



RF and MICROWAVE DISCRETE LOW POWER TRANSISTORS

Qualified per MIL-PRF-19500/343

*Qualified Levels:
JAN, JANTX,
and JANTXV*

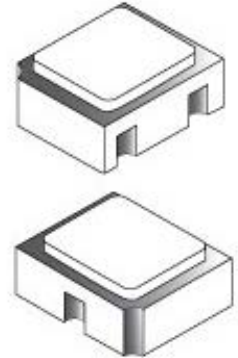
DESCRIPTION

The 2N2857UB is a military qualified silicon NPN transistor (also available in commercial version), designed for UHF equipment and other high-reliability applications. Common applications include low noise amplifier; oscillator, and mixer applications. Microsemi also offers numerous other products to meet higher and lower power voltage regulation applications.

Important: For the latest information, visit our website <http://www.microsemi.com>.


FEATURES

- Surface mount equivalent to JEDEC registered 2N2857.
- Silicon NPN, UB packaged UHF transistor.
- Maximum unilateral gain = 13 dB (typ) @ 500 MHz.
- JAN, JANTX, and JANTXV military qualified versions available per MIL-PRF-19500/343.
- RoHS compliant version available (commercial grade only).



UB Package

Also available in:

 **TO-72 Package**
(axial-leaded)
[2N2857](#)

APPLICATIONS / BENEFITS

- Low-power, ultra-high frequency transistor.
- Low-profile ceramic surface mount package.

MAXIMUM RATINGS @ T_A = +25 °C

| Parameters/Test Conditions | Symbol | Value | Unit |
|-----------------------------------------------|-------------------------------------|-------------|------|
| Junction and Storage Temperature | T _J and T _{STG} | -65 to +200 | °C |
| Collector-Emitter Voltage | V _{CEO} | 15 | V |
| Collector-Base Voltage | V _{CBO} | 30 | V |
| Emitter-Base Voltage | V _{EBO} | 3 | V |
| Thermal Resistance Junction-to-Ambient | R _{θJA} | 400 | °C/W |
| Thermal Resistance Junction-to-Solder Pad | R _{θJSP} | 210 | °C/W |
| Steady-State Power Dissipation ⁽¹⁾ | P _D | 200 | mW |
| Collector Current | I _C | 40 | mA |

Notes: 1. Derate linearly 1.14 mW/°C for T_A > +25 °C.

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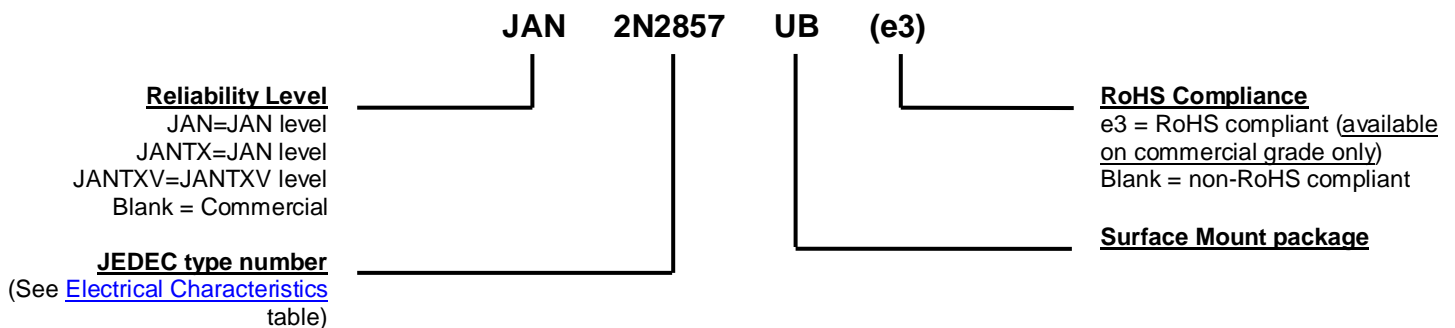
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www.microsemi.com

MECHANICAL and PACKAGING

- CASE: Ceramic.
- TERMINALS: Gold plating over nickel underplate. RoHS compliant matte/tin available on commercial grade only.
- MARKING: Part number, date code, manufacturer's ID.
- TAPE & REEL option: Standard per EIA-418D. Consult factory for quantities.
- WEIGHT: < 0.04 Grams.
- See [Package Dimensions](#) on last page.

