



Power Transistors

40406 40408 40410
40407 40409 40411

Silicon N-P-N and P-N-P Power Transistors

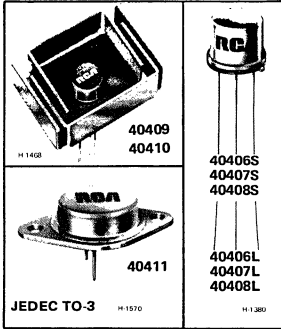
For Audio-Amplifier Applications

Features:

40406 & 40407

- $V_{CEO(sus)} = -50$ V max. (40406)
- $V_{CEO(sus)} = 50$ V max. (40407)
- 40406 is p-n-p complement of 40407
- 1 W dissipation rating

These devices are available with either 1/2-inch leads (TO-5 package) or 1/2-inch leads (TO-39 package). The longer-lead versions are specified by suffix "L" after the type number; the shorter-lead versions are specified by suffix "S" after the type number.



40408

- $V_{CEO(sus)} = 90$ V max.
- 1 W dissipation rating

40409 & 40410

- $V_{CE(sus)} = 90$ V max. (40409)
- $V_{CE(sus)} = -90$ V max. (40410)
- 40410 is p-n-p complement of 40409
- 3 W free-air dissipation rating

40411

- $V_{CE(sus)} = 90$ max.
- Hometaxial-base construction
- 150 W dissipation rating

RCA-40406-40411, inclusive, are diffused-junction silicon n-p-n and p-n-p transistors intended for use in audio amplifiers. Giving high-quality performance economically, these six devices have power dissipation ratings of 1 to 150 W.

TERMINAL CONNECTIONS FOR 40406-40410

- Lead 1 - Emitter
- Lead 2 - Base
- Case or Heat
- Radiator, Lead 3 - Collector

TERMINAL CONNECTIONS FOR 40411

- Pin 1 - Base
- Pin 2 - Emitter
- Case - Collector
- Mounting Flange - Collector

MAXIMUM RATINGS, Absolute-Maximum Values

	40406	40407	40408	40409	40410	40411
Collector-to-Emitter Sustaining Voltage:						
With base open	$V_{CEO(sus)} -50$	50	90	-	-	-
With $R_{BE} = 100 \Omega$	$V_{CER(sus)} -$	-	-	90	-90	90
Emitter-to-Base Voltage:						
With collector open	$V_{EBO} -4$	4	4	4	-4	4
Collector Current	$I_C -0.7$	0.7	0.7	0.7	-0.7	30
Base Current	$I_B -0.2$	0.2	0.2	0.2	-0.2	15
Transistor Power Dissipation:						
At free-air temperatures up to 25° C	1	1	1	-	-	-
At free-air temperatures up to 50° C	-	-	-	3	3	-
At case temperatures up to 25° C	-	-	-	-	-	150
At other temperatures		See Fig. 1			See Fig. 2	See Fig. 3
Operating Junction Temperature Range	← -65 to +200 → °C					

ELECTRICAL CHARACTERISTICS

Characteristic	TEST CONDITIONS						LIMITS					
	V _{CB}	V _{CE}	V _{EB}	I _C	I _B	T _C	40406		40407		40408	
	Volts			mA		°C	Min.	Max.	Min.	Max.	Min.	Max.
I _{CEO}		40 ^a				25		-1 μA		1 μA		
		80				25					1 μA	
		40 ^a				150		-10 μA		100 μA		
		80				150						250 μA
I _{CBO}	10								0.25 μA			
I _{EBO}			4 ^a					-1 mA		1 mA		1 mA
V _{CEO(sus)}				100 ^a			-50 V		50 V		90 V	
V _{CE(sat)}				150 ^a	15							1.4 V
V _{BE}		-10		-0.1				-0.8 V				
		10		1					0.8 V			
		4		10								1 V
h _{FE}		-10		-0.1			30	200				
		10		1					40	200		
		4		10							40	200
h _{fe} ^c		10		50					6			
f _T		4 ^a		50 ^a			← 100 MHz (Typ) →					
θ _{J-C}							35° C/W		35° C/W		35° C/W	
θ _{J-FA}							175° C/W		175° C/W		175° C/W	
C _{ob} ^d	10								15 pF			

