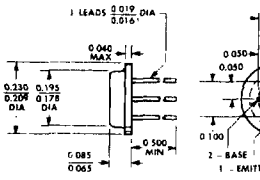
TYPES 2N3485, 2N3485A, 2N3486, 2N3486A
P-N-P SILICON TRANSISTORS

BULLETIN NO. DL-S 657885, JULY 1965

DESIGNED FOR HIGH-SPEED, MEDIUM-POWER SWITCHING AND GENERAL PURPOSE AMPLIFIER APPLICATIONS

- **Electrically Identical to 2N2906, 2N2906A, 2N2907, and 2N2907A in Space-Saving TO-46 Package**
- **High Breakdown Voltage Combined With Very Low Saturation Voltage**

***mechanical data**



THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE.

ALL JEDEC TO-46 DIMENSIONS AND NOTES ARE APPLICABLE.

†TI guaranteed minimum. The JEDEC registered minimum lead diameter for the TO-46 is 0.012.

absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

	2N3485 2N3486	2N3485A 2N3486A
*Collector-Base Voltage	−60 v	−60 v
*Collector-Emitter Voltage (See Note 1)	−40 v	−60 v
*Emitter-Base Voltage	−5 v	−5 v
*Collector Current	← −0.6 a →	
Continuous Device Dissipation at (or below) 25°C Free-Air Temperature (See Note 2)	← 0.4 w →	
*Continuous Device Dissipation at (or below) 25°C Case Temperature (See Note 3)	← 2 w →	
*Storage Temperature Range	−65°C to +200°C	
Lead Temperature 1/16 Inch from Case for 10 Seconds	← 300°C →	

***electrical characteristics at 25°C free-air temperature (unless otherwise noted)**

PARAMETER		TEST CONDITIONS		2N3485 MIN	2N3485 MAX	2N3486 MIN	2N3486 MAX	2N3485A MIN	2N3485A MAX	2N3486A MIN	2N3486A MAX	UNIT
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = -10\ \mu a$, $I_E = 0$		−60		−60		−60		−60		v
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = -10$ ma, $I_B = 0$,	See Note 4	−40		−40		−60		−60		v
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = -10\ \mu a$, $I_C = 0$		−5		−5		−5		−5		v
I_{CBO}	Collector Cutoff Current	$V_{CB} = -50$ v, $I_E = 0$			−20		−20		−10		−10	na
		$V_{CB} = -50$ v, $I_E = 0$,	$T_A = 150°C$		−20		−20		−10		−10	μa
I_{CEV}	Collector Cutoff Current	$V_{CE} = -30$ v, $V_{BE} = 0.5$ v			−50		−50		−50		−50	na
I_{BEV}	Base Cutoff Current	$V_{CE} = -30$ v, $V_{BE} = 0.5$ v			50		50		50		50	na
h_{FE}	Static Forward Current Transfer Ratio	$V_{CE} = -10$ v, $I_C = -100\ \mu a$		20		35		40		75		
		$V_{CE} = -10$ v, $I_C = -1$ ma		25		50		40		100		
		$V_{CE} = -10$ v, $I_C = -10$ ma		35		75		40		100		
		$V_{CE} = -10$ v, $I_C = -150$ ma	See Note 4	40	120	100	300	40	120	100	300	
		$V_{CE} = -10$ v, $I_C = -500$ ma		20		30		40		50		
		$V_{CE} = -1$ v, $I_C = -150$ ma		20		50		20		50		
V_{BE}	Base-Emitter Voltage	$I_B = -15$ ma, $I_C = -150$ ma			−1.3		−1.3		−1.3		−1.3	v
		$I_B = -50$ ma, $I_C = -500$ ma			−2.6		−2.6		−2.6		−2.6	v
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_B = -15$ ma, $I_C = -150$ ma			−0.4		−0.4		−0.4		−0.4	v
		$I_B = -50$ ma, $I_C = -500$ ma			−1.6		−1.6		−1.6		−1.6	v

NOTES: 1. This value applies between 0 and 100 ma collector current when the base-emitter diode is open-circuited
2. Derate linearly to 200°C free-air temperature at the rate of 2.28 mw/°C.
3. Derate linearly to 200°C case temperature at the rate of 11.43 mw/°C.
4. These parameters must be measured using pulse techniques, PW ≤ 300 μsec, Duty Cycle ≤ 2%.

