



PNP Silicon Small Signal Transistor

Qualified per MIL-PRF-19500/382

Qualified Levels:
JAN, JANTX, and
JANTXV

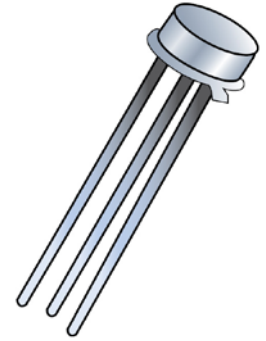
DESCRIPTION

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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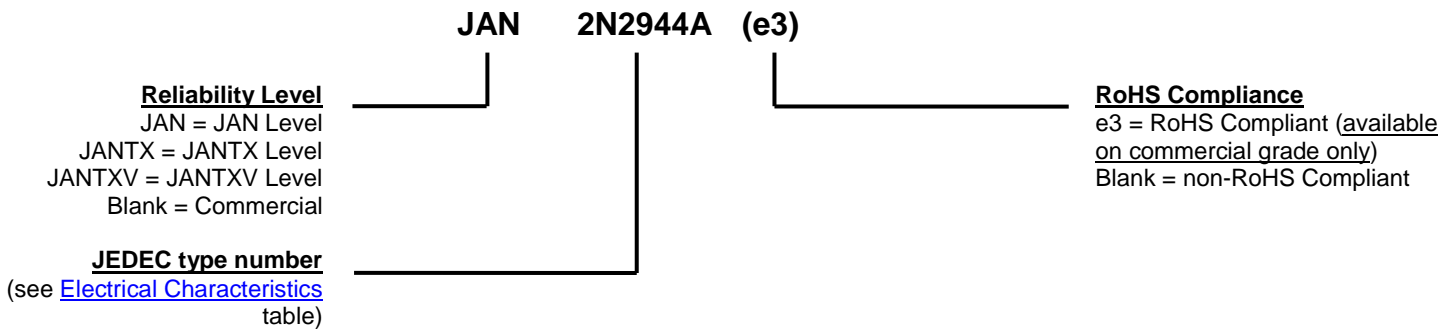
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MECHANICAL and PACKAGING

- 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

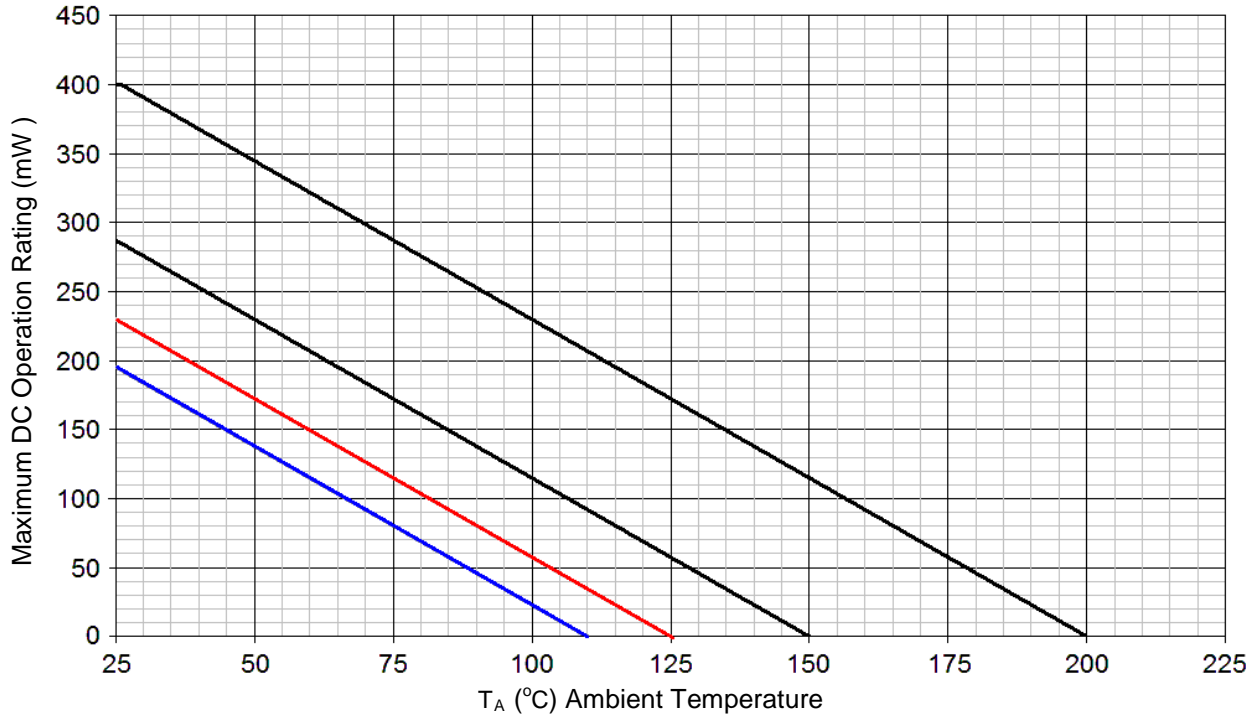
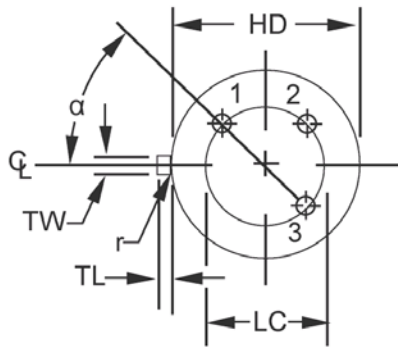
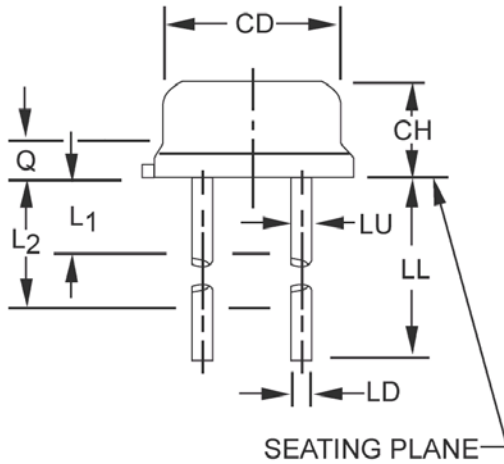


FIGURE 1 – Temperature-Power Derating Curve

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:

- Dimensions are in inches.
- Millimeters are given for general information only.
- Symbol TL is measured from HD maximum.
- Details of outline in this zone are optional.
- 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.
- Symbol LU applies between L₁ and L₂. Dimension LD applies between L₂ and LL minimum.
- Lead number three is electrically connected to case.
- Beyond r maximum, TW shall be held for a minimum length of .011 inch (0.28 mm).
- Symbol r applied to both inside corners of tab.
- In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.
- Lead 1 is emitter, lead 2 is base, and lead 3 is collector.