

File Number 677

2N6246, 2N6247, 2N6248, 2N6469

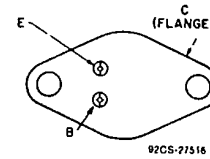
Silicon P-N-P Epitaxial-Base, High-Power Transistors

General-Purpose Types of Switching and Linear-Amplifier Applications

Features:

- High dissipation capability: 125 W at 25°C
- Low saturation voltages
- Maximum safe-area-of-operation curves
- High gain at high current

TERMINAL DESIGNATIONS



JEDEC TO-204AA

RCA-2N6246, 2N6247, 2N6248, and 2N6469 are epitaxial-base silicon p-n-p transistors featuring high gain at high current. All of these devices have a dissipation capability of 125 watts at case temperatures up to 25°C. They differ in voltage ratings and in the currents at which the parameters are controlled. All are supplied in the JEDEC TO-204AA package.

▲ Formerly RCA Dev. Nos. TA7281, TA7280, TA7279, and TA8724, respectively.

Maximum Ratings, Absolute-Maximum Values:

| | 2N6469 | 2N6246 | 2N6247 | 2N6248 | |
|---|-----------------|--------|--------|--------|----|
| *COLLECTOR-TO-BASE VOLTAGE | -50 | -70 | -90 | -110 | V |
| COLLECTOR-TO-EMITTER VOLTAGE: | | | | | |
| * With external base-to-emitter resistance (R _{BE}) = 100 Ω | -50 | -70 | -90 | -110 | V |
| With base open | -40 | -60 | -80 | -100 | V |
| *EMITTER-TO-BASE VOLTAGE. | -5 | -5 | -5 | -5 | V |
| *CONTINUOUS COLLECTOR CURRENT. | -15 | -15 | -15 | -10 | A |
| *CONTINUOUS BASE CURRENT | -5 | -5 | -5 | -5 | A |
| *TRANSISTOR DISSIPATION: P _T | | | | | |
| At case temperatures up to 25°C | 125 | 125 | 125 | 125 | W |
| At case temperatures above 25°C | ← See Fig. 2 → | | | | |
| *TEMPERATURE RANGE: | | | | | |
| Storage & Operating (Junction) | ← -65 to +200 → | | | | °C |
| *PIN TEMPERATURE (During Soldering): | | | | | |
| At distances ≥ 1/32" (0.8 mm) from seating plane for 10 s max. | ← +235 → | | | | °C |

* In accordance with JEDEC registration data format (JS-6 RDF-2).

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General-Purpose Power Transistors

2N6246, 2N6247, 2N6248, 2N6469

ELECTRICAL CHARACTERISTICS FOR P-N-P TYPES, At case temperature (T_C) = 25°C unless otherwise specified

