



## CPH3109/CPH3209

### DC/DC Converter Applications

#### Applications

- Relay drivers, lamp drivers, motor drivers, strobes.

#### Features

- Adoption of MBIT processes.
- Large current capacitance.
- Low collector-to-emitter saturation voltage.
- High-speed switching.
- Ultrasmall package facilitates miniaturization in end products (mounting height : 0.9mm).
- High allowable power dissipation.

#### Specifications

( ) : CPH3109

**Absolute Maximum Ratings** at  $T_a = 25^\circ\text{C}$

| Parameter                    | Symbol    | Conditions                                             | Ratings     | Unit |
|------------------------------|-----------|--------------------------------------------------------|-------------|------|
| Collector-to-Base Voltage    | $V_{CBO}$ |                                                        | (-30)40     | V    |
| Collector-to-Emitter Voltage | $V_{CEO}$ |                                                        | (-)30       | V    |
| Emitter-to-Base Voltage      | $V_{EBO}$ |                                                        | (-)35       | V    |
| Collector Current            | $I_C$     |                                                        | (-)3        | A    |
| Collector Current (Pulse)    | $I_{CP}$  |                                                        | (-)5        | A    |
| Base Current                 | $I_B$     |                                                        | (-)600      | mA   |
| Collector Dissipation        | $P_C$     | Mounted on a ceramic board (600mm <sup>2</sup> ×0.8mm) | 0.9         | W    |
| Junction Temperature         | $T_J$     |                                                        | 150         | °C   |
| Storage Temperature          | $T_{stg}$ |                                                        | -55 to +150 | °C   |

**Electrical Characteristics** at  $T_a = 25^\circ\text{C}$

| Parameter                | Symbol    | Conditions                                  | Ratings |        |        | Unit          |
|--------------------------|-----------|---------------------------------------------|---------|--------|--------|---------------|
|                          |           |                                             | min     | typ    | max    |               |
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB}=(-)30\text{V}, I_E=0$               |         |        | (-)0.1 | $\mu\text{A}$ |
| Emitter Cutoff Current   | $I_{EBO}$ | $V_{EB}=(-)4\text{V}, I_C=0$                |         |        | (-)0.1 | $\mu\text{A}$ |
| DC Current Gain          | $h_{FE}$  | $V_{CE}=(-)2\text{V}, I_C=(-)500\text{mA}$  | 200     |        | 560    |               |
| Gain-Bandwidth Product   | $f_T$     | $V_{CE}=(-)10\text{V}, I_C=(-)500\text{mA}$ |         | (380)  |        | MHz           |
|                          |           |                                             |         | 450    |        | MHz           |
| Output Capacitance       | $C_{ob}$  | $V_{CB}=(-)10\text{V}, f=1\text{MHz}$       |         | (25)20 |        | pF            |

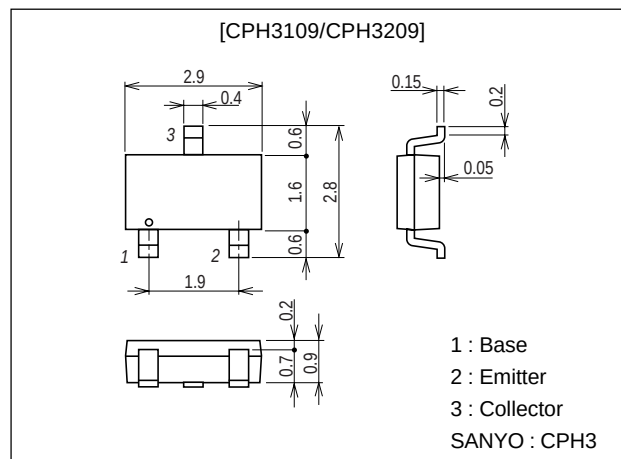
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#### Package Dimensions

