



PNP Silicon Small Signal Transistor

Qualified per MIL-PRF-19500/382

Qualified Levels:
JAN, JANTX, and
JANTXV

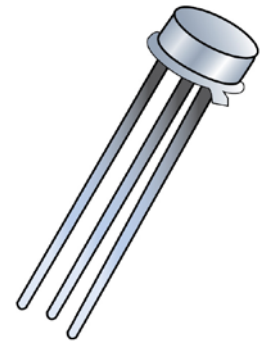
DESCRIPTION

This 2N2944A through 2N2946A 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

- JEDEC registered 2N2944A thru 2N2946A series.
- JAN, JANTX, and JANTXV qualifications per MIL-PRF-19500/382 available.
- RoHS compliant versions available (commercial grade only).




**TO-46 (TO-206AB)
Package**

APPLICATIONS / BENEFITS

- Low profile metal can package.
- ESD to Class 3 per MIL-STD-750, method 1020.

Also available in:

 **UB package**
(surface mount)

[2N2944AUB – 2N2946AUB](#)

MAXIMUM RATINGS @ +25 °C unless specified otherwise.

| Parameters/Test Conditions | Symbol | Value | Unit |
|---|-------------------------------------|-------------------|------|
| Junction and Storage Temperature | T _J and T _{STG} | -65 to +200 | °C |
| Thermal Resistance Junction-to-Ambient | R _{θJA} | 435 | °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 _{CB0} | -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 |

Notes: 1. Derate linearly 2.30 mW /°C above T_A = +25 °C.

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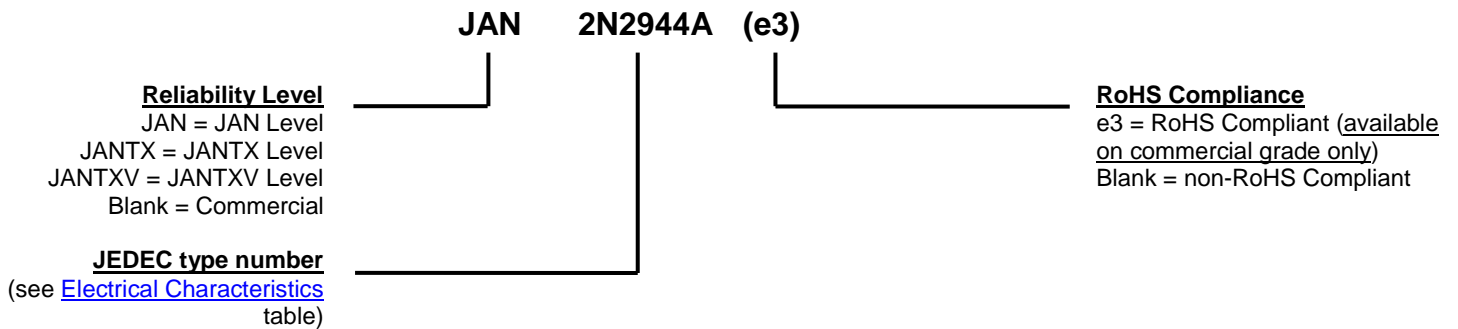
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MECHANICAL and PACKAGING

