File Number **325**

2N5320, 2N5321, 2N5322, 2N5323

Complementary N-P-N & P-N-P Silicon Power Transistors

General-Purpose Types for Small-Signal, Medium-Power Applications

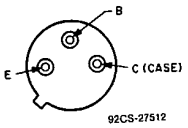
Features:

- *2N5322, 2N5323* } *P-N-P Complements of:* { *2N5320, 2N5321*
- *Maximum safe-area-of-operation curves*
- *Planar construction for low-noise and low leakage characteristics*
- *Low saturation voltage*
- *High beta at high collector current*

The RCA-2N5320, 2N5321, 2N5322 and 2N5323 are doubled-diffused epitaxial-planar silicon power transistors intended for small-signal medium-power applications. The 2N5320 and 2N5321 n-p-n types are actually high-current, high-dissipation versions of the 2N2102 with all of the salient features of that device. The 2N5322 and 2N5323, p-n-p complements of the 2N5320 and 2N5321, are actually high-current, high-power versions of the 2N4036 with all of its additional outstanding features.

The 2N5320, 2N5321, 2N5322, and 2N5323 are supplied in the TO-205AD package.

TERMINAL DESIGNATIONS



92CS-27512

JEDEC TO-205AD

MAXIMUM RATINGS, *Absolute-Maximum Values:*

	2N5321	2N5323	2N5320	2N5322	
*V_{CBO}	75	-75	100	-100	V
V_{CEV} (V_{BE} = -1.5 V)	75	-75	100	-100	V
V_{CER} (R_{BE} = 100 Ω)	65	-65	90	-90	V
	50	-50	75	-75	V
*V_{CEO}	5	-5	7	-7	V
*V_{EBO}	2	-2	2	-2	A
*I_C	1	-1	1	-1	A
*I_B	10	10	10	10	W
*P_T	Derate linearly at 0.057 W/°C				
$T_C \leq 25°C$	-65 to +200				°C
$T_C > 25°C$					
*T_{stg}, T_J	230				°C
*T_L At distance > 1/16 in. (1.58 mm) from seating plane for 10 s max.					

* In accordance with JEDEC registration data format (JS-6-RDF-1).

2N5320, 2N5321, 2N5322, 2N5323

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

CHARACTERISTIC	TEST CONDITIONS				LIMITS								UNITS
	VOLTAGE V dc		CURRENT mA dc		2N5320		2N5321		2N5322		2N5323		
	V_{CE}	V_{BE}	I_C	I_B	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
I_{CBO}	80▲				–	0.5	–	–	–	–	–	–	μA
	60▲				–	–	–	5	–	–	–	–	
	−80▲				–	–	–	–	–	−0.5	–	–	
	−60▲				–	–	–	–	–	–	–	−5	
* I_{CEX}	100	−1.5			–	0.1	–	–	–	–	–	–	mA
	75	−1.5			–	–	–	0.1	–	–	–	–	
	−100	1.5			–	–	–	–	–	−0.1	–	–	
	−75	1.5			–	–	–	–	–	–	–	−0.1	
T_C = 150°C	70	−1.5			–	5	–	–	–	–	–	–	mA
	45	−1.5			–	–	–	5	–	–	–	–	
	−70	1.5			–	–	–	–	–	−5	–	–	
	−45	1.5			–	–	–	–	–	–	–	−5	
* I_{EBO}		−7	0		–	0.1	–	–	–	–	–	–	mA
		−5	0		–	–	–	0.1	–	–	–	–	
		7	0		–	–	–	–	–	−0.1	–	–	
		5	0		–	–	–	–	–	–	–	−0.1	
		−5	0		–	0.1	–	–	–	–	–	–	μA
		−4	0		–	–	–	0.5	–	–	–	–	
		5	0		–	–	–	–	–	−0.1	–	–	
		4	0		–	–	–	–	–	–	–	−0.5	
$V_{(BR)CEV}$		−1.5	0.1		100	–	75	–	–	–	–	–	V
		1.5	−0.1		–	–	–	–	−100	–	−75	–	
$V_{CER(sus)}$[a] R_{BE} = 100Ω			100[b]		90	–	65	–	–	–	–	–	V
			−100[b]		–	–	–	–	−90	–	−65	–	
* $V_{CEO(sus)}$[a]			100[b]	0	75	–	50	–	–	–	–	–	V
			−100[b]	0	–	–	–	–	−75	–	−50	–	
* $V_{CE(sat)}$			500[b]	50	–	0.5	–	0.8	–	–	–	–	V
			−500[b]	−50	–	–	–	–	–	−0.7	–	−1.2	
* V_{BE}	4		500[b]		–	1.1	–	1.4	–	–	–	–	V
	−4		−500[b]		–	–	–	–	–	−1.1	–	−1.4	
* h_{FE}	4		500[b]		30	130	40	250	–	–	–	–	
	−4		−500[b]		–	–	–	–	30	130	40	250	
	2		1000[b]		10	–	–	–	–	–	–	–	
	−2		−1000[b]		–	–	–	–	10	–	–	–	
* $\lvert h_{fe} \rvert$ f = 10 MHz	4		50		5	–	5	–	–	–	–	–	
	−4		−50		–	–	–	–	5	–	5	–	
$I_{S/b}$[d]	50				200	–	200	–	–	–	–	–	mA
	−35				–	–	–	–	−285	–	−285	–	
* t_{ON}	30		500	50	–	80	–	80	–	–	–	–	ns
	−30		−500	−50	–	–	–	–	–	100	–	100	
* t_{OFF}	30		500	50	–	800	–	800	–	–	–	–	ns
	−30		−500	−50	–	–	–	–	–	1000	–	1000	
* $R_{\theta JC}$					–	17.5	–	17.5	–	17.5	–	17.5	°C/W
$R_{\theta JA}$					–	150	–	150	–	150	–	150	°C/W