unit:mm

2150A



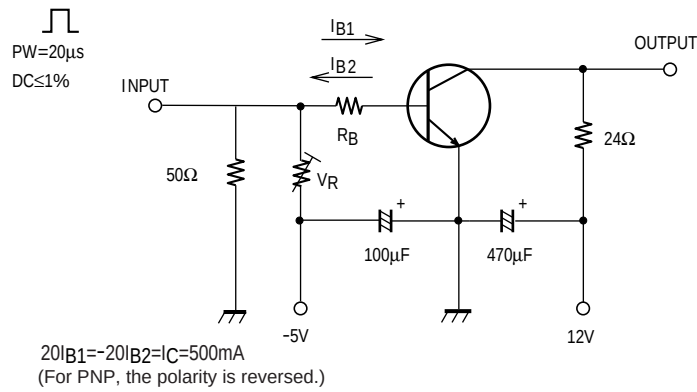
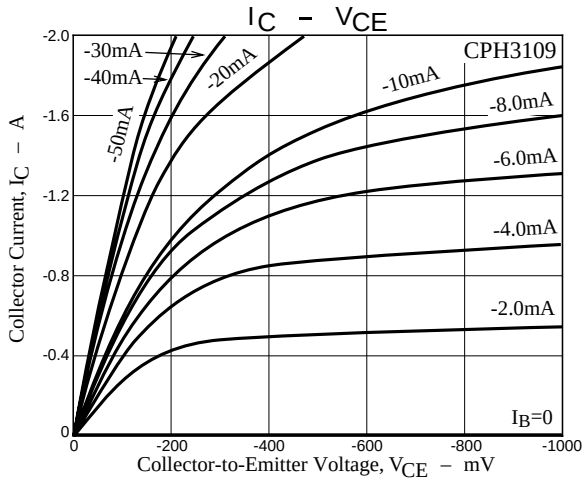
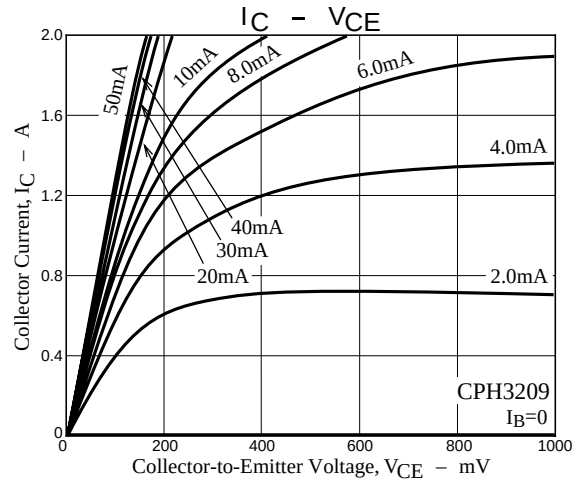
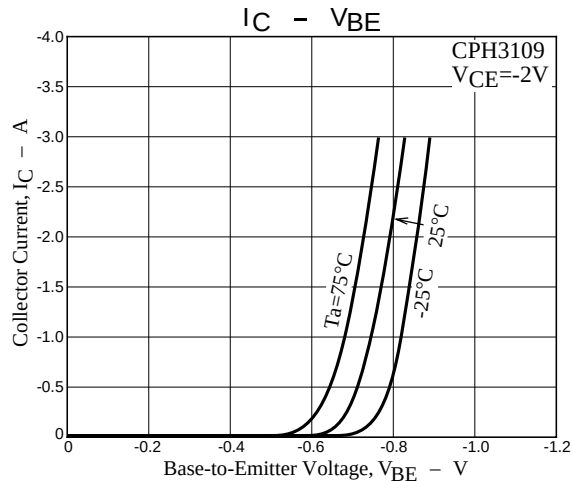
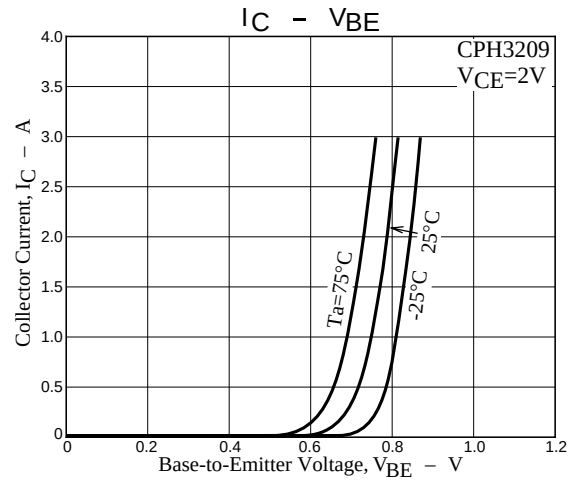
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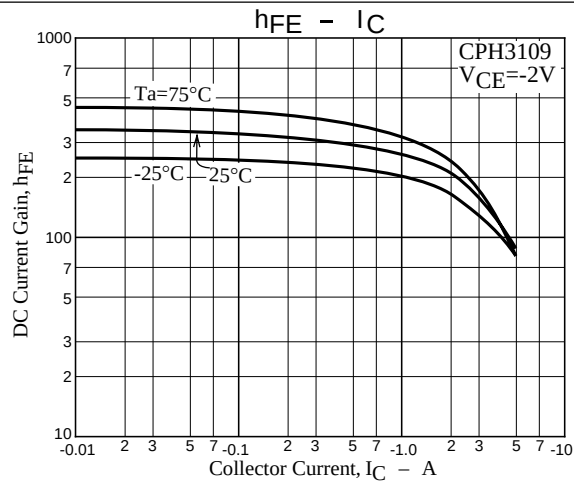
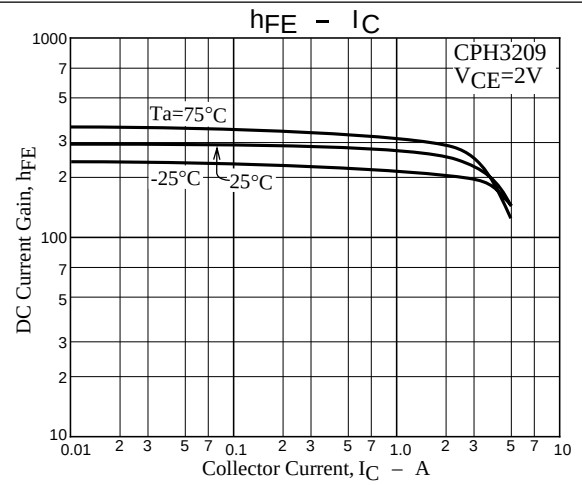
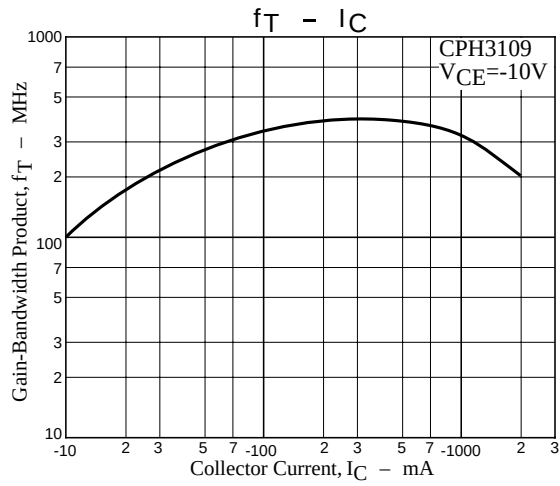
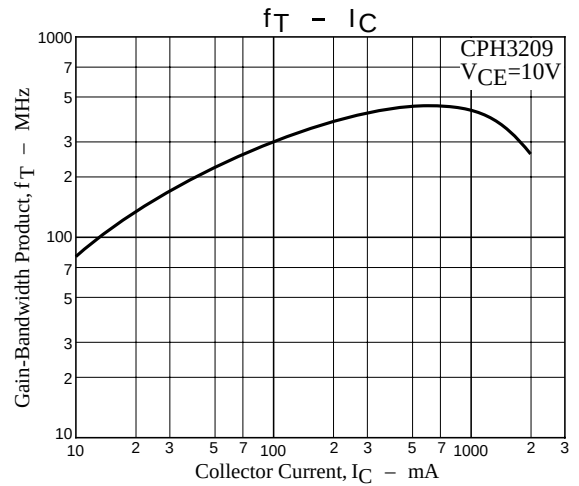
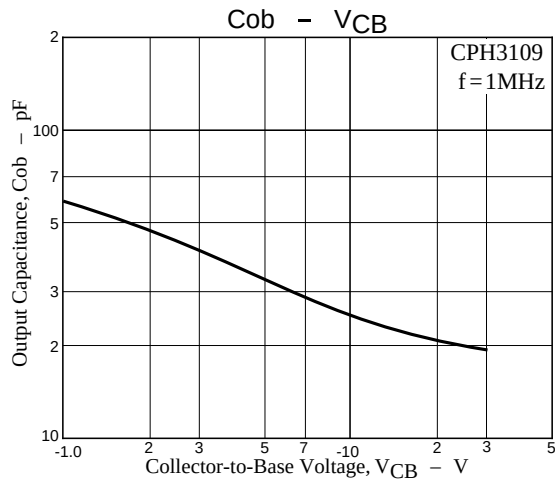
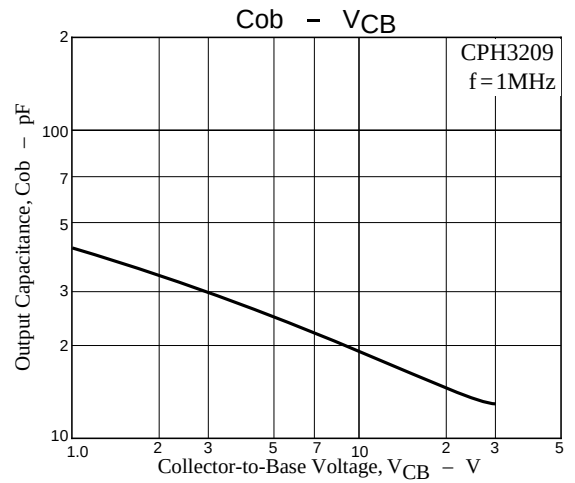
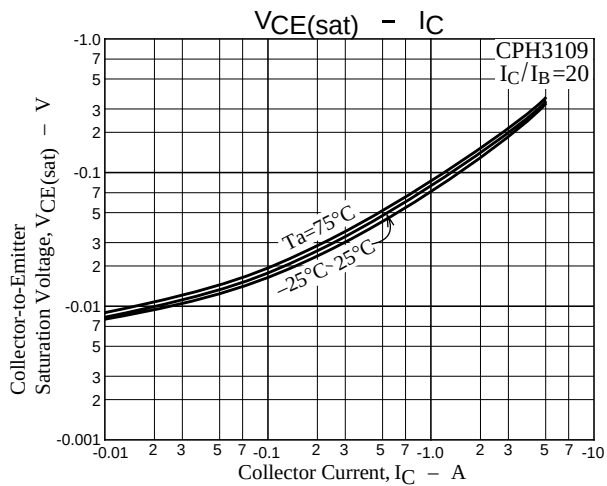
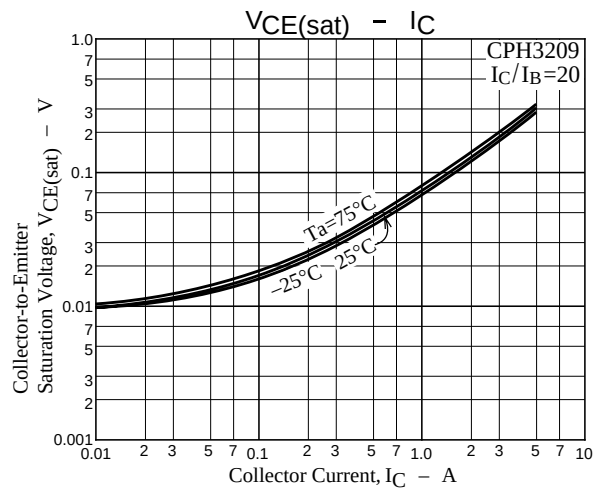
