



Power Transistors

**40346 40346V1 40346V2
40412 40412V1 40412V2**

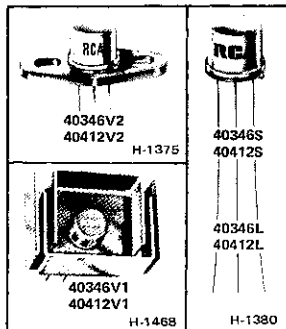
Medium-Power Silicon N-P-N Planar Transistors

For High-Voltage Switching and
Linear-Amplifier Applications

Features:

- For operation at junction temperature up to 200°C
- Planar construction for low noise and low leakage

These devices are available with either 1½-inch leads (TO-39 package) or ½-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.



RCA-40346, -40346V1, -40346V2, -40412, -40412V1, and -40412V2 are silicon n-p-n transistors having high breakdown voltages, high frequency-response capability, and fast switching speeds.

These transistors are intended for a wide variety of low- and medium-power, high-voltage applications. Types 40346, 40346V1, and 40346V2 are especially useful in such devices as neon indicator and NIXIE* driver circuits and in differential and operational amplifiers. Types 40412, 40412V1, and 40412V2 are especially suited for class-A ac/dc audio-amplifier service.

Types 40346 and 40412 are supplied in a JEDEC TO-39 (S) or TO-5 (L) package; types 40346V1 and 40412V1, with a factory-attached heat radiator for greater free-air dissipation capability; and types 40346V2 and 40412V2 are supplied with an attached flange for increased power dissipation and mounting convenience.

* Nixie is a Registered Trademark of Burroughs Corporation, Electronic Components Division, Plainfield, N. J.

MAXIMUM RATINGS, Absolute-Maximum Values:

	40346	40346V1	40346V2	40412	40412V1	40412V2
COLLECTOR-TO-EMITTER VOLTAGE: $V_{CE}(sus)$						
With $R_{BE} = 1,000 \Omega$	175	175	175	—	—	— V
With $R_{BE} = 10,000 \Omega$	—	—	—	250	250	250 V
COLLECTOR CURRENT I_C	1	1	1	1	1	1 A
BASE CURRENT I_B	0.5	0.5	0.5	0.5	0.5	0.5 A
TRANSISTOR DISSIPATION: P_T						
At case temperatures up to 25°C	10	—	10	10	—	10 W
At free-air temperatures up to 50°C	1	—	—	1	—	— W
At free-air temperatures up to 25°C	—	4	—	—	4	— W
At other temperatures	See Fig. 1					
TEMPERATURE RANGE:						
Storage and Operating	-65 to +200 °C					

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

CHARACTERISTICS	SYMBOL	VOLTAGE		CURRENT mA dc	LIMITS								UNITS
		V dc			40346		40346V1		40412		40412V1		
		V _{CE}	V _{EB}		I _C	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Collector-Cutoff Current: With base open With R = 10,000 ohms With base reverse-biased: T _C = 25° C T _C = 150° C T _C = 150° C	I _{CEO} I _{CER} I _{CEV} I _{CEV} I _{CEV}	100 100 200 200 150	— — 1.5 1.5 1.5	— — — — —	— — — — —	5 — 10 1 —	— — — — —	5 — 10 1 —	— — — — —	— 1 — — 2	— — — — 2	— 1 — — 2	μA mA μA mA mA
Emitter-Cutoff Current	I _{EBO} I _{EBO}	— —	4 3	— —	— —	5 —	— —	5 —	— —	— 100	— —	— 100	μA μA
Collector-To-Emitter Sustaining Voltage: With external base-to-emitter resistance R _{BE} = 1,000 ohms R _{BE} = 10,000 ohms	V _{CER(sus)} V _{CER(sus)}	— —	— —	50 50	175 —	— —	175 —	— —	— 250	— —	— 250	— —	V V
Collector-To-Emitter Saturation Voltage: I _B = 1 mA	V _{CE(sat)}	—	—	10	—	0.5	—	0.5	—	—	—	—	V
Base-To-Emitter Voltage	V _{BE}	10	—	10	—	1	—	1	—	—	—	—	V
Second-Breakdown Current	I _{S/b}	200	—	—	—	—	—	—	50	—	50	—	mA
DC Forward-Current Transfer Ratio	h _{FE} h _{FE}	10 20	— —	10 30	25 —	— —	25 —	— —	— 40	— —	— 40	— —	
Small-Signal Forward- Current Transfer Ratio: f = 5 MHz	h _{fe}	10	—	10	2	—	2	—	2	—	2	—	
Output Capacitance: V _{CB} = 10 V, f = 1 MHz	C _{ob}	—	—	—	—	—	—	—	—	10	—	10	pF
Thermal Resistance: Junction-to-case Junction-to-free air	R _{θJC} R _{θJFA}	— —	— —	— —	— —	15 —	— —	— 45	— —	15 —	— —	— 45	°C/W °C/W

