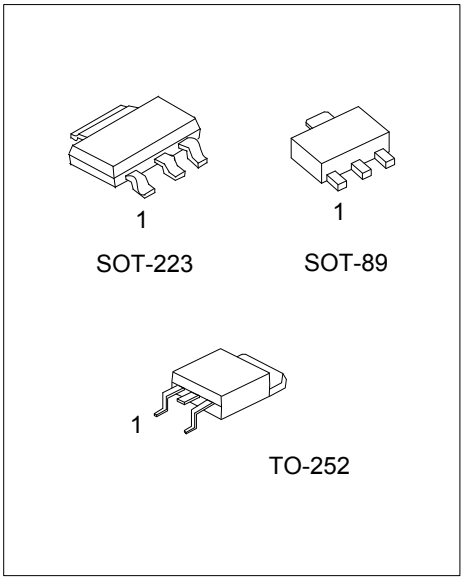
# UP3855

**PNP SILICON TRANSISTOR**

## PNP MEDIUM POWER LOW SATURATION TRANSISTOR




### ■ DESCRIPTION

The UTC **UP3855** is a transistor with low saturation voltage. It provides customers with very low on-state losses that makes it ideal for applications, such as driving and power management functions and DC-DC circuits.

### ■ FEATURES

* Extremely low saturation voltages
* Peak current up to 10A
* 4A continuous current

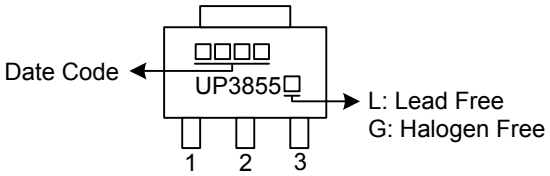
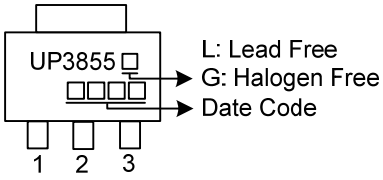
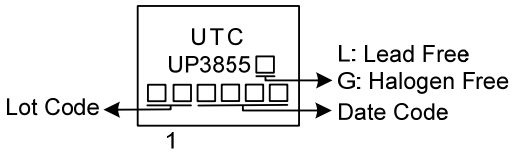
### ■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|---|---|---|---|---|---|---|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| UP3855L-AA3-R | UP3855G-AA3-R | SOT-223 | B | C | E | Tape Reel |
| UP3855L-AB3-R | UP3855G-AB3-R | SOT-89 | B | C | E | Tape Reel |
| UP3855L-TN3-R | UP3855G-TN3-R | TO-252 | B | C | E | Tape Reel |

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

| | |
|---|---|
| UP3855G-AA3-R<br>(1)Packing Type<br>(2)Package Type<br>(3)Green Package | (1) R: Tape Reel<br>(2) AA3: SOT-223, AB3: SOT-89, TN3: TO-252<br>(3) G: Halogen Free and Lead Free, , L: Lead Free |

## ■ MARKING

| PACKAGE | MARKING |
|---|---|
| SOT-89 |   |
| SOT-223 |   |
| TO-252 |   |

## ■ ABSOLUTE MAXIMUM RATING ($T_A$=25°C, unless otherwise specified )

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Collector-Base Voltage | | $V_{CBO}$ | -180 | V |
| Collector-Emitter Voltage | | $V_{CEO}$ | -140 | V |
| Emitter-Base Voltage | | $V_{EBO}$ | -7 | V |
| Continuous Collector Current (Note 1) | | $I_C$ | -4 | A |
| Peak Pulse Current | | $I_{CM}$ | -10 | A |
| Power Dissipation | SOT-223 | $P_D$ | 3.0 (Note 1) | W |
| | | | 1.6 (Note 2) | W |
| | SOT-89 | | 0.6 | W |
| | TO-252 | | 2 | W |
| Junction Temperature | | $T_J$ | +150 | °C |
| Storage Temperature | | $T_{STG}$ | -55 ~ +150 | °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.