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| Parameter                               | Symbol         | Conditions                  | Ratings |         |        | Unit |
|-----------------------------------------|----------------|-----------------------------|---------|---------|--------|------|
|                                         |                |                             | min     | typ     | max    |      |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)1}$ | $I_C=(-)1.5A, I_B=(-)30mA$  |         | (-155)  | (-230) | mV   |
|                                         | $V_{CE(sat)2}$ | $I_C=(-)1.5A, I_B=(-)75mA$  |         | (-)105  | (-)155 | mV   |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$  | $I_C=(-)1.5A, I_B=(-)30mA$  |         | (-)0.83 | (-)1.2 | V    |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$  | $I_C=(-)10\mu A, I_E=0$     |         | (-30)   |        | V    |
|                                         |                |                             |         | 40      |        | V    |
| Collector-to-Emittor Breakdown Voltage  | $V_{(BR)CEO}$  | $I_C=(-)1mA, R_{BE}=\infty$ |         | (-)30   |        | V    |
| Emitter-to-Base Breakdown Voltage       | $V_{(BR)EBO}$  | $I_E=(-)10\mu A, I_C=0$     |         | (-)5    |        | V    |
| Turn-ON Time                            | $t_{on}$       | See specified test circuit. |         | (50)30  |        | ns   |
| Storage Time                            | $t_{stg}$      | See specified test circuit. |         | (270)   |        | ns   |
|                                         |                |                             |         | 300     |        | ns   |
| Fall Time                               | $t_f$          | See specified test circuit. |         | (25)15  |        | ns   |