^a Negative for types 40406 & 40410^c F = 20 MHz^d F = 1 MHz, I_E = 0

ELECTRICAL CHARACTERISTICS

Characteristic	TEST CONDITIONS						LIMITS					
	V _{CB}	V _{CE}	V _{EB}	I _C	I _B	T _C	40409		40410		40411	
	Volts			mA		°C	Min.	Max.	Min.	Max.	Min.	Max.
I _{CER} ^b		80 ^a				25		1 μA		-1 μA		500 μA
		80 ^a				150		100 μA		-100 μA		2 mA
I _{EBO}			4 ^a					1 mA		-1 mA		5 mA
V _{CER(sus)} ^b				100 ^a			90 V		-90 V			
				200							90 V	
V _{CE(sat)}				150 ^a	15			1.4 V		-1.4 V		
				4 A	400							0.8 V
V _{BE}		4 ^a		150 ^a				1 V		-1 V		
		4		4 A								1.2 V
h _{FE}		4		150			50	250				
		-4		-150					50	250		
		4		4 A							35	100
f _T		4 ^a		50 ^a			← 100 MHz (Typ) →					
		4		4 A							800 kHz (Typ)	
θ _{J-C}												1.17° C/W
θ _{J-FA}							50° C/W		50° C/W			
PRT ^e		40		5 A							1 sec	

^a Negative for types 40406 & 40410

^b R_{BE} = 100 Ω

^c Power rating test at 200 watts

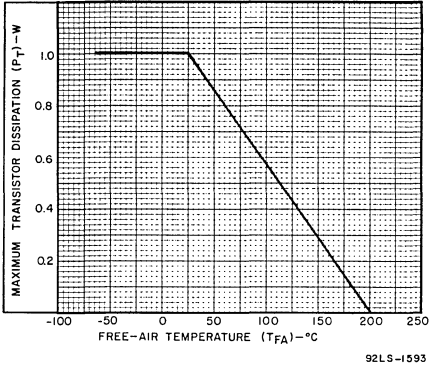


Fig. 1 - Dissipation derating curve for 40406, 40407, and 40408.

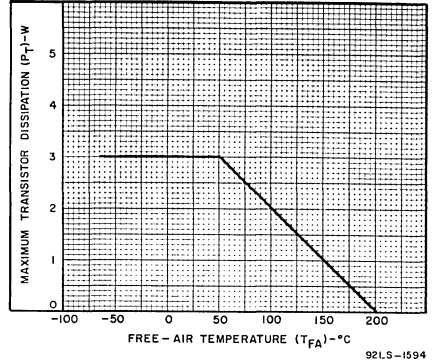


Fig. 2 - Dissipation derating curve for 40409 and 40410.

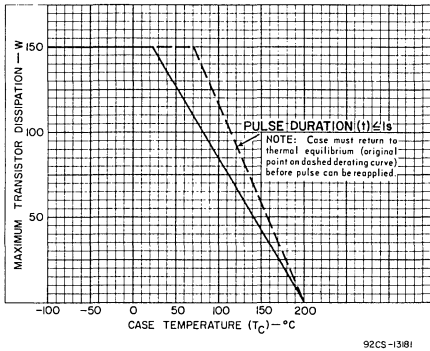


Fig. 3 - Dissipation derating curve for 40411.

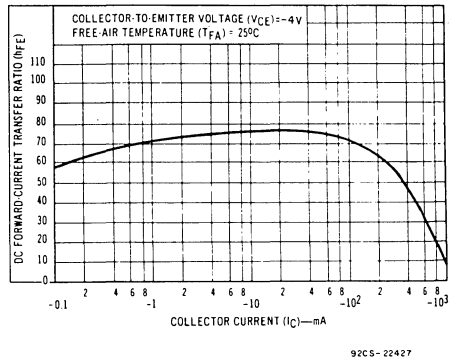


Fig. 4 - Typical dc beta characteristic for 40406 and 40410.

