Ordering number:ENN346G

PNP/NPN Epitaxial Planar Silicon Transistor

# 2SB631,631K/2SD600,600K

## 100V/120V, 1A Low-Frequency Power Amplifier Applications

An ON Semiconductor Company

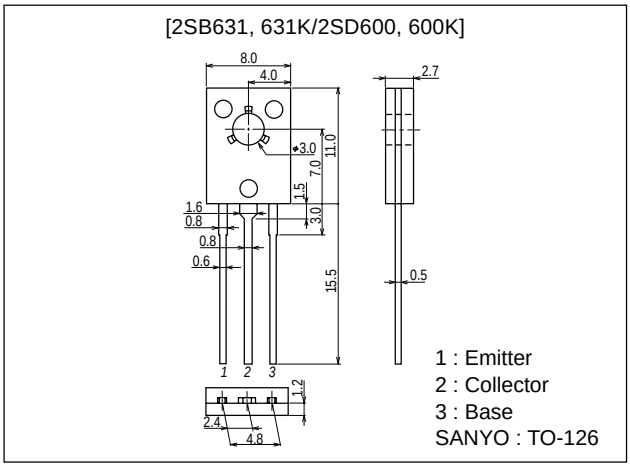
## Features

- High breakdown voltage $V_{CEO}$ 100/120V, High current 1A.
- Low saturation voltage, excellent $h_{FE}$ linearity.

## Package Dimensions

unit:mm

2009B




( ) : 2SB631, 631K

## Specifications

### Absolute Maximum Ratings at Ta = 25˚C

| Parameter | Symbol | Conditions | 2SB631, D600 | 2SB631K, D600K | Unit |
|---|---|---|---|---|---|
| Collector-to-Base Voltage | $V_{CBO}$ | | (–)100 | (–)120 | V |
| Collector-to-Emitter Voltage | $V_{CEO}$ | | (–)100 | (–)120 | V |
| Emitter-to-Base Voltage | $V_{EBO}$ | | (–)5 | | V |
| Collector Current | $I_C$ | | (–)1 | | A |
| Collector Current (Pulse) | $I_{CP}$ | | (–)2 | | A |
| Collector Dissipation | $P_C$ | | 1 | | W |
| | | Tc=25˚C | 8 | | W |
| Junction Temperature | Tj | | 150 | | ˚C |
| Storage Temperature | Tstg | | –55 to +150 | | ˚C |

### Electrical Characteristics at Ta = 25˚C

| Parameter | Symbol | Conditions | | Ratings min | Ratings typ | Ratings max | Unit |
|---|---|---|---|---|---|---|---|
| Collector-to-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C$=(–)10μA, $I_E$=0 | B631, D600 | (–)100 | | | V |
| | | | B631K, D600K | (–)120 | | | V |
| Collector-to-Emitter Brakdown Voltage | $V_{(BR)CEO}$ | $I_C$=(–)1mA, $R_{BE}$=∞ | B631, D600 | (–)100 | | | V |
| | | | B631K, D600K | (–)120 | | | V |
| Emitter-to-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E$=(–)10μA, $I_C$=0 | | (–)5 | | | V |
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB}$=(–)50V, $I_E$=0 | | | | (–)1 | μA |
| Emitter Cutoff Current | $I_{EBO}$ | $V_{EB}$=(–)4V, $I_C$=0 | | | | (–)1 | μA |

