

High-Voltage Medium-Power Silicon P-N-P Transistors

For High-Speed Switching and Linear-Amplifier Applications

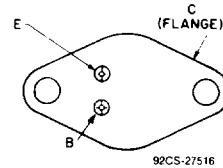
Features:

- *High voltage ratings:*
 - $V_{CE0(SUS)} = -175 \text{ V max. (2N6420)}$
 - $= -250 \text{ V max. (2N6421)}$
 - $= -300 \text{ V max. (2N6422)}$
 - $= -300 \text{ V max. (2N6423)}$
- *Large safe-operating area*

The 2N6420, 2N6421, 2N6422, and 2N6423 are epitaxial silicon p-n-p power transistors with high-voltage ratings and fast switching speeds. Typical applications for these transistors include high-voltage operational amplifiers, switching regulators, converters, inverters, deflection stages and high-fidelity amplifiers.

These types are supplied in steel JEDEC TO-213AA hermetic packages.

TERMINAL DESIGNATIONS



JEDEC TO-213AA

MAXIMUM RATINGS, Absolute-Maximum Values:

	2N6420	2N6421	2N6422	2N6423	
* V_{CBO}	-250	-375	-550	-550	V
* $V_{CE0(SUS)}$	-175	-250	-300	-300	V
* V_{EBO}			-6		V
* I_C	-1		-2		A
I_{CM}			-5		A
* I_B			-1		A
P_T					
$T_C \leq 100^\circ\text{C}, V_{CE} \leq 50\text{V}$			20		W
$T_C \leq 25^\circ\text{C}, V_{CE} \leq 40\text{V}$			35		W
$T_C \leq 25^\circ\text{C}, V_{CE} > 40\text{V}$			See Fig. 1		
$T_C < 25^\circ\text{C}, V_{CE} > 40\text{V}$			See Figs. 1 & 3		
* $T_{stg}, *T_J$			-65 to +200		$^\circ\text{C}$
* T_C					
At distances $\geq 1/32$ in. (0.8 mm) from case for 10 s max			235		$^\circ\text{C}$

*In accordance with JEDEC registration date

2N6420, 2N6421, 2N6422, 2N6423

ELECTRICAL CHARACTERISTICS, At Case Temperature (T_C) = 25°C
Unless Otherwise Specified

CHARACTERISTIC	TEST CONDITIONS				LIMITS						Units
	VOLTAGE V dc		CURRENT A dc		2N6420		2N6421 2N6422		2N6423		
	V _{CE}	V _{BE}	I _C	I _B	Min.	Max.	Min.	Max.	Min.	Max.	
* I _{CEO}	-150				-	-10	-	-5	-	-5	mA
* I _{CEX}	-225	1.5			-	-1	-	-	-	-	
2N6421	-340	1.5			-	-	-	-1	-	-	
2N6422	-450	1.5			-	-	-	-1	-	-	
2N6422	-450	1.5			-	-	-	-	-	-2	
* I _{CEX} T _C =150°C	-225	1.5			-	-3	-	-	-	-	mA
	-300	1.5			-	-	-	-3	-	-5	
* I _{EBO}		6	0		-	-5	-	-0.5	-	-0.5	
h _{FE}	-10		-0.1 ^a		40	-	40	-	40	-	V
	-10		-0.5 ^a		40	200	-	-	-	-	
	-2		-0.75 ^a		-	-	-	-	10	100	
	-10		-0.75 ^a		-	-	-	-	30	150	
	-2		-1 ^a		-	-	8	80	-	-	
	-10		-1 ^a		10	-	25	100	-	-	
V _{BE}	-10		-1 ^a		-	-1.4	-	-1.4	-	-1.4	
* V _{BE(sat)}			-0.75 ^a -1 ^a	-0.075 -0.1	-	-	-	-	-1.8	-	V
V _{CE(sat)}			-0.75 ^a -1 ^a	-0.075 -0.125	-	-5	-	-0.75	-	-1	
* V _{CEO(sus)} ^b			-0.05 ^a -0.05 ^a -0.05 ^a	0 0 0	-175 - -	- -250 -300	- - -	- - -	-300 - -	- - -	
I _{S/b}	-100				-0.15	-	-0.15	-	-0.15	-	A
* h _{fe} f = 5 MHz	-10		-0.2		2	-	2	-	3	-	
f = 1 kHz	-30		-0.1		25	350	-	-	-	-	
C _{obo} V _{CB} =10V f = 1 MHz			0		-	180	-	180	-	180	pF
* t _{r^c}			-0.75 -1	-0.075 ^d -0.1 ^d	-	-	-	-	3	-	0.5
* t _{s^c}			-0.75 -1	-0.075 ^d -0.1 ^d	-	-	-	-	4	-	6
* t _{f^c}			-0.75 -1	-0.075 ^d -0.1 ^d	-	-	-	-	3	-	3
R _{θJC}	-10		-1		-	5	-	5	-	5	°C/W

* In accordance with JEDEC registration data.

