

# New Jersey Semi-Conductor Products, Inc.

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

TELEPHONE: (973) 376-2922  
(212) 227-6005  
FAX: (973) 376-8960

## SILICON PLANAR PNP

**2N 4034**  
**2N 4035**

### GENERAL PURPOSE AMPLIFIERS AND SWITCHES

The 2N 4034 and 2N 4035 are silicon planar epitaxial PNP transistors in Jedec TO-18 metal case, primarily intended for small signal, low noise industrial applications.

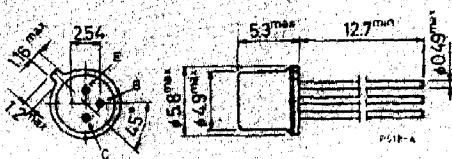
### ABSOLUTE MAXIMUM RATINGS

$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	-40	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	-40	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	-5	V
$I_C$	Collector current	-100	mA
$P_{tot}$	Total power dissipation at $T_{amb} \leq 25^\circ C$ at $T_{case} \leq 25^\circ C$	0.36	W
$T_{stg}, T_j$	Storage and junction temperature	1	W
		-65 to 200	$^\circ C$

### MECHANICAL DATA

Dimensions in mm

Collector connected to case.



(sim. to TO-18)



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify their datasheets are current before placing orders.



## THERMAL DATA

$R_{th\ j-case}$	Thermal resistance junction-case	max 175	$^{\circ}\text{C}/\text{W}$
$R_{th\ j-amb}$	Thermal resistance junction-ambient	max 486	$^{\circ}\text{C}/\text{W}$

## ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector cutoff current ( $V_{BE} = 0$ ) $V_{CE} = -30\text{V}$ $T_{amb} = 125^{\circ}\text{C}$		-15	-15	nA $\mu\text{A}$
$V_{(BR)CBO}$	Collector-base breakdown voltage ( $I_E = 0$ )	$I_C = -10\ \mu\text{A}$	-40		V
$V_{(BR)CES}$	Collector-emitter breakdown voltage ( $V_{BE} = 0$ )	$I_C = -10\ \mu\text{A}$	-40		V
$V_{CEO(sus)}$ *	Collector-emitter sustaining voltage ( $I_B = 0$ )	$I_C = -10\ \text{mA}$	-40		V
$V_{(BR)EBO}$	Emitter-base breakdown voltage ( $I_C = 0$ )	$I_E = -10\ \mu\text{A}$	-5		V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_C = -1\ \text{mA}$ * $I_C = -10\ \text{mA}$ * $I_C = -50\ \text{mA}$	$I_B = -0.1\ \text{mA}$ $I_B = -1\ \text{mA}$ $I_B = -5\ \text{mA}$	-0.13 -0.14 -0.3	V V V
$V_{BE(sat)}$	Base-emitter saturation voltage	$I_C = -1\ \text{mA}$ * $I_C = -10\ \text{mA}$ * $I_C = -50\ \text{mA}$	$I_B = -0.1\ \text{mA}$ $I_B = -1\ \text{mA}$ $I_B = -5\ \text{mA}$	-0.7 -0.9 -1.1	V V V
$h_{FE}$	DC current gain	for 2N 4034			
		$I_C = -10\ \mu\text{A}$	$V_{CE} = -1\text{V}$	20	
		$I_C = -100\ \mu\text{A}$	$V_{CE} = -1\text{V}$	50	
		$I_C = -1\ \text{mA}$	$V_{CE} = -1\text{V}$	60	
		* $I_C = -10\ \text{mA}$	$V_{CE} = -1\text{V}$	70	
		* $I_C = -50\ \text{mA}$	$V_{CE} = -1\text{V}$	15	
		* $I_C = -10\ \text{mA}$	$V_{CE} = -1\text{V}$	30	
		$T_{amb} = -55^{\circ}\text{C}$			
		for 2N 4035			
		$I_C = -10\ \mu\text{A}$	$V_{CE} = -1\text{V}$	70	
		$I_C = -100\ \mu\text{A}$	$V_{CE} = -1\text{V}$	140	
		$I_C = -1\ \text{mA}$	$V_{CE} = -1\text{V}$	150	
		* $I_C = -10\ \text{mA}$	$V_{CE} = -1\text{V}$	150	
		* $I_C = -50\ \text{mA}$	$V_{CE} = -1\text{V}$	30	
		* $I_C = -10\ \text{mA}$	$V_{CE} = -1\text{V}$	70	
		$T_{amb} = -55^{\circ}\text{C}$			



### ELECTRICAL CHARACTERISTICS (continued)

Parameter	Test conditions	Min.	Typ.	Max.	Unit
$h_{fe}$ Small signal current gain	$I_C = -1 \text{ mA}$ $V_{CE} = -10V$ $f = 1 \text{ kHz}$ for 2N 4034 for 2N 4035	50 150	300 450	— —	
$f_T$ Transition frequency	$I_C = -10 \text{ mA}$ $V_{CE} = -20V$ $f = 100 \text{ MHz}$ for 2N 4034 for 2N 4035	400 450	—	—	MHz MHz
$C_{EBO}$ Emitter-base capacitance	$I_C = 0$ $V_{EB} = -0.5V$ $f = 1 \text{ MHz}$	—	5.5	—	pF
$C_{CBO}$ Collector-base capacitance	$I_E = 0$ $V_{CB} = -10V$ $f = 1 \text{ MHz}$	—	3.5	—	pF
NF Noise figure	$I_C = -1 \text{ mA}$ $V_{CE} = -5V$ $f = 100 \text{ MHz}$ $R_g = 100\Omega$	—	6	—	dB
$t_{on}$ Turn-on time	$I_C = -50 \text{ mA}$ $V_{CC} = -30V$ $I_{B1} = -5 \text{ mA}$	—	40	—	ns
$t_{off}$ Turn-off time	$I_C = -50 \text{ mA}$ $V_{CC} = -30V$ $I_{B1} = -I_{B2} = -5 \text{ mA}$	—	150	—	ns
$h_{ie}$ Input impedance	$I_C = -1 \text{ mA}$ $V_{CE} = -10V$ $f = 1 \text{ kHz}$ for 2N 4034 for 2N 4035	1 4	8 12	—	kΩ kΩ
$h_{re}$ Reverse voltage ratio	$I_C = -1 \text{ mA}$ $V_{CE} = -10V$ $f = 1 \text{ kHz}$ for 2N 4034 for 2N 4035	—	$3 \times 10^{-4}$ $4 \times 10^{-4}$	— —	
$h_{oe}$ Output admittance	$I_C = -1 \text{ mA}$ $V_{CE} = -10V$ $f = 1 \text{ kHz}$ for 2N 4034 for 2N 4035	2 8	24 40	—	μS μS
$r_{bb'}C_{bc'}$ Feedback time constant	$I_C = -10 \text{ mA}$ $V_{CE} = -20V$ $f = 80 \text{ MHz}$	—	40	—	ps

\* Pulsed: pulse duration = 300 μs, duty cycle = 1%