

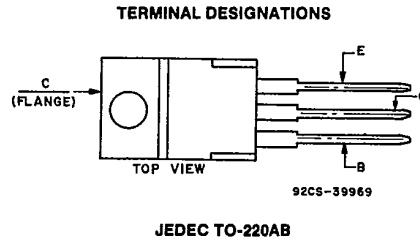
File Number 873

2N6530, 2N6531, 2N6532, 2N6533

## 8-Ampere N-P-N Darlington Power Transistors

80, 100, 120 Volts, 60 Watts  
 Gain of 1000 at 5 A (2N6530, 2N6532)  
 Gain of 1000 at 3 A (2N6533)  
 Gain of 500 at 3 A (2N6531)

- |  |  |
|--|--|
| <b>Features:</b>   | <b>Applications:</b>   |
| <ul style="list-style-type: none"> <li>■ Operate from IC without predriver</li> <li>■ Low leakage at high temperature</li> </ul> | <ul style="list-style-type: none"> <li>■ Power switching</li> <li>■ Hammer drivers</li> <li>■ Series and shunt regulators</li> <li>■ Audio amplifiers</li> </ul> |



The RCA-2N6530, 2N6531, 2N6532, and 2N6533<sup>•</sup> are monolithic n-p-n silicon Darlington transistors designed for power applications at low and medium frequencies. The construction of these devices provides good forward-bias second-breakdown characteristics. Their high gain allows them to be driven directly from integrated circuits.

These devices are supplied in the JEDEC TO-220AB (VERSAWATT) plastic package.

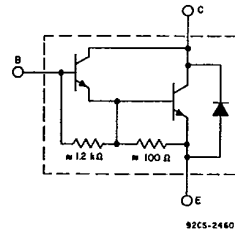


Fig. 1—Schematic diagram for all types.

**MAXIMUM RATINGS, Absolute-Maximum Values:**

	2N6530	2N6531	2N6532	2N6533	
*V <sub>CB0</sub> . . . . .	80	100	100	120	V
V <sub>CER(sus)</sub>					
R <sub>BE</sub> = 100 Ω . . . . .	80	100	100	120	V
V <sub>CEO(sus)</sub> . . . . .	80	100	100	120	V
*V <sub>CEV(sus)</sub>					
V <sub>BE</sub> = -1.5 V . . . . .	80	100	100	120	V
*V <sub>EBO</sub> . . . . .	5	5	5	5	V
*I <sub>C</sub> . . . . .	8	8	8	8	A
I <sub>CM</sub> . . . . .	15	15	15	15	A
*I <sub>B</sub> . . . . .	0.25	0.25	0.25	0.25	A
*P <sub>T</sub>					
Up to 25°C . . . . .	65	65	65	65	W
Above 25°C . . . . .	See Fig. 3				
*T <sub>J</sub> , T <sub>stg</sub> . . . . .	-65 to +150				°C
*T <sub>L</sub>					
At distances ≥ 1/8 in. (3.17 mm) from case for 10 s max. . . . .	235				°C

<sup>•</sup> In accordance with JEDEC registration data format JS-6, RDF-4.