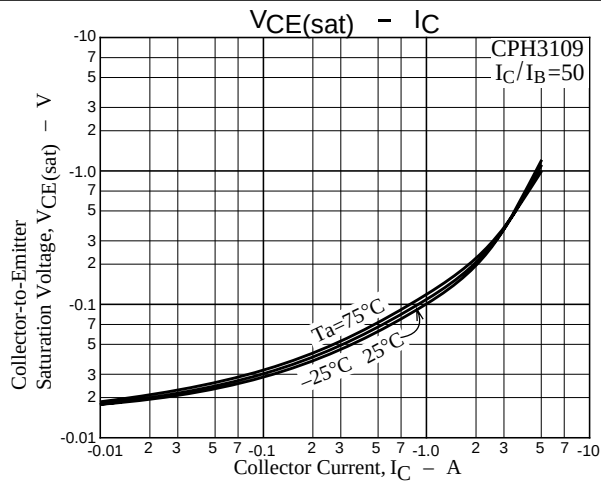
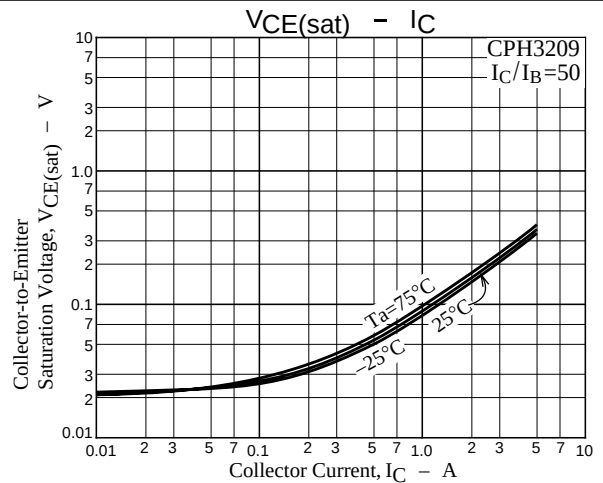
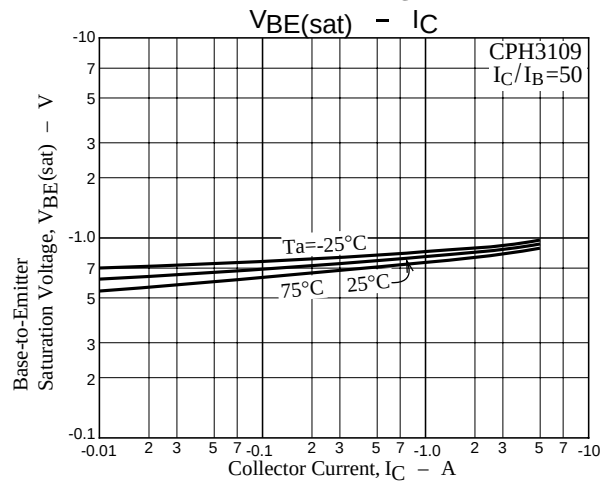
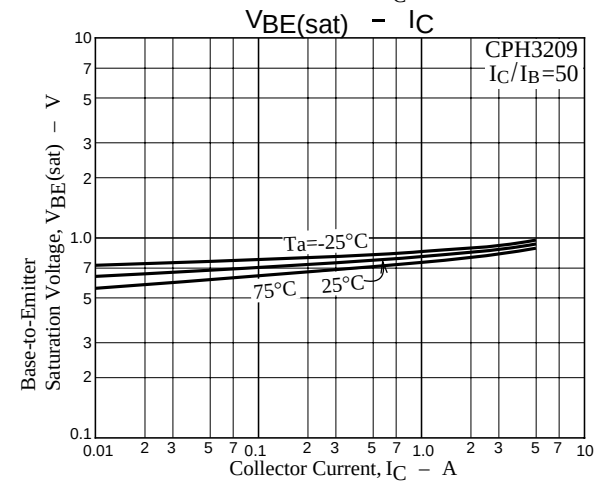
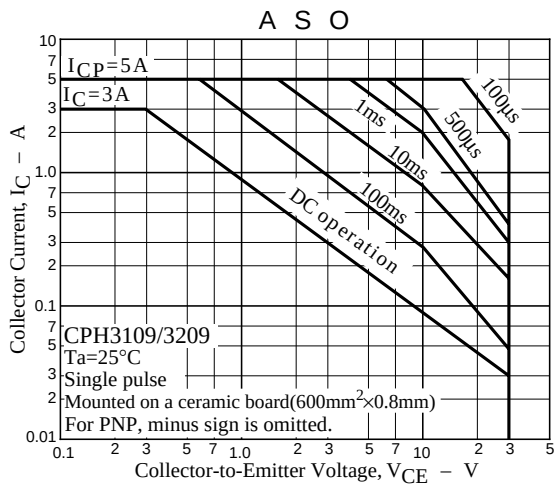
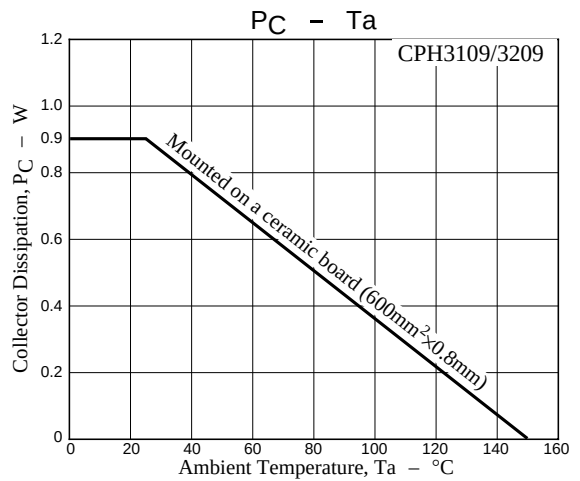
### Switching Time Test Circuit



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