

## Features

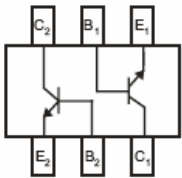
- Epitaxial Die Construction
- Ideal for Low Power Amplification and Switching
- Ultra-Small Surface Mount Package
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings @ 25°C Unless Otherwise Specified

- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 625°C/W Junction to Ambient

| Parameter                   | Symbol    | Rating | Unit |
|-----------------------------|-----------|--------|------|
| Collector-Base Voltage      | $V_{CBO}$ | 60     | V    |
| Collector-Emitter Voltage   | $V_{CEO}$ | 40     | V    |
| Emitter-Base Voltage        | $V_{EBO}$ | 6      | V    |
| Collector Current           | $I_C$     | 200    | mA   |
| Collector Power Dissipation | $P_C$     | 200    | mW   |

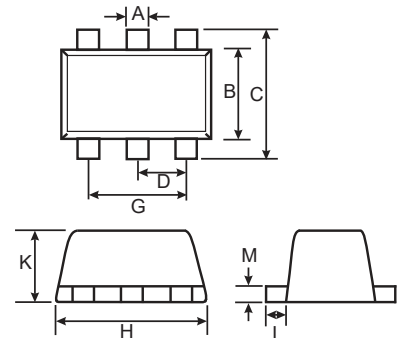
## Internal Structure



Marking: KAP

## NPN Plastic Encapsulate Amplifier

## SOT-563



| DIM | DIMENSIONS |       |      |      | NOTE |
|-----|------------|-------|------|------|------|
|     | INCHES     |       | MM   |      |      |
|     | MIN        | MAX   | MIN  | MAX  |      |
| A   | 0.006      | 0.011 | 0.15 | 0.30 |      |
| B   | 0.043      | 0.051 | 1.10 | 1.30 |      |
| C   | 0.059      | 0.067 | 1.50 | 1.70 |      |
| D   | 0.020      |       | 0.50 |      | TYP. |
| G   | 0.035      | 0.043 | 0.90 | 1.10 |      |
| H   | 0.059      | 0.067 | 1.50 | 1.70 |      |
| K   | 0.020      | 0.023 | 0.52 | 0.60 |      |
| L   | 0.004      | 0.011 | 0.10 | 0.30 |      |
| M   | 0.004      | 0.007 | 0.10 | 0.18 |      |

**Electrical Characteristics @ 25°C Unless Otherwise Specified**

| Parameter                            | Symbol        | Min  | Typ | Max  | Units | Conditions                                       |
|--------------------------------------|---------------|------|-----|------|-------|--|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | 60   |     |      | V     | $I_C=10\mu A, I_E=0$                             |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | 40   |     |      | V     | $I_C=1mA, I_B=0$                                 |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | 6    |     |      | V     | $I_E=10\mu A, I_C=0$                             |
| Base Cutoff Current                  | $I_{BL}$      |      |     | 50   | nA    | $V_{CE}=30V, V_{EB(OFF)}=3V$                     |
| Collector Cutoff Current             | $I_{CEX}$     |      |     | 50   | nA    | $V_{CE}=30V, V_{EB(OFF)}=3V$                     |
| DC Current Gain <sup>(Note1)</sup>   | $h_{FE(1)}$   | 40   |     |      |       | $V_{CE}=1V, I_C=0.1mA$                           |
|                                      | $h_{FE(2)}$   | 70   |     |      |       | $V_{CE}=1V, I_C=1mA$                             |
|                                      | $h_{FE(3)}$   | 100  |     | 300  |       | $V_{CE}=1V, I_C=-10mA$                           |
|                                      | $h_{FE(4)}$   | 60   |     |      |       | $V_{CE}=1V, I_C=50mA$                            |
|                                      | $h_{FE(5)}$   | 30   |     |      |       | $V_{CE}=1V, I_C=100mA$                           |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ |      |     | 0.2  | V     | $I_C=10mA, I_B=1mA$                              |
|                                      |               |      |     | 0.3  | V     | $I_C=50mA, I_B=5mA$                              |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ | 0.65 |     | 0.85 | V     | $I_C=10mA, I_B=1mA$                              |
|                                      |               |      |     | 0.95 | V     | $I_C=50mA, I_B=5mA$                              |
| Transition Frequency                 | $f_T$         | 300  |     |      | MHz   | $V_{CE}=20V, I_C=10mA, f=100MHz$                 |
| Output Capacitance                   | $C_{ob}$      |      |     | 4.0  | pF    | $V_{CB}=5V, I_E=0, f=1MHz,$                      |
| Noise Figure                         | NF            |      |     | 5    | dB    | $V_{CE}=5V, I_C=0.1mA$<br>$R_S=1K\Omega, f=1KHz$ |
| Delay Time                           | $t_d$         |      |     | 35   | ns    | $V_{CC}=3V, I_C=10mA$                            |
| Rise Time                            | $t_r$         |      |     | 35   | ns    | $V_{BE(OFF)}=-0.5V, I_{B1}=-I_{B2}=1mA$          |
| Storage Time                         | $t_s$         |      |     | 200  | ns    | $V_{CC}=3V, I_C=10mA$                            |
| Fall Time                            | $t_f$         |      |     | 50   | ns    | $I_{B1}=I_{B2}=1mA$                              |