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D T-33-29

## 2N6530, 2N6531, 2N6532, 2N6533

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

CHARACTERISTIC SYMBOL	TEST CONDITIONS				LIMITS				UNITS
	VOLTAGE V <sub>dc</sub>		CURRENT A <sub>dc</sub>		2N6530		2N6531		
	V <sub>CE</sub>	V <sub>BE</sub>	I <sub>C</sub>	I <sub>B</sub>	Min.	Max.	Min.	Max.	
I <sub>CEO</sub>	80			0	—	1	—	—	mA
	100			0	—	—	—	1	
I <sub>CEV</sub>	80	-1.5			—	0.5	—	—	
	100	-1.5			—	—	—	0.5	
T <sub>C</sub> = 125°C	80	-1.5			—	5	—	—	
	100	-1.5			—	—	—	5	
I <sub>EBO</sub>		-5	0		—	5	—	5	mA
h <sub>FE</sub>	3		5 <sup>a</sup>		1,000	10,000	—	—	
	3		3 <sup>a</sup>		—	—	500	10,000	
	3		8 <sup>a</sup>		100	5,000	100	5,000	
V <sub>CEO(sus)</sub>			0.2	0	80 <sup>b</sup>	—	100 <sup>b</sup>	—	V
V <sub>CER(sus)</sub> R <sub>BE</sub> = 100 Ω			0.2		80 <sup>b</sup>	—	100 <sup>b</sup>	—	
V <sub>CEV(sus)</sub>		-1.5	0.2		80 <sup>b</sup>	—	100 <sup>b</sup>	—	
V <sub>BE</sub>	3		5 <sup>a</sup>		—	2.8	—	—	V
	3		3 <sup>a</sup>		—	—	—	2.8	
	3		8 <sup>a</sup>		—	4.5*	—	4.5*	
V <sub>CE(sat)</sub>			3 <sup>a</sup>	0.006	—	—	—	3	V
			5 <sup>a</sup>	0.01	—	2	—	—	
			8 <sup>a</sup>	0.08	—	3*	—	3*	
V <sub>F</sub>			5 <sup>a</sup>		—	—	—	4	V
			8 <sup>a</sup>		—	5	—	—	
h <sub>fe</sub> f = 1 kHz	5		1		1,000	—	1,000	—	
h <sub>fe</sub>    f = 1 MHz	5		1		20	—	20	—	
C <sub>obo</sub> V <sub>CB</sub> = 10 V f = 1 MHz					—	200	—	200	pF
I <sub>S/b</sub> t = 0.5 s, nonrep.	24				2.7	—	2.7	—	A
R <sub>θJC</sub>					—	1.92	—	1.92	°C/W

\* In accordance with JEDEC registration data format JS-6, RDF-4.

a Pulsed, pulse duration = 300 μs, duty factor ≤ 2%.

b CAUTION: Sustaining voltages V<sub>CEO(sus)</sub>, V<sub>CER(sus)</sub>, and V<sub>CEV(sus)</sub> MUST NOT be measured on a curve tracer.

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## 2N6530, 2N6531, 2N6532, 2N6533

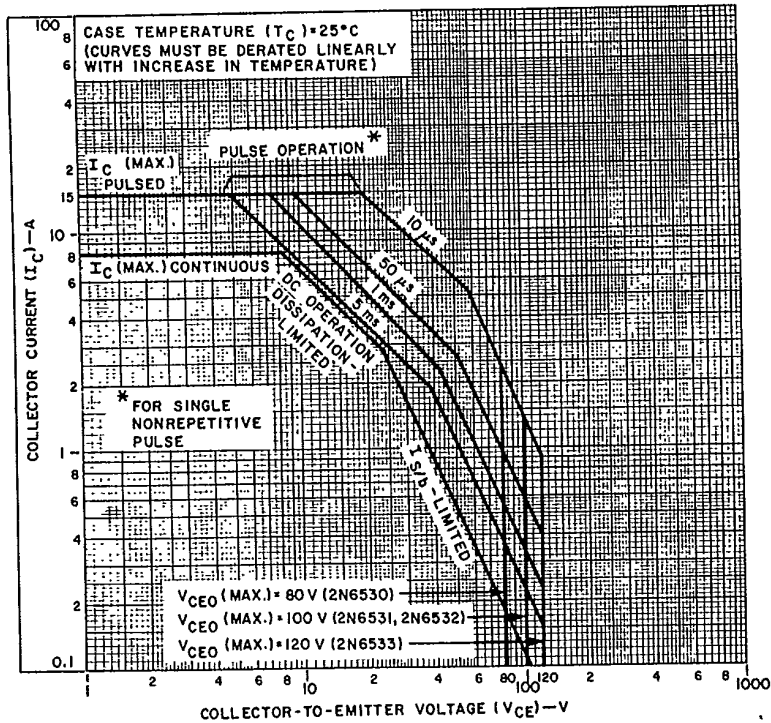
ELECTRICAL CHARACTERISTICS, At Case Temperature ( $T_C$ ) = 25°C unless otherwise specified

