



LOW POWER NPN SILICON TRANSISTOR

Qualified per MIL-PRF-19500/391

Qualified Levels:
JAN, JANTX,
JANTXV, and JANS

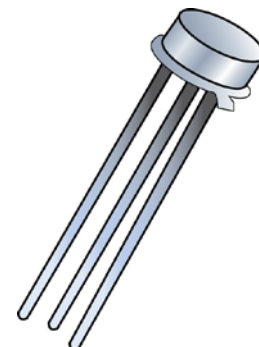
DESCRIPTION

This 2N3057A NPN leaded silicon transistor device is military qualified for high-reliability applications. Microsemi also offers numerous other transistor products to meet higher and lower power ratings with various switching speed requirements in both through-hole and surface-mount packages.

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

FEATURES


- JEDEC registered 2N3057 number.
- JAN, JANTX, JANTXV and JANS qualifications are available per MIL-PRF-19500/391.
- Rad hard levels are also available per MIL-PRF-19500/391.
(For RHA datasheet see [JANS D2N3057A](#).)
- RoHS compliant by design.



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

Also available in:

TO-39 (TO-205AD)
(short-leaded)
 [2N3019S](#)

TO-5 package
(long-leaded)
 [2N3019](#)

TO-18 (TO-206AA)
(leaded)
 [2N3700](#)

UB package
(surface mount)
 [2N3700UB](#)

APPLICATIONS / BENEFITS

- Low profile metal TO-46 leaded package.
- Light weight.
- General-purpose switching and amplifier applications.
- Military and high-reliability applications.

MAXIMUM RATINGS @ $T_A = +25^\circ\text{C}$ unless otherwise noted.

| Parameters/Test Conditions | Symbol | Value | Unit |
|---------------------------------------|--|-------------|--------------------|
| Junction and Storage Temperature | T_J and T_{STG} | -65 to +200 | $^\circ\text{C}$ |
| Thermal Impedance Junction-to-Ambient | $R_{\theta JA}$ | 325 | $^\circ\text{C/W}$ |
| Thermal Impedance Junction-to-Case | $R_{\theta JC}$ | 80 | $^\circ\text{C/W}$ |
| Collector-Emitter Voltage | V_{CEO} | 80 | V |
| Collector-Base Voltage | V_{CBO} | 140 | V |
| Emitter-Base Voltage | V_{EBO} | 7.0 | V |
| Collector Current | I_C | 1.0 | A |
| Total Power Dissipation: | P_D | 0.5 | W |
| | @ $T_A = +25^\circ\text{C}$ ⁽¹⁾ | 1.8 | |
| | @ $T_C = +25^\circ\text{C}$ ⁽²⁾ | | |

- Notes:**
1. Derate linearly 2.3 mW/ $^\circ\text{C}$ for $T_A \geq +25^\circ\text{C}$.
 2. Derate linearly 10.3 mW/ $^\circ\text{C}$ for $T_C \geq +25^\circ\text{C}$.

MSC – Lawrence

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

MSC – Ireland

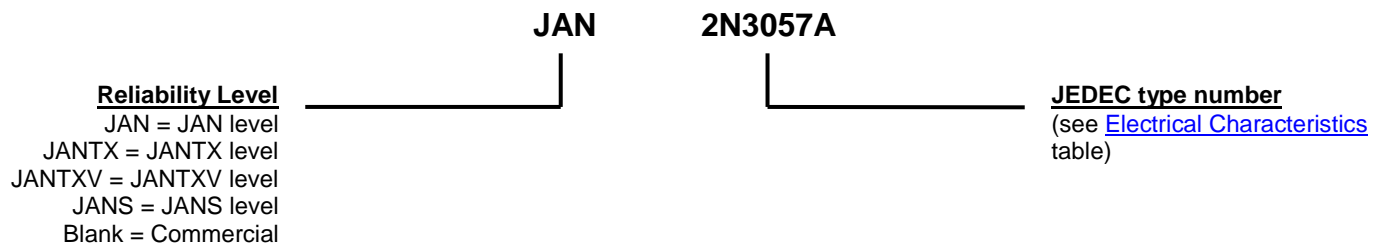
Gort Road Business Park,
Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044
Fax: +353 (0) 65 6822298