| CHARACTERISTIC | SYMBOL | TEST CONDITIONS | | | | LIMITS | | | | UNITS |
|---|-----------------------|-----------------|-----------------|--|--------------------------|------------------|------------------------|------------------|---------------|-------|
| | | VOLTAGE V dc | | CURRENT A dc | | 2N6469 | | 2N6246 | | |
| | | V _{CE} | V _{BE} | I _C | I _B | Min. | Max. | Min. | Max. | |
| Collector-Cutoff Current: With external base-emitter resistance (R_{BE}) = 100 Ω | I _{CER} | -35 -55 | | | | - | -200 | - | - | μA |
| With base-emitter junction reverse-biased | I _{CEX} | -45 -65 | 1.5 1.5 | | | - | -200 | - | - | μA |
| With reverse bias and T_C = 150°C | | -45 -55 | 1.5 1.5 | | | - | -5 | - | - | mA |
| With base open | I _{CEO} | -20 -30 | | | 0 0 | - | -1 | - | - | mA |
| Emitter-Cutoff Current | I _{EBO} | | 5 | | 0 | - | -5 | - | -5 | mA |
| DC Forward-Current Transfer Ratio | h _{FE} | -4 -4 -4 | | -5 ^a -7 ^a -15 ^a | | 20 - 5 | 150 - - | - 20 5 | - 100 - | |
| Collector-to-Emitter Sustaining Voltage: With base open | V _{CEO(sus)} | | | -0.2 | 0 | -40 ^b | - | -60 ^b | - | V |
| With external base-emitter resistance (R_{BE}) = 100 Ω | V _{CER(sus)} | | | -0.2 | | -45 ^b | - | -65 ^b | - | V |
| Base-to-Emitter Voltage | V _{BE} | -4 -4 | | -15 ^a -7 ^a | | - | -3.5 - | - | - | V |
| Collector-to-Emitter Saturation Voltage | V _{CE(sat)} | | | -5 ^a -7 ^a -15 ^a -15 ^a | -0.5 -0.7 -5 -3 | - | -1.3 - -3.5 - | - | - | V |
| Magnitude of Common-Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio: f = 2 MHz | h _{fe} | -4 | | -1 | | 5 | - | 5 | - | |
| Common-Emitter, Small-Signal Short-Circuit, Forward-Current Transfer Ratio: f = 1 kHz | h _{fe} | -4 | | -1 | | 25 | - | 25 | - | |
| Thermal Resistance: Junction-to-case | R _{θJC} | | | | | - | 1.4 | - | 1.4 | °C/W |

^a In accordance with JEDEC registration data format (JS-6 RDF-2).

^b Pulsed: pulse duration = 300 μs, duty factor = 1.8%.

^c CAUTION: CAUTION: Sustaining voltages V_{CEO(sus)} and V_{CER(sus)} MUST NOT be measured on a curve tracer.

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General-Purpose Power Transistors

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ELECTRICAL CHARACTERISTICS FOR P-N-P TYPES, At case temperature (T_C) = 25°C unless otherwise specified

| CHARACTERISTIC | SYMBOL | TEST CONDITIONS | | | | LIMITS | | | | UNITS |
|---|-----------------------|----------------------|-----------------|--|--------------------------|-------------------|------------------------|-------------------|------------------------|-------|
| | | VOLTAGE V dc | | CURRENT A dc | | 2N6247 | | 2N6248 | | |
| | | V _{CE} | V _{BE} | I _C | I _B | Min. | Max. | Min. | Max. | |
| Collector-Cutoff Current: With external base-emitter resistance (R _{BE}) = 100 Ω | I _{CER} | -75 -95 | | | | - - | -200 - | - - | - -200 | μA |
| With base-emitter junction reverse-biased | I _{CEX} | -85 -100 | 1.5 1.5 | | | - - | -200 - | - - | - -200 | μA |
| With reverse bias, at T _C = 150°C | | -70 -90 | 1.5 1.5 | | | - - | -5 - | - - | - -5 | mA |
| With base open | I _{CEO} | -40 -50 | | | 0 0 | - - | -1 - | - - | - -1 | mA |
| Emitter-Cutoff Current | I _{EBO} | | 5 | | 0 | - - | -1 - | - - | - -1 | mA |
| DC Forward-Current Transfer Ratio | h _{FE} | -4 -4 -4 -4 | | -5 ^a -6 ^a -10 ^a -15 ^a | | - 20 - 5 | - 100 - - | 20 - 5 - | 100 - - - | |
| Collector-to-Emitter Sustaining Voltage: With base open | V _{CEO(sus)} | | | -0.2 | 0 | -80 ^b | - | -100 ^b | - | V |
| With external base-emitter resistance (R _{BE}) = 100 Ω | V _{CER(sus)} | | | -0.2 | | -85 ^b | - | -105 ^b | - | V |
| Base-to-Emitter Voltage | V _{BE} | -4 -4 | | -6 ^a -5 ^a | | - - | -1.8 - | - - | - -1.8 | V |
| Collector-to-Emitter Saturation Voltage | V _{CE(sat)} | | | -5 ^a -6 ^a -15 ^a -10 ^a | -0.5 -0.6 -4 -2 | - - - - | - -1.3 -3.5 - | - - - - | -1.3 - -3.5 - | V |
| Magnitude of Common-Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio: f = 2 MHz | h _{fe} | -4 | | -1 | | 5 | - | 5 | - | |
| Common-Emitter, Small-Signal, Short-Circuit, Forward-Current Transfer Ratio: f = 1 kHz | h _{fe} | -4 | | -1 | | 25 | - | 25 | - | |
| Thermal Resistance: Junction-to-case | R _{θJC} | | | | | - | 1.4 | - | 1.4 | °C/W |