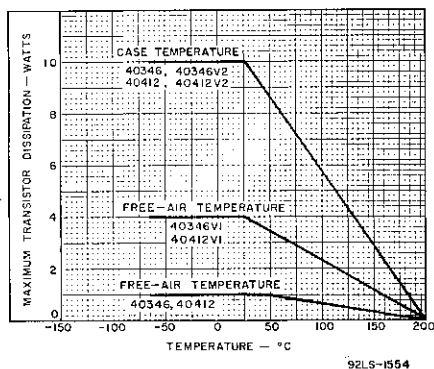


Fig. 1 - Dissipation derating curves.

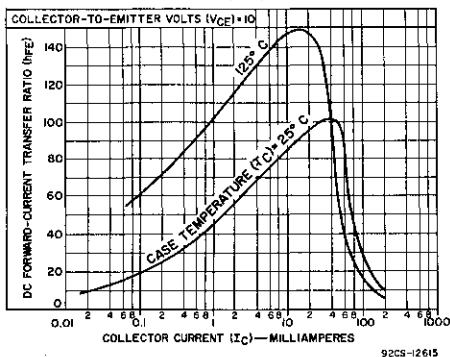


Fig. 2 - Typical dc-beta characteristics for all types.

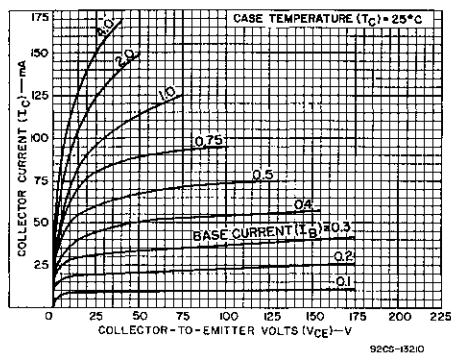


Fig. 3 - Typical output characteristics for all types.

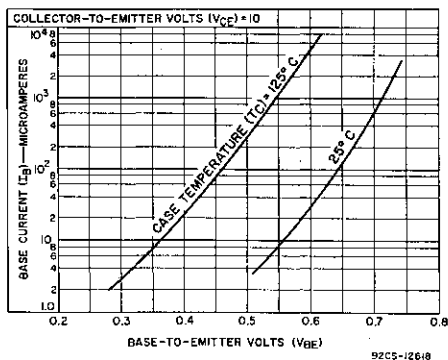


Fig. 4 - Typical input characteristics for all types.

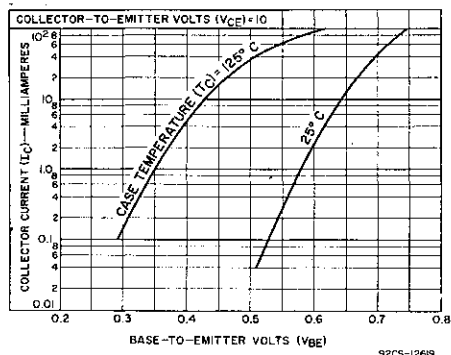


Fig. 5 - Typical transfer characteristics for all types.

TERMINAL CONNECTIONS FOR 40346 AND 40412

Lead 1 - Emitter
Lead 2 - Base
Case, Lead 3 - Collector

TERMINAL CONNECTIONS FOR 40346V1 AND 40412V1

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

TERMINAL CONNECTIONS FOR 40346V2 AND 40412V2

Lead 1 - Emitter
Lead 2 - Base
Flange, Lead 3 - Collector