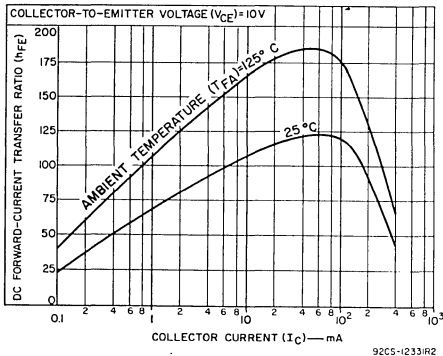


Fig. 5 - Typical dc beta characteristics for 40407, 40408, 40409.

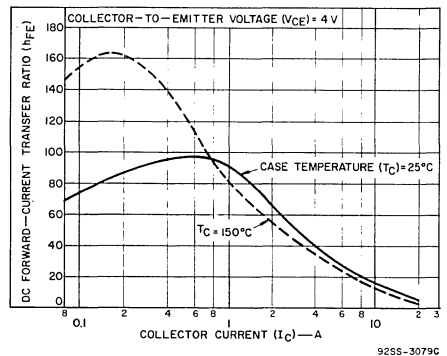
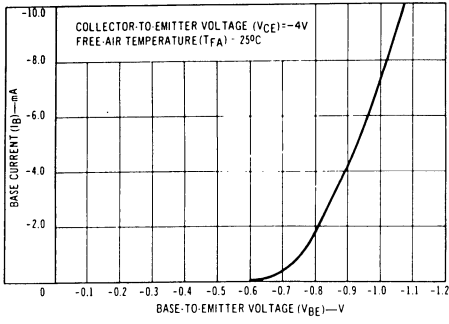
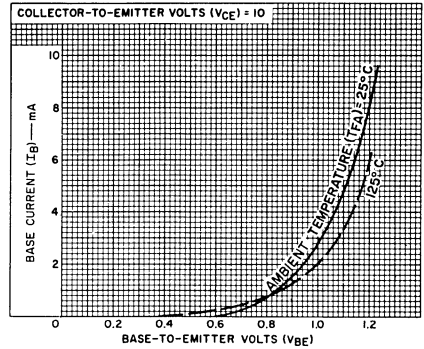


Fig. 6 - Typical dc beta characteristics for 40411.



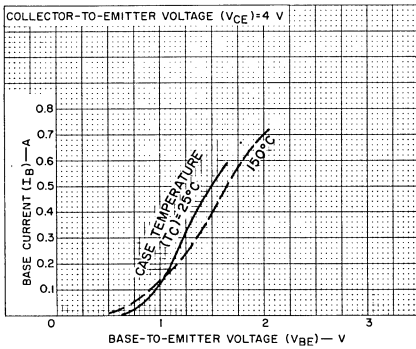
92CS-22428

Fig. 7 - Typical input characteristic for 40406 and 40410.



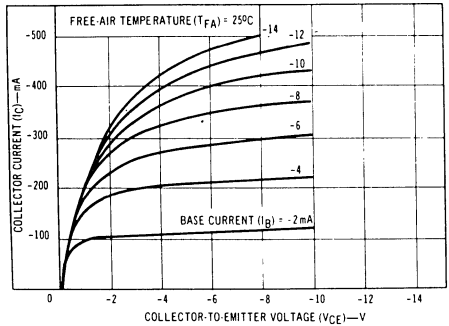
92CS-12329R2

Fig. 8 - Typical input characteristics for 40407, 40408, and 40409.



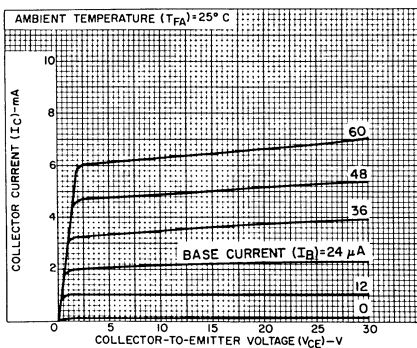
92CS-13167

Fig. 9 - Typical input characteristics for 40411.