PART NOMENCLATURE

SYMBOLS & DEFINITIONS

| Symbol | Definition |
|----------|----------------------------------|
| I_C | Collector current (dc). |
| I_B | Base current (dc). |
| T_A | Ambient or free air temperature. |
| T_C | Case temperature. |
| V_{CB} | Collector to base voltage (dc). |
| V_{EB} | Emitter to base voltage (dc). |

ELECTRICAL CHARACTERISTICS @ $T_C = +25^\circ\text{C}$
OFF CHARACTERISTICS

| Test Conditions | Symbol | Value | | | Unit |
|-------------------------------------------------------------------------------------|---------------|-------|------|------|---------------|
| | | Min. | Typ. | Max. | |
| Collector-Emitter Breakdown Voltage ($I_C = 3.0\text{ mA}$, Bias condition D) | $V_{(BR)CEO}$ | 15 | - | - | V |
| Collector to Emitter Cutoff Current ($V_{CE} = 16\text{ V}$, Bias condition C) | I_{CES} | - | - | 100 | nA |
| Emitter to Base Cutoff Current ($V_{EB} = 3\text{ V}$, Bias condition D) | I_{EBO} | - | - | 10 | μA |
| Collector to Base Cutoff Current ($V_{CB} = 15\text{ V}$, Bias condition D) | I_{CBO} | - | - | 10 | nA |

ON CHARACTERISTICS

| Test Conditions | Symbol | Value | | | Unit |
|----------------------------------------------------------------------------------------|---------------|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| Forward Current transfer ratio ($I_C = 3.0\text{ mA}$, $V_{CE} = 1.0\text{ V}$) | h_{FE} | 30 | - | 150 | |
| Collector-Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$) | $V_{CE(sat)}$ | | - | 0.4 | V |
| Base-Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$) | $V_{BE(sat)}$ | | - | 1.0 | V |

DYNAMIC CHARACTERISTICS

| Test Conditions | Symbol | Value | | | Unit |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| Magnitude of common emitter small signal short circuit forward current transfer ratio ($V_{CE} = 6\text{ V}$, $I_C = 5\text{ mA}$, $f = 100\text{ MHz}$) | $ h_{fe} $ | 10 | - | 21 | |
| Collector-base time constant ($I_E = 2.0\text{ mA}$, $V_{CB} = 6.0\text{ V}$, $f = 31.9\text{ MHz}$) | $r_b'C_c$ | 4 | - | 15 | pF |
| Collector to Base – feedback capacitance ($I_E = 0\text{ mA}$, $V_{CB} = 10\text{ V}$, $100\text{ kHz} \leq f \leq 1\text{ MHz}$) | C_{cb} | | | 1.0 | pF |
| Noise Figure (50 Ohms) ($I_C = 1.5\text{ mA}$, $V_{CE} = 6\text{ V}$, $f = 450\text{ MHz}$, $R_g = 50\ \Omega$) | F | | 4.5 | | dB |
| Small Signal Power Gain (common emitter) ($I_E = 1.5\text{ mA}$, $V_{CE} = 6\text{ V}$, $f = 450\text{ MHz}$) | G_{pe} | 12.5 | | 21 | dB |

