

NPN SWITCHING SILICON TRANSISTOR

Qualified per MIL-PRF-19500/251

Devices

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

Qualified Level

JAN
JANTX
JANTXV
JANS

MAXIMUM RATINGS

| Ratings | Symbol | 2N2218 2N2219 | 2N2218A; 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 | | mAdc |
| Total Power Dissipation | P_T | @ $T_A = +25^{\circ}\text{C}^{(1)}$ | 0.8 | W |
| | | @ $T_C = +25^{\circ}\text{C}^{(2)}$ | 3.0 | W |
| Operating & Storage Junction Temp. Range | T_{op}, T_{stg} | -55 to +200 | | $^{\circ}\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristics | Symbol | Max. | Unit |
|--------------------------------------|-----------------|------|-----------------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 59 | $^{\circ}\text{C}/\text{W}$ |

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



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



TO-5*
2N2218AL,
2N2219AL

*See appendix A for package outline

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

| Characteristics | Symbol | Min. | Max. | Unit |
|-----------------|--------|------|------|------|
|-----------------|--------|------|------|------|

OFF CHARACTERISTICS

| | | | | |
|---|---|---------------|----------------|-------------------------------------|
| Collector-Emitter Breakdown Voltage $I_E = 10 \text{ mAdc}$ | 2N2218; 2N2219 2N2218A; L; 2N2219A; L | $V_{(BR)CEO}$ | 30 50 | Vdc |
| Emitter-Base Cutoff Current $V_{EB} = 5.0 \text{ Vdc}$ $V_{EB} = 6.0 \text{ Vdc}$ $V_{EB} = 4.0 \text{ Vdc}$ | 2N2218; 2N2219 2N2218A; L; 2N2219A; L All Types | I_{EBO} | 10 10 10 | μAdc ηAdc |
| Collector-Base Cutoff Current $V_{CE} = 30 \text{ Vdc}$ $V_{CE} = 50 \text{ Vdc}$ | 2N2218; 2N2219 2N2218A; L; 2N2219A; L | I_{CES} | 10 10 | ηAdc |

2N2218; A; AL; 2N2219; A; AL JAN SERIES

ELECTRICAL CHARACTERISTICS (con't)

| Characteristics | Symbol | Min. | Max. | Unit |
|---|-----------|------|------|------------|
| Collector-Base Cutoff Current | | | | |
| $V_{CB} = 50$ Vdc 2N2218; 2N2219 | I_{CBO} | | 10 | η Adc |
| $V_{CB} = 60$ Vdc 2N2218A; L; 2N2219A; L | | | 10 | |
| $V_{CB} = 60$ Vdc 2N2218; 2N2219 | | | 10 | μ Adc |
| $V_{CB} = 75$ Vdc 2N2218A; L; 2N2219A; L | | | 10 | |

ON CHARACTERISTICS (3)

| | | | | | |
|---|---------------|---------------|-------------------|------------|-----|
| Forward-Current Transfer Ratio | | | | | |
| $I_C = 0.1$ mAdc, $V_{CE} = 10$ Vdc 2N2218 2N2219 | h_{FE} | | 20 35 | | |
| $I_C = 1.0$ mAdc, $V_{CE} = 10$ Vdc 2N2218A; 2N2218AL 2N2219A; 2N2219AL | | | 30 50 | | |
| | | | 25 50 | 150 325 | |
| $I_C = 10$ mAdc, $V_{CE} = 10$ Vdc 2N2218 2N2219 | | | 35 75 | 150 325 | |
| | | | 35 75 | | |
| $I_C = 150$ mAdc, $V_{CE} = 10$ Vdc 2N2218A; 2N2218AL 2N2219A; 2N2219AL | | | 40 100 | | |
| | | | 40 100 | 120 300 | |
| $I_C = 500$ mAdc, $V_{CE} = 10$ Vdc 2N2218; A; 2N2218AL 2N2219; A; 2N2219AL | | | 20 30 | | |
| | | | 20 30 | | |
| Collector-Emitter Saturation Voltage | | | | | |
| $I_C = 150$ mAdc, $I_B = 15$ mAdc 2N2218; 2N2219 | | $V_{CE(sat)}$ | | 0.4 0.3 | Vdc |
| $I_C = 500$ mAdc, $I_B = 50$ mAdc 2N2218A; L; 2N2219A; L | | | | 1.6 1.0 | |
| Base-Emitter Saturation Voltage | | | | | |
| $I_C = 150$ mAdc, $I_B = 15$ mAdc 2N2218; 2N2219 | $V_{BE(sat)}$ | | 0.6 0.6 | Vdc | |
| $I_C = 500$ mAdc, $I_B = 50$ mAdc 2N2218A; L; 2N2219A, L | | | 1.2 2.6 2.0 | | |

DYNAMIC CHARACTERISTICS

| | | | | |
|---|------------|--------|-----|----|
| Magnitude of Small-Signal Forward Current Transfer Ratio $I_C = 20$ mAdc, $V_{CE} = 20$ Vdc, $f = 100$ MHz | $ h_{fe} $ | 2.5 | 12 | |
| Small-Signal Forward Current Transfer Ratio $I_C = 1.0$ mAdc, $V_{CE} = 10$ Vdc, $f = 1.0$ kHz | h_{fe} | 2N2218 | 25 | |
| 2N2219 | | 50 | | |
| 2N2218A, L | | 35 | | |
| 2N2219A, L | | 75 | | |
| Output Capacitance $V_{CB} = 10$ Vdc, $I_E = 0$, 100 kHz $\leq f \leq 1.0$ MHz | C_{obo} | | 8.0 | pF |
| Input Capacitance $V_{EB} = 0.5$ Vdc, $I_C = 0$, 100 kHz $\leq f \leq 1.0$ MHz | C_{ibo} | | 25 | pF |

SWITCHING CHARACTERISTICS

$V_{CC} = 30$ Vdc; $I_C = 150$ mAdc; $I_{B1} = 15$ mAdc

| | | | | |
|--|--|-----------|------------|----------|
| Turn-On Time (See Figure 3 of MIL-PRF-19500/251) | 2N2218, 2N2219 2N2218A, L, 2N2219A, L | t_{on} | 40 35 | η s |
| Turn-Off Time (See Figure 4 of MIL-PRF-19500/251) | 2N2218, 2N2219 2N2218A, L, 2N2219A, L | t_{off} | 250 300 | η s |

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