

# Silicon NPN Transistor

## **2N1486**

General Purpose Transistor

100V / 3A

# DATASHEET

OEM –RCA

Source: RCA Databook 1975

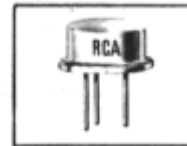
**Power Transistors**

**2N1483 2N1484  
2N1485 2N1486**

RCA-2N1483-2N1486 are diffused-junction power transistors of the silicon n-p-n type. These transistors are intended for a wide variety of applications in industrial and military equipment. They are particularly useful in power-switching circuits such as in dc-to-dc converters, inverters, choppers, solenoid and relay controls; in oscillator, regulator, and pulse amplifier circuits; and as class-A and class-B push-pull audio and servo amplifiers.

These transistors feature high beta at high current, and excellent high temperature performance.

**Intermediate-Power Types**



JEDEC-TO-8

- Maximum dissipation rating of 25 watts at a case temperature of 25°C
- 2N1485 and 2N1486 have a maximum saturation resistance of 1 ohm

Maximum Ratings, *Absolute-Maximum Values:*

	2N1483 2N1485	2N1484 2N1486		
COLLECTOR-TO-BASE VOLTAGE . . . . .	60	100	max.	volts
COLLECTOR-TO-EMITTER VOLTAGE:				
With base open (sustaining voltage) . . . . .	40	55	max.	volts
With emitter-to-base reverse biased ( $V_{EB} = 1.5$ volts) . . . . .	60	100	max.	volts
EMITTER-TO-BASE VOLTAGE . . . . .	12	12	max.	volts
COLLECTOR CURRENT . . . . .	3	3	max.	amp
EMITTER CURRENT . . . . .	-3.5	-3.5	max.	amp
BASE CURRENT . . . . .	1.5	1.5	max.	amp
TRANSISTOR DISSIPATION:				
(See Rating Chart Fig. 3):				
At case temperature of 25°C . . . . .	25	25	max.	watts
At case temperature of 100°C . . . . .	14.1	14.1	max.	watts
TEMPERATURE RANGE:				
Operating and Storage . . . . .	-65 to +200			°C

ELECTRICAL CHARACTERISTICS, At Case Temperature ( $T_C$ ) = 25°C unless otherwise specified

CHARACTERISTIC	SYMBOL	TEST CONDITIONS				LIMITS				UNITS
		VOLTAGE V dc		CURRENT mA dc		2N1483		2N1484		
		$V_{CB}$	$V_{CE}$	$I_C$	$I_B$	Min.	Max.	Min.	Max.	
Collector Cutoff Current: With emitter open At $T_C = 150^\circ\text{C}$	$I_{CBO}$	30				-	15	-	15	$\mu\text{A}$
		30				-	750	-	750	
Emitter Cutoff Current $V_{EB} = 12\text{ V}$	$I_{EBO}$			0		-	15	-	15	$\mu\text{A}$
DC Forward-Current Transfer Ratio	$h_{FE}$		4	750 <sup>a</sup>		20	60	20	60	
Collector-to-Emitter Sustaining Voltage: With base open	$V_{CEO(sus)}$			100 <sup>a</sup>	0	40	-	55	-	V
With base-emitter junction reverse-biased ( $V_{BE} = -1.5\text{ V}$ )	$V_{CEX}$			0.25		60	-	100	-	V
Base-to-Emitter Voltage	$V_{BE}$		4	750 <sup>a</sup>		-	3.5	-	3.5	V
Collector-to-Emitter Saturation Resistance	$r_{CE(sat)}$			750	75	-	2.67	-	2.67	$\Omega$
Collector-to-Base Capacitance	$C_{ob}$	40				175 (typ.)	175 (typ.)			pF
Thermal Time Constant	$\tau_1$					10 (typ.)	10 (typ.)			ms
Alpha Cutoff Frequency	$f_{ab}$	28		5		1.25 (typ.)	1.25 (typ.)			MHz
Saturated Switching Time										
Delay time	$t_d$					0.2 (typ.)	0.2 (typ.)			$\mu\text{s}$
Rise time	$t_r$					1 (typ.)	1 (typ.)			
Storage time	$t_s$					0.8 (typ.)	0.8 (typ.)			
Fall time	$t_f$					1.1 (typ.)	1.1 (typ.)			
Thermal Resistance: Junction-to-case	$R_{\theta JC}$					-	7	-	7	$^\circ\text{C/W}$
Junction-to-ambient	$R_{\theta JA}$					-	100	-	100	

<sup>a</sup>Pulsed, pulse duration = 300  $\mu\text{s}$ , duty factor = 1.8%.

