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PNP Silicon Small Signal Transistor

Qualified per MIL-PRF-19500/382

Qualified Levels:
JAN, JANTX, and
JANTXV

DESCRIPTION

This 2N2944AUB through 2N2946AUB PNP silicon transistor device is military qualified up to a JANTXV level for high-reliability 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 of JEDEC registered 2N2944A thru 2N2946A series.
- Low-profile ceramic surface mount package.
- JAN, JANTX, and JANTXV qualification per MIL-PRF-19500/382 available.
- RoHS compliant versions available (commercial grade only).

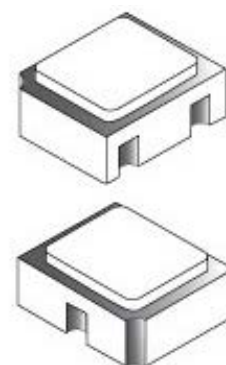
APPLICATIONS / BENEFITS

- Small lightweight package.
- ESD to Class 3 per MIL-STD-750, method 1020.

MAXIMUM RATINGS @ +25 °C unless otherwise noted.

| Parameters/Test Conditions | Symbol | Value | Unit |
|--|---------------------|-------------------|------|
| Junction and Storage Temperature | T_J and T_{STG} | -65 to +200 | °C |
| Thermal Resistance Junction-to-Ambient ⁽²⁾ | $R_{\theta JA}$ | 435 | °C/W |
| Thermal Resistance surface mount Junction to Solder Point | $R_{\theta JSP}$ | 90 | °C/W |
| Collector Current (dc) | I_C | -100 | mA |
| Emitter to Base voltage (static), collector open | V_{EBO} | -15 -25 -40 | V |
| Collector to Base voltage (static), emitter open | V_{CBO} | -15 -25 -40 | V |
| Collector to Emitter voltage (static), base open | V_{CEO} | -10 -20 -35 | V |
| Emitter to Collector voltage | V_{ECO} | -10 -20 -35 | V |
| Total Power Dissipation, all terminals @ $T_A = +25$ °C ⁽¹⁾ | P_T | 400 | mW |
| Total Power Dissipation, all terminals @ $T_{SP} = +25$ °C | P_T | 800 | mW |

- Notes:**
1. Derate linearly 2.30 mW /°C above $T_A = +25$ °C.
 2. $T_A = +55$ °C for UB on printed circuit board (PCB), PCB = FR4 .0625 inch (1.59 mm) 1 - layer 1 Oz Cu, horizontal, still air, pads (UB) = .034 inch (0.86 mm) x .048 inch (1.22 mm), $R_{\theta JA}$ with a defined thermal resistance condition included is measured at $P_T = 400$ mW .



UB Package

Also available in:

TO-46 (TO-206AB)

(axial leaded)

 [2N2944A – 2N2946A](#)

MSC – Lawrence

6 Lake Street,
Lawrence, MA 01841
Tel: 1-800-446-1158 or
(978) 620-2600
Fax: (978) 689-0803

MSC – Ireland

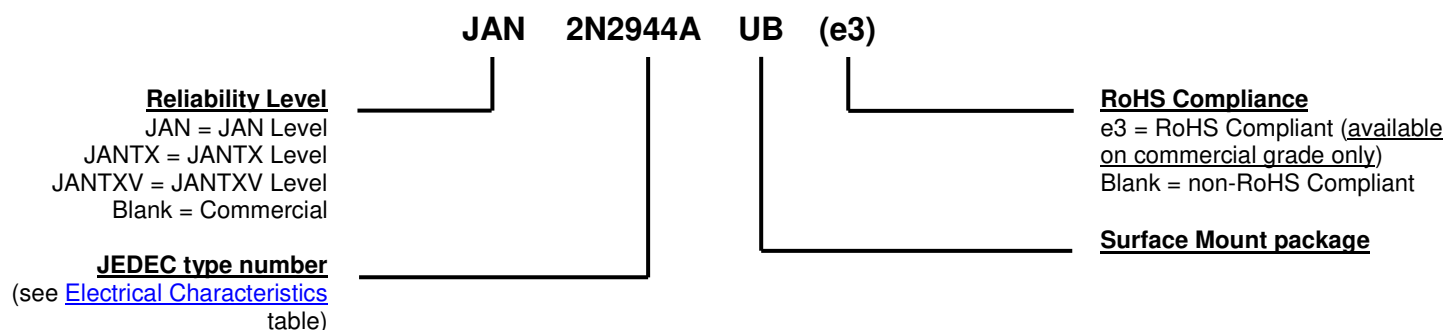
Gort Road Business Park,
Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044
Fax: +353 (0) 65 6822298

Website:

www.microsemi.com

MECHANICAL and PACKAGING

- CASE: Ceramic.
- TERMINALS: Gold plating over nickel under-plate. 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.