▲ V_{CB}

* In accordance with JEDEC registration data format (JS-6 RDF-1)

a CAUTION: The sustaining voltages $V_{CEO(sus)}$ and $V_{CER(sus)}$ MUST NOT be measured on a curve tracer.

b Pulsed; pulse duration < 300 μs, duty factor < 0.02.

d Pulsed; 0.4 s non-repetitive pulse.

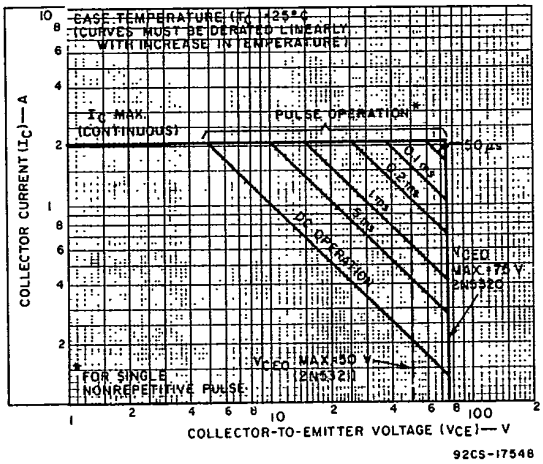


Fig.1 – Maximum operating areas for types 2N5320 and 2N5321.

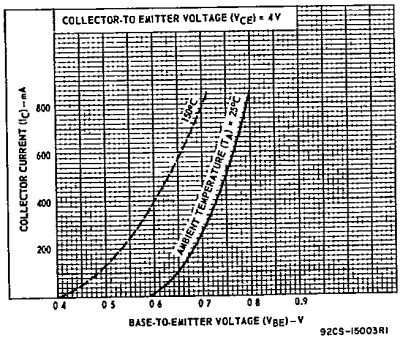


Fig.2 – Typical static beta characteristics for types 2N5320 and 2N5321.

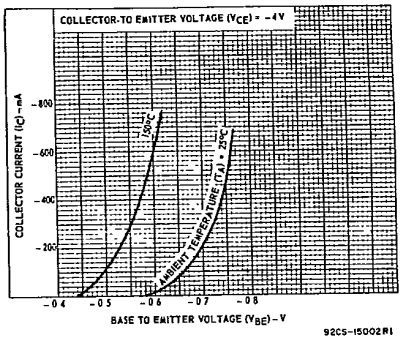


Fig.3 – Typical static beta characteristics for types 2N5322 and 2N5323.

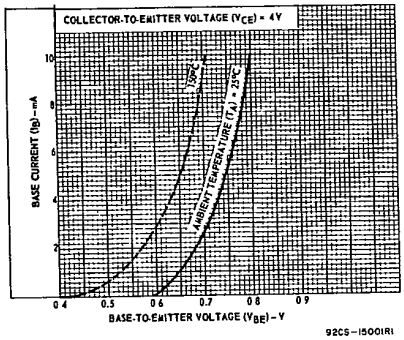


Fig.4 – Typical output characteristics for types 2N5320 and 2N5321.