CHARACTERISTIC SYMBOL	TEST CONDITIONS				LIMITS				UNITS
	VOLTAGE V dc		CURRENT A dc		2N6532		2N6533		
	V <sub>CE</sub>	V <sub>BE</sub>	I <sub>C</sub>	I <sub>B</sub>	Min.	Max.	Min.	Max.	
I <sub>CEO</sub>	120			0	—	—	—	1	mA
	100			0	—	1	—	—	
I <sub>CEV</sub>	120	-1.5			—	—	—	0.5	
	100	-1.5			—	0.5	—	—	
T <sub>C</sub> = 125°C	120	-1.5			—	—	—	5	
	100	-1.5			—	5	—	—	
I <sub>EBO</sub>		-5	0		—	5	—	5	mA
h <sub>FE</sub>	3		3 <sup>a</sup>		—	—	1,000	10,000	
	3		5 <sup>a</sup>		1,000	10,000	—	—	
	3		8 <sup>a</sup>		100	5,000	100	5,000	
V <sub>CEO(sus)</sub>			0.2	0	100 <sup>b</sup>	—	120 <sup>b</sup>	—	V
V <sub>CER(sus)</sub> R <sub>BE</sub> = 100 Ω			0.2		100 <sup>b</sup>	—	120 <sup>b</sup>	—	
V <sub>CEV(sus)</sub>		-1.5	0.2		100 <sup>b</sup>	—	120 <sup>b</sup>	—	
V <sub>BE</sub>	3		3 <sup>a</sup>		—	—	—	2.8	V
	3		5 <sup>a</sup>		—	2.8	—	—	
	3		8 <sup>a</sup>		—	4.5*	—	4.5*	
V <sub>CE(sat)</sub>			3 <sup>a</sup>	0.006	—	—	—	2	V
			5 <sup>a</sup>	0.01	—	2	—	—	
			8 <sup>a</sup>	0.08	—	3*	—	3*	
V <sub>F</sub>			5 <sup>a</sup>		—	—	—	4	V
			8 <sup>a</sup>		—	5	—	—	
h <sub>fe</sub> f = 1 kHz	5		1		1,000	—	1,000	—	
h <sub>fe</sub>    f = 1 MHz	5		1		20	—	20	—	
C <sub>obo</sub> V <sub>CB</sub> = 10 V f = 1 MHz					—	200	—	200	pF
I <sub>S/b</sub> t = 0.5 s, nonrep.	24				2.7	—	2.7	—	A
R <sub>θJC</sub>					—	1.92	—	1.92	°C/W

\* In accordance with JEDEC registration data format JS-6, RDF-4.

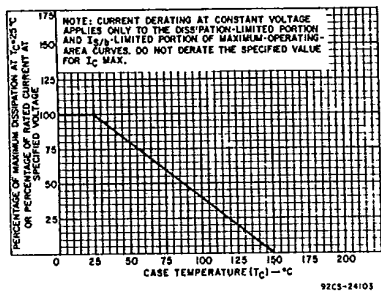
<sup>a</sup> Pulsed, pulse duration = 300 μs, duty factor ≤ 2%.<sup>b</sup> CAUTION: Sustaining voltages V<sub>CEO(sus)</sub>, V<sub>CER(sus)</sub>, and V<sub>CEV(sus)</sub> MUST NOT be measured on a curve tracer.

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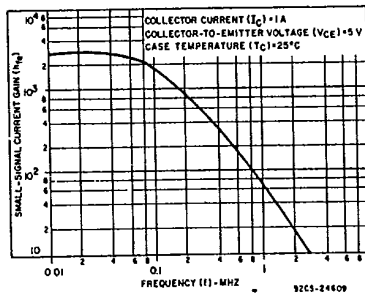
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Fig. 2—Maximum operating areas for all types at case temperature of 25°C.



92CS-24103

Fig. 3—Dissipation derating curve for all types.



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Fig. 4 — Typical small-signal current gain for all types.

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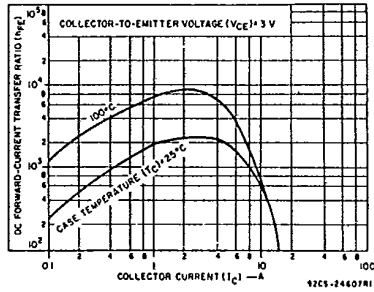


Fig. 5 - Typical dc beta characteristics for all types.

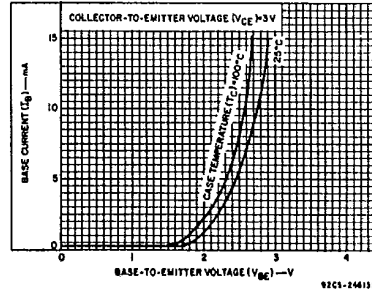


Fig. 6 - Typical input characteristics for all types.