## ■ THERMAL CHARACTERISTICS

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Junction to Ambient | SOT-223 | $\theta_{JA}$ | 42 (Note 1) | °C/W |
| | | | 78 (Note 2) | °C/W |
| | SOT-89 | | 208 | °C/W |
| | TO-252 | | 62.5 | °C/W |

Notes: 1. For a device surface mounted on 52mm x 52mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
2. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

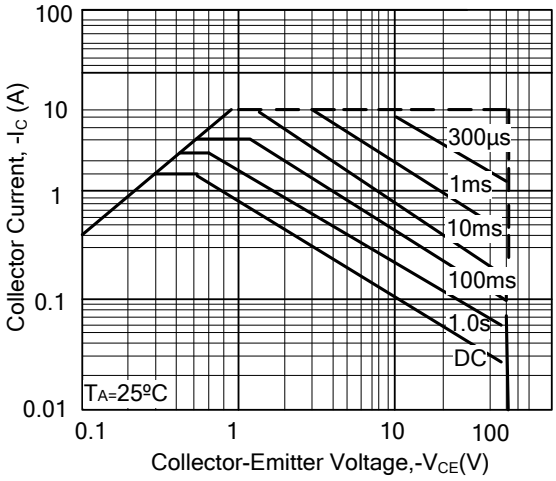
## ■ ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise stated)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $V_{CBO}$ | $I_C$=-100μA | -180 | -200 | | V |
| Collector-Emitter Breakdown Voltage | $V_{CER}$ | $I_C$=-1μA, RB≤1kΩ | -180 | -200 | | V |
| Collector-Emitter Breakdown Voltage | $V_{CEO}$ | $I_C$=-10mA (Note 1) | -140 | -160 | | V |
| Emitter-Base Breakdown Voltage | $V_{EBO}$ | $I_E$=-100μA | -7.0 | -8.0 | | V |
| Collector Cut-Off Current | $I_{CBO}$ | $V_{CB}$=-150V | | <1 | -20 | nA |
| | | $V_{CB}$=-150V, $T_A$=100°C | | | -0.5 | μA |
| Collector Cut-Off Current | $I_{CER}$ | $V_{CB}$=-150V, R≤1kΩ | | <1 | -20 | nA |
| | | $T_A$=100°C | | | -0.5 | μA |
| Emitter Cut-Off Current | $I_{EBO}$ | $V_{EB}$=-6V | | <1 | -10 | nA |
| Collector-Emitter Saturation Voltage (Note 1) | $V_{CE(SAT)}$ | $I_C$=-0.1A, $I_B$=-5mA | | -40 | -60 | mV |
| | | $I_C$=-0.5A, $I_B$=-50mA | | -55 | -80 | mV |
| | | $I_C$=-1A, $I_B$=-100mA | | -85 | -120 | mV |
| | | $I_C$=-3A, $I_B$=-300mA | | -275 | -360 | mV |
| Base-Emitter Saturation Voltage | $V_{BE(SAT)}$ | $I_C$=-3A, $I_B$=-300mA(Note 1) | | -940 | -1040 | mV |
| Base-Emitter Turn-On Voltage | $V_{BE(ON)}$ | $I_C$=-3A, $V_{CE}$=-5V (Note 1) | | -830 | -930 | mV |
| Static Forward Current Transfer Ratio (Note 1) | $h_{FE}$ | $I_C$=-10mA, $V_{CE}$=-5V | 100 | 225 | | |
| | | $I_C$=-1A, $V_{CE}$=-5V | 100 | 200 | 300 | |
| | | $I_C$=-3A, $V_{CE}$=-5V | 45 | 100 | | |
| | | $I_C$=-10A, $V_{CE}$=-5V | | 5 | | |
| Transition Frequency | $f_T$ | $I_C$=-100mA, $V_{CE}$=-10V f=50MHz | | 120 | | MHz |
| Output Capacitance (Note) | $C_{OBO}$ | $V_{CB}$=-10V, f=1MHz | | 33 | | pF |
| Switching Times | $t_{ON}$ | $I_C$=-1A, $V_{CC}$=-50V, $I_{B1}$=-$I_{B2}$=-100mA | | 150 | | ns |
| | $t_{OFF}$ | | | 750 | | ns |

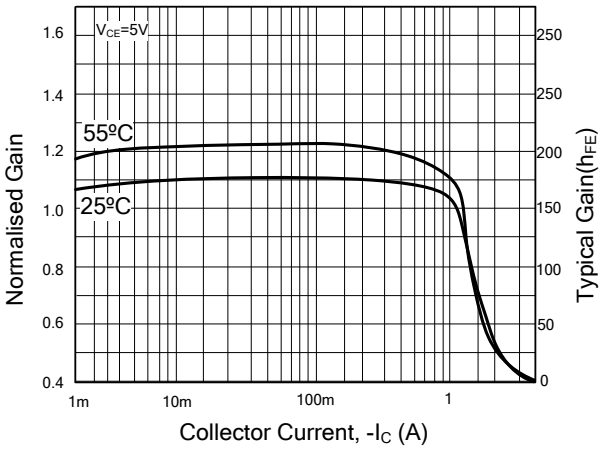
Note: Measured under pulsed conditions. Pulse width≤300μs; duty cycle≤2%.