GRAPHS

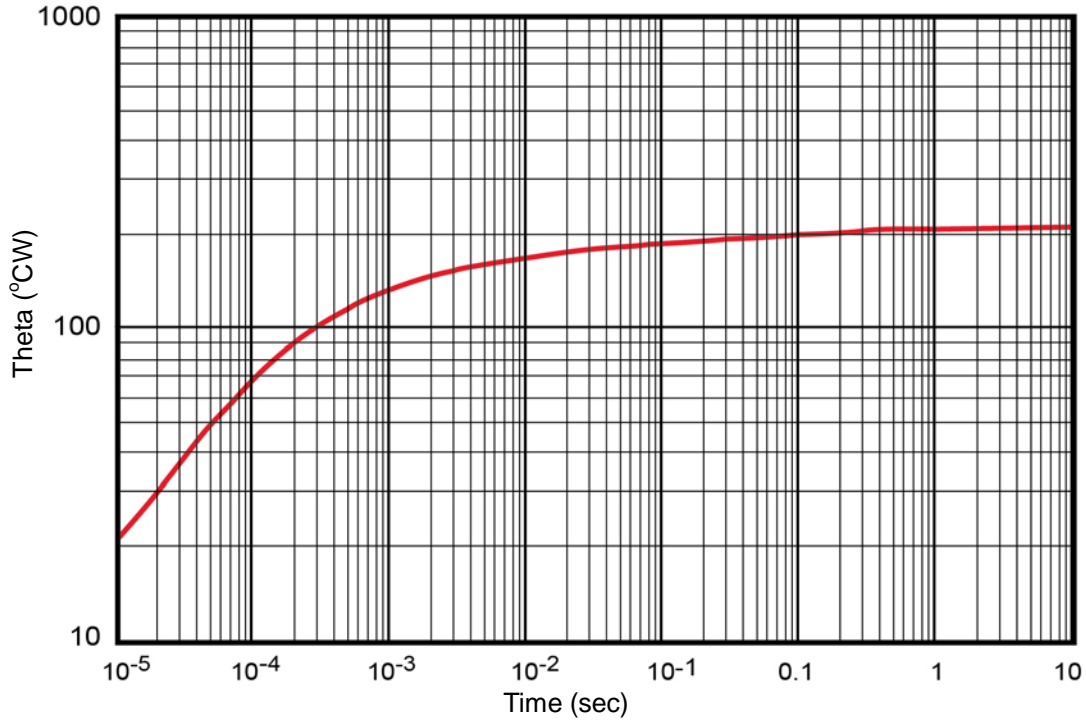
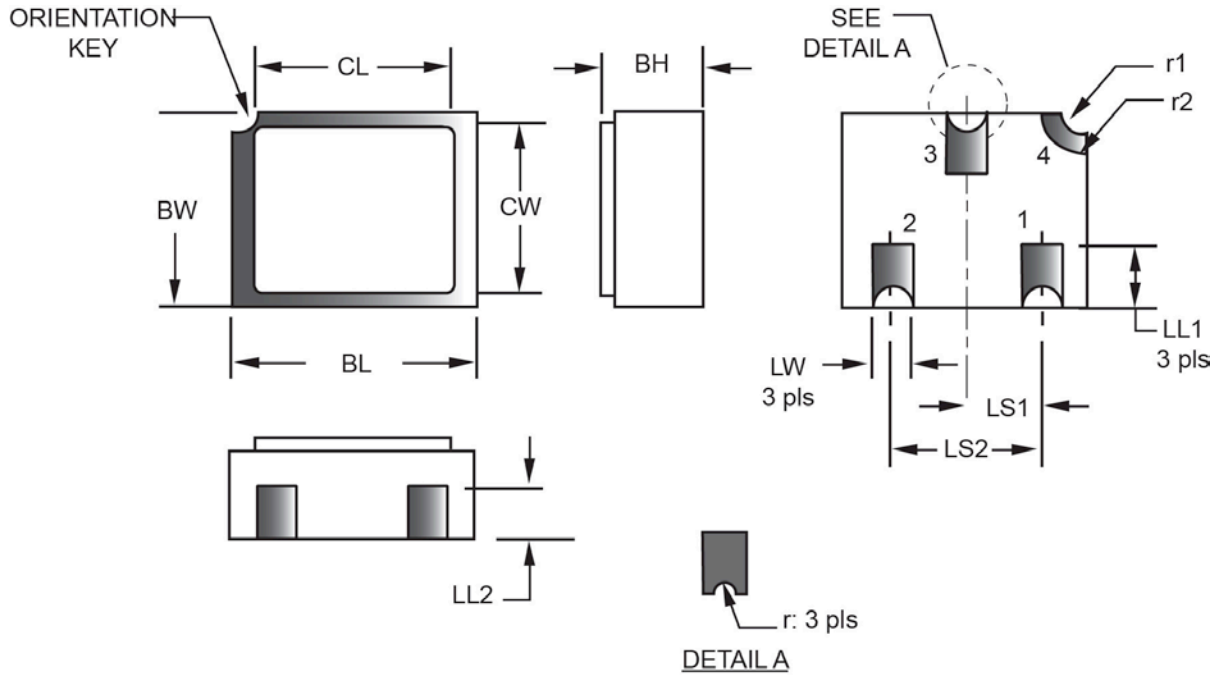


FIGURE 1
Maximum Thermal Impedance

PACKAGE DIMENSIONS


| Symbol | Dimensions | | | | Note | Symbol | Dimensions | | | | Note |
|--------|------------|------|-------------|------|------|--------|------------|------|-------------|------|------|
| | inch | | millimeters | | | | inch | | millimeters | | |
| | Min | Max | Min | Max | | | Min | Max | Min | Max | |
| BH | .046 | .056 | 1.17 | 1.42 | | LS1 | .035 | .039 | 0.89 | 1.02 | |
| BL | .115 | .128 | 2.92 | 3.25 | | LS2 | .071 | .079 | 1.80 | 2.01 | |
| BW | .085 | .108 | 2.16 | 2.74 | | LW | 0.16 | 0.24 | 0.41 | 0.61 | |
| CL | | .128 | | 3.25 | | r | | .008 | | 0.20 | |
| CW | | .108 | | 2.74 | | r1 | | .012 | | 0.31 | |
| LL1 | .022 | .038 | 0.56 | 0.97 | | r2 | | .022 | | .056 | |
| LL2 | .017 | .035 | 0.43 | 0.89 | | | | | | | |

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Hatched areas on package denote metallized areas.
4. Pad 1 = Base, Pad 2 = Emitter, Pad 3 = Collector, Pad 4 = Shielding connected to the lid.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.



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