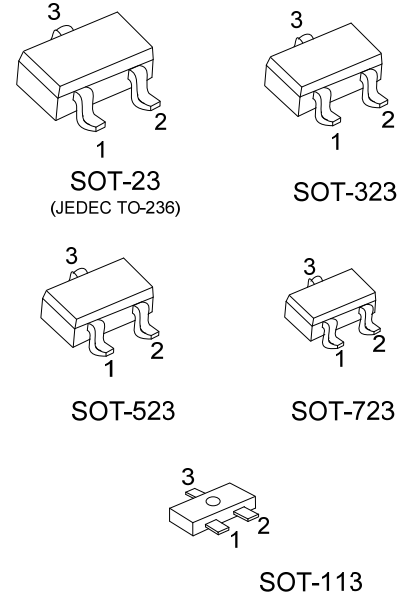


**MMBT1815****NPN SILICON TRANSISTOR****HIGH FREQUENCY NPN  
AMPLIFIER TRANSISTOR****■ FEATURES**

- \* Collector-Emitter Voltage:  $BV_{CEO}=50V$
- \* Collector Current up to 150mA
- \* High  $h_{FE}$  Linearity
- \* Complement to MMBT1015

**■ ORDERING INFORMATION**

| Ordering Number   |                   | Package | Pin Assignment |   |   | Packing   |
|-------------------|-------------------|---------|----------------|---|---|-----------|
| Lead Free         | Halogen Free      |         | 1              | 2 | 3 |           |
| MMBT1815L-x-AC3-R | MMBT1815G-x-AC3-R | SOT-113 | B              | E | C | Tape Reel |
| MMBT1815L-x-AE3-R | MMBT1815G-x-AE3-R | SOT-23  | B              | E | C | Tape Reel |
| MMBT1815L-x-AL3-R | MMBT1815G-x-AL3-R | SOT-323 | B              | E | C | Tape Reel |
| MMBT1815L-x-AN3-R | MMBT1815G-x-AN3-R | SOT-523 | B              | E | C | Tape Reel |
| MMBT1815L-x-AQ3-R | MMBT1815G-x-AQ3-R | SOT-723 | B              | E | C | Tape Reel |

Note: Pin Assignment: B: Base E: Emitter C: Collector

|                                                                                                       |                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MMBT1815G-x-AC3-R</b><br><br>(1) Packing Type<br>(2) Package Type<br>(3) Rank<br>(4) Green Package | (1) R: Tape Reel<br>(2) AC3: SOT-113, AE3: SOT-23, AL3: SOT-323,<br>AN3: SOT-523, AQ3: SOT-723<br>(3) x: refer to Classification of $h_{FE1}$<br>(4) G: Halogen Free and Lead Free, L: Lead Free |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**■ MARKING**

| PACKAGE                     | MARKING                             |                                     |                                     |
|-----------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                             | Y                                   | GR                                  | BL                                  |
| SOT-23                      | <br>L: Lead Free<br>G: Halogen Free | <br>L: Lead Free<br>G: Halogen Free | <br>L: Lead Free<br>G: Halogen Free |
| SOT-113 / SOT-323 / SOT-523 | <br>L: Lead Free<br>G: Halogen Free |                                     |                                     |
| SOT-723                     | <br>L: Lead Free<br>G: Halogen Free |                                     |                                     |

■ **ABSOLUTE MAXIMUM RATING** ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER                                             |         | SYMBOL    | RATINGS    | UNIT               |
|-------------------------------------------------------|---------|-----------|------------|--------------------|
| Collector-Base Voltage                                |         | $V_{CBO}$ | 60         | V                  |
| Collector-Emitter Voltage                             |         | $V_{CEO}$ | 50         | V                  |
| Emitter-Base Voltage                                  |         | $V_{EBO}$ | 5          | V                  |
| Collector Dissipation<br>( $T_A=25^{\circ}\text{C}$ ) | SOT-23  | $P_C$     | 250        | mW                 |
|                                                       | SOT-523 |           | 200        | mW                 |
|                                                       | SOT-113 |           |            |                    |
|                                                       | SOT-323 |           |            |                    |
|                                                       | SOT-723 |           | 190        | mW                 |
| Collector Current                                     |         | $I_C$     | 150        | mA                 |
| Base Current                                          |         | $I_B$     | 50         | mA                 |
| Junction Temperature                                  |         | $T_J$     | +150       | $^{\circ}\text{C}$ |
| Storage Temperature                                   |         | $T_{STG}$ | -55 ~ +150 | $^{\circ}\text{C}$ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.  
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