Note: 1.Pulse Width  $\leq 300\mu s$ , Duty Cycle $\leq 2.0\%$

**Curve Characteristics**

Fig. 1 - Static Characteristics

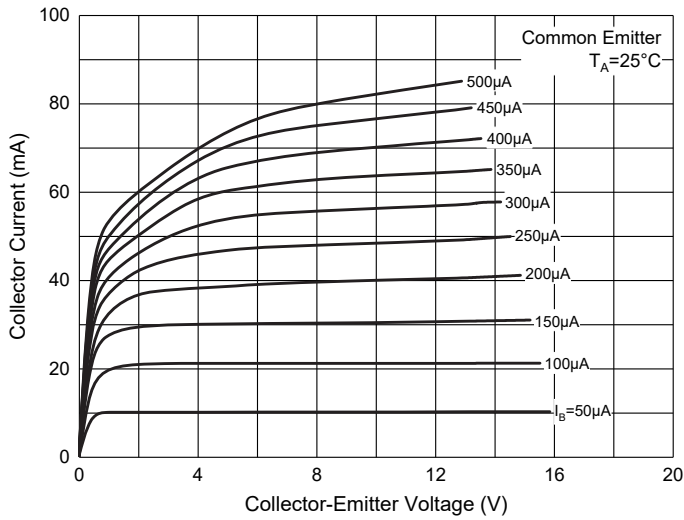


Fig. 2 - DC Current Gain Characteristics

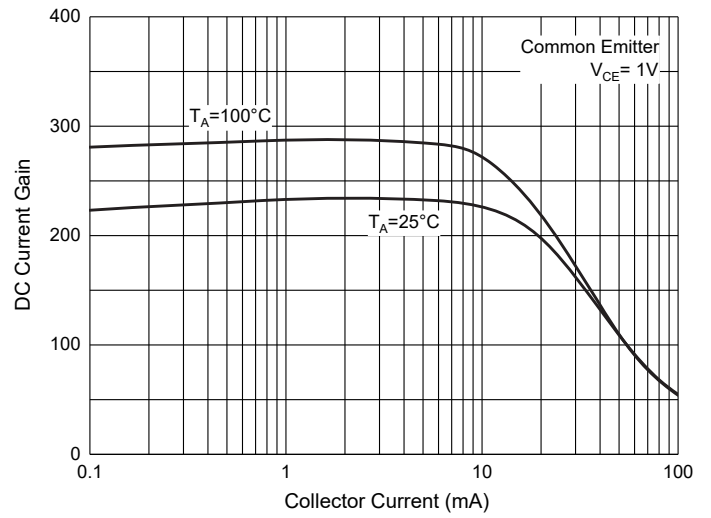


Fig. 4 - Collector-Emitter Saturation Voltage Characteristics

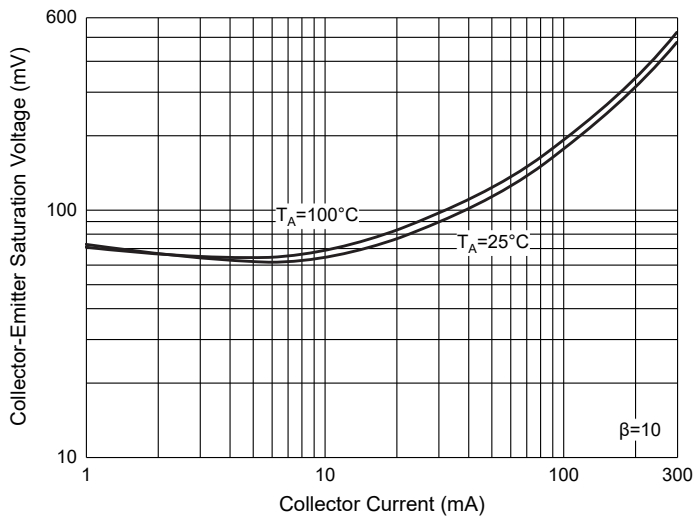


Fig. 4 - Base-Emitter Saturation Voltage Characteristics

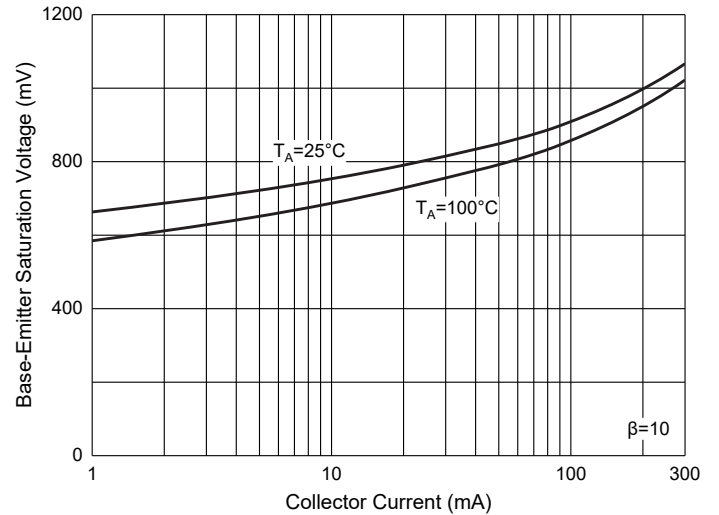


