

# New Jersey Semi-Conductor Products, Inc.

20 STERN AVE.  
 SPRINGFIELD, NEW JERSEY 07081  
 U.S.A.

TELEPHONE: (973) 376-2922  
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**2N2904,A, 2N2905,A,  
 2N2906,A, 2N2907,A,  
 2N3485,A, 2N3486,A**

JAN, JTX, JTXV AVAILABLE\*

CASE 79-02, STYLE 1  
 2N2904/2905 TO-39 (TO-205AD)  
 CASE 22-03, STYLE 1  
 2N2906/2907 TO-18 (TO-206AA)  
 CASE 26-03, STYLE 1  
 2N3485/3486 TO-46 (TO-206AB)

**GENERAL PURPOSE  
 TRANSISTOR**

PNP SILICON

### MAXIMUM RATINGS

Rating	Symbol	Non-A Suffix	A-Suffix	Unit	
Collector-Emitter Voltage	$V_{CE0}$	40	60	Vdc	
Collector-Base Voltage	$V_{CB0}$	60		Vdc	
Emitter-Base Voltage	$V_{EB0}$	5.0		Vdc	
Collector Current — Continuous	$I_C$	600		mAdc	
2N2904,A, 2N2906,A, 2N3485,A 2N2905,A, 2N2907,A, 2N3486,A					
Total Device Dissipation (@ $T_A = 25^\circ\text{C}$ )	$P_D$	600	400	400	mW
Derate above $25^\circ\text{C}$		3.43	2.28	2.28	mW/C
Total Device Dissipation (@ $T_C = 25^\circ\text{C}$ )	$P_D$	3.0	1.8	2.0	Watts
Derate above $25^\circ\text{C}$		17.2	10.0	10.45	mW/C
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +200		$^\circ\text{C}$	

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage(1) ( $I_C = 10 \text{ mAdc}, I_B = 0$ )	$V_{(BR)CEO}$	40 60	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 10 \mu\text{A}, I_E = 0$ )	$V_{(BR)CBO}$	60	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10 \mu\text{A}, I_C = 0$ )	$V_{(BR)EBO}$	5.0	—	—	Vdc
Collector Cutoff Current ( $V_{CE} = 30 \text{ Vdc}, V_{BE} = 0.5 \text{ Vdc}$ )	$I_{CEX}$	—	—	50	nA
Collector Cutoff Current ( $V_{CB} = 50 \text{ Vdc}, I_E = 0$ )	$I_{CBO}$	—	—	0.020 0.010	$\mu\text{A}$
Base Current ( $V_{CE} = 30 \text{ Vdc}, V_{BE} = 0.5 \text{ Vdc}$ )	$I_B$	—	—	50	nA
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 0.1 \text{ mA}, V_{CE} = 10 \text{ Vdc}$ )	$h_{FE}$	20 35 40 75	—	—	—
		2N2904, 2N2905, 2N3485 2N2906, 2N2907, 2N3486 2N2904A, 2N2906A, 2N3485A 2N2905A, 2N2907A, 2N3486A			
( $I_C = 1.0 \text{ mA}, V_{CE} = 10 \text{ Vdc}$ )		25 50 40 100	—	—	—
		2N2904, 2N2906, 2N3485 2N2905, 2N2907, 2N3486 2N2904A, 2N2906A, 2N3485A 2N2905A, 2N2907A, 2N3486A			
( $I_C = 10 \text{ mA}, V_{CE} = 10 \text{ Vdc}$ )		35 75 40 100	—	—	—
		2N2904, 2N2906, 2N3485 2N2905, 2N2907, 2N3486 2N2904A, 2N2906A, 2N3485A 2N2905A, 2N2907A, 2N3486A			
( $I_C = 150 \text{ mA}, V_{CE} = 10 \text{ Vdc}$ )(1)		40 100	—	100 300	—
		2N2904A, 2N2906A, 2N3485A 2N2905A, 2N2907A, 2N3486A			

\*ALSO AVAILABLE 2N2905AJANS AND 2N2907AJANS

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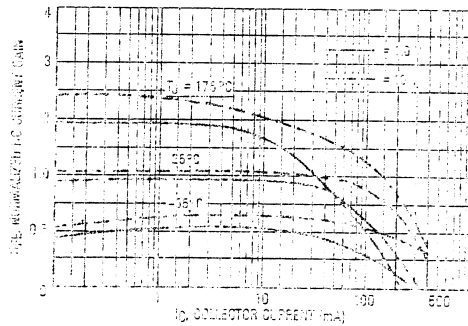
## 2N2904,A, 2N2905,A, 2N2906,A, 2N2907,A, 2N3485,A, 2N3486,A

ELECTRICAL CHARACTERISTICS (continued); ( $T_A = 25^\circ\text{C}$  unless otherwise noted.)