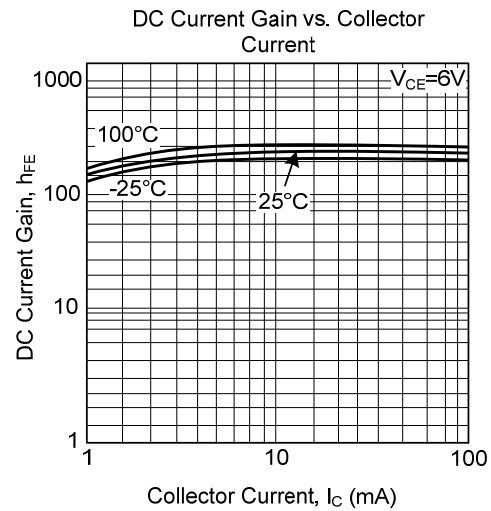
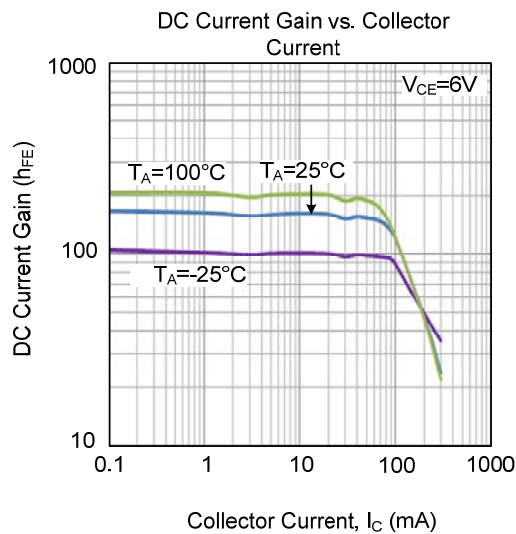
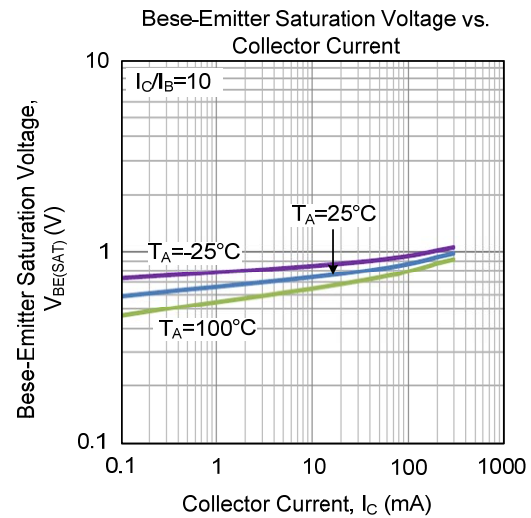
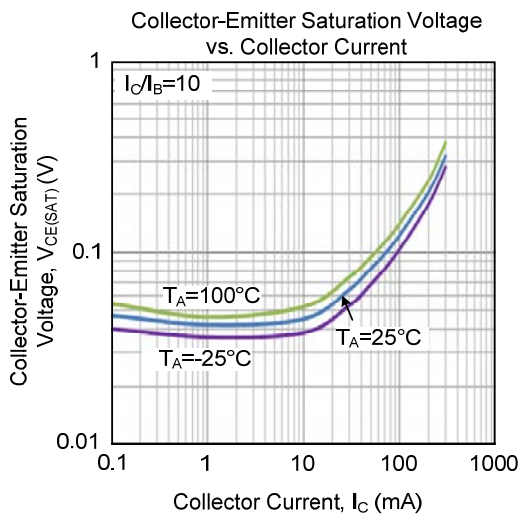
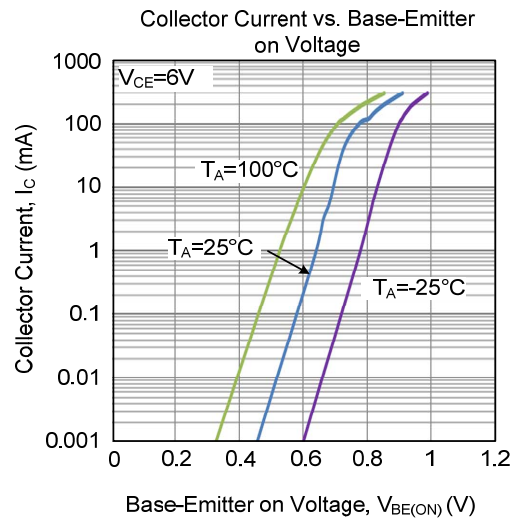
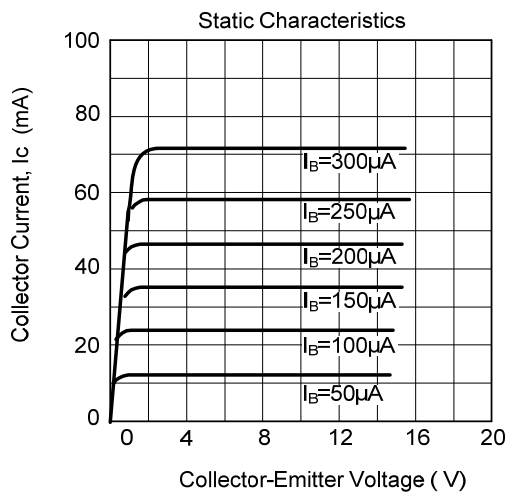
■ **ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER                            | SYMBOL        | TEST CONDITIONS                                                                              | MIN | TYP | MAX  | UNIT |
|--------------------------------------|---------------|----------------------------------------------------------------------------------------------|-----|-----|------|------|
| Collector-Base Breakdown Voltage     | $BV_{CBO}$    | $I_C = 100\mu\text{A}$ , $I_E = 0$                                                           | 60  |     |      | V    |
| Collector-Emitter Breakdown Voltage  | $BV_{CEO}$    | $I_C = 10\text{mA}$ , $I_B = 0$                                                              | 50  |     |      | V    |
| Emitter-Base Breakdown Voltage       | $BV_{EBO}$    | $I_E = 10\mu\text{A}$ , $I_C = 0$                                                            | 5   |     |      | V    |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_C = 100\text{mA}$ , $I_B = 10\text{mA}$                                                   |     | 0.1 | 0.25 | V    |
| Base-Emitter Saturation Voltage      | $V_{BE(SAT)}$ | $I_C = 100\text{mA}$ , $I_B = 10\text{mA}$                                                   |     |     | 1.0  | V    |
| Collector Cut-off Current            | $I_{CBO}$     | $V_{CB} = 60\text{V}$ , $I_E = 0$                                                            |     |     | 100  | nA   |
| Emitter Cut-off Current              | $I_{EBO}$     | $V_{EB} = 5\text{V}$ , $I_C = 0$                                                             |     |     | 100  | nA   |
| DC Current Gain                      | $h_{FE1}$     | $V_{CE} = 6\text{V}$ , $I_C = 2\text{mA}$                                                    | 120 |     | 700  |      |
|                                      | $h_{FE2}$     | $V_{CE} = 6\text{V}$ , $I_C = 150\text{mA}$                                                  | 25  |     |      |      |
| Transition Frequency                 | $f_T$         | $V_{CE} = 10\text{V}$ , $I_C = 50\text{mA}$                                                  | 80  |     |      | MHz  |
| Output Capacitance                   | $C_{OB}$      | $V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$                                        |     | 2.0 | 3.0  | pF   |
| Noise Figure                         | NF            | $I_C = 0.1\text{mA}$ , $V_{CE} = 6\text{V}$<br>$R_G = 10\text{k}\Omega$ , $f = 100\text{Hz}$ |     | 1.0 | 1.0  | dB   |