^a In accordance with JEDEC registration data format (JS-6 RDF-2).

^a Pulsed; pulse duration = 300 μs, duty factor = 1.8%.

^b CAUTION: Sustaining voltages V_{CEO(sus)} and V_{CER(sus)} MUST NOT be measured on a curve tracer.

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General-Purpose Power Transistors

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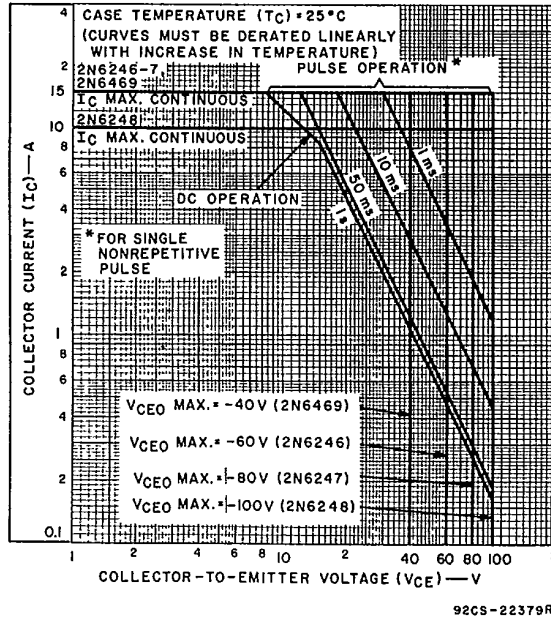


Fig. 1 — Maximum operating areas for all types.

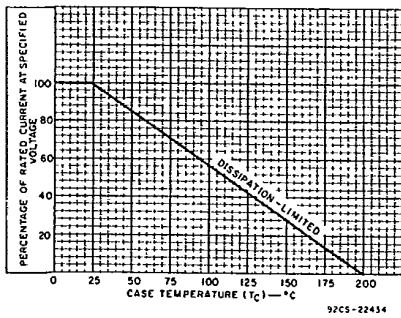


Fig. 2 — Current derating for all types.

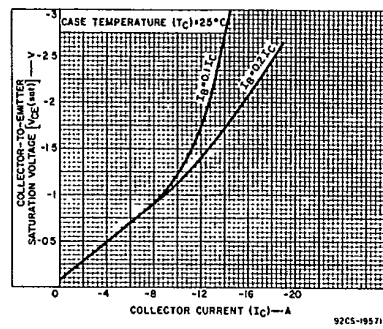
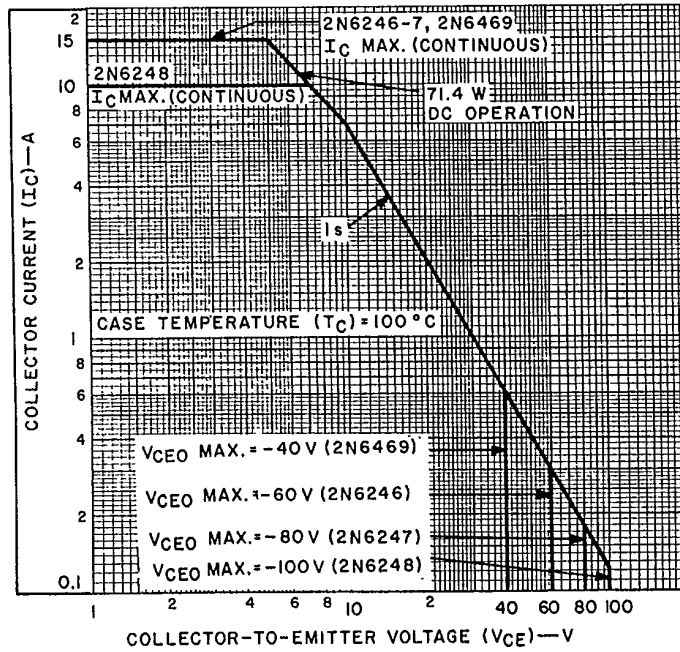


