# NPN Meduim Power Silicon Transistor 2N3418, 2N3419, 2N3420 & 2N3421 2N34185, 2N34195, 2N34205 & 2N34215

### **Features**

- Available in JAN, JANTX and JANTXV per MIL-PRF-19500/393
- TO-5, TO-39 (TO-205AD) Package



A passion for performance.

## **Maximum Ratings**

| Ratings  | Symbol                             | 2N3418, S<br>2N3420, S | 2N3419, S<br>2N3421, S | Units |
|--|------------------------------------|------------------------|------------------------|-------|
| Collector - Emitter Voltage                      | V <sub>CEO</sub>                   | 60                     | 80                     | Vdc   |
| Collector - Base Voltage                         | V <sub>CBO</sub>                   | 85 125                 |                        | Vdc   |
| Emitter - Base Voltage                           | V <sub>EBO</sub>                   | 8.0                    |                        | Vdc   |
| Collector Current                                | IС                                 | 3.0                    |                        | Adc   |
| $T_P \le 1.0$ ms, duty cycle $\le 50\%$          |                                    | 5                      |                        |       |
| Total Power Dissipation @ $T_A = +25 \text{ °C}$ | PT                                 | 1.0                    |                        | W     |
| @ T <sub>C</sub> = +100 °C                       |                                    | 10.0                   |                        | W     |
| Operating & Storage Temperature Range            | T <sub>op</sub> , T <sub>stg</sub> | -65 to                 | °C                     |       |

## **Electrical Characteristics**

| <b>OFF</b> Characteristics  |  | Symbol               | Mimimum  | Maximum     | Units |
|---|--|----------------------|----------|-------------|-------|
| Collector - Emitter Breakdown Voltag<br>I <sub>C</sub> = 50 mAdc  | ge<br>2N3418, S, 2N3420, S<br>2N3419, S, 2N3421, S | V <sub>(BR)CEO</sub> | 60<br>80 |             | Vdc   |
| $\begin{array}{l} \mbox{Collector - Emitter Cutoff Current} \\ \mbox{V}_{CE} = 80 \mbox{ Vdc}, \mbox{V}_{BE} = -0.5 \mbox{ Vdc} \\ \mbox{V}_{CE} = 120 \mbox{ Vdc}, \mbox{V}_{BE} = -0.5 \mbox{ Vdc} \end{array}$ | 2N3418, S, 2N3420, S<br>2N3419, S, 2N3421, S       | ICEX                 |          | 0.3<br>0.3  | μAdc  |
| Collector - Emitter Cutoff Current<br>$V_{CE} = 45 \text{ Vdc}$<br>$V_{CE} = 60 \text{ Vdc}$  | 2N3418, S, 2N3420, S<br>2N3419, S, 2N3421, S       | ICEO                 |          | 5.0<br>5.0  | μAdc  |
| Emitter - Base Cutoff Current<br>$V_{EB} = 6.0 \text{ Vdc}, I_C = 0$<br>$V_{EB} = 8.0 \text{ Vdc}, I_C = 0$   |  | I <sub>EBO</sub>     |          | 0.5<br>10.0 | μAdc  |