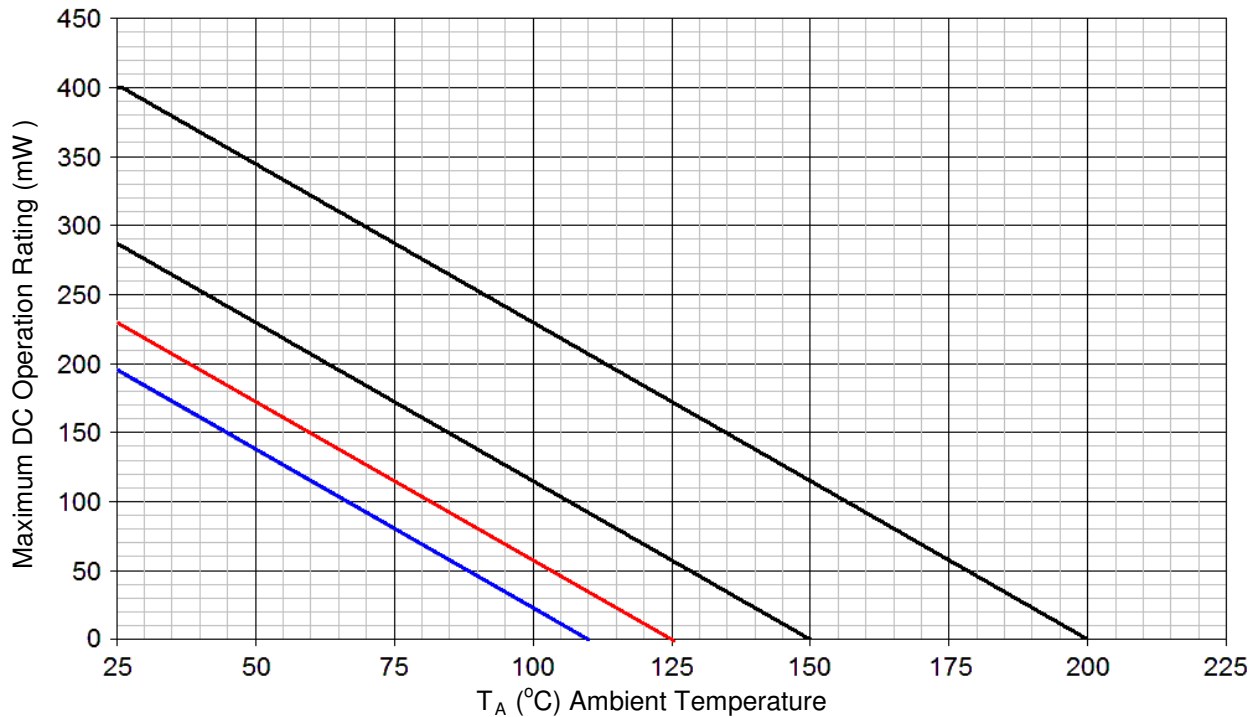
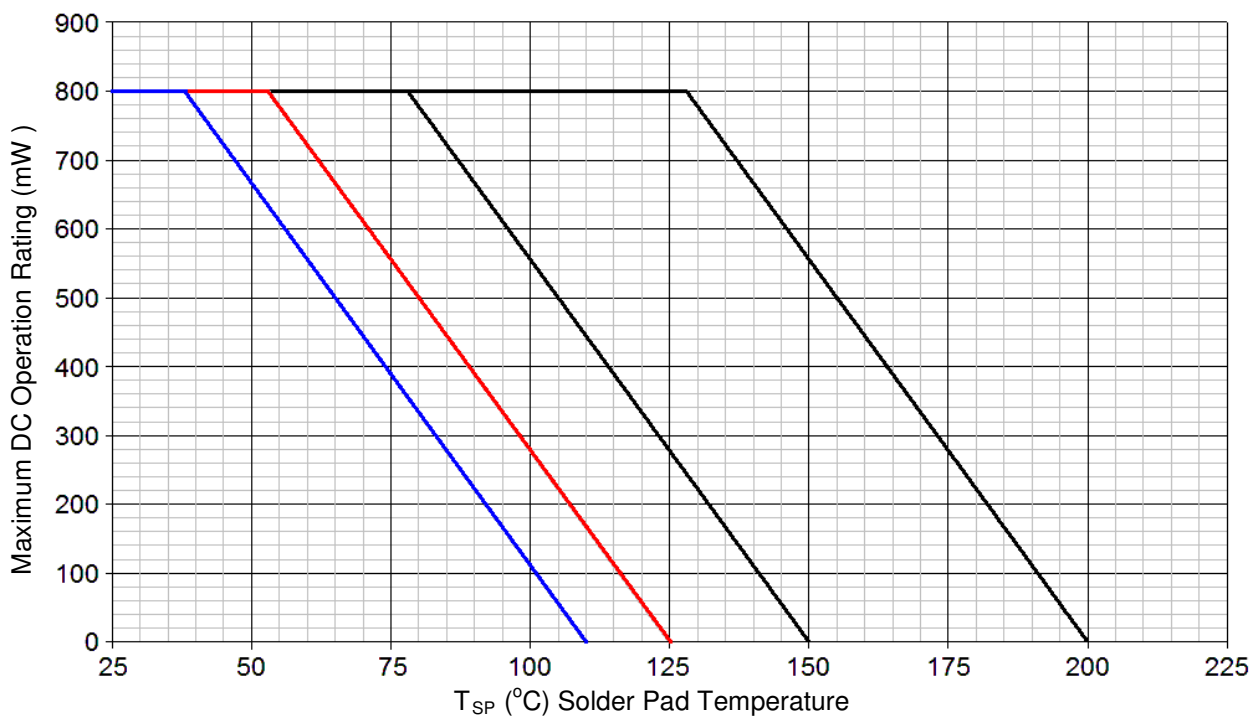
PART NOMENCLATURE

