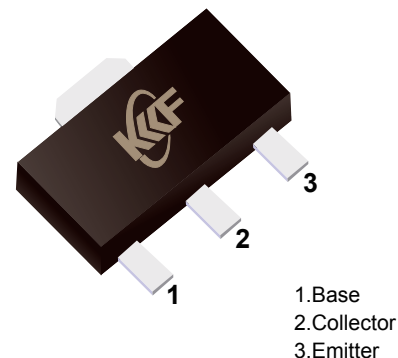


## 2SA1213

### PNP Transistors

#### Features

- Low Saturation Voltage:  $V_{CE(sat)} = -0.5V$  (max) ( $I_C = -1A$ )
- High Speed Switching Time:  $t_{stg} = 1.0\mu s$  (typ.)
- Small Flat Package
- $P_c = 1$  to  $2W$  (mounted on ceramic substrate)
- Complementary to 2SC2873



■ Simplified outline(SOT-89)

#### Absolute Maximum Ratings $T_a = 25^\circ C$

| Parameter                      | Symbol    | Rating     | Unit       |
|--------------------------------|-----------|------------|------------|
| Collector - Base Voltage       | $V_{CBO}$ | -50        | V          |
| Collector - Emitter Voltage    | $V_{CEO}$ | -50        |            |
| Emitter - Base Voltage         | $V_{EBO}$ | -5         |            |
| Collector Current - Continuous | $I_C$     | -2         | A          |
| Base Current - Continuous      | $I_B$     | -0.4       |            |
| Collector Power Dissipation    | $P_c$     | 500        | mW         |
| Junction Temperature           | $T_J$     | 150        | $^\circ C$ |
| Storage Temperature range      | $T_{stg}$ | -55 to 150 |            |

#### Electrical Characteristics $T_a = 25^\circ C$

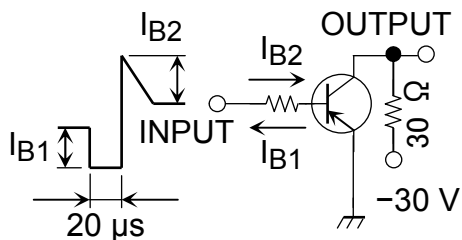
| Parameter                            | Symbol        | Test Conditions                    | Min | Typ | Max  | Unit |
|--------------------------------------|---------------|------------------------------------|-----|-----|------|------|
| Collector- base breakdown voltage    | $V_{CBO}$     | $I_C = -100 \mu A, I_E = 0$        | -50 |     |      | V    |
| Collector- emitter breakdown voltage | $V_{CEO}$     | $I_C = -10 mA, I_B = 0$            | -50 |     |      |      |
| Emitter - base breakdown voltage     | $V_{EBO}$     | $I_E = -100 \mu A, I_C = 0$        | -5  |     |      |      |
| Collector-base cut-off current       | $I_{CBO}$     | $V_{CB} = -50 V, I_E = 0$          |     |     | -100 | nA   |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB} = -5V, I_C = 0$            |     |     | -100 |      |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = -1 A, I_B = -50mA$          |     |     | -0.5 | V    |
| Base - emitter saturation voltage    | $V_{BE(sat)}$ | $I_C = -1 A, I_B = -50mA$          |     |     | -1.2 |      |
| DC current gain                      | $h_{FE(1)}$   | $V_{CE} = -2V, I_C = -0.5A$        | 70  |     | 240  |      |
|                                      | $h_{FE(2)}$   | $V_{CE} = -2V, I_C = -2A$          | 20  |     |      |      |
| Turn-on time                         | $t_{on}$      | See Test Circuit.                  |     | 0.1 |      | us   |
| Storage time                         | $t_{stg}$     |                                    |     | 1   |      |      |
| Fall time                            | $t_f$         |                                    |     | 0.1 |      |      |
| Collector output capacitance         | $C_{ob}$      | $V_{CB} = -10V, I_E = 0, f = 1MHz$ |     | 40  |      | pF   |
| Transition frequency                 | $f_T$         | $V_{CE} = -2V, I_C = -0.5A$        |     | 120 |      | MHz  |

