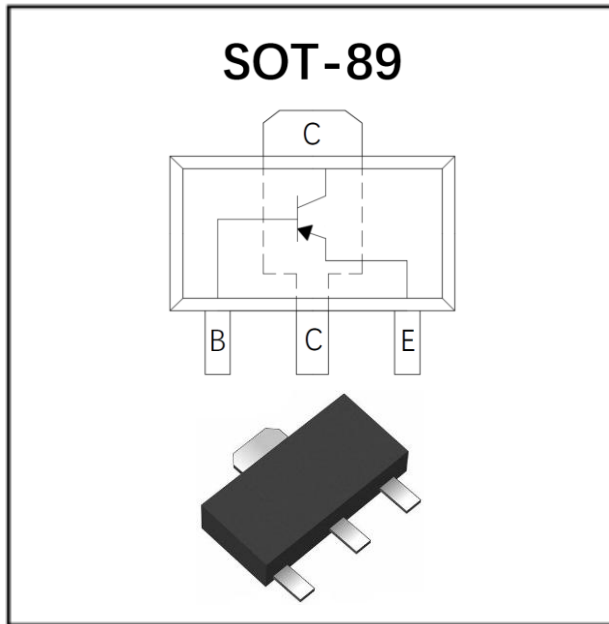


## PNP General Purpose Amplifier



### Features

- Epoxy meets UL-94 V-0 flammability rating
- Halogen free available upon request by adding suffix "HF"
- Moisture Sensitivity Level 1
- Low collector-emitter saturation voltage

### Mechanical Data

- **Package:** SOT-89  
Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant, halogen-free
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking:** 5320X

### ■Maximum Ratings (Ta=25°C unless otherwise noted)

| Item                                    | Symbol                 | Unit | Conditions                   | Value       |
|-----------------------------------------|------------------------|------|------------------------------|-------------|
| Minimum Collector-Emitter Voltage       | $V_{CEO}$              | V    | $I_C = -10mA, I_B = 0$       | -20         |
| Minimum Collector-Base Voltage          | $V_{CBO}$              | V    | $I_C = -100uA, I_E = 0$      | -20         |
| Minimum Emitter-Base Voltage            | $V_{EBO}$              | V    | $I_E = -100uA, I_C = 0$      | -5          |
| Collector Current                       | $I_C$                  | A    |                              | -3          |
| Peak Collector current                  | $I_{CM}$               | A    | single pulse, $t_p \leq 1ms$ | -5          |
| Power dissipation                       | $P_D^{(1)}$            | mW   |                              | 550         |
| Thermal resistance, junction-to-ambient | $R_{\theta J-A}^{(1)}$ | °C/W |                              | 225         |
| Thermal resistance, junction-to-case    | $R_{\theta J-C}^{(1)}$ | °C/W |                              | 182         |
| Operation Junction Temperature          | $T_j$                  | °C   |                              | -55 to +150 |
| Storage Temperature                     | $T_{stg}$              | °C   |                              | -55 to +150 |

Note: (1) Device mounted on an FR4 Printed-Circuit Board (PCB), 35 um single-sided copper, tin-plated and standard footprint