## ■ TYPICAL CHARACTERISTICS

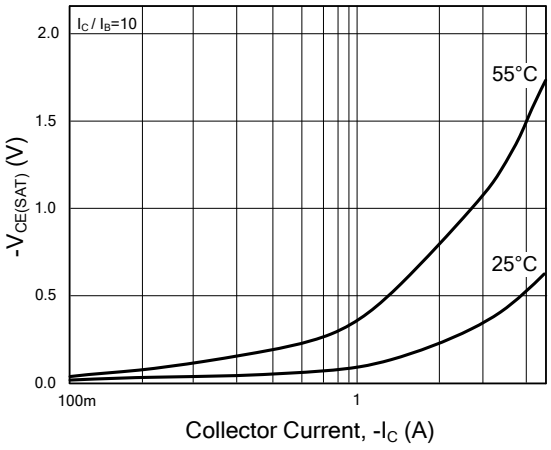
Power Dissipatio vs Ambient Temperature



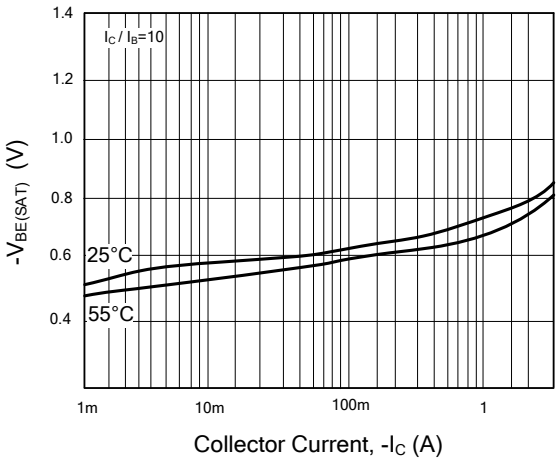

$h_{FE}$ vs. $I_C$



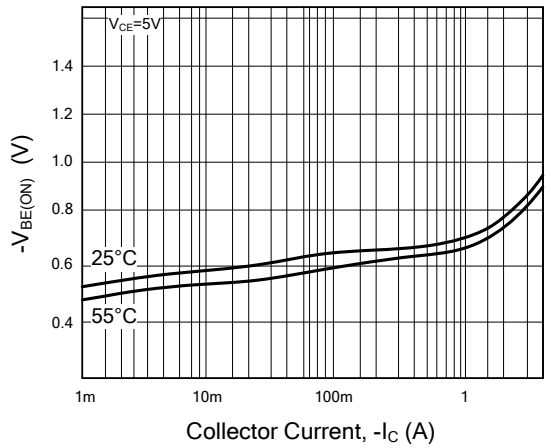

$V_{CE(SAT)}$ vs. $I_C$



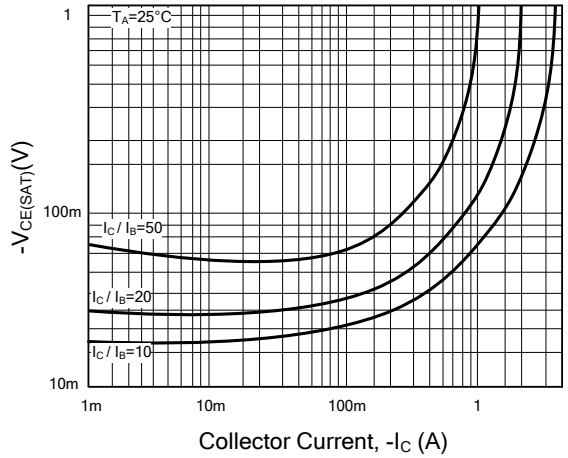

$V_{BE(SAT)}$ vs. $I_C$




$V_{BE(ON)}$ vs. $I_C$

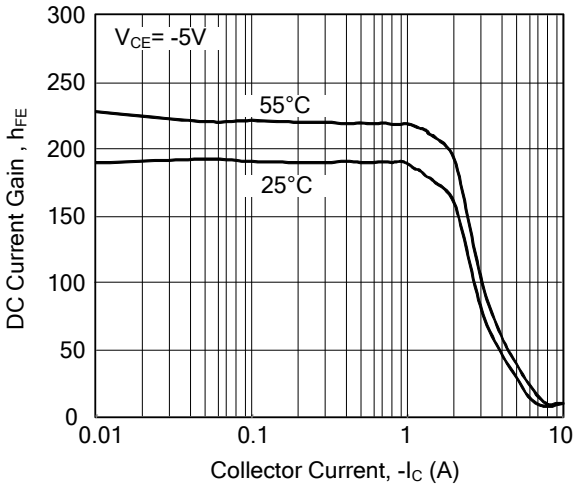



$V_{CE(SAT)}$ vs. $I_C$