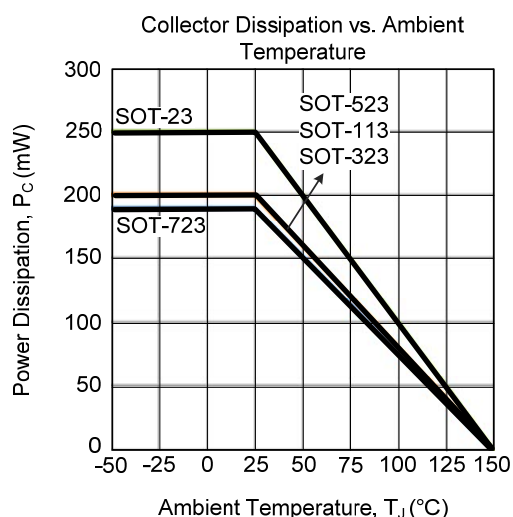
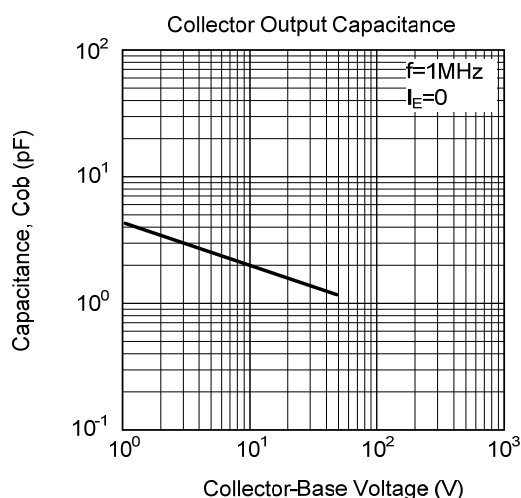
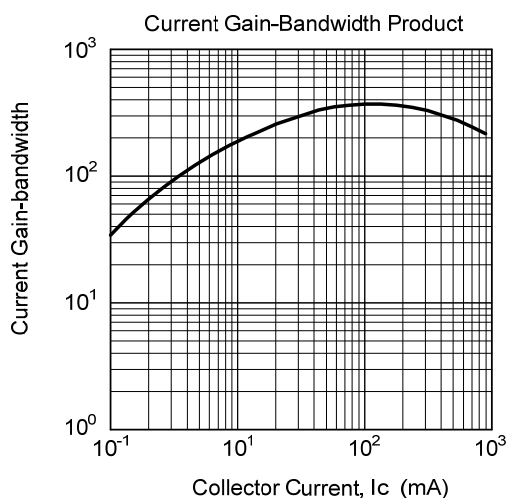
■ **CLASSIFICATION OF  $h_{FE1}$**

| RANK  | Y       | GR      | BL      |
|-------|---------|---------|---------|
| RANGE | 120-240 | 200-400 | 350-700 |

### TYPICAL CHARACTERISTICS



### ■ TYPICAL CHARACTERISTICS



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