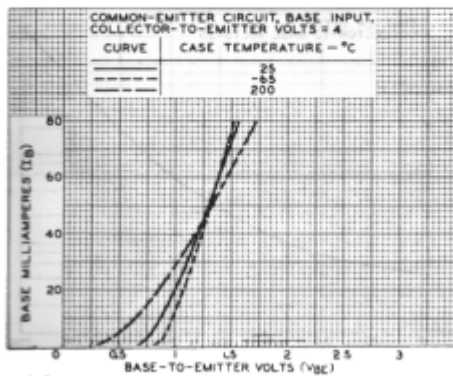


Fig. 1—Typical input characteristics for all types.

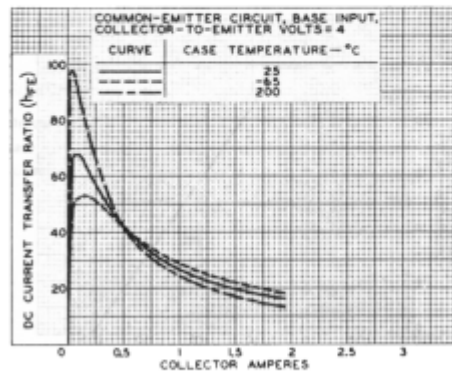


Fig. 2—Typical operation characteristics for all types.

ELECTRICAL CHARACTERISTICS, At Case Temperature ( $T_C$ ) = 25°C unless otherwise specified

CHARACTERISTIC	SYMBOL	TEST CONDITIONS				LIMITS				UNITS
		VOLTAGE V dc		CURRENT mA dc		2N1485		2N1486		
		$V_{CB}$	$V_{CE}$	$I_C$	$I_B$	Min.	Max.	Min.	Max.	
Collector Cutoff Current: With emitter open At $T_C = 150^\circ\text{C}$	$I_{CBO}$	30				—	15	—	15	$\mu\text{A}$
		30				—	750	—	750	
Emitter Cutoff Current $V_{EB} = 12\text{ V}$	$I_{EBO}$			0		—	15	—	15	$\mu\text{A}$
DC Forward-Current Transfer Ratio	$h_{FE}$		4	750 <sup>a</sup>		35	100	35	100	
Collector-to-Emitter Sustaining Voltage: With base open	$V_{CEO(sus)}$			100 <sup>a</sup>	0	40	—	55	—	V
With base-emitter junction reverse-biased ( $V_{BE} = -1.5\text{ V}$ )	$V_{CEX}$			0.25		60	—	100	—	
Base-to-Emitter Voltage	$V_{BE}$		4	750 <sup>a</sup>		—	2.5	—	2.5	V
Collector-to-Emitter Saturation Resistance	$r_{CE(sat)}$			750	40	—	1	—	1	$\Omega$
Collector-to-Base Capacitance	$C_{ob}$	40				175 (typ.)	175 (typ.)			$\mu\text{F}$
Thermal Time Constant	$\tau_1$					10 (typ.)	10 (typ.)			ms
Alpha Cutoff Frequency	$f_{ab}$	28		5		1.25 (typ.)	1.25 (typ.)			MHz
Saturated Switching Time										
Delay time	$t_d$					0.2 (typ.)	0.2 (typ.)			$\mu\text{s}$
Rise time	$t_r$					1 (typ.)	1 (typ.)			
Storage time	$t_s$					0.8 (typ.)	0.8 (typ.)			
Fall time	$t_f$					1.1 (typ.)	1.1 (typ.)			
Thermal Resistance: Junction-to-case	$R_{\theta JC}$					—	7	—	7	$^\circ\text{C/W}$
Junction-to-ambient	$R_{\theta JA}$					—	100	—	100	

<sup>a</sup> Pulsed, pulse duration = 300  $\mu\text{s}$ , duty factor = 1.8%.