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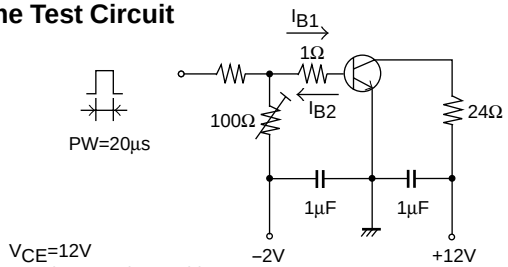
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| DC Current Gain | $h_{FE}1$ | $V_{CE}$=(–)5V, $I_C$=(–)50mA | 60* | | 320* | |
| | $h_{FE}2$ | $V_{CE}$=(–)5V, $I_C$=(–)500mA | 20 | | | |
| Gain-Bandwidth Product | $f_T$ | $V_{CE}$=(–)10V, $I_C$=(–)50mA | | (110) | | MHz |
| | | | | 130 | | MHz |
| Output Capacitance | $C_{ob}$ | $V_{CB}$=(–)10V, f=1MHz | | (30)20 | | pF |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C$=(–)500mA, $I_B$=(–)50mA | | (–)0.15 | (–)0.4 | V |
| Base-to-Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C$=(–)500mA, $I_B$=(–)50mA | | (–)0.85 | (–)1.2 | V |
| Fall Time | $t_f$ | See specified Test Circuit | | (80) | | ns |
| | | | | 100 | | ns |
| Turn-OFF Time | $t_{off}$ | See specified Test Circuit | | (100) | | ns |
| | | | | 500 | | ns |
| Storage Time | $t_{stg}$ | See specified Test Circuit | | (600) | | ns |
| | | | | 700 | | ns |

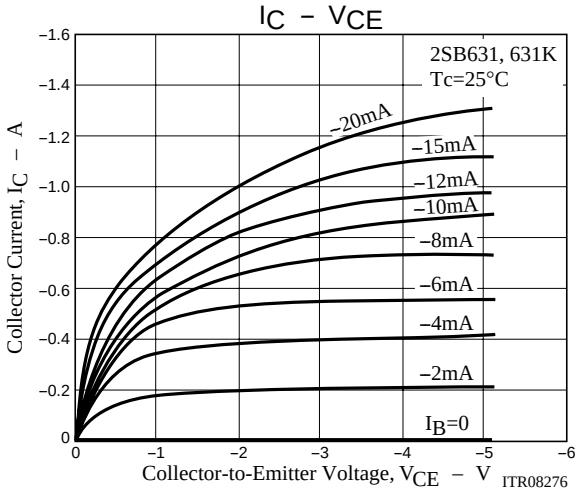
* : The 2SB631/2SD600 are classified by 50mA $h_{FE}$ as follows :

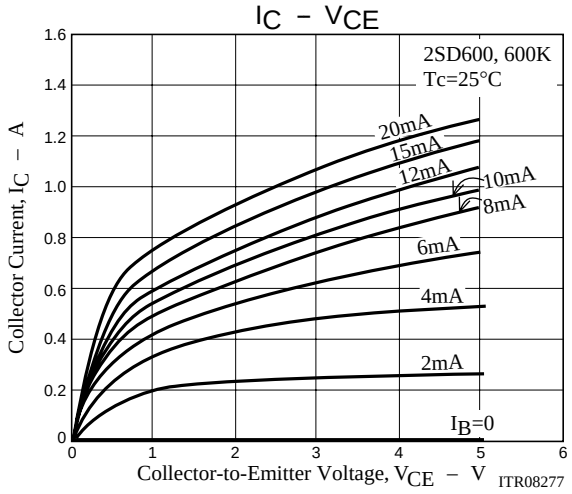
| Rank | D | E | F |
|---|---|---|---|
| $h_{FE}$ | 60 to 120 | 100 to 200 | 160 to 320 |