- CASE: Nickel plated kovar, glass seals.
- TERMINALS: Gold plating over nickel, solder dipped, kovar.
- MARKING: Part number, date code, manufacturer's ID.
- WEIGHT: 0.234 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 $I_C = -10 \mu\text{A}$ | 2N2944A 2N2945A 2N2946A | $V_{(BR)CEO}$ | -10 -20 -35 | | V |
| Emitter-Collector Breakdown Voltage $I_E = -10 \mu\text{A}, I_B = 0$ | 2N2944A 2N2945A 2N2946A | $V_{(BR)ECO}$ | -10 -20 -35 | | V |
| Collector-Base Cutoff Current $V_{CB} = -15 \text{ V}$ $V_{CB} = -25 \text{ V}$ $V_{CB} = -40 \text{ V}$ | 2N2944A 2N2945A 2N2946A | I_{CBO} | 10 10 10 | | μA |
| Emitter-Base Cutoff Current $V_{EB} = -12 \text{ V}$ $V_{EB} = -20 \text{ V}$ $V_{EB} = -32 \text{ V}$ | 2N2944A 2N2945A 2N2946A | I_{EBO} | | -0.1 -0.2 -0.5 | ηA |
| ON CHARACTERISTICS: ⁽¹⁾ | | | | | |
| Forward-Current Transfer Ratio $I_C = -1.0 \text{ mA}, V_{CE} = -0.5 \text{ V}$ | 2N2944A 2N2945A 2N2946A | h_{FE} | 100 70 50 | | |
| Forward-Current Transfer Ratio (inverted connection) $I_E = -200 \mu\text{A}, V_{EC} = -0.5 \text{ V}$ | 2N2944A 2N2945A 2N2946A | $h_{FE(inv)}$ | 50 30 20 | | |
| Emitter-Collector Offset Voltage $I_B = -200 \mu\text{A}, I_E = 0$ $I_B = -1.0 \text{ mA}, I_E = 0$ $I_B = -2.0 \text{ mA}, I_E = 0$ | 2N2944A 2N2945A 2N2946A 2N2944A 2N2945A 2N2946A 2N2944A 2N2945A 2N2946A | $V_{EC(ofs)}$ | | -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 $I_B = -100 \mu\text{A}, I_E = 0, I_e = 100 \mu\text{A ac (rms)}$ $f = 1.0 \text{ kHz}$ $I_B = -1.0 \text{ mA}, I_E = 0, I_e = 100 \mu\text{A ac (rms)}$ $f = 1.0 \text{ kHz}$ | 2N2944A 2N2945A 2N2946A 2N2944A 2N2945A 2N2946A | $r_{ec(on)}$ | | 10 12 14 4.0 6.0 8.0 | Ω |
| Magnitude of Small-Signal Forward Current Transfer Ratio $I_C = -1.0 \text{ mA}, V_{CE} = -6.0 \text{ V}, f = 1.0 \text{ MHz}$ | 2N2944A 2N2945A 2N2946A | $ h_{fe} $ | 15 10 5.0 | 55 55 55 | |
| Output Capacitance $V_{CB} = -6.0 \text{ V}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$ | | C_{obo} | | 10 | pF |
| Input Capacitance $V_{EB} = -6.0 \text{ V}, I_C = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$ | | C_{ibo} | | 6.0 | pF |

