

NPN-SWITCHING SILICON TRANSISTOR

Qualified per MIL-PRF-19500/251

DEVICES

| | |
|-----------------|-----------------|
| 2N2218 | 2N2219 |
| 2N2218A | 2N2219A |
| 2N2218AL | 2N2219AL |

LEVELS

JAN
JANTX
JANTXV
JANS *

* Also available in Radiation Hardened versions. See datasheet for JANSR2N2218 & JANSR2N2219

ABSOLUTE MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

| Parameters / Test Conditions | Symbol | 2N2218 2N2219 | 2N221A; L 2N2219A; L | Unit |
|--|-------------------|-----------------------------|-------------------------|------------------|
| Collector-Emitter Voltage | V_{CEO} | 30 | 50 | Vdc |
| Collector-Base Voltage | V_{CBO} | 60 | 75 | Vdc |
| Emitter-Base Voltage | V_{EBO} | 5.0 | 6.0 | Vdc |
| Collector Current | I_C | 800 | | mA |
| Total Power Dissipation | P_T | @ $T_A = +25^\circ\text{C}$ | 0.8 | W |
| | | @ $T_C = +25^\circ\text{C}$ | 3.0 | W |
| Operating & Storage Junction Temp. Range | T_{op}, T_{stg} | -55 to +200 | | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Value | Unit |
|--------------------------------------|-----------------|-------|---------------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 59 | $^\circ\text{C}/\text{W}$ |

Note: (1) Derate linearly 4.6mW/ $^\circ\text{C}$ above $T_A > +25^\circ\text{C}$
 (2) Derate linearly 17.0mW/ $^\circ\text{C}$ above $T_C > +25^\circ\text{C}$

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

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|--|---------------|------|------|----------------|
| OFF CHARACTERISTICS | | | | |
| Collector-Emitter Breakdown Voltage $I_E = 10\text{mA}$ | $V_{(BR)CEO}$ | 30 | 50 | Vdc |
| 2N2218; 2N2219 2N2218A; 2N2219A / AL | | | | |
| Emitter-Base Cutoff Current $V_{EB} = 5.0\text{Vdc}$ | I_{EBO} | | 10 | μA |
| $V_{EB} = 6.0\text{Vdc}$ | | | 10 | ηA |
| $V_{EB} = 4.0\text{Vdc}$ | | | 10 | |
| Collector-Base Cutoff Current $V_{CE} = 30\text{Vdc}$ | I_{CES} | | 10 | ηA |
| $V_{CE} = 50\text{Vdc}$ | | | 10 | |



TO-39 (TO-205AD)
 2N2218, 2N2218A
 2N2219, 2N2219A



TO-5
 2N2218AL
 2N2219AL

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise noted) (Con't)

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|--|-----------------------|------|------|------------------|
| Collector-Base Cutoff Current | | | | |
| $V_{CB} = 50\text{Vdc}$ | 2N2218; 2N2219 | | 10 | ηAdc |
| $V_{CB} = 60\text{Vdc}$ | 2N2218; 2N2219 | | 10 | μAdc |
| $V_{CB} = 60\text{Vdc}$ | 2N2218A; 2N2219A / AL | | 10 | ηAdc |
| $V_{CB} = 75\text{Vdc}$ | 2N2218A; 2N2219A / AL | | 10 | μAdc |
| ON CHARACTERISTICS (3) | | | | |
| Forward-Current Transfer Ratio | | | | |
| $I_C = 0.1\text{mA}$, $V_{CE} = 10\text{Vdc}$ | 2N2218 | 20 | | |
| | 2N2219 | 35 | | |
| | 2N2218A; 2N2218AL | 30 | | |
| | 2N2219A; 2N2219AL | 50 | | |
| $I_C = 1.0\text{mA}$, $V_{CE} = 10\text{Vdc}$ | 2N2218 | 25 | 150 | |
| | 2N2219 | 50 | 325 | |
| | 2N2218A; 2N2218AL | 35 | 150 | |
| | 2N2219A; 2N2219AL | 75 | 325 | |
| $I_C = 10\text{mA}$, $V_{CE} = 10\text{Vdc}$ | 2N2218 | 35 | | |
| | 2N2219 | 75 | | |
| | 2N2218A; 2N2218AL | 40 | | |
| | 2N2219A; 2N2219AL | 100 | | |
| $I_C = 150\text{mA}$, $V_{CE} = 10\text{Vdc}$ | 2N2218; A; AL | 40 | 120 | |
| | 2N2219; A; AL | 100 | 300 | |
| $I_C = 500\text{mA}$, $V_{CE} = 10\text{Vdc}$ | 2N2218; A; AL | 20 | | |
| | 2N2219; A; AL | 30 | | |
| Collector-Emitter Saturation Voltage | | | | |
| $I_C = 150\text{mA}$, $I_B = 15\text{mA}$ | 2N2218; 2N2219 | | 0.4 | |
| | 2N2218A; 2N2219A / AL | | 0.3 | Vdc |
| $I_C = 500\text{mA}$, $I_B = 50\text{mA}$ | 2N2218; 2N2219 | | 1.6 | |
| | 2N2218A; 2N2219A / AL | | 1.0 | |
| Base-Emitter Saturation Voltage | | | | |
| $I_C = 150\text{mA}$, $I_B = 15\text{mA}$ | 2N2218; 2N2219 | 0.6 | 1.3 | |
| | 2N2218A; 2N2219A / AL | 0.6 | 1.2 | Vdc |
| $I_C = 500\text{mA}$, $I_B = 50\text{mA}$ | 2N2218; 2N2219 | | 2.6 | |
| | 2N2218A; 2N2219A / AL | | 2.0 | |

