

NSS20300MR6T1G

Product Preview

20 V, 5 A, Low $V_{CE(sat)}$ PNP Transistor

ON Semiconductor's e²PowerEdge family of low $V_{CE(sat)}$ transistors are miniature surface mount devices featuring ultra low saturation voltage ($V_{CE(sat)}$) and high current gain capability. These are designed for use in low voltage, high speed switching applications where affordable efficient energy control is important.

Typical application are DC-DC converters and power management in portable and battery powered products such as cellular and cordless phones, PDAs, computers, printers, digital cameras and MP3 players. Other applications are low voltage motor controls in mass storage products such as disc drives and tape drives. In the automotive industry they can be used in air bag deployment and in the instrument cluster. The high current gain allows e²PowerEdge devices to be driven directly from PMU's control outputs, and the Linear Gain (Beta) makes them ideal components in analog amplifiers.

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

| Rating | Symbol | Max | Unit |
|--------------------------------|-----------|----------------------------|------|
| Collector-Emitter Voltage | V_{CEO} | -20 | Vdc |
| Collector-Base Voltage | V_{CBO} | -30 | Vdc |
| Emitter-Base Voltage | V_{EBO} | -6.0 | Vdc |
| Collector Current – Continuous | I_C | -3.0 | Adc |
| Collector Current – Peak | I_{CM} | -5.0 | A |
| Electrostatic Discharge | ESD | HBM Class 3B MM Class C | |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|----------------------------------|----------------|----------------------------|
| Total Device Dissipation, $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D (Note 1) | TBD | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ (Note 1) | TBD | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D (Note 2) | TBD | W mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ (Note 2) | TBD | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Lead #1 | $R_{\theta JL}$ | TBD | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation (Single Pulse < 10 sec.) | $P_{D\text{single}}$ (Note 2) | TBD | W |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

- FR-4 @ Minimum Pad
- FR-4 @ 1.0 X 1.0 inch Pad

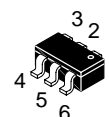
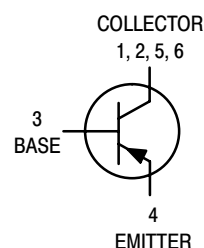
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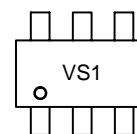
<http://onsemi.com>

20 VOLTS
5.0 AMPS
PNP LOW $V_{CE(sat)}$ TRANSISTOR
EQUIVALENT $R_{DS(on)}$ 78 m Ω



CASE 318G
TSOP
STYLE 6

DEVICE MARKING



VS1= Specific Device Code
d = Date Code

ORDERING INFORMATION

| Device | Package | Shipping† |
|----------------|---------------------|------------------|
| NSS20300MR6T1G | TSOP-6 (Pb-Free) | 3000/Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

| Characteristic | Symbol | Min | Typical | Max | Unit |
|--|---------------|------|---------|------|------------------|
| OFF CHARACTERISTICS | | | | | |
| Collector–Emitter Breakdown Voltage ($I_C = -10\text{ mA}$, $I_B = 0$) | $V_{(BR)CEO}$ | -20 | | - | Vdc |
| Collector–Base Breakdown Voltage ($I_C = -0.1\text{ mA}$, $I_E = 0$) | $V_{(BR)CBO}$ | -30 | | - | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = -0.1\text{ mA}$, $I_C = 0$) | $V_{(BR)EBO}$ | -6.0 | | - | Vdc |
| Collector Cutoff Current ($V_{CB} = -20\text{ Vdc}$, $I_E = 0$) | I_{CBO} | - | | -0.1 | μA dc |
| Collector–Emitter Cutoff Current ($V_{CES} = -20\text{ Vdc}$) | I_{CES} | - | | -0.1 | μA dc |
| Emitter Cutoff Current ($V_{EB} = -6.0\text{ Vdc}$) | I_{EBO} | - | | -0.1 | μA dc |