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

^b CAUTION: The sustaining voltage V_{CEO(sus)}

MUST NOT be measured on a curve tracer.

^c V_{CC} = -200 V, t_p = 20 μs

^d -I_{B1} = I_{B2}

2
POWER TRANSISTORS

2N6420, 2N6421, 2N6422, 2N6423

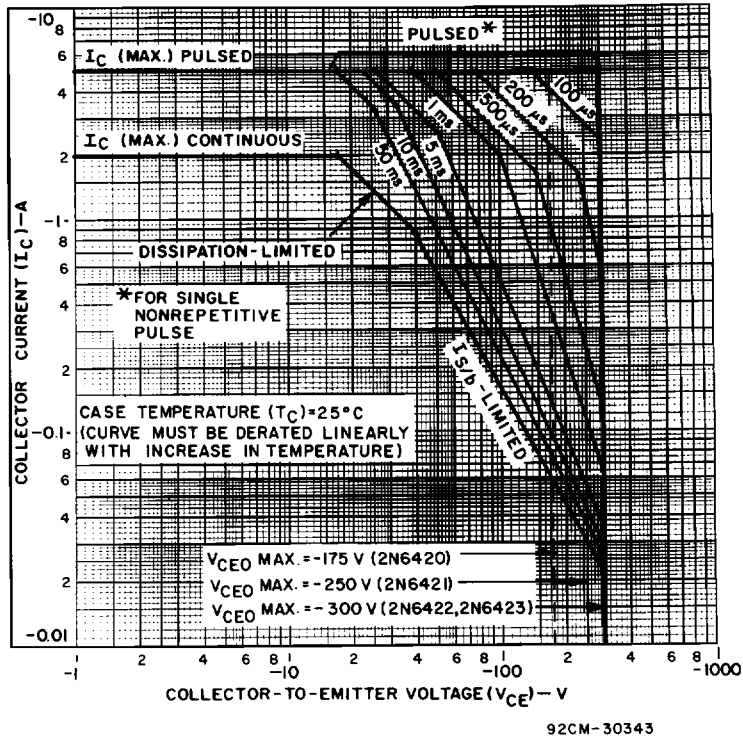


Fig. 1 -- Maximum operating areas for all types.

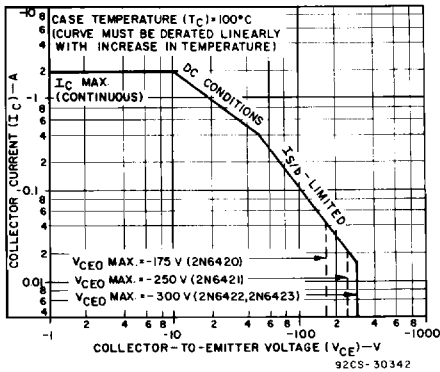


Fig. 2 -- Maximum operating areas for all types.

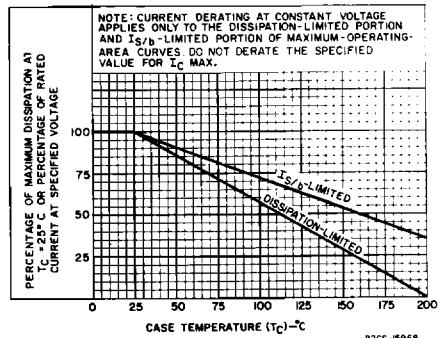


Fig. 3 -- Derating curves for all types.

2N6420, 2N6421, 2N6422, 2N6423

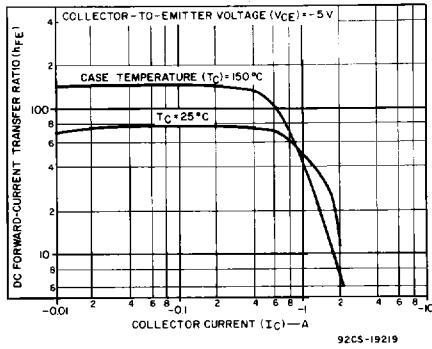


Fig. 4 — Typical dc beta characteristics for all types.

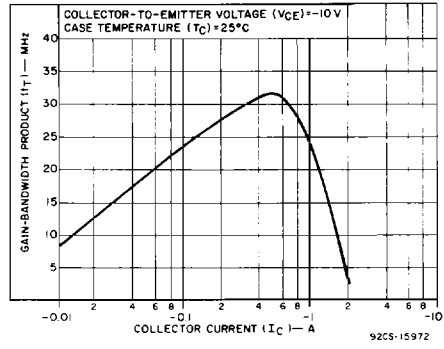


Fig. 5 — Typical gain-bandwidth product for all types.

