



CHENMKO ENTERPRISE CO.,LTD

CH3906ZPT

SURFACE MOUNT PNP Switching Transistor

VOLTAGE 40 Volts CURRENT 0.2 Ampere

Lead free devices

APPLICATION

- * Telephony and professional communication equipment.
- * Other switching applications.

FEATURE

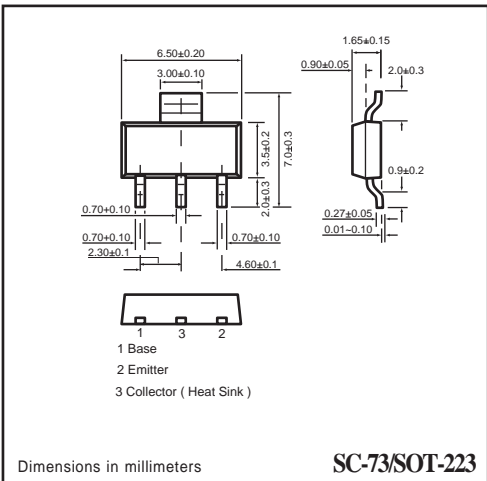
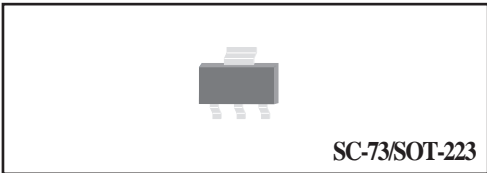
- * Small flat package. (SC-73/SOT-223)
- * Low current (Max.=200mA).
- * Suitable for high packing density.
- * Low voltage (Max.=40V) .
- * High saturation current capability.
- * Voltage controlled small signal switch.

CONSTRUCTION

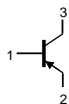
- * PNP Switching Transistor

MARKING

- * ZGP



CIRCUIT



LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|-------------------------------|----------------------------------|------|------|------|
| V _{CB0} | collector-base voltage | open emitter | - | -40 | V |
| V _{CEO} | collector-emitter voltage | open base | - | -40 | V |
| V _{EBO} | emitter-base voltage | open collector | - | -5 | V |
| I _C | collector current DC | | - | -200 | mA |
| I _{CM} | peak collector current | | - | -200 | mA |
| I _{BM} | peak base current | | - | -100 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C; note 1 | - | 2.0 | W |
| T _{stg} | storage temperature | | -65 | +150 | °C |
| T _j | junction temperature | | - | 150 | °C |
| T _{amb} | operating ambient temperature | | -65 | +150 | °C |

Note

1. Transistor mounted on an FR4 printed-circuit board.

RATING CHARACTERISTIC CURVES (CH3906ZPT)

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---------------|---|------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | note 1 | 500 | K/W |

Note

1. Transistor mounted on an FR4 printed-circuit board.

CHARACTERISTICS

$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-------------|--------------------------------------|---|-----------------------------|-------------------------|------|
| I_{CBO} | collector cut-off current | $I_E = 0; V_{CB} = -30\text{ V}$ | – | -50 | nA |
| I_{EBO} | emitter cut-off current | $I_C = 0; V_{EB} = 6\text{ V}$ | – | -50 | nA |
| h_{FE} | DC current gain | $V_{CE} = -1\text{ V}$; note 1 $I_C = -0.1\text{ mA}$ $I_C = -1\text{ mA}$ $I_C = -10\text{ mA}$ $I_C = -50\text{ mA}$ $I_C = -100\text{ mA}$ | 60 80 100 60 30 | – – 300 – – | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = -10\text{ mA}; I_B = -1\text{ mA}$ | – | -250 | mV |
| | | $I_C = -50\text{ mA}; I_B = -5\text{ mA}$ | – | -400 | mV |
| V_{BEsat} | base-emitter saturation voltage | $I_C = -10\text{ mA}; I_B = -1\text{ mA}$ | -650 | -850 | mV |
| | | $I_C = -50\text{ mA}; I_B = -5\text{ mA}$ | – | -950 | mV |
| C_c | collector capacitance | $I_E = i_e = 0; V_{CB} = -5\text{ V}; f = 1\text{ MHz}$ | – | 4.5 | pF |
| C_e | emitter capacitance | $I_C = i_c = 0; V_{EB} = -500\text{ mV}; f = 1\text{ MHz}$ | – | 10 | pF |
| f_T | transition frequency | $I_C = 10\text{ mA}; V_{CE} = -20\text{ V}; f = 100\text{ MHz}$ | 250 | – | MHz |
| F | noise figure | $I_C = 100\text{ }\mu\text{A}; V_{CE} = -5\text{ V}; R_S = 1\text{ k}\Omega; f = 10\text{ Hz to }15.7\text{ kHz}$ | – | 4 | dB |

