

NSS30101LT1G

30 V, 2 A, Low $V_{CE(sat)}$ NPN 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.

- This is a Pb-Free Device

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

| Rating | Symbol | Max | Unit |
|--------------------------------|-----------|-----|------|
| Collector-Emitter Voltage | V_{CEO} | 30 | Vdc |
| Collector-Base Voltage | V_{CBO} | 50 | Vdc |
| Emitter-Base Voltage | V_{EBO} | 5.0 | Vdc |
| Collector Current – Continuous | I_C | 1.0 | A |
| Collector Current – Peak | I_{CM} | 2.0 | A |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|--------------------------|----------------|--------------------|
| Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D (Note 1) | 310 | mW |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ (Note 1) | 403 | $^\circ\text{C/W}$ |
| Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D (Note 2) | 710 | mW |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ (Note 2) | 176 | $^\circ\text{C/W}$ |
| Total Device Dissipation (Single Pulse < 10 sec.) | $P_{D\text{single}}$ | 575 | mW |
| 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.

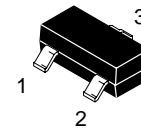
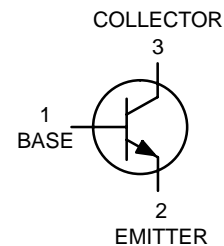
1. FR-4 @ Minimum Pad.
2. FR-4 @ 1.0 X 1.0 inch Pad.



ON Semiconductor®

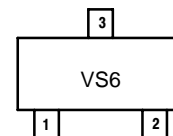
<http://onsemi.com>

**30 VOLTS
2.0 AMPS
NPN LOW $V_{CE(sat)}$ TRANSISTOR
EQUIVALENT $R_{DS(on)} 100\text{ m}\Omega$**



SOT-23 (TO-236)
CASE 318
STYLE 6

DEVICE MARKING



VS6 = Specific Device Code

ORDERING INFORMATION

| Device | Package | Shipping† |
|--------------|---------------------|------------------|
| NSS30101LT1G | SOT-23 (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 Specification Brochure, BRD8011/D.

NSS30101LT1G

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|---|----------------------|-----|-----|------|
| OFF CHARACTERISTICS | | | | |
| Collector–Emitter Breakdown Voltage (I _C = 10 mAdc, I _B = 0) | V _{(BR)CEO} | 30 | – | Vdc |
| Collector–Base Breakdown Voltage (I _C = 0.1 mAdc, I _E = 0) | V _{(BR)CBO} | 50 | – | Vdc |
| Emitter–Base Breakdown Voltage (I _E = 0.1 mAdc, I _C = 0) | V _{(BR)EBO} | 5.0 | – | Vdc |
| Collector Cutoff Current (V _{CB} = 30 Vdc, I _E = 0) | I _{CBO} | – | 0.1 | μAdc |
| Collector–Emitter Cutoff Current (V _{CES} = 30 Vdc) | I _{CES} | – | 0.1 | μAdc |
| Emitter Cutoff Current (V _{EB} = 4.0 Vdc) | I _{EBO} | – | 0.1 | μAdc |

ON CHARACTERISTICS

| | | | | |
|---|----------------------|-------------------|-------------------------|-----|
| DC Current Gain (Note 3) (I _C = 50 mA, V _{CE} = 5.0 V) (I _C = 0.5 A, V _{CE} = 5.0 V) (I _C = 1.0 A, V _{CE} = 5.0 V) | h _{FE} | 300 300 200 | – 900 – | |
| Collector–Emitter Saturation Voltage (Note 3) (I _C = 1.0 A, I _B = 100 mA) (I _C = 0.5 A, I _B = 50 mA) (I _C = 0.1 A, I _B = 1.0 mA) | V _{CE(sat)} | – – – | 0.200 0.125 0.075 | V |
| Base–Emitter Saturation Voltage (Note 3) (I _C = 1.0 A, I _B = 0.1 A) | V _{BE(sat)} | – | 1.1 | V |
| Base–Emitter Turn–on Voltage (Note 3) (I _C = 1.0 mA, V _{CE} = 2.0 V) | V _{BE(on)} | – | 1.1 | V |
| Cutoff Frequency (I _C = 100 mA, V _{CE} = 5.0 V, f = 100 MHz) | f _T | 100 | – | MHz |
| Output Capacitance (f = 1.0 MHz) | C _{obo} | – | 15 | pF |