Fig. 5 - Base-Emitter Voltage Characteristics

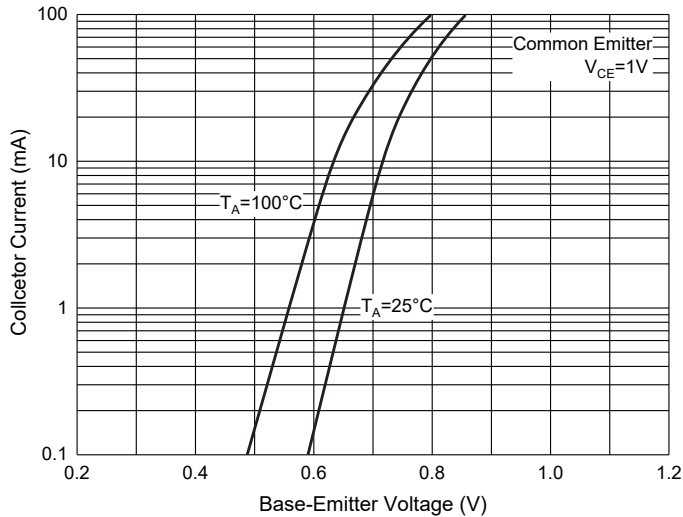
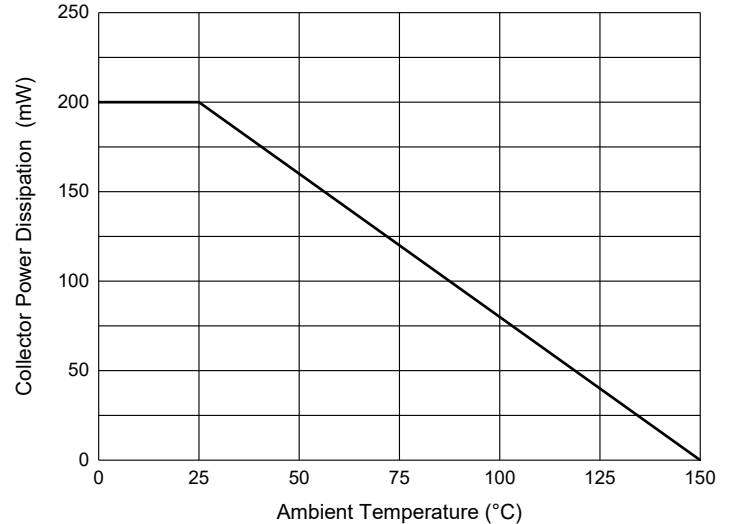


Fig. 6 - Collector Power Derating Curve



## Ordering Information

| Device         | Packing               |
|----------------|-----------------------|
| Part Number-TP | Tape&Reel: 3Kpcs/Reel |

Note : Adding "-HF" Suffix For Halogen Free, eg. Part Number-TP-HF

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