#### Classification of $h_{FE(1)}$

| Type    | 2SA1213-O | 2SA1213-Y |
|---------|-----------|-----------|
| Range   | 70-140    | 120-240   |
| Marking | NO        | NY        |

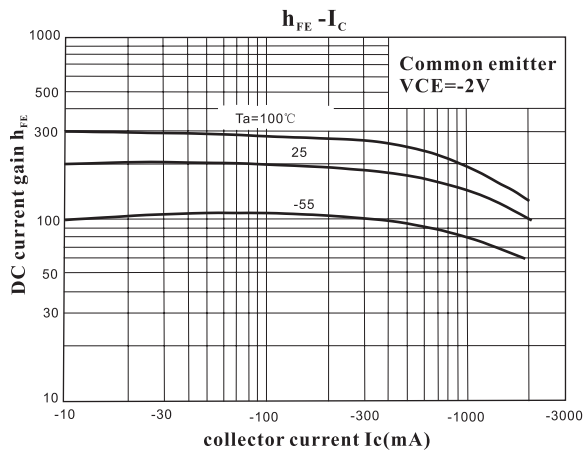
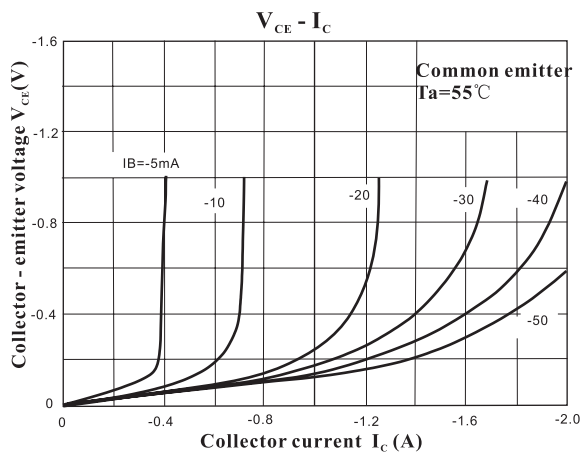
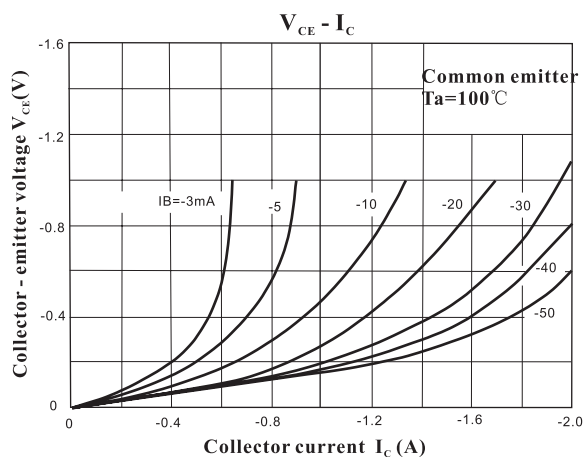
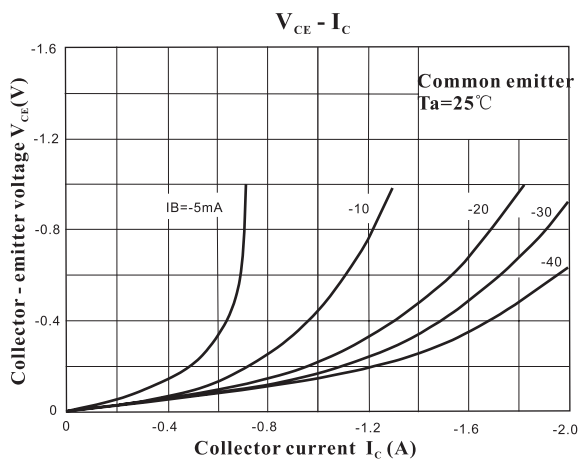
## 2SA1213