3. Pulsed Condition: Pulse Width = 300 μsec, Duty Cycle ≤ 2%

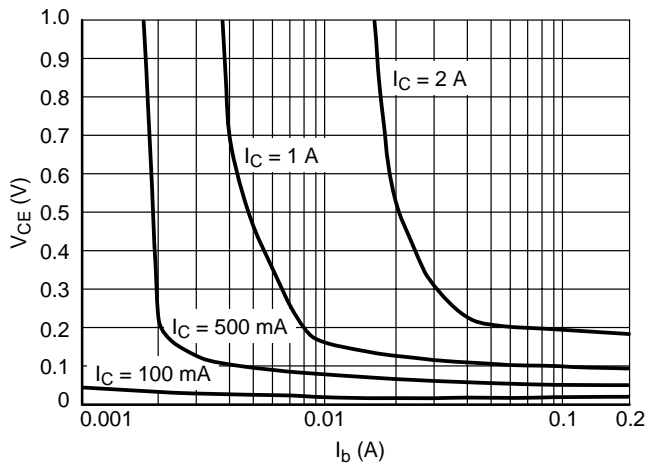


Figure 1. V_{CE} versus I_b

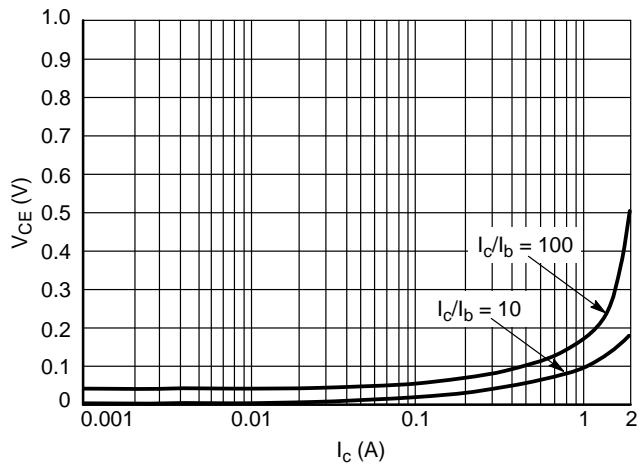


Figure 2. V_{CE} versus I_c

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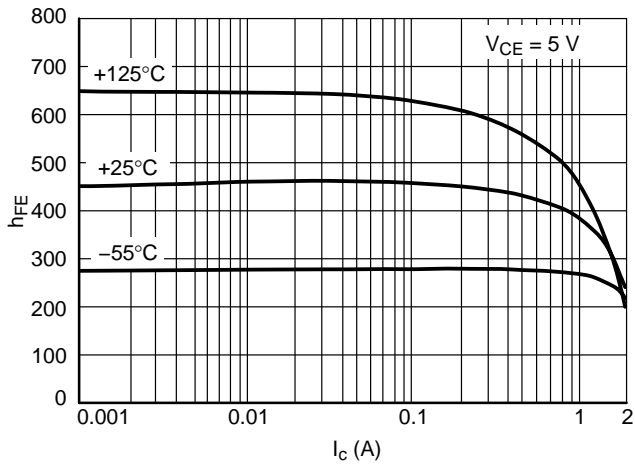


Figure 3. h_{FE} versus I_C

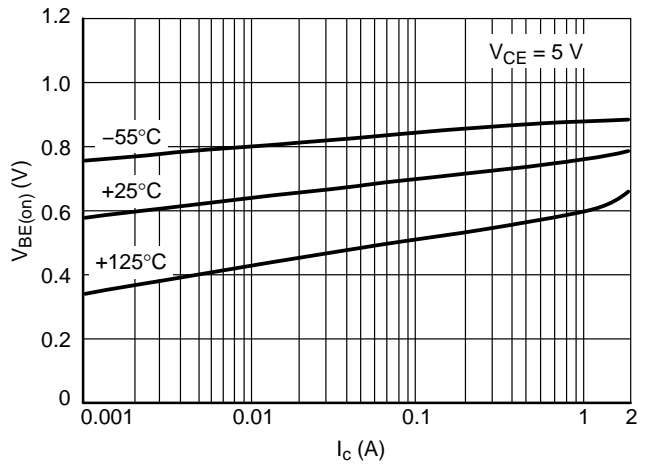


Figure 4. $V_{BE(on)}$ versus I_C

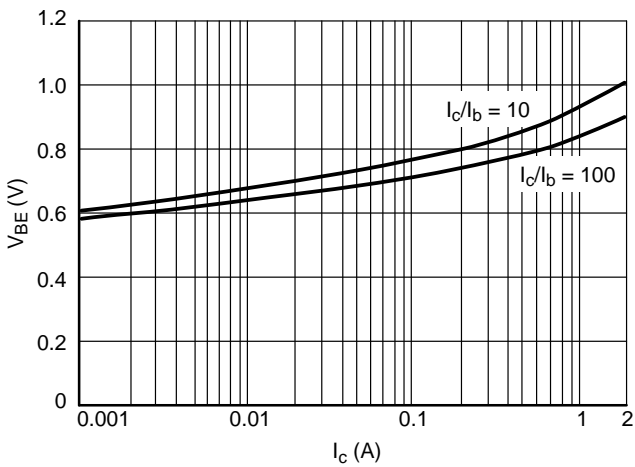


Figure