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

GRAPHS

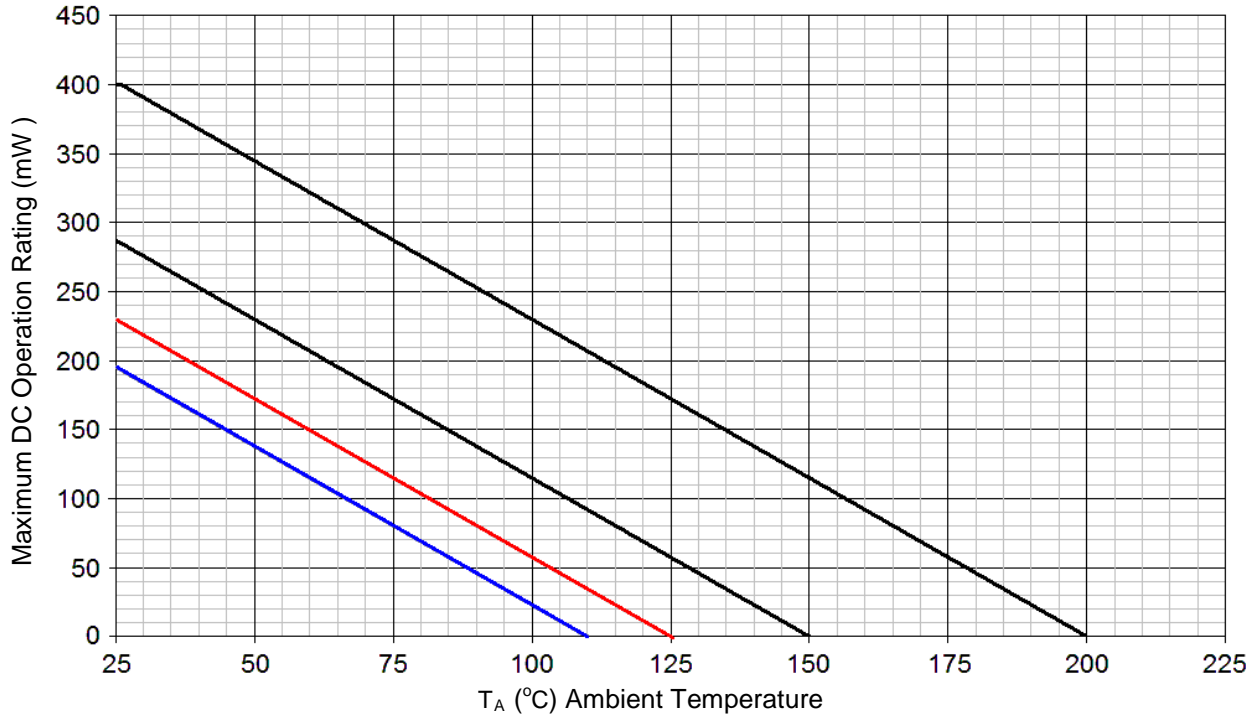
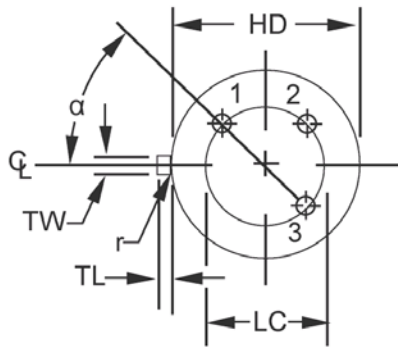
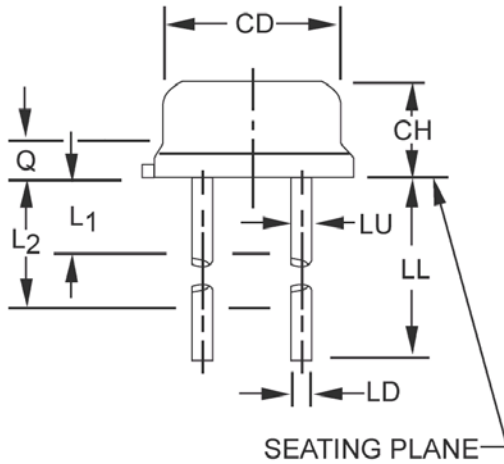


FIGURE 1 – Temperature-Power Derating Curve

PACKAGE DIMENSIONS


| Ltr. | Dimensions | | | | Notes |
|----------------------------|------------|-------|-------------|-------|-------|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| CD | .178 | .195 | 4.52 | 4.95 | |
| CH | .065 | .085 | 1.65 | 2.16 | |
| HD | .209 | .230 | 5.31 | 5.84 | |
| LC | .100 TP | | 2.54 TP | | 5 |
| LD | .016 | .021 | 0.41 | 0.53 | |
| LL | .500 | 1.750 | 12.70 | 44.45 | 6 |
| LU | .016 | .019 | 0.41 | 0.48 | 6 |
| L1 | | .050 | | 1.27 | 6 |
| L2 | .250 | | 6.35 | | 6 |
| Q | | .040 | | 1.02 | 3 |
| TL | .028 | .048 | 0.71 | 1.22 | 8 |
| TW | .036 | .046 | 0.91 | 1.17 | 4 |
| r | | .010 | | 0.25 | 9 |
| α | 45° TP | | 45° TP | | 5 |

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Symbol TL is measured from HD maximum.
4. Details of outline in this zone are optional.
5. Leads at gauge plane .054 inch (1.37 mm) +.001 inch (0.03 mm) -.000 inch (0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of TP relative to tab. Device may be measured by direct methods or by gauge.
6. Symbol LU applies between L₁ and L₂. Dimension LD applies between L₂ and LL minimum.
7. Lead number three is electrically connected to case.
8. Beyond r maximum, TW shall be held for a minimum length of .011 inch (0.28 mm).
9. Symbol r applied to both inside corners of tab.
10. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.
11. Lead 1 is emitter, lead 2 is base, and lead 3 is collector.