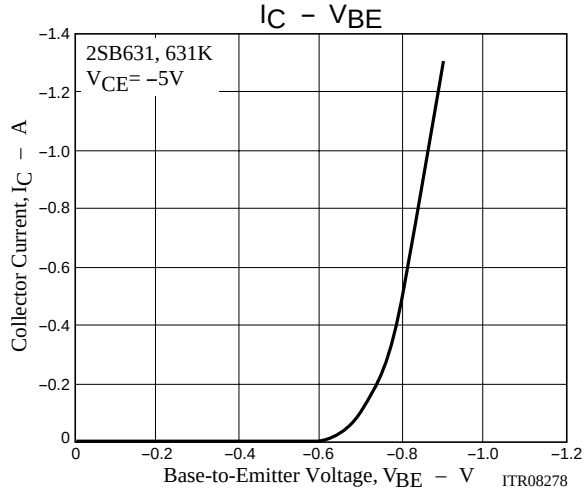
## Switching Time Test Circuit

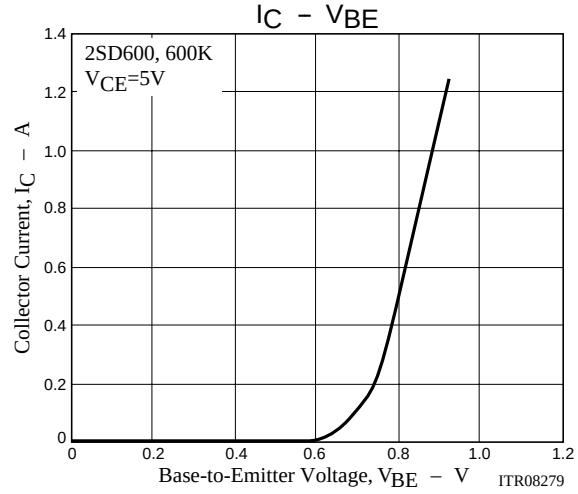



$V_{CE}$=12V
$I_C$=10$I_{B1}$= −10$I_{B2}$=500mA
(For PNP, the polarity is reversed.)

