



Solid State Devices Incorporated
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2N5303, SPT5303

200 WATT

NPN SILICON

POWER TRANSISTOR

X00256

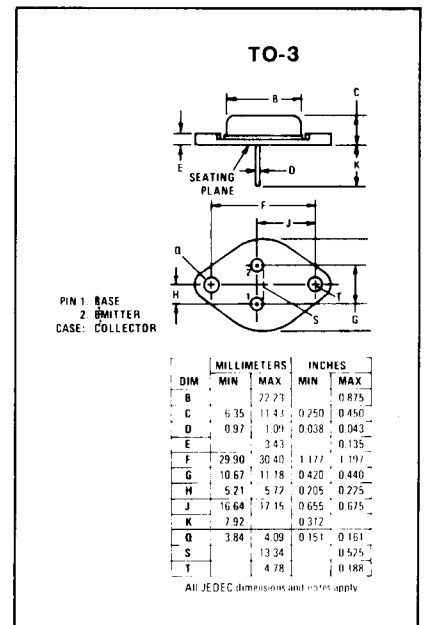
- FEATURES**
- HFE 15–60 @ 10 Amps
 - VCE (sat) 2.0 V @ 20 Amps
 - Fast Switching 1 μ sec Rise Time
 - Excellent Safe Operating Area

MAXIMUM RATINGS

| Rating | Symbol | 2N5303 | SPT5303 | Unit |
|--|----------------|-------------|---------|---------------------|
| Collector-Emitter Voltage | V_{CE0} | 80 | 100 | Vdc |
| Collector-Base Voltage | V_{CB} | 80 | 100 | Vdc |
| Emitter-Base Voltage | V_{EB} | 5 | 5 | Vdc |
| Collector Current – Continuous | I_C | 20 | | Adc |
| Base Current | I_B | 7.5 | | Adc |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 200 | | Watts |
| | | 1.14 | | W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -65 to +200 | | $^\circ\text{C}$ |

PHYSICAL DIMENSIONS

In accordance with JEDEC (TO-3) outline



THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max. | Unit |
|--------------------------------------|---------------|------|---------------------------|
| Thermal Resistance, Junction to Case | θ_{JC} | .875 | $^\circ\text{C}/\text{W}$ |

ELECTRICAL CHARACTERISTICS

| Characteristic | Fig. No. | Symbol | Min | Max | Unit |
|--|--|-------------------|-----------|--------------------|------|
| OFF CHARACTERISTICS | | | | | |
| Collector-Emitter Sustaining Voltage* ($I_C = 200 \text{ mAdc}, I_B = 0$) | 2N5303 SPT5303 | $BV_{CE0(sus)}$ * | 80 100 | | Vdc |
| Collector Cutoff Current ($V_{CE} = 80 \text{ Vdc}, I_B = 0$) ($V_{CE} = 100 \text{ Vdc}, I_B = 0$) | 2N5303 SPT5303 | I_{CEO} | | 5 5 | mAdc |
| Collector Cutoff Current ($V_{CE} = 80 \text{ Vdc}, V_{EB(off)} = 1.5 \text{ Vdc}$) ($V_{CE} = 100 \text{ Vdc}, V_{EB(off)} = 1.5 \text{ Vdc}$) ($V_{CE} = 80 \text{ Vdc}, V_{EB(off)} = 1.5 \text{ Vdc}, T_C = 150^\circ\text{C}$) ($V_{CE} = 100 \text{ Vdc}, V_{EB(off)} = 1.5 \text{ Vdc}, T_C = 150^\circ\text{C}$) | 2N5303 SPT5303 2N5303 SPT5303 | I_{CEX} | | 1 1 10 10 | mAdc |
| Collector Cutoff Current ($V_{CB} = \text{Rated } V_{CB}, I_E = 0$) | All Types | I_{CBO} | | 1 | mAdc |
| Emitter Cutoff Current ($V_{BE} = 5 \text{ Vdc}, I_C = 0$) | All Types | I_{EBO} | | 5 | mAdc |

ELECTRICAL CHARACTERISTICS

| Characteristic | Fig. No. | Symbol | Min | Max | Unit |
|----------------|----------|--------|-----|-----|------|
|----------------|----------|--------|-----|-----|------|

ON CHARACTERISTICS

| | | | | | |
|---|-----------|-----------------|----|-----|-----|
| DC Current Gain* $(I_C = 1000 \text{ mAdc}, V_{CE} = 2 \text{ Vdc})$ $(I_C = 10 \text{ Adc}, V_{CE} = 2 \text{ Vdc})$ $(I_C = 20 \text{ Adc}, V_{CE} = 4 \text{ Vdc})$ | All Types | h_{FE}^* | 40 | 60 | |
| Collector-Emitter Saturation Voltage* $(I_C = 10 \text{ Adc}, I_B = 1 \text{ Adc})$ $(I_C = 20 \text{ Adc}, I_B = 2 \text{ Adc})$ | All Types | $V_{CE(Sat)}^*$ | | 1 | Vdc |
| Base-Emitter Saturation Voltage* $(I_C = 10 \text{ Adc}, I_B = 1 \text{ Adc})$ $(I_C = 20 \text{ Adc}, I_B = 2 \text{ Adc})$ | All Types | $V_{BE(Sat)}^*$ | | 1.7 | Vdc |

DYNAMIC CHARACTERISTICS

| | | | | | |
|---|-----------|-------|---|--|-----|
| Current-Gain-Bandwidth Product $(I_C = 1000 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1 \text{ MHz})$ | All Types | f_T | 2 | | MHz |
|---|-----------|-------|---|--|-----|

SWITCHING CHARACTERISTICS

| | | | | | | |
|--------------|---|-----------|-------|--|------|---------|
| Delay Time | $(V_{CC} = 30 \text{ Vdc}$ $I_C = 10 \text{ Adc}, I_{B1} = 1000 \text{ mAdc})$ | All Types | t_r | | 1000 | ns |
| Rise Time | | | | | | |
| Storage Time | $(V_{CC} = 30 \text{ Vdc}, I_C = 10 \text{ Adc},$ $I_{B1} = I_{B2} = 1000 \text{ mAdc})$ | All Types | t_s | | 2 | μs |
| Fall Time | | | | | | |
| | | | t_f | | 1000 | ns |

*Pulse Test: Pulse Width 300 μs , Duty Cycle = 2%

TYPICAL OPERATING CURVES