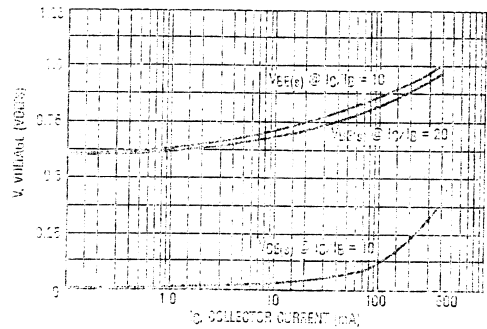
Characteristic	Symbol	Min	Typ	Max	Unit
( $I_C = 500\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )(1)		20	—	—	
2N2904, 2N2906, 2N3485		30	—	—	
2N2905, 2N2907, 2N3486		40	—	—	
2N2904A, 2N2906A, 2N3485A		—	—	—	
2N2905A, 2N2907A, 2N3486A		50	—	—	
Collector-Emitter Saturation Voltage(1) ( $I_C = 150\text{ mAdc}$ , $I_B = 15\text{ mAdc}$ ) ( $I_C = 500\text{ mAdc}$ , $I_B = 50\text{ mAdc}$ )	$V_{CE(sat)}$	—	—	0.4 1.6	Vdc
Base-Emitter Saturation Voltage ( $I_C = 150\text{ mAdc}$ , $I_B = 15\text{ mAdc}$ ) ( $I_C = 500\text{ mAdc}$ , $I_B = 50\text{ mAdc}$ )	$V_{BE(sat)}$	—	—	1.3 2.6	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Current-Gain — Bandwidth Product(2) ( $I_C = 50\text{ mAdc}$ , $V_{CE} = 20\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$f_T$	200	—	—	MHz
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 100\text{ kHz}$ )	$C_{obo}$	—	—	3.0	pF
Input Capacitance ( $V_{BE} = 2.0\text{ Vdc}$ , $I_C = 0$ , $f = 100\text{ kHz}$ )	$C_{ibo}$	—	—	30	pF
<b>SWITCHING CHARACTERISTICS</b>					
Turn-On Time	$t_{on}$	—	26	45	ns
Delay Time ( $V_{CC} = 30\text{ Vdc}$ , $I_C = 150\text{ mAdc}$ , $I_{B1} = 15\text{ mAdc}$ )	$t_d$	—	6.0	10	ns
Rise Time	$t_r$	—	20	40	ns
Fall-Off Time	$t_{off}$	—	70	100	ns
Storage Time ( $V_{CC} = 30\text{ Vdc}$ , $I_C = 150\text{ mAdc}$ , $I_{B1} = I_{B2} = 15\text{ mAdc}$ )	$t_s$	—	80	60	ns
Hold Time	$t_h$	—	20	30	ns

(1) Pulse Test: Pulse Width  $\leq 200\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$   
 (2)  $f_T$  is defined as the frequency at which  $|h_{fe}|$  extrapolates to unity.

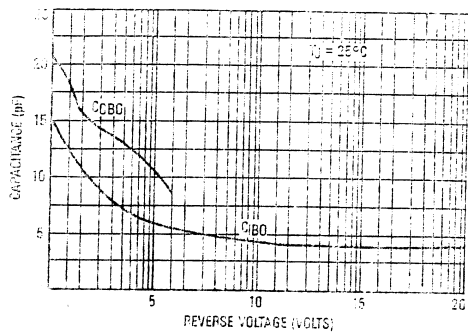
NORMALIZED DC CURRENT GAIN



CURRENT GAIN—BANDWIDTH PRODUCT



"ON" VOLTAGES



CURRENT GAIN—BANDWIDTH PRODUCT