#### **Electrical Characteristics -con't**

|  | (1)   |                            |                      |         |         |      |  |
|--|---|----------------------------|----------------------|---------|---------|------|--|
| ON Characteristics <sup>(1)</sup><br>Forward Current Transfer Ratio                              |   |                            | Symbol               | Minimum | Maximum | Unit |  |
|  | Adc, V <sub>CF</sub> = 2.0 Vdc                            | 2N3418, S, 2N3419, S       |                      | 20      |         |      |  |
|  |   | 2N3420, S, 2N3421, S       |                      | 40      |         |      |  |
| $I_{\rm C} = 1.0  {\rm Ad}$  | lc, V <sub>CF</sub> = 2.0 Vdc                             | 2N3418, S, 2N3419, S       |                      | 20      | 60      |      |  |
| C  | 0L  | 2N3420, S, 2N3421, S       | H <sub>FE</sub>      | 40      | 120     |      |  |
| $I_{\rm C} = 2.0  {\rm Ac}$  | $lc, V_{CF} = 2.0 V dc$                                   | 2N3418, S, 2N3419, S       |                      | 15      |         |      |  |
| C  | 0L  | 2N3420, S, 2N3421, S       |                      | 30      |         |      |  |
| $I_{\rm C} = 5.0  {\rm Ac}$  | dc, $V_{CE} = 5.0 \text{ Vdc}$                            | 2N3418, S, 2N3419, S       |                      | 10      |         |      |  |
|  |   | 2N3420, S, 2N3421, S       |                      | 15      |         |      |  |
| Base - Emitter   |   |                            | V <sub>BE(sat)</sub> |         |         |      |  |
| 0  | $I_{\rm C} = 1.0$ Adc, $I_{\rm B} = 0.1$ Adc              |                            |                      | 0.6     | 1.2     | Vdc  |  |
| -  | dc, $I_{B} = 0.2 \text{ Adc}$                             |                            |                      | 0.7     | 1.4     |      |  |
|  | itter Saturation Voltage<br>Adc, I <sub>B</sub> = 25 mAdc |                            | Vor                  |         | 0.25    | Vdc  |  |
| $l_{\rm C} = 500  {\rm m}$   | Adc, $I_B = 50 \text{ mAdc}$                              |                            | V <sub>CE(on)</sub>  |         | 0.25    | vuc  |  |
| DYNAMIC C  | Characteristics   |                            | I                    | 1       | I       |      |  |
| Magnitude of   | Common Emitter Smal                                       | -Signal Short-Circuit      |                      |         |         |      |  |
| Forward Curre  | ent Transfer Ratio  | 5                          |                      |         |         |      |  |
| $I_{C} = 0.1 \text{ Adc}, V_{CE} = 10.0 \text{ Vdc}, f = 20 \text{ MHz}$                         |   | h <sub>fe</sub>            | 1.3                  | 8.0     |         |      |  |
| Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \le f \le 1.0 \text{ MHz}$ |   | C <sub>obo</sub>           |                      | 150     | pF      |      |  |
| Switching C  | Characteristics   |                            |                      | •       |         |      |  |
| Delay Time   | $V_{BE(off)} = -3.7 Vdc$                                  |                            | t <sub>d</sub>       |         | 0.08    | μs   |  |
| Rise Time  | $I_{\rm C} = 1.0$ Adc, $I_{\rm B2} = 100$ mAdc            |                            | t <sub>r</sub>       |         | 0.22    | μs   |  |
| Storage Time   | $V_{BE(off)} = -3.7  Vdc$                                 |                            | ts                   |         | 1.10    | μs   |  |
| Fall Time  | $I_{\rm C} = 1.0$ Adc, $I_{\rm B2} = -100$ mAdc           |                            | <sup>t</sup> f       |         | 0.20    | μs   |  |
| SAFE OPERA   | TING AREA   |                            | -                    | •       | -       |      |  |
| DC Tests:  | $T_{\rm C} = 100$   | ) °C, 1 Cycle, t = 1.0 s s |                      |         |         |      |  |
| Test 1:  | $V_{CE} = 5.0 \text{ Vdc}, I_{C} = 3.0 \text{ Adc}$       |                            |                      |         |         |      |  |
| Test 2:  | $V_{CE} = 37 \text{ Vdc}, I_{C} = 0.4 \text{ Adc}$        |                            |                      |         |         |      |  |
| <b>Test 3:</b> $V_{CE} = 60 \text{ Vdc}, I_C = 0.185 \text{ mAdc} 2N3418, S; 2N3420, S$          |   |                            |                      |         |         |      |  |
| $V_{CE} = 80 \text{ Vdc}, I_C = 0.12 \text{ mAdc}$ 2N3419, S; 2N3421, S                          |   |                            |                      |         |         |      |  |
|  |   | -                          |                      |         |         |      |  |



#### **Outline Drawing**



NOTE: Dimensions in Inches [mm]

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