Website:

www.microsemi.com

MECHANICAL and PACKAGING

- CASE: Low profile nickel cap.
- TERMINALS: Gold over nickel plated kovar leads. Solder dip (Sn63/Pb37) available upon request. NOTE: Solder dip will eliminate RoHS compliance.
- MARKING: Part number, date code, manufacturer's ID and serial number.
- WEIGHT: Approximately 0.234 grams.
- See [Package Dimensions](#) on last page.

PART NOMENCLATURE

SYMBOLS & DEFINITIONS

| Symbol | Definition |
|-----------------|-----------------------------------|
| f | Frequency |
| I _B | Base current (dc) |
| I _E | Emitter current (dc) |
| T _A | Ambient temperature |
| T _C | Case temperature |
| V _{CB} | Collector to base voltage (dc) |
| V _{CE} | Collector to emitter voltage (dc) |
| V _{EB} | Emitter to base voltage (dc) |

ELECTRICAL CHARACTERISTICS @ $T_A = +25\text{ }^\circ\text{C}$, unless otherwise noted

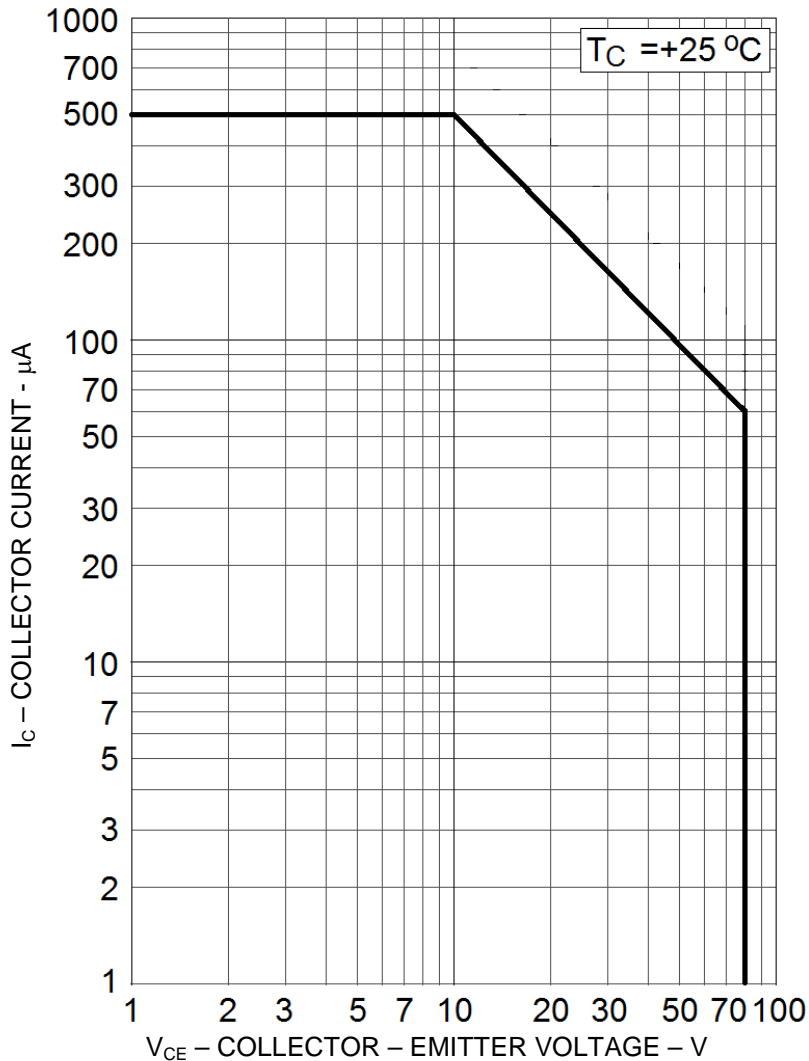
| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|---------------|-----------------------------|-------------------|----------------|
| OFF CHARACTERISTICS | | | | |
| Collector-Emitter Breakdown Current $I_C = 30\text{ mA}$ | $V_{(BR)CEO}$ | 80 | | V |
| Collector-Base Cutoff Current $V_{CB} = 140\text{ V}$ | I_{CBO} | | 10 | μA |
| Emitter-Base Cutoff Current $V_{EB} = 7\text{ V}$ | I_{EBO1} | | 10 | μA |
| Collector-Emitter Cutoff Current $V_{CE} = 90\text{ V}$ | I_{CES} | | 10 | ηA |
| Emitter-Base Cutoff Current $V_{EB} = 5.0\text{ V}$ | I_{EBO2} | | 10 | ηA |
| ON CHARACTERISTICS | | | | |
| Forward-Current Transfer Ratio $I_C = 150\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 0.1\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 10\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 500\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 1.0\text{ A}, V_{CE} = 10\text{ V}$ | h_{FE} | 100 50 90 50 15 | 300 300 300 | |
| Collector-Emitter Saturation Voltage $I_C = 150\text{ mA}, I_B = 15\text{ mA}$ $I_C = 500\text{ mA}, I_B = 50\text{ mA}$ | $V_{CE(sat)}$ | | 0.2 0.5 | V |
| Base-Emitter Saturation Voltage $I_C = 150\text{ mA}, I_B = 15\text{ mA}$ | $V_{BE(sat)}$ | | 1.1 | V |