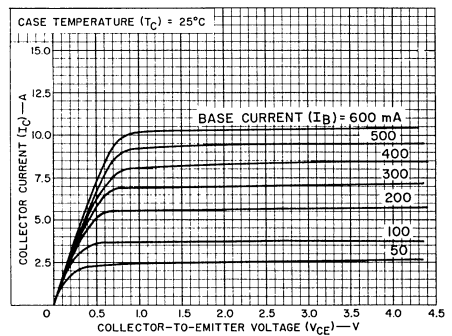
92CS-22429

Fig. 10 - Typical output characteristics for 40406 and 40410.



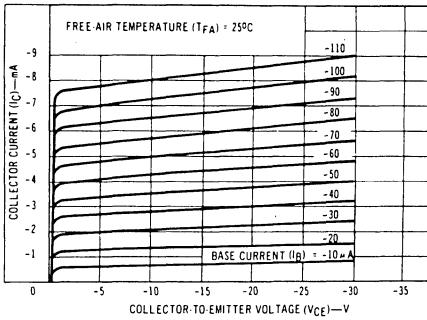
92CS-13003R2

Fig. 11 - Typical output characteristics for 40407, 40408, and 40409.



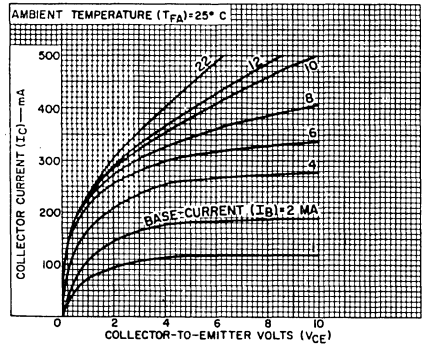
92CS-13164

Fig. 12 - Typical output characteristics for 40411.



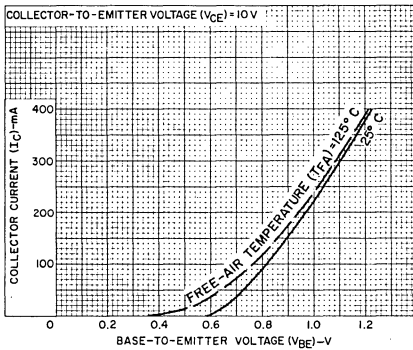
92CS-22430

Fig. 13 - Typical output characteristics for 40406 and 40410.



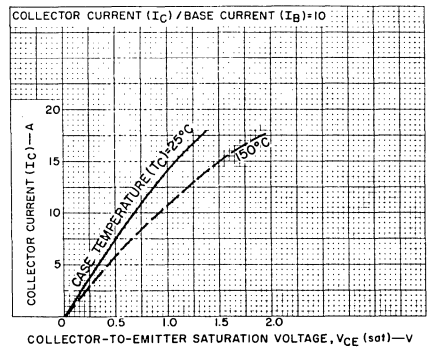
92CS-12327R2

Fig. 14 - Typical output characteristics for 40407, 40408, and 40409.



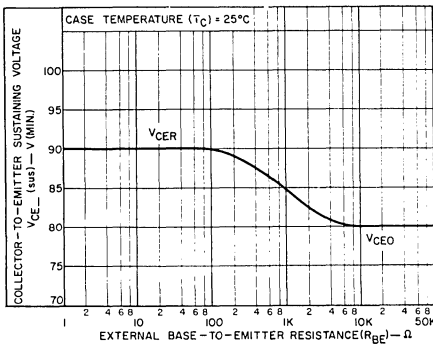
92CS-12328R1

Fig. 15 - Typical transfer characteristics for 40407, 40408, and 40409.



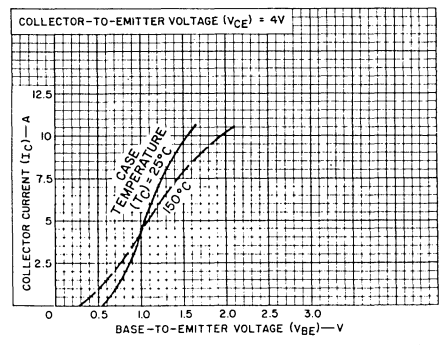
92CS-13186

Fig. 16 - Typical saturation-voltage characteristics for 40411.



92CS-3080C

Fig. 17 - Sustaining voltage vs. external base-to-emitter resistance for 40411.



92CS-13188

Fig. 18 - Typical transfer characteristics for 40411.