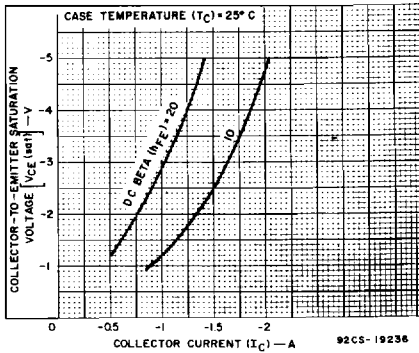


Fig. 6 — Typical saturation-voltage characteristics for all types.

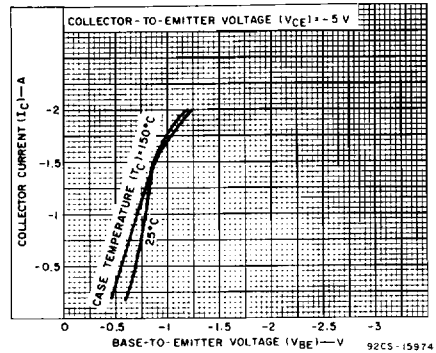


Fig. 7 — Typical transfer characteristics for all types.

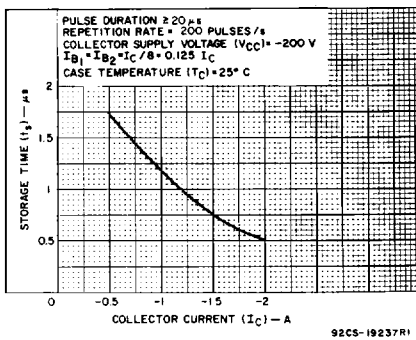


Fig. 8 — Typical storage time characteristic for all types.

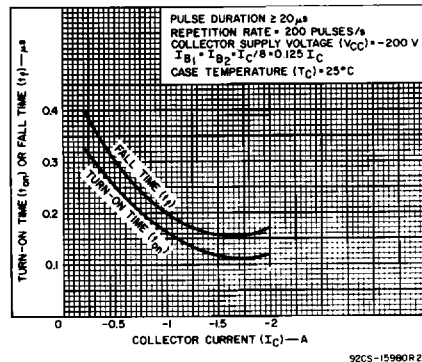


Fig. 9 — Typical turn-on time and fall-time characteristics for all types.

2
POWER TRANSISTORS

2N6420, 2N6421, 2N6422, 2N6423

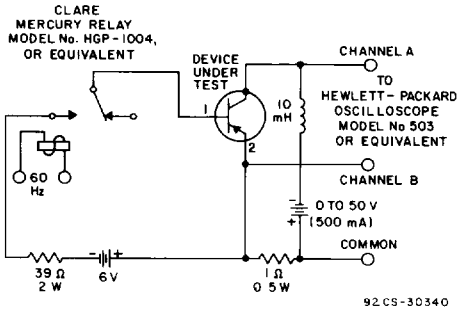
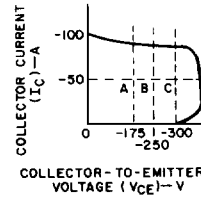


Fig. 10 — Circuit used to measure sustaining voltage $V_{CE0} (sus)$ for all types.



NOTE:
SUSTAINING VOLTAGES $V_{CE0} (sus)$ ARE ACCEPTABLE WHEN TRACES FALL TO THE RIGHT AND ABOVE POINTS "A" FOR TYPE 2N6420 POINTS "B" FOR TYPE 2N6421 AND POINTS "C" FOR TYPES 2N6422 AND 2N6423.

92CS-30341

Fig. 11 — Oscilloscope display for measurement of sustaining voltages.

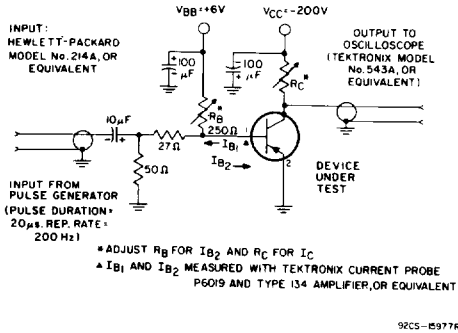


Fig. 12 — Circuit used to measure saturated switching times for all types.

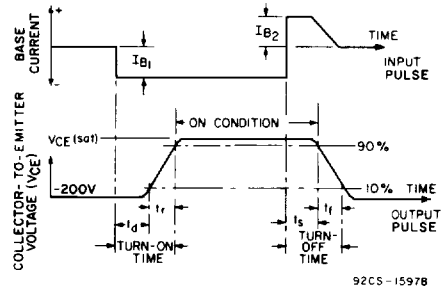


Fig. 13 — Phase relationship between input current and output voltage showing reference points for specification of switching times.