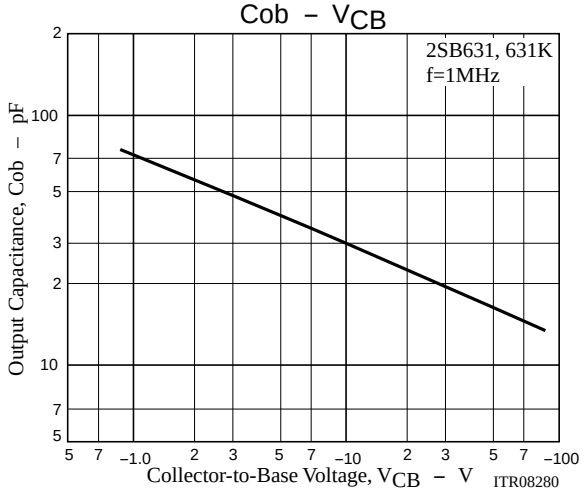


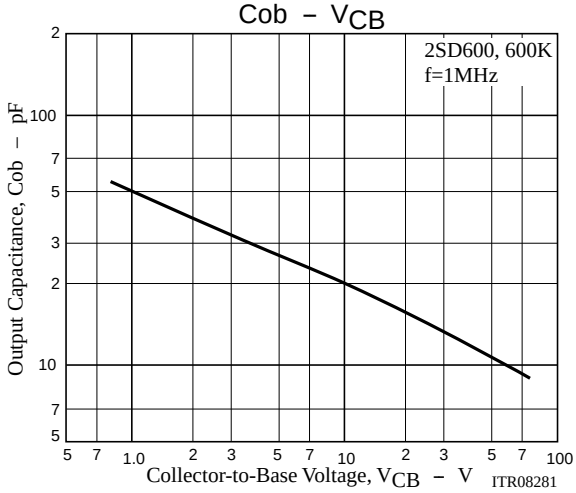



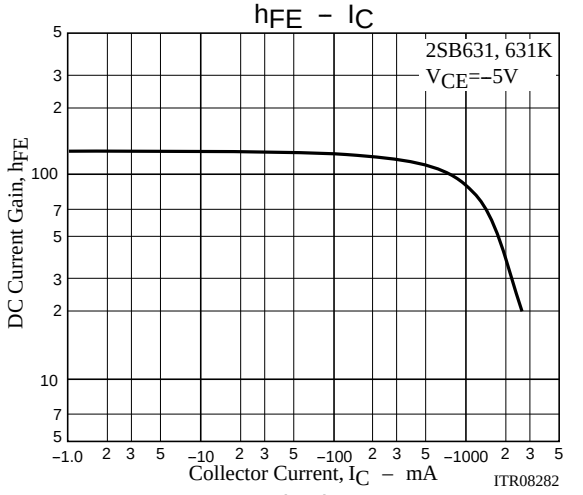
Cob – $V_{CB}$



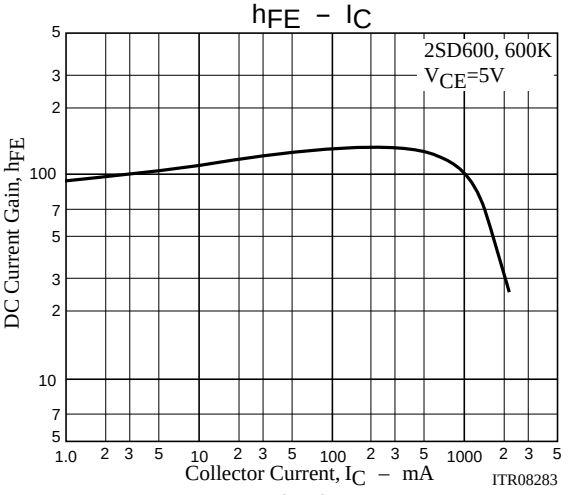

Cob – $V_{CB}$



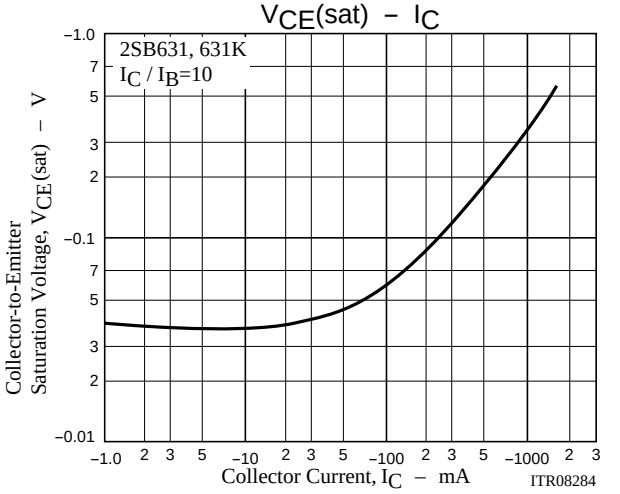

$h_{FE}$ – $I_C$



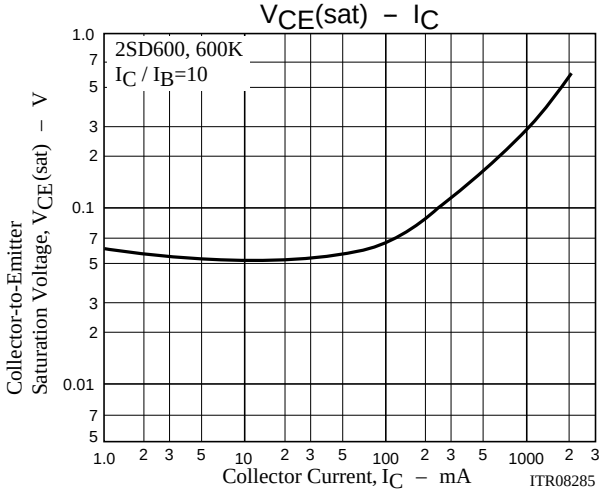

$h_{FE}$ – $I_C$



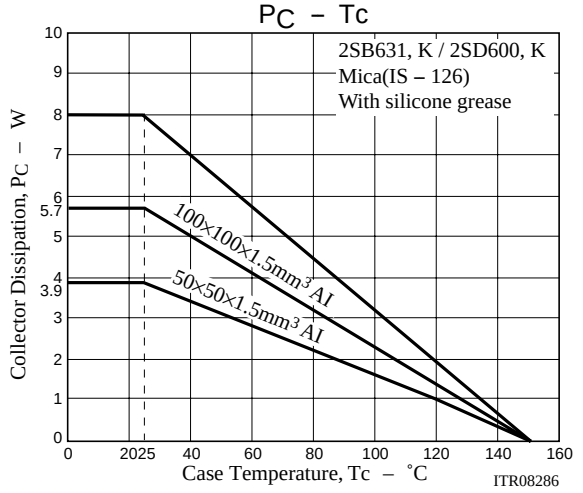

$V_{CE}$(sat) – $I_C$




$V_{CE}$(sat) – $I_C$




$P_C$ – Tc

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