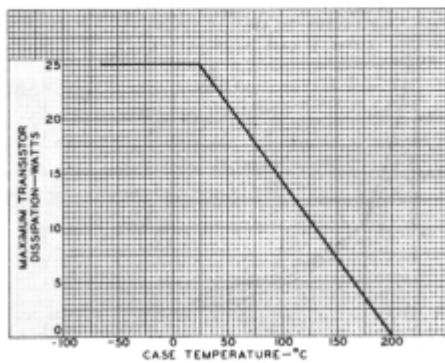


Fig. 3—Rating chart for all types.

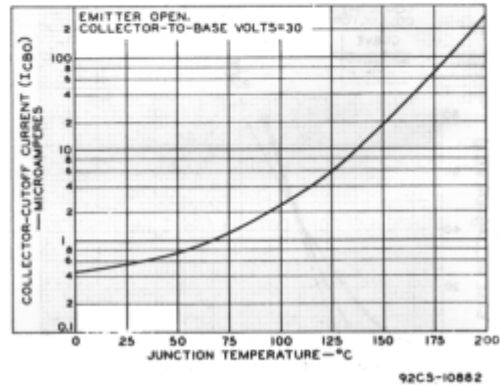


Fig. 4—Typical operation characteristics for all types.

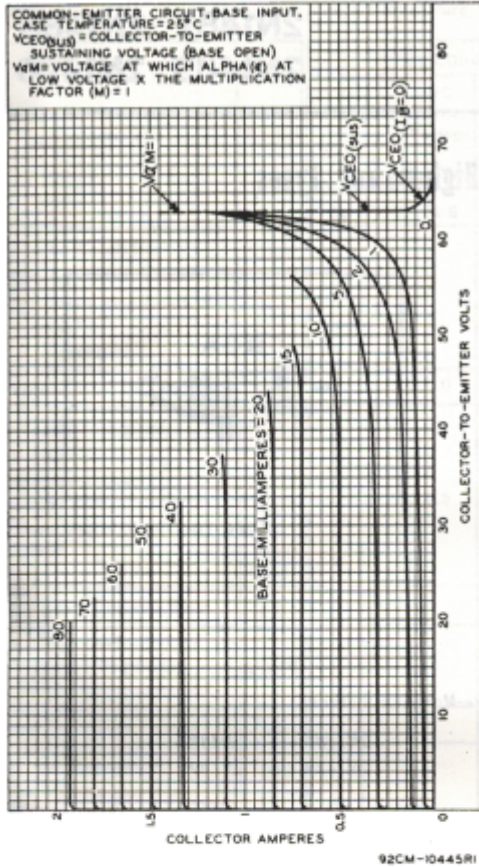
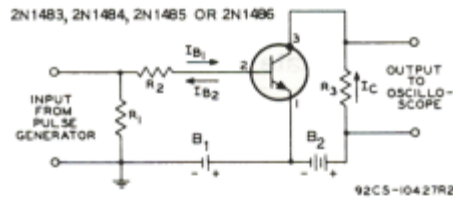
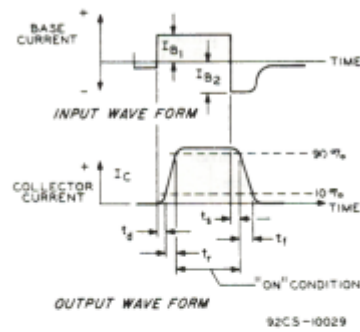


Fig. 5—Typical collector characteristics for all types.



$B_1 = 8.5$  volts  
 $B_2 = 12$  volts  
 $R_1 = 50$  ohms, 1 watt  
 $R_2 = 220$  ohms, 1 watt  
 $R_3 = 15.9$  ohms, 2 watts



Typical Operation of the 2N1483 - 2N1486

At Case Temperature ( $T_C$ ) = 25°C:

DC Supply Voltage ( $B_2$ )	12	V
DC Base Bias Voltage ( $B_1$ )	-8.5	V
Generator Resistance	50	$\Omega$
"On" DC Collector Current	750	mA
"Turn-On" Base Current ( $I_{B1}$ )	65	mA
"Turn-Off" Base Current ( $I_{B2}$ )	-35	mA

Fig. 6—Typical power-switching circuit.

TERMINAL CONNECTIONS

- Lead 1 - Emitter
- Lead 2 - Base
- Case, Lead 3 - Collector