (Top View)



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

**ABSOLUTE MAXIMUM RATINGS**

Maximum Voltages and Currents (Ta = 25 °C)

Output Voltage	VO	60	V
Input Voltage (except μPA2001C)	VI	-0.5 to +30	V
Input Current (only μPA2001C)	II	25	mA/unit
Output Current	IO	500	mA/unit
Output Current	IO*	2.3	A/package
Reverse Voltage (Clamp Diode)	VR	60	V
Forward Current (Clamp Diode)	IF	500	mA/unit

Maximum Power Dissipation

Total Power Dissipation	Pd	900	mW/package
Total Power Dissipation	Pd*	2.5	W/package

Maximum Temperature

Operating Temperature	Topt	-30 to + 75	°C
Storage Temperature	Tstg	-55 to +150	°C

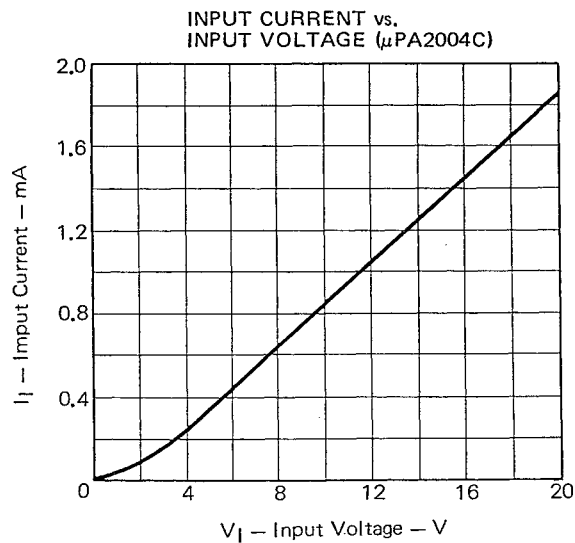
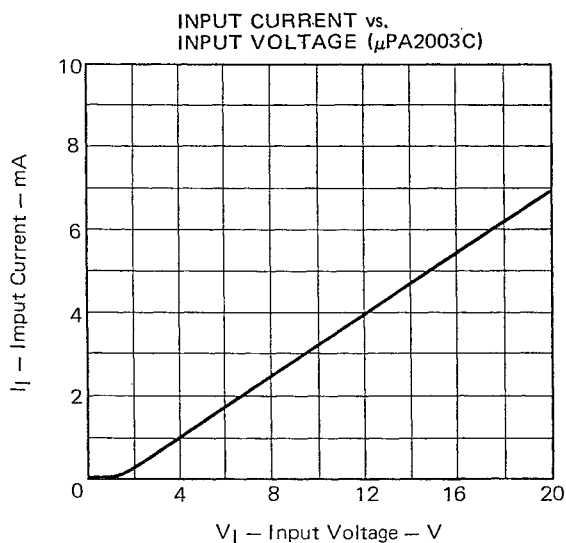
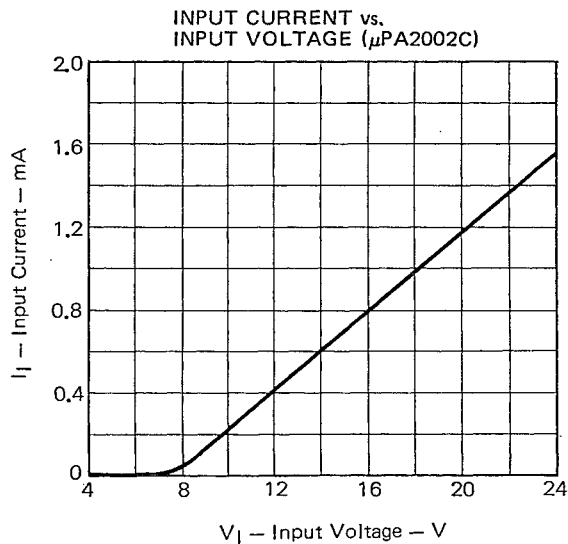
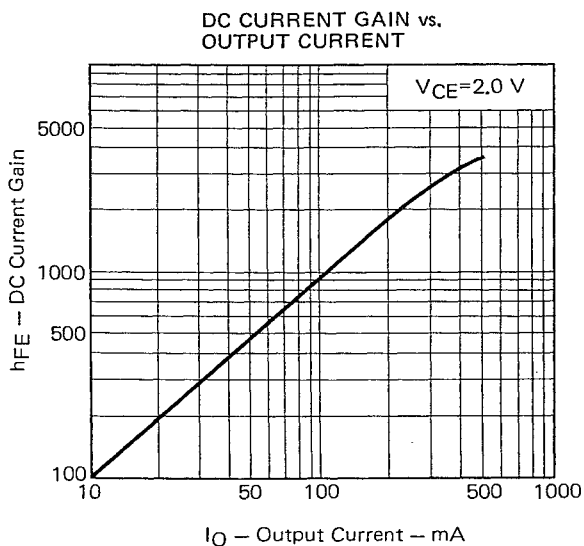
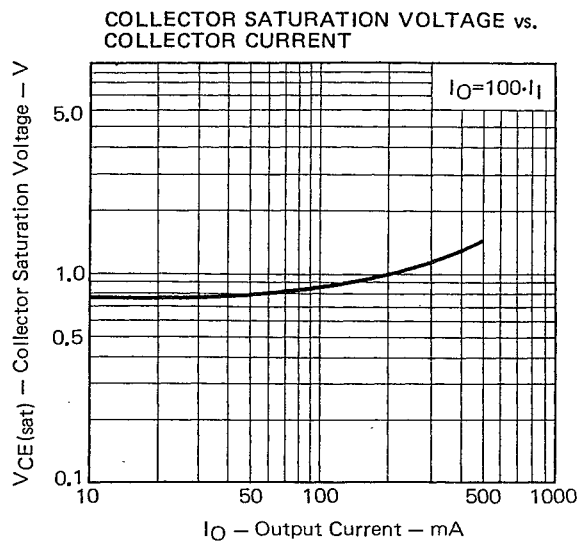
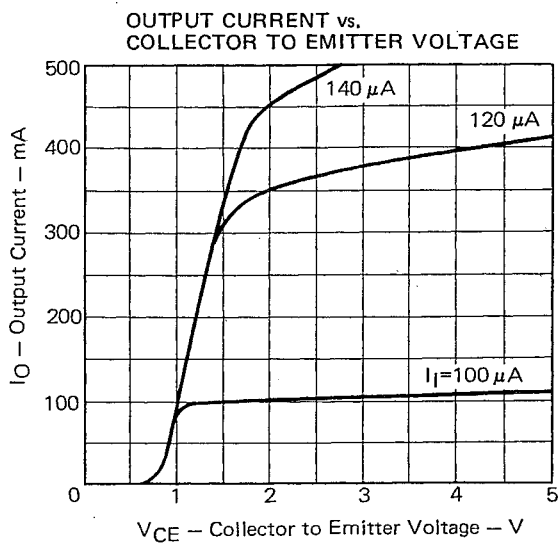
\* PW ≤ 20 ms, duty cycle ≤ 10 %