* JEDEC registered data

USES CHIP P20

***electrical characteristics at 25°C free-air temperature**

PARAMETER		TEST CONDITIONS			ALL TYPES MIN	ALL TYPES MAX	UNIT
$\|h_{fe}\|$	Small-Signal Common-Emitter Forward Current Transfer Ratio	$V_{CE} = -20$ v,	$I_C = -50$ ma,	f = 100 Mc	2		
C_{obo}	Common-Base Open-Circuit Output Capacitance	$V_{CB} = -10$ v,	$I_E = 0$,	f = 100 kc		8	pf
C_{ibo}	Common-Base Open-Circuit Input Capacitance	$V_{EB} = -2$ v,	$I_C = 0$,	f = 100 kc		30	pf

***switching characteristics at 25°C free-air temperature**

PARAMETER		TEST CONDITIONS†			ALL TYPES MAX	UNIT
t_d	Delay Time	$I_C = -150$ ma,	$I_{B(1)} = -15$ ma,	$V_{BE(off)} = 0$,	10	nsec
t_r	Rise Time	$R_L = 200\ \Omega$,	See Figure 1		40	nsec
t_s	Storage Time	$I_C = -150$ ma,	$I_{B(1)} = -13$ ma,	$I_{B(2)} = 17$ ma,	80	nsec
t_f	Fall Time	$R_L = 37\ \Omega$,	See Figure 2		30	nsec

† Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

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*PARAMETER MEASUREMENT INFORMATION

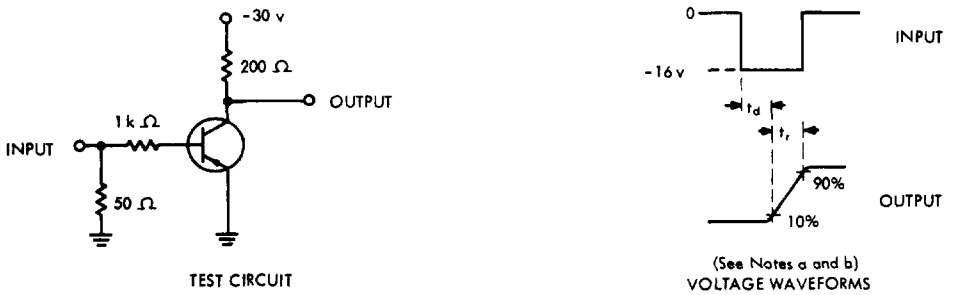

FIGURE 1—DELAY AND RISE TIMES

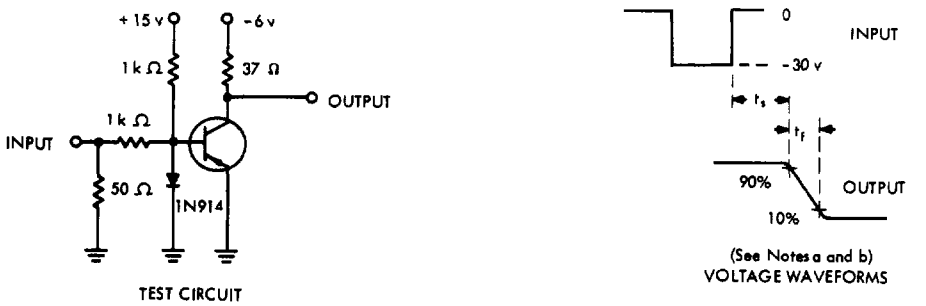

FIGURE 2—STORAGE AND FALL TIMES

NOTES: a. The input waveforms are supplied by a generator with the following characteristics: $Z_{out} = 50\ \Omega$, $t_r \leq 2$ nsec, $t_f \leq 2$ nsec, PW = 200 nsec, PRR = 150 pps.
b. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 5$ nsec, $R_{in} = 10$ MΩ.

* JEDEC registered data.

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