DYNAMIC CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|------------|------|------|------|
| Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0\text{ mA}, V_{CE} = 5.0\text{ V}, f = 1.0\text{ kHz}$ | h_{fe} | 80 | 400 | |
| Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 50\text{ mA}, V_{CE} = 10\text{ V}, f = 20\text{ MHz}$ | $ h_{fe} $ | 5.0 | 20 | |
| Output Capacitance $V_{CB} = 10\text{ V}, I_E = 0, 100\text{ kHz} \leq f \leq 1.0\text{ MHz}$ | C_{obo} | | 12 | pF |
| Input Capacitance $V_{EB} = 0.5\text{ V}, I_C = 0, 100\text{ kHz} \leq f \leq 1.0\text{ MHz}$ | C_{ibo} | | 60 | pF |

ELECTRICAL CHARACTERISTICS @ $T_A = +25\text{ }^\circ\text{C}$, unless otherwise noted (continued)
SAFE OPERATION AREA (See SOA graph below and [MIL-STD-750, method 3053](#))

DC Tests
 $T_C = 25\text{ }^\circ\text{C}$, 1 cycle, $t = 10\text{ ms}$
Test 1 $V_{CE} = 10\text{ V}$
 $I_C = 180\text{ mA}$
Test 2 $V_{CE} = 40\text{ V}$
 $I_C = 45\text{ mA}$
Test 3 $V_{CE} = 80\text{ V}$
 $I_C = 22.5\text{ mA}$

(1) Pulse Test: Pulse Width = $300\text{ }\mu\text{s}$, duty cycle $\leq 2.0\%$.