Fig. 3 — Typical collector-to-emitter saturation-voltage characteristics for 2N6246, 2N6247, 2N6248, and 2N6469.

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Fig. 4 — Maximum operating areas for all types.

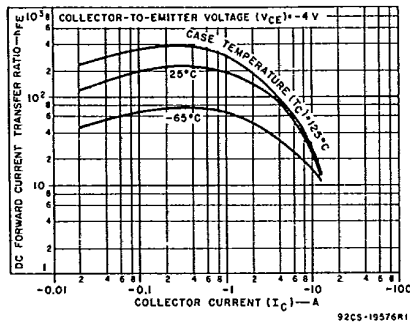


Fig. 5 — Typical dc beta characteristics for 2N6246, 2N6247, and 2N6469.

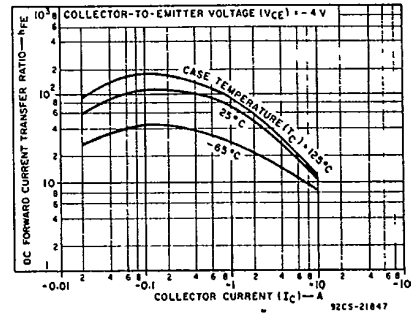


Fig. 6 — Typical dc beta characteristics for 2N6248.

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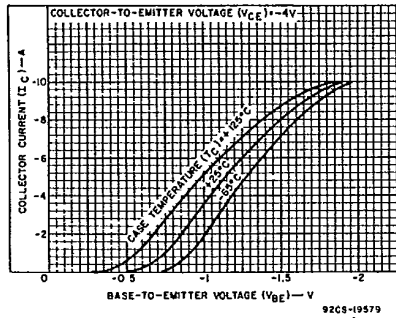


Fig. 7 — Typical transfer characteristics for 2N6246, 2N6247, 2N6248, and 2N6469.

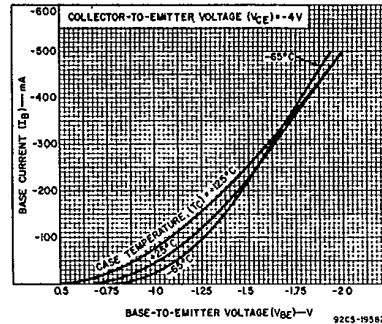


Fig. 8 — Typical input characteristics for 2N6246, 2N6247, and 2N6469.

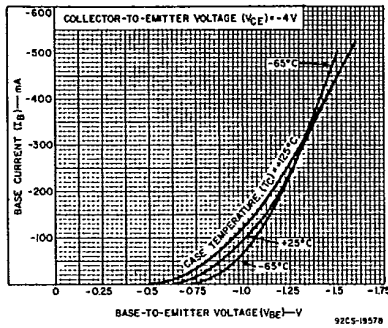


Fig. 9 — Typical input characteristics for 2N6248.