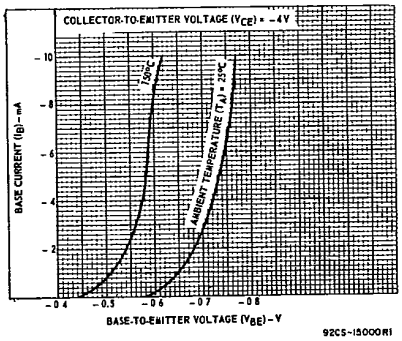


Fig.5 – Typical output characterisitcs for types 2N5322 and 2N5323.

2N5320, 2N5321, 2N5322, 2N5323

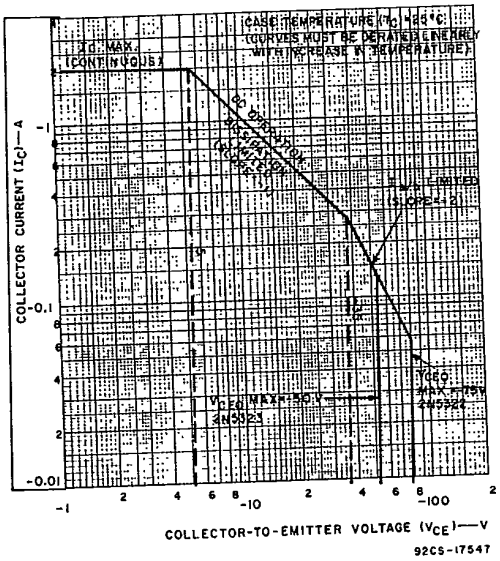


Fig.6 – Maximum operating areas for types 2N5322 and 2N5323.

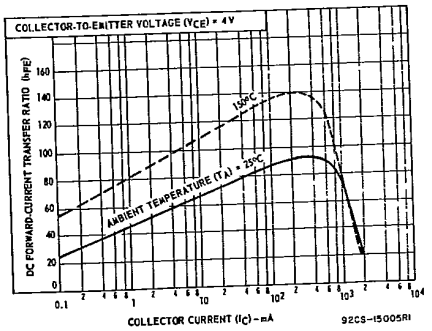


Fig.7 – Typical transfer characteristics for types 2N5320 and 2N5321.

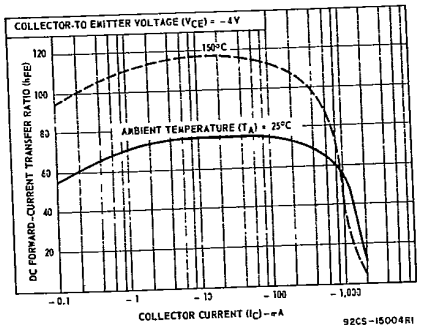


Fig.8 – Typical transfer characteristics for types 2N5322 and 2N5323.

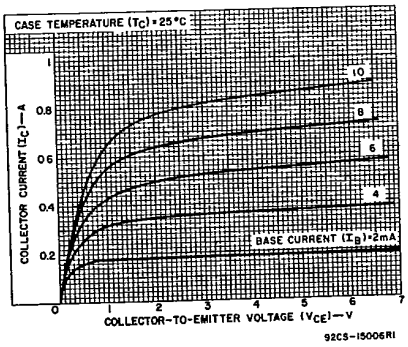


Fig.9 – Typical input characteristics for types 2N5320 and 2N5321.

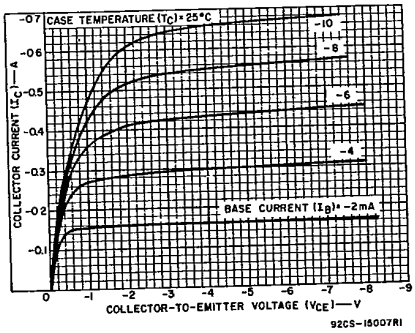
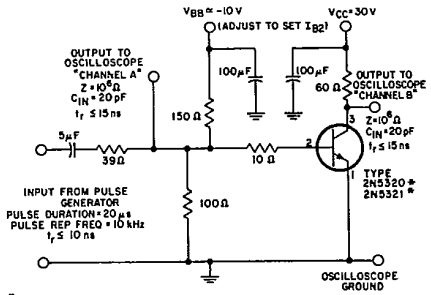


Fig.10 – Typical input characteristics for types 2N5322 and 2N5323.

2N5320, 2N5321, 2N5322, 2N5323



* * For 2N5322 or 2N5323, reverse direction of I_{B1} and I_{B2} and reverse polarity of V_{BB} and V_{CC}.

Fig. 11 — Circuit used to measure switching times for all types.