SYMBOLS & DEFINITIONS

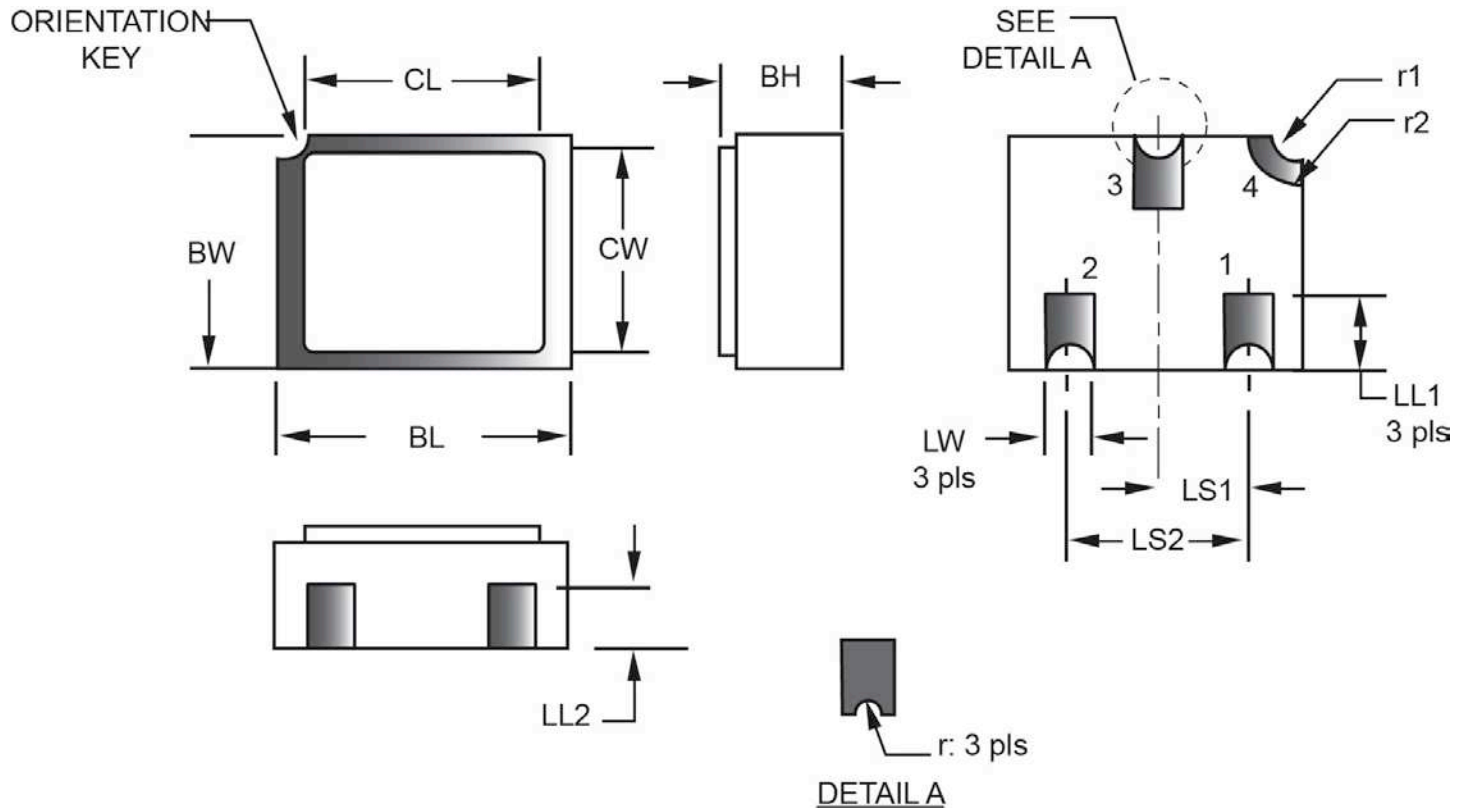
| Symbol | Definition |
|------------|--|
| I_B | Base current (dc). |
| I_E | Emitter current (dc). |
| V_{CB} | Collector to base voltage (dc). |
| V_{EB} | Emitter to base voltage (dc). |
| $V_{(BR)}$ | Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current. |