## ■Electrical Characteristics (Ta=25°C unless otherwise noted)

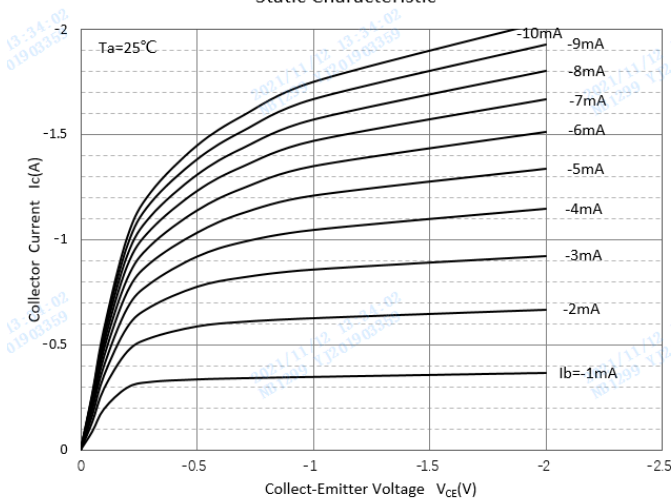
| Item                                 | Symbol         | Unit       | Conditions                         | Min | Max  |
|--------------------------------------|----------------|------------|------------------------------------|-----|------|
| Collector-Emitter Voltage            | $V_{CEO}$      | V          | $I_C=-10mA, I_B=0$                 | -20 |      |
| Collector-Base Voltage               | $V_{CBO}$      | V          | $I_C=-100\mu A, I_E=0$             | -20 |      |
| Emitter-Base Voltage                 | $V_{EBO}$      | V          | $I_E=-100\mu A, I_C=0$             | -5  |      |
| Collector-base Cut-off Current       | $I_{CBO}$      | nA         | $V_{CB}=-20V$                      |     | -100 |
| Collector-Emitter cut-off current    | $I_{CES}$      | nA         | $V_{CE}=-20V, V_{BE}=0V$           |     | -100 |
| Base-emitter Cut-off Current         | $I_{EBO}$      | nA         | $V_{EB}=-5V$                       |     | -100 |
| DC Current Gain                      | $h_{FE}$       |            | $I_C=-100mA, V_{CE}=-2V$           | 220 |      |
|                                      |                |            | $I_C=-500mA, V_{CE}=-2V$           | 220 |      |
|                                      |                |            | $I_C=-1A, V_{CE}=-2V$              | 200 |      |
|                                      |                |            | $I_C=-2A, V_{CE}=-2V$              | 150 |      |
|                                      |                |            | $I_C=-3A, V_{CE}=-2V$              | 100 |      |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)1}$ | mV         | $I_C=-500mA, I_B=-50mA$            |     | -70  |
|                                      | $V_{CE(sat)2}$ | mV         | $I_C=-1A, I_B=-50mA$               |     | -130 |
|                                      | $V_{CE(sat)3}$ | mV         | $I_C=-2A, I_B=-100mA$              |     | -230 |
|                                      | $V_{CE(sat)4}$ | mV         | $I_C=-3A, I_B=-300mA$              |     | -300 |
| Equivalent On-Resistance             | $R_{CE(sat)}$  | m $\Omega$ | $I_C=-3A, I_B=-300mA$              |     | 105  |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)1}$ | V          | $I_C=-2A, I_B=-100mA$              |     | -1.1 |
|                                      | $V_{BE(sat)2}$ | V          | $I_C=-3A, I_B=-300mA$              |     | -1.2 |
| Base-Emitter Turn-On Voltage         | $V_{BE(on)}$   | V          | $I_C=-1A, V_{CE}=-2V$              |     | -1.1 |
| Transition frequency                 | $f_T$          | MHz        | $I_C=-100mA, V_{CE}=-5V, f=100MHz$ | 100 |      |
| Collector Capacitance                | $C_{ob}$       | pF         | $V_{CB}=-10V, I_E=0, f=1MHz$       |     | 45   |

## ■Ordering Information (Example)

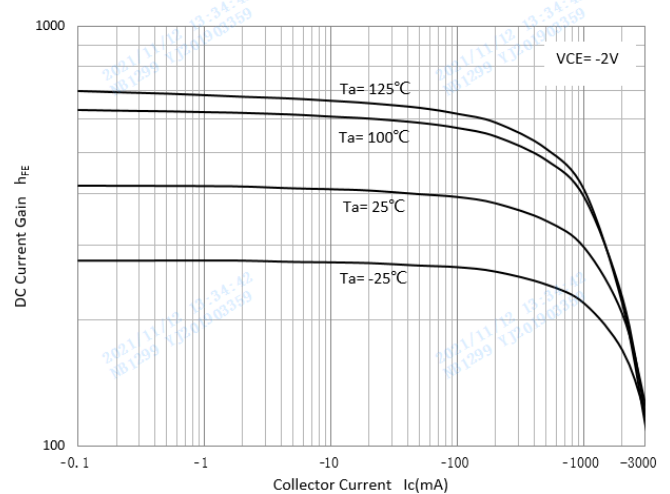
| PREFERRED P/N | PACKING CODE | UNIT WEIGHT(g)    | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|-------------------|----------------------|-------------------------|----------------------------|---------------|
| YJBS5320X     | F2           | Approximate 0.055 | 1000                 | 8000                    | 32000                      | 7" reel       |