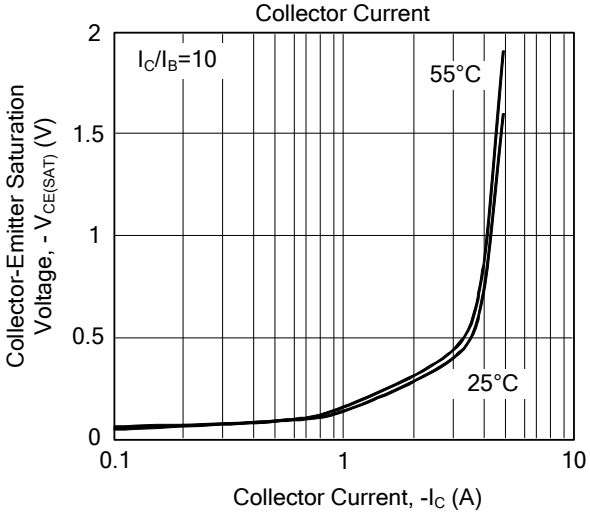


## ■ TYPICAL CHARACTERISTICS (Cont.)

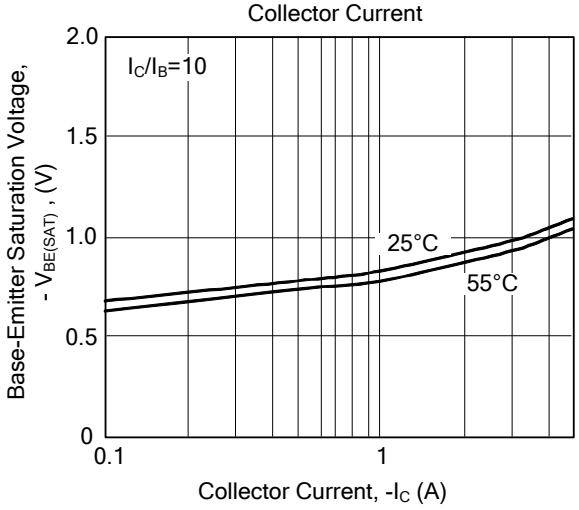
DC Current Gain vs. Collector Current



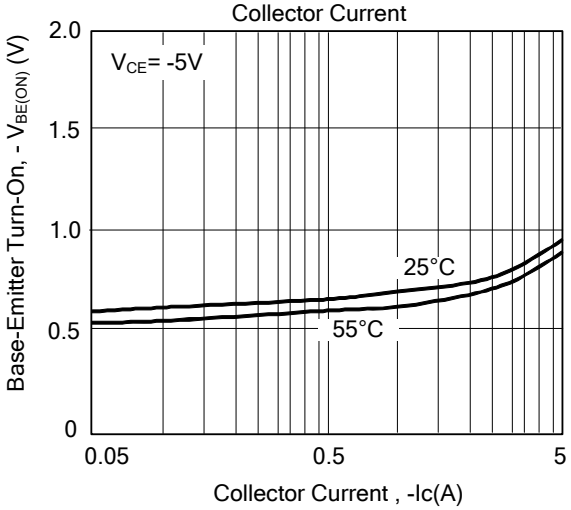

Collector-Emitter Saturation Voltage vs. Collector Current




Base-Emitter Saturation Voltage vs. Collector Current




Base-Emitter Turn-On vs. Collector Current




Safe Operation Area