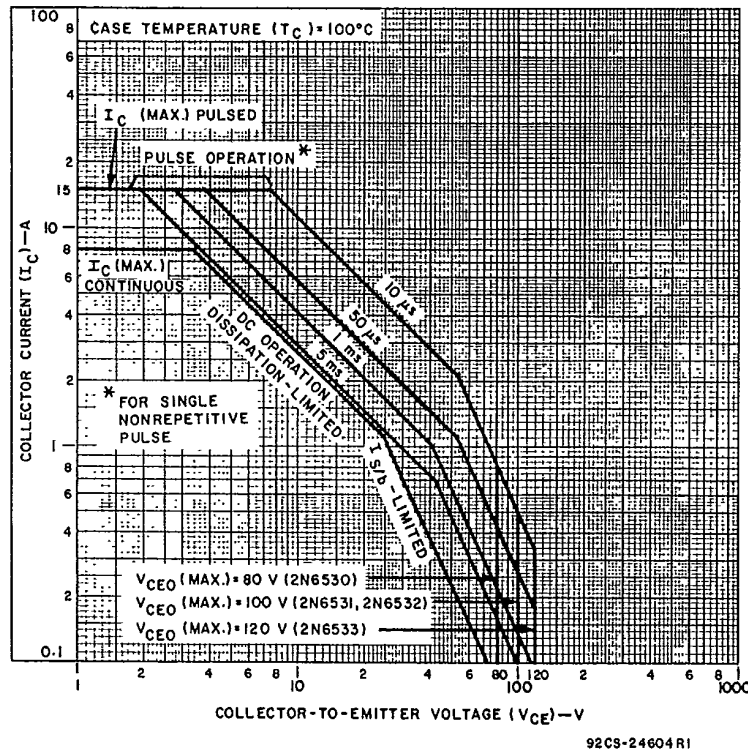


Fig. 7 - Maximum operating areas for all types at case temperature of 100°C.

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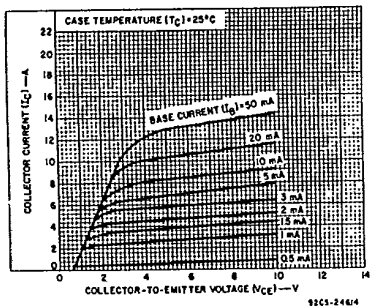


Fig. 8 — Typical output characteristics for all types.

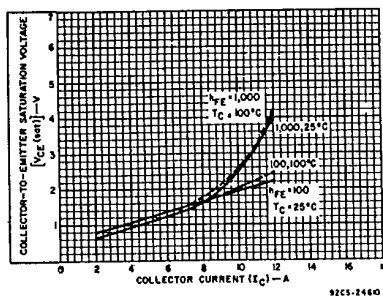


Fig. 9 — Typical saturation characteristics for all types.

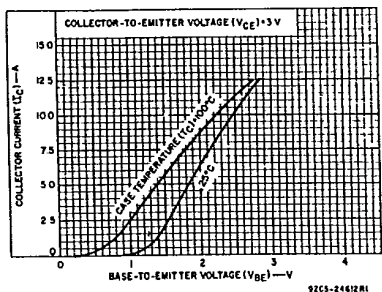


Fig. 10 — Typical transfer characteristics for all types.

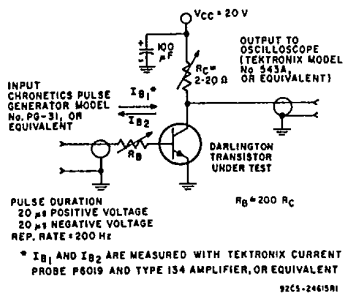


Fig. 11 — Circuit used to measure saturated switching-times.

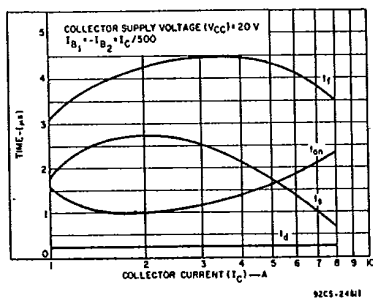


Fig. 12 — Typical saturated switching-time characteristics for all types.

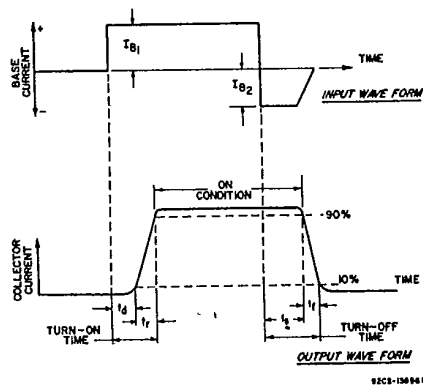


Fig. 13 — Phase relationship between input current and output current, showing reference points for specification of switching-times.