DYNAMIC CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|------------|-------------|------|------|
| Magnitude of Small-Signal Forward Current Transfer Ratio $I_C = 20\text{mA}$, $V_{CE} = 20\text{V}$, $f = 100\text{MHz}$ | $ h_{fe} $ | 2.5 | 12 | |
| Small-Signal Forward Current Transfer Ratio $I_C = 1.0\text{mA}$, $V_{CE} = 10\text{V}$, $f = 1.0\text{kHz}$ | h_{fe} | 2N2218 | 25 | |
| | | 2N2219 | 50 | |
| | | 2N2218A, AL | 35 | |
| | | 2N2219A, AL | 75 | |
| Output Capacitance $V_{CB} = 10\text{V}$, $I_E = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$ | C_{obo} | | 8.0 | pF |
| Input Capacitance $V_{EB} = 0.5\text{V}$, $I_C = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$ | C_{ibo} | | 25 | pF |

SWITCHING CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|-----------|-----------------------|------|----------------|
| $V_{CC} = 30\text{V}$; $I_C = 150\text{mA}$; $I_{B1} = 15\text{mA}$ | | | | |
| Turn-On Time (See Figure 3 of MIL-PRF-19500/251) | t_{on} | 2N2218, 2N2219 | 40 | ηs |
| | | 2N2218A, 2N2219A / AL | 35 | |
| Turn-Off Time (See Figure 4 of MIL-PRF-19500/251) | t_{off} | 2N2218, 2N2219 | 250 | ηs |
| | | 2N2218A, 2N2219A / AL | 300 | |

(3) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$.

PACKAGE DIMENSIONS



| Symbol | Dimensions | | | | Notes |
|----------------|-------------|------|-------------|------|-------|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| CD | .305 | .335 | 7.75 | 8.51 | |
| CH | .240 | .260 | 6.10 | 6.60 | |
| HD | .335 | .370 | 8.51 | 9.40 | |
| LC | .200 TP | | 5.08 TP | | 7 |
| LD | .016 | .019 | 0.41 | 0.48 | 8, 9 |
| LL | See note 14 | | | | |
| LU | .016 | .019 | 0.41 | 0.48 | 8, 9 |
| L ₁ | | .050 | | 1.27 | 8, 9 |
| L ₂ | .250 | | 6.35 | | 8, 9 |
| P | .100 | | 2.54 | | 7 |
| Q | | .030 | | 0.76 | 5 |
| TL | .029 | .045 | 0.74 | 1.14 | 3, 4 |
| TW | .028 | .034 | 0.71 | 0.86 | 3 |
| r | | .010 | | 0.25 | 10 |
| α | 45° TP | | 45° TP | | 7 |

NOTES:

- Dimensions are in inches.
- Millimeters are given for general information only.
- Beyond r (radius) maximum, TW shall be held for a minimum length of .011 (0.28 mm).
- Dimension TL measured from maximum HD.
- Body contour optional within zone defined by HD, CD, and Q.
- CD shall not vary more than .010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
- Leads at gauge plane .054 +.001 -.000 inch (1.37 +0.03 -0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC.
- Dimension LU applies between L1 and L2. Dimension LD applies between L2 and LL minimum. Diameter is uncontrolled in L1 and beyond LL minimum.
- All three leads.
- The collector shall be internally connected to the case.
- Dimension r (radius) applies to both inside corners of tab.
- In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.
- Lead 1 = emitter, lead 2 = base, lead 3 = collector.
- For L suffix devices (TO-5), dimension LL = 1.5 inches (38.10 mm) min. and 1.75 inches (44.45 mm) max. For non-L suffix types (TO-39), dimension LL = .5 inch (12.70 mm) min. and .750 inch (19.05 mm) max.

FIGURE 1. Physical dimensions (similar to TO-39, TO-5).



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- Техническая поддержка проекта;
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