Switching times (between 10% and 90% levels);

| | | | | | |
|-----------|---------------|---|---|-----|----|
| t_{on} | turn-on time | $I_{Con} = -10\text{ mA}; I_{Bon} = -1\text{ mA}; I_{Boff} = 1\text{ mA}$ | – | 65 | ns |
| t_d | delay time | | – | 35 | ns |
| t_r | rise time | | – | 35 | ns |
| t_{off} | turn-off time | | – | 300 | ns |
| t_s | storage time | | – | 225 | ns |
| t_f | fall time | | – | 75 | ns |

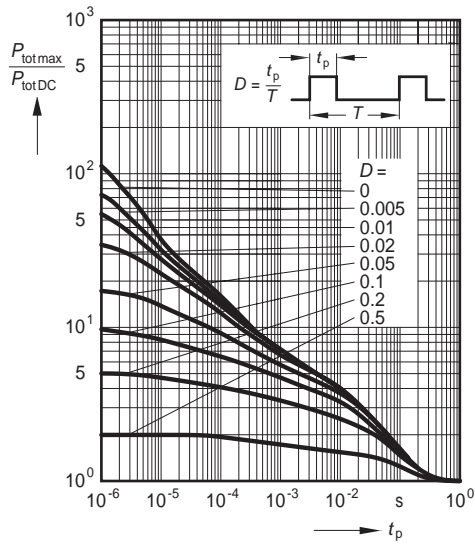
Note

1. Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.

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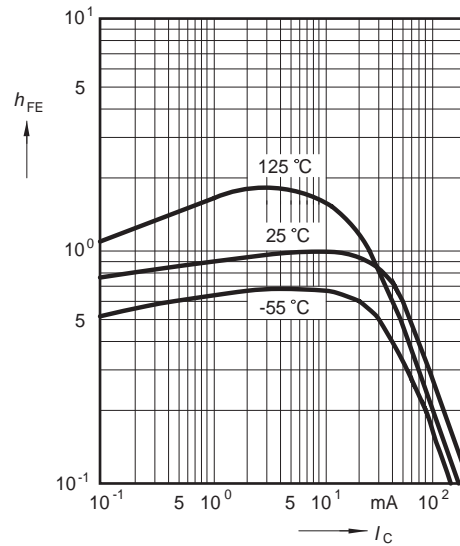
Permissible Pulse Load

$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$



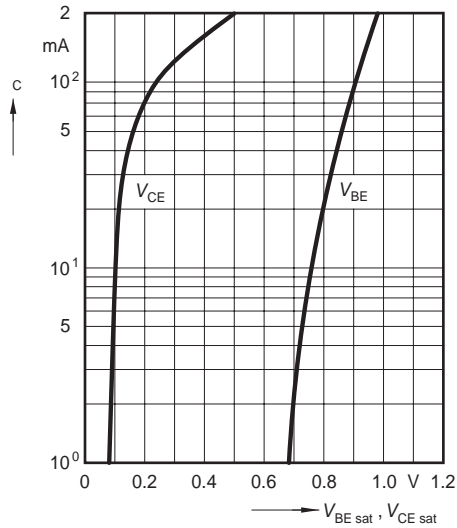
DC current gain $h_{FE} = f(I_C)$

$V_{CE} = 1$ V, normalized



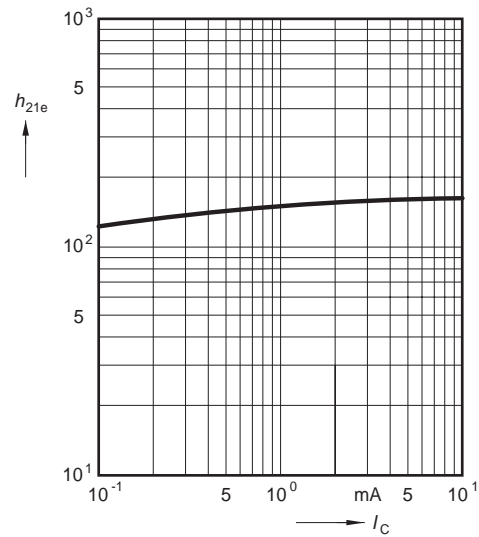
Saturation voltage $I_C = f(V_{BE\text{sat}}, V_{CE\text{sat}})$

$h_{FE} = 10$



Short-circuit forward current transfer ratio $h_{21e} = f(I_C)$

$V_{CE} = 10$ V, $f = 1$ MHz

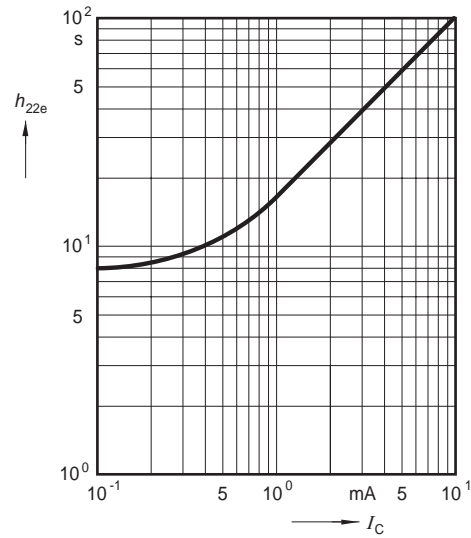


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Open-circuit output admittance