### ■ Test Circuit



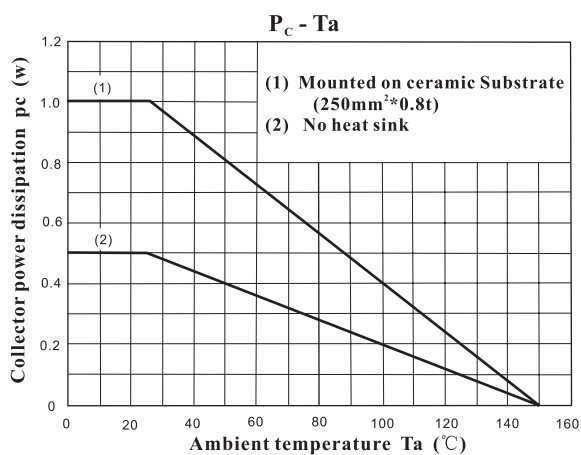
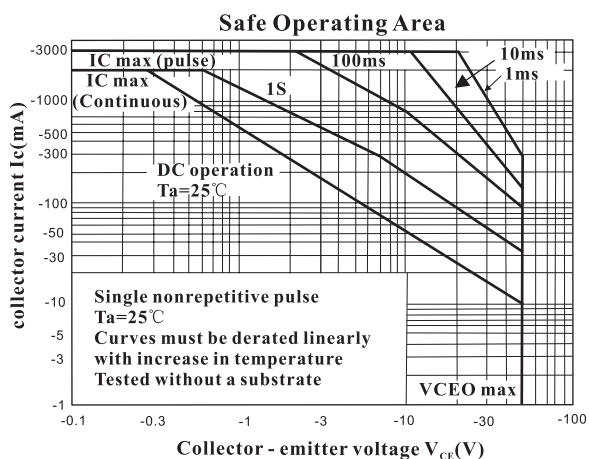
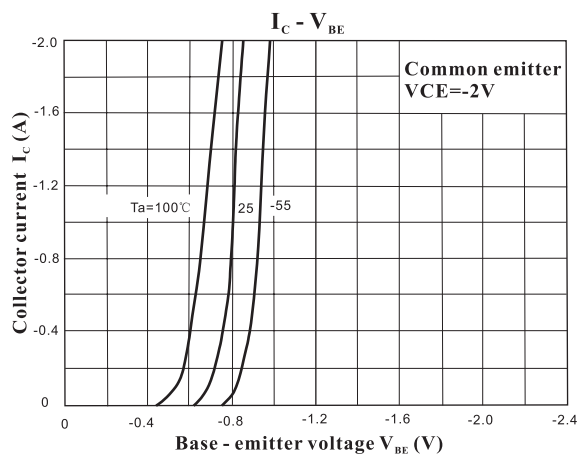
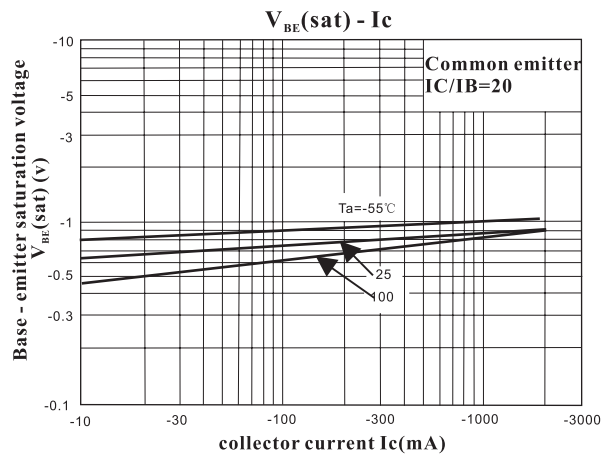
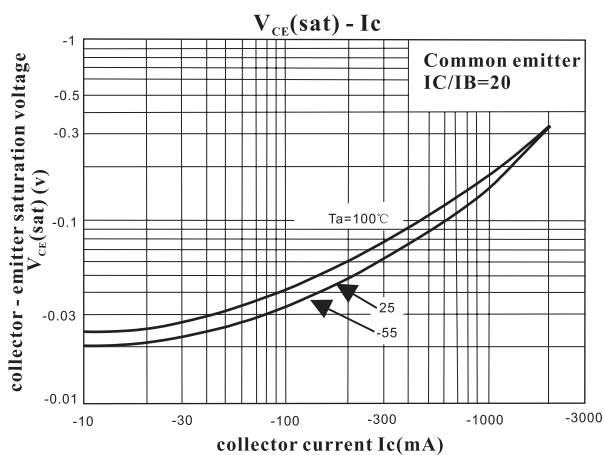
$I_{B1} = 0.05 \text{ A}, I_{B2} = 0.05 \text{ A}$   
DUTY CYCLE  $\leq 1\%$