**ELECTRICAL CHARACTERISTICS (Ta = 25 °C)**

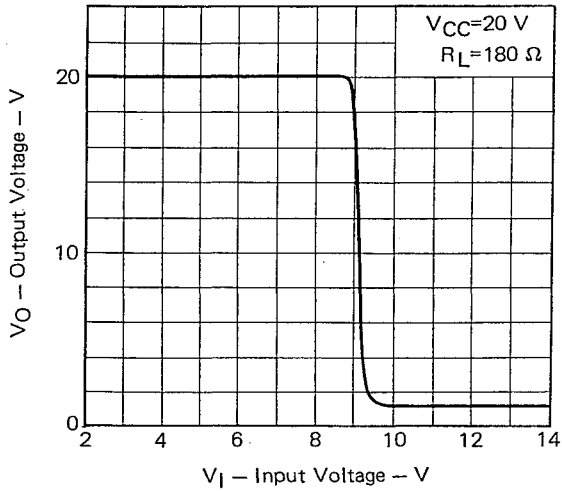
CHARACTERISTIC		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Leakage Current		IL			10	μA	VCE=50 V
					100	μA	VCE=50 V, Ta=70 °C
DC Current Gain		hFE	1000	2800			VCE=2.0 V, IO=350 mA
Collector Saturation Voltage		VCE(sat)		0.9	1.1	V	IO=100 mA, II=250 μA
				1.0	1.3	V	IO=200 mA, II=350 μA
				1.2	1.6	V	IO=350 mA, II=500 μA
Input Voltage	μPA2002C	VI			11	V	VCE=2.0 V, IO=100 mA
					12	V	VCE=2.0 V, IO=200 mA
					13.5	V	VCE=2.0 V, IO=350 mA
	μPA2003C				2.0	V	VCE=2.0 V, IO=100 mA
					2.4	V	VCE=2.0 V, IO=200 mA
					3.4	V	VCE=2.0 V, IO=350 mA
	μPA2004C				5.0	V	VCE=2.0 V, IO=100 mA
					6.0	V	VCE=2.0 V, IO=200 mA
					8.0	V	VCE=2.0 V, IO=350 mA
Input Current	μPA2002C	II			1.3	mA	VI=17 V
	μPA2003C				1.35	mA	VI=3.85 V
	μPA2004C				1.0	mA	VI=5.0 V
Reverse Current (Clamp Diode)		IR			50	μA	VR=50 V
Forward Voltage (Clamp Diode)		VF			2.0	V	IF=350 mA
Terminal Capacitance		Ct		15		pF	VI=0, f=1.0 MHz

Note: Input Voltage and Current of the μPA2001C depend on external resistor.

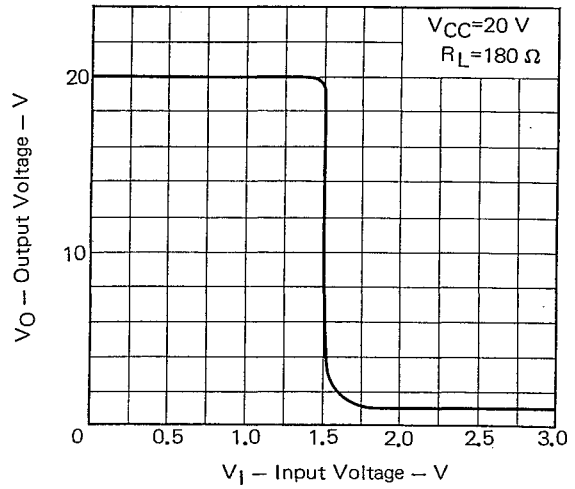
TYPICAL CHARACTERISTICS (Ta = 25 °C)



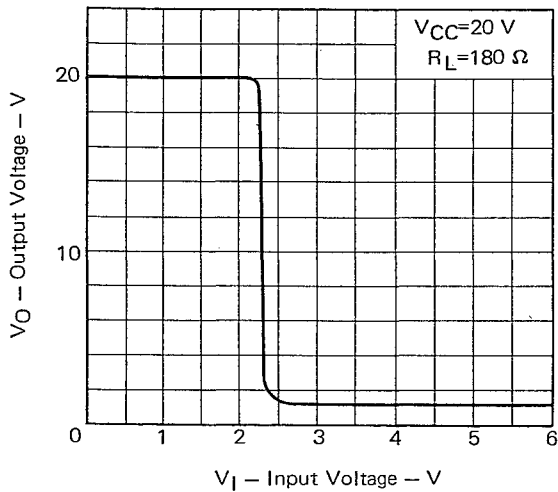
OUTPUT VOLTAGE vs.  
INPUT VOLTAGE ( $\mu$ PA2002C)



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



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



$V_O$ - $V_I$  TEST CIRCUIT