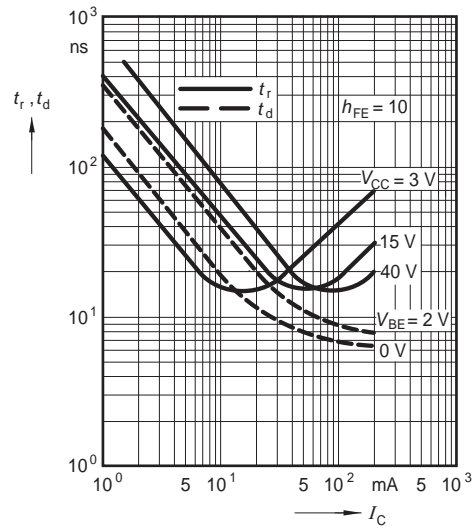
$$h_{22e} = f(I_C)$$

$V_{CE} = 10V, f = 1MHz$

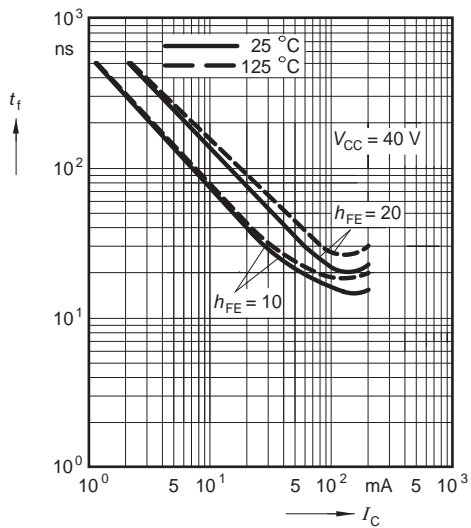


Delay time $t_d = f(I_C)$

Rise time $t_r = f(I_C)$



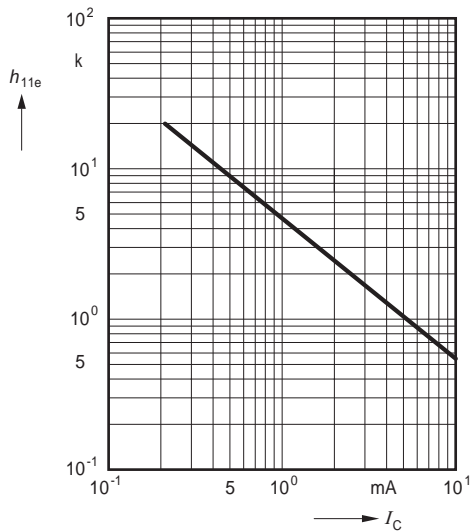
Fall time $t_f = f(I_C)$



Input impedance

$$h_{11e} = f(I_C)$$

$V_{CE} = 10V, f = 1kHz$

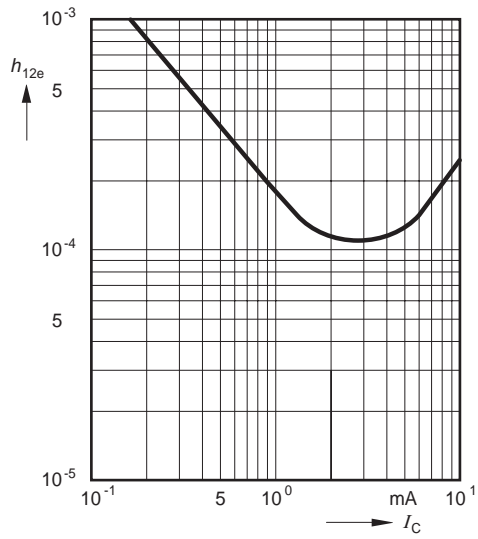


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Open-circuit reverse voltage

transfer ratio $h_{12e} = f(I_C)$

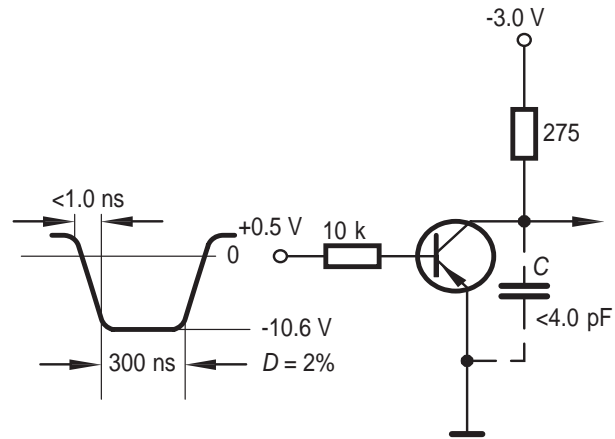
$V_{CE} = 10V, f = 1kHz$



RATING CHARACTERISTIC CURVES (CH3906ZPT)

Test circuit

Delay and rise time



Storage and fall time