## ■Characteristics (Typical)

Static Characteristic

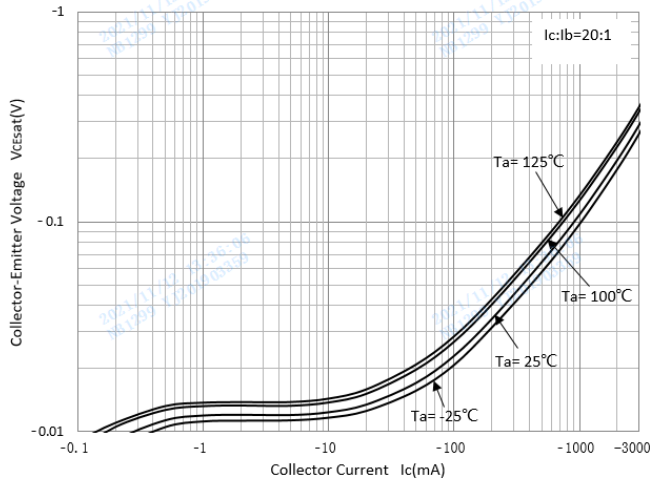


DC Current Gain

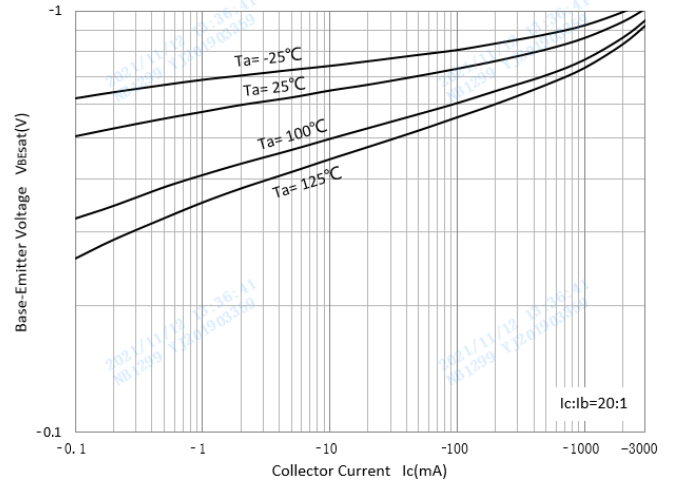




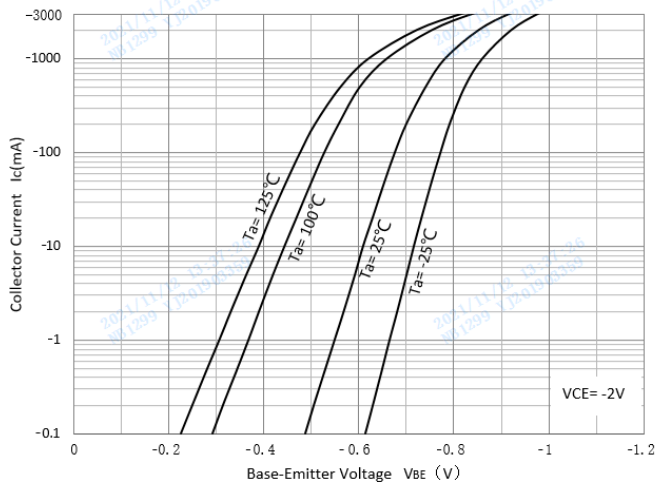
Collector-Emitter Saturation Voltage



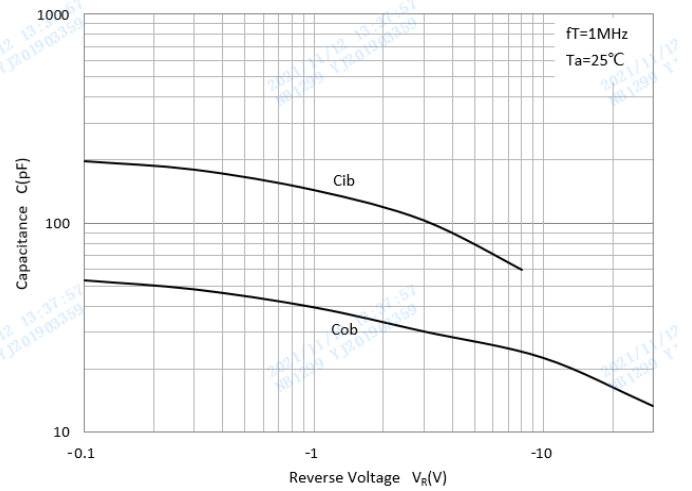
Base-Emitter Saturation Voltage



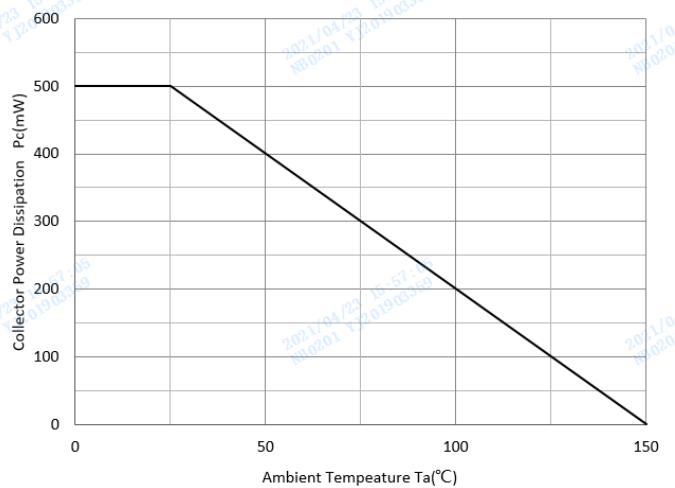
Base-Emitter On Voltage



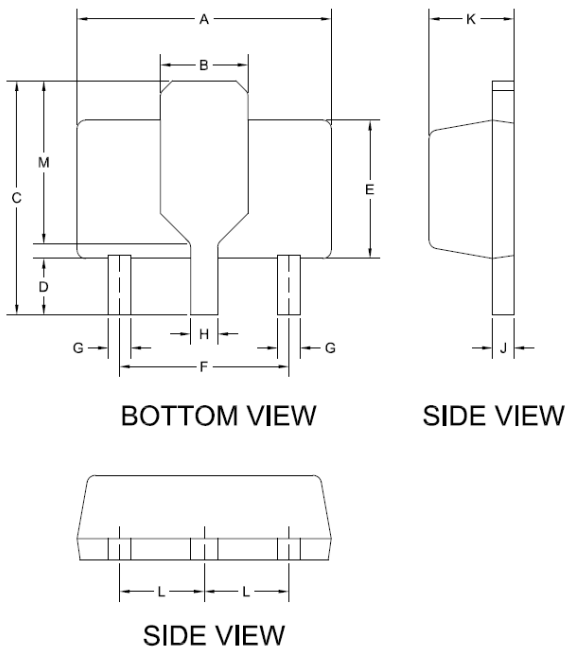
$C_{ob}/C_{ib}-V_{CB}/V_{EB}$



Collector Power Derating Curve

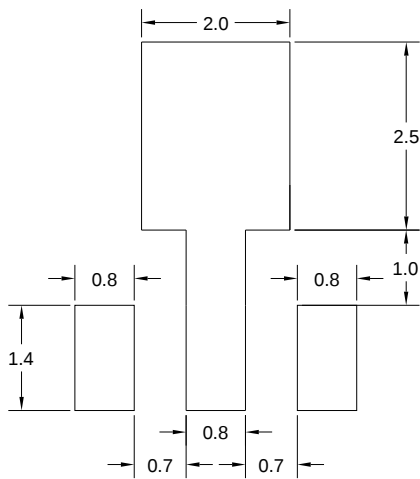


## ■SOT-89 Package Outline Dimensions



| DIM | DIMENSIONS |       |            |       |
|-----|------------|-------|------------|-------|
|     | INCHES     |       | MM         |       |
|     | MIN.       | MAX.  | MIN.       | MAX.  |
| A   | 0.173      | 0.181 | 4.400      | 4.600 |
| B   | 0.061 TYP. |       | 1.550 TYP. |       |
| C   | 0.155      | 0.167 | 3.940      | 4.250 |
| D   | 0.031      | 0.047 | 0.800      | 1.200 |
| E   | 0.094      | 0.102 | 2.400      | 2.600 |
| F   | 0.118 TYP. |       | 3.00 TYP.  |       |
| G   | 0.014      | 0.019 | 0.360      | 0.480 |
| H   | 0.017      | 0.022 | 0.440      | 0.560 |
| J   | 0.014      | 0.017 | 0.350      | 0.440 |
| K   | 0.055      | 0.063 | 1.400      | 1.600 |
| L   | 0.059 TYP. |       | 1.500 TYP. |       |
| M   | 0.108 TYP. |       | 2.750 TYP. |       |

## ■SOT-89 Suggested Pad Layout



UNIT:MM



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