ON CHARACTERISTICS

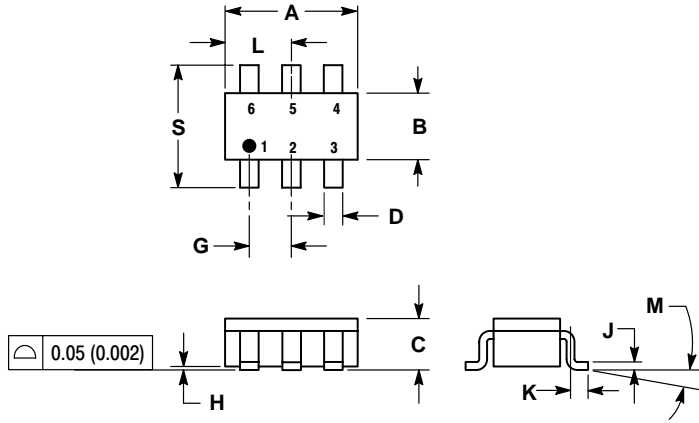
| | | | | | |
|--|---------------|-------------------|-------------|----------------------------|-----|
| DC Current Gain ⁽¹⁾ ($I_C = -1.0\text{ A}$, $V_{CE} = -1.5\text{ V}$) ($I_C = -1.5\text{ A}$, $V_{CE} = -2.0\text{ V}$) ($I_C = -2.0\text{ A}$, $V_{CE} = -2.0\text{ V}$) | h_{FE} | 100 100 100 | | - 400 - | |
| Collector–Emitter Saturation Voltage (Note 3) ($I_C = -0.10\text{ A}$, $I_B = -0.010\text{ A}$) ($I_C = -1.0\text{ A}$, $I_B = -0.010\text{ A}$) ($I_C = -2.0\text{ A}$, $I_B = -0.02\text{ A}$) | $V_{CE(sat)}$ | - - - | - - - | -0.015 -0.145 -0.320 | V |
| Base–Emitter Saturation Voltage (Note 3) ($I_C = -1\text{ A}$, $I_B = -0.010\text{ A}$) | $V_{BE(sat)}$ | - | - | -0.85 | V |
| Base–Emitter Turn–on Voltage (Note 3) ($I_C = -2.0\text{ A}$, $V_{CE} = -3.0\text{ V}$) | $V_{BE(on)}$ | - | - | -0.875 | V |
| Cutoff Frequency ($I_C = -100\text{ mA}$, $V_{CE} = -5.0\text{ V}$, $f = 100\text{ MHz}$) | f_T | 100 | - | - | MHz |
| Input Capacitance ($V_{EB} = -0.5\text{ V}$, $f = 1.0\text{ MHz}$) | C_{ibo} | - | | 650 | pF |
| Output Capacitance ($V_{CB} = -3.0\text{ V}$, $f = 1.0\text{ MHz}$) | C_{obo} | - | | 100 | pF |

3. Pulsed Condition: Pulse Width $\leq 300\ \mu\text{sec}$, Duty Cycle $\leq 2\%$

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PACKAGE DIMENSIONS

TSOP-6
CASE 318G-02
ISSUE N



NOTES:

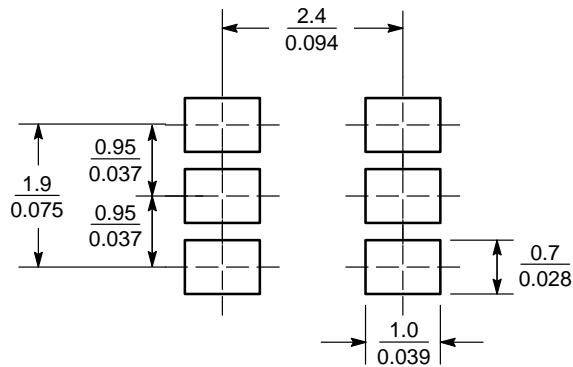
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|--------|--------|
| | MIN | MAX | MIN | MAX |
| A | 2.90 | 3.10 | 0.1142 | 0.1220 |
| B | 1.30 | 1.70 | 0.0512 | 0.0669 |
| C | 0.90 | 1.10 | 0.0354 | 0.0433 |
| D | 0.25 | 0.50 | 0.0098 | 0.0197 |
| G | 0.85 | 1.05 | 0.0335 | 0.0413 |
| H | 0.013 | 0.100 | 0.0005 | 0.0040 |
| J | 0.10 | 0.26 | 0.0040 | 0.0102 |
| K | 0.20 | 0.60 | 0.0079 | 0.0236 |
| L | 1.25 | 1.55 | 0.0493 | 0.0610 |
| M | 0 | 10 | 0 | 10 |
| S | 2.50 | 3.00 | 0.0985 | 0.1181 |

STYLE 6:

- PIN 1. COLLECTOR
- 2. COLLECTOR
- 3. BASE
- 4. EMITTER
- 5. COLLECTOR
- 6. COLLECTOR

SOLDERING FOOTPRINT*



SCALE 10:1 ($\frac{\text{mm}}{\text{inches}}$)

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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