Maximum Safe Operating Area

GRAPHS

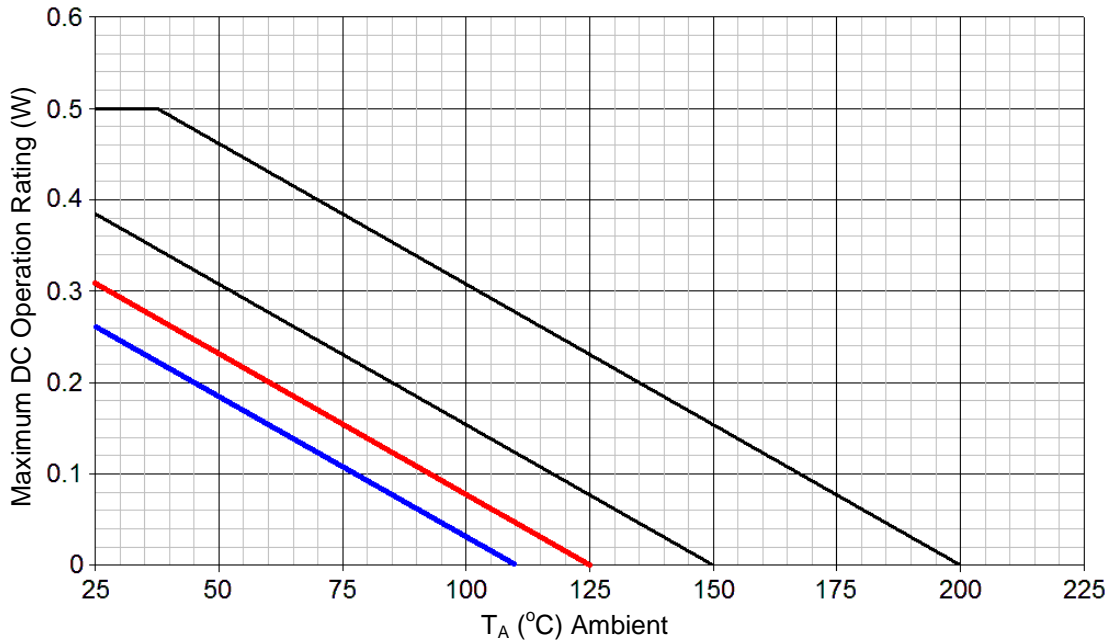


FIGURE 1
Temperature-Power Derating (R_{θJA})
 Leads = .125 inch (3.175mm)

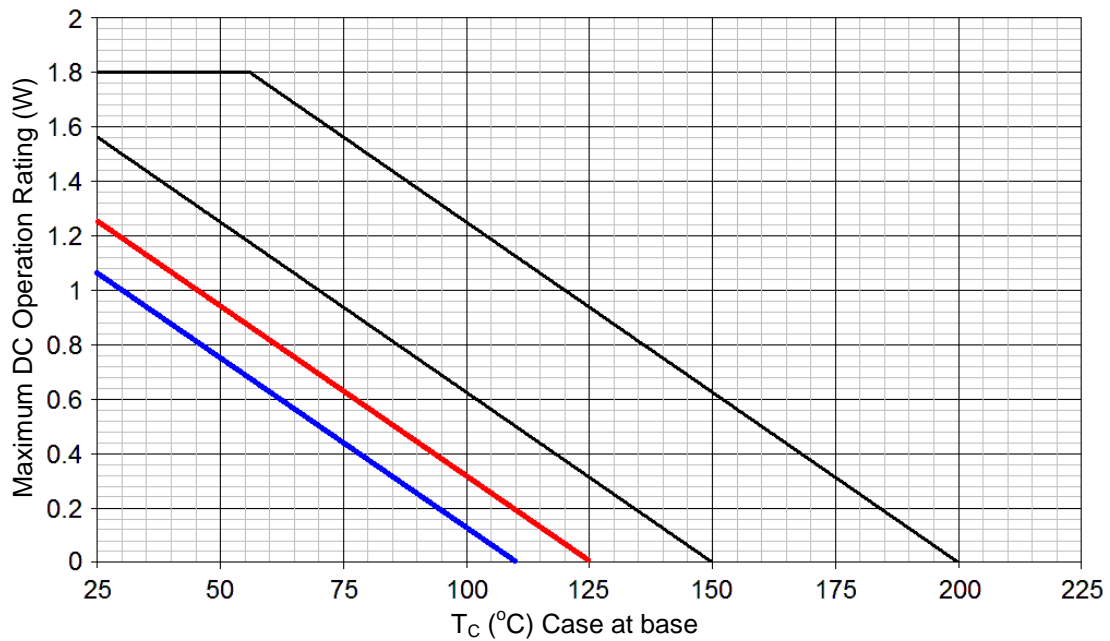


FIGURE 2
Temperature-Power Derating (R_{θJC})