ELECTRICAL CHARACTERISTICS @ 25 °C unless otherwise noted.

| Characteristic | | Symbol | Min. | Max. | Unit |
|--|---|---------------|-------------------|--|----------|
| OFF CHARACTERISTICS: | | | | | |
| Collector-Emitter Breakdown Voltage $I_C = -10 \mu A$ | 2N2944AUB 2N2945AUB 2N2946AUB | $V_{(BR)CEO}$ | -10 -20 -35 | | V |
| Emitter-Collector Breakdown Voltage $I_E = -10 \mu A, I_B = 0$ | 2N2944AUB 2N2945AUB 2N2946AUB | $V_{(BR)ECO}$ | -10 -20 -35 | | V |
| Collector-Base Cutoff Current $V_{CB} = -15 V$ $V_{CB} = -25 V$ $V_{CB} = -40 V$ | 2N2944AUB 2N2945AUB 2N2946AUB | I_{CBO} | 10 10 10 | | μA |
| Emitter-Base Cutoff Current $V_{EB} = -12 V$ $V_{EB} = -20 V$ $V_{EB} = -32 V$ | 2N2944AUB 2N2945AUB 2N2946AUB | I_{EBO} | | -0.1 -0.2 -0.5 | ηA |
| ON CHARACTERISTICS: ⁽¹⁾ | | | | | |
| Forward-Current Transfer Ratio $I_C = -1.0 mA, V_{CE} = -0.5 V$ | 2N2944AUB 2N2945AUB 2N2946AUB | h_{FE} | 100 70 50 | | |
| Forward-Current Transfer Ratio (inverted connection) $I_E = -200 \mu A, V_{EC} = -0.5 V$ | 2N2944AUB 2N2945AUB 2N2946AUB | $h_{FE(inv)}$ | 50 30 20 | | |
| Emitter-Collector Offset Voltage $I_B = -200 \mu A, I_E = 0$ $I_B = -1.0 mA, I_E = 0$ $I_B = -2.0 mA, I_E = 0$ | 2N2944AUB 2N2945AUB 2N2946AUB 2N2944AUB 2N2945AUB 2N2946AUB 2N2944AUB 2N2945AUB 2N2946AUB | $V_{EC(ofs)}$ | | -0.3 -0.5 -0.8 -0.6 -1.0 -2.0 -1.0 -1.6 -2.5 | mV |
| DYNAMIC CHARACTERISTICS: | | | | | |
| Emitter-Collector On-State Resistance $I_B = -100 \mu A, I_E = 0, I_C = 100 \mu A$ ac (rms) $f = 1.0 kHz$ $I_B = -1.0 mA, I_E = 0, I_C = 100 \mu A$ ac (rms) $f = 1.0 kHz$ | 2N2944AUB 2N2945AUB 2N2946AUB 2N2944AUB 2N2945AUB 2N2946AUB | $r_{ec(on)}$ | | 10 12 14 4.0 6.0 8.0 | Ω |
| Magnitude of Small-Signal Forward Current Transfer Ratio $I_C = -1.0 mA, V_{CE} = -6.0 V, f = 1.0 MHz$ | 2N2944AUB 2N2945AUB 2N2946AUB | $ h_{fe} $ | 15 10 5.0 | 55 55 55 | |
| Output Capacitance $V_{CB} = -6.0 V, I_E = 0, 100 kHz \leq f \leq 1.0 MHz$ | | C_{obo} | | 10 | pF |
| Input Capacitance $V_{EB} = -6.0 V, I_C = 0, 100 kHz \leq f \leq 1.0 MHz$ | | C_{ibo} | | 6.0 | pF |

(1) Pulse Test: Pulse Width = 300 s, duty cycle 2.0%.

GRAPHS

FIGURE 1 – Temperature-Power Derating Curve ($R_{\Theta JA}$)

FIGURE 2 – Temperature-Power Derating Curve ($R_{\Theta JSP}$)

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 | 0.99 | |
| 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.