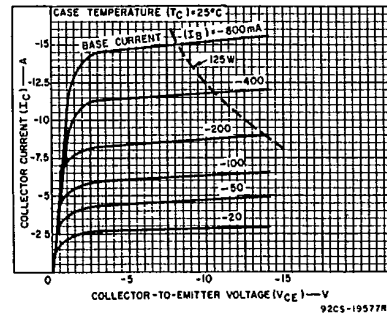


Fig. 10 — Typical output characteristics for 2N6246, 2N6247, and 2N6469.

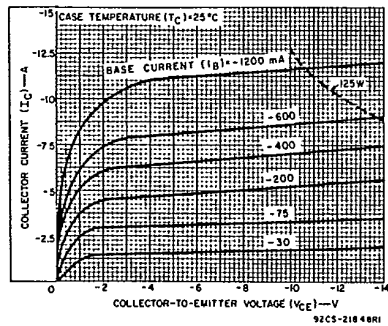


Fig. 11 — Typical output characteristics for 2N6248.

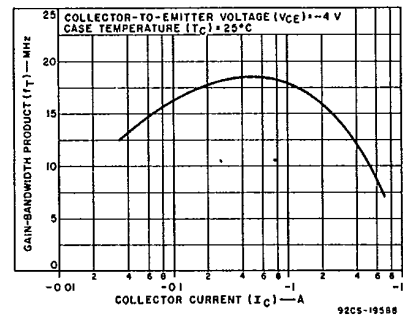


Fig. 12 — Typical gain-bandwidth product vs. collector current for 2N6246, 2N6247, 2N6248, and 2N6469.

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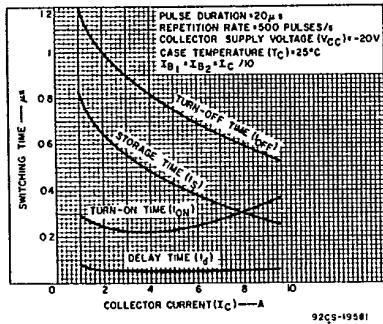


Fig. 13 — Typical saturated switching characteristics for 2N6246, 2N6247, 2N6248, and 2N6469.

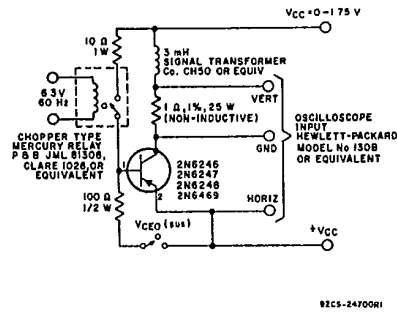


Fig. 14 — Circuit used to measure sustaining voltages $V_{CE(sus)}$ and $V_{CE(sus)}$ for all types.

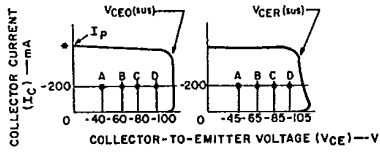


Fig. 15 — Oscilloscope display for measurement of sustaining voltages (test circuit shown in Fig. 14).

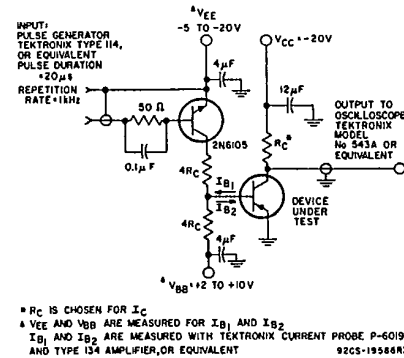


Fig. 16 — Circuit used to measure switching times for 2N6246, 2N6247, 2N6248, and 2N6469.

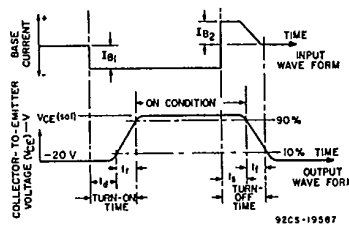


Fig. 17 — Oscilloscope display for measurement of switching times.