### ■ Typical Characteristics



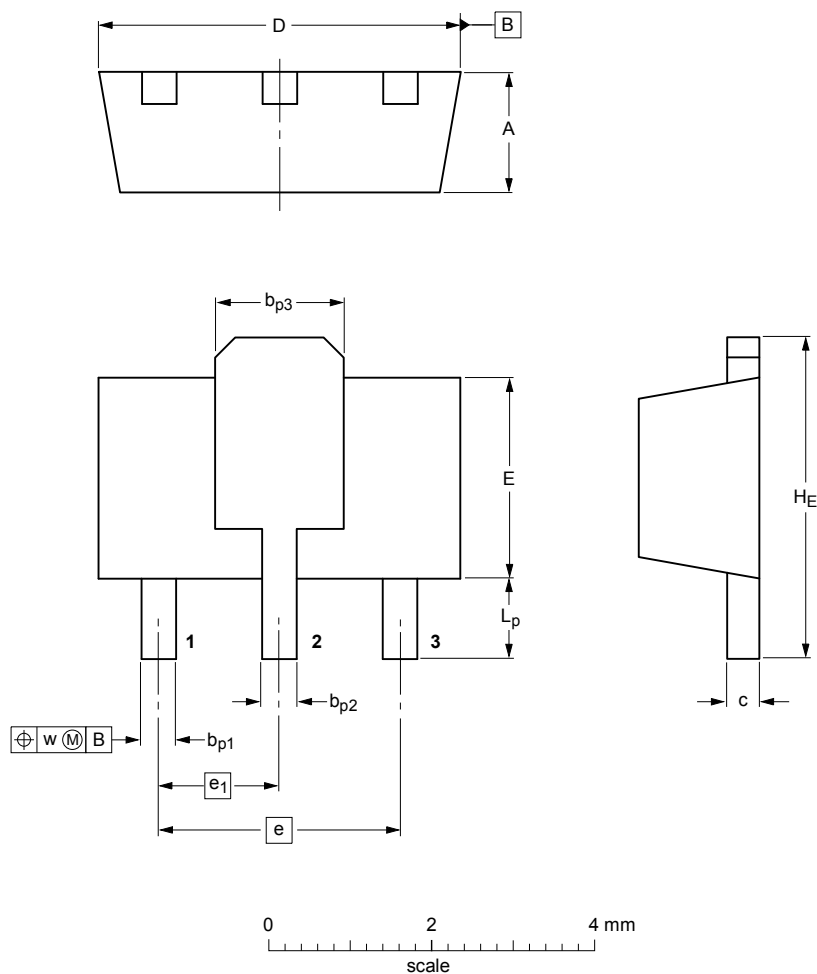
## 2SA1213

### ■ Typical Characteristics



## 2SA1213

### ■ SOT-89



**DIMENSIONS** (mm are the original dimensions)

| UNIT | A          | b <sub>p1</sub> | b <sub>p2</sub> | b <sub>p3</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | w    |
|------|------------|-----------------|-----------------|-----------------|--------------|------------|------------|-----|----------------|----------------|----------------|------|
| mm   | 1.6<br>1.4 | 0.48<br>0.35    | 0.53<br>0.40    | 1.8<br>1.4      | 0.44<br>0.23 | 4.6<br>4.4 | 2.6<br>2.4 | 3.0 | 1.5            | 4.25<br>3.75   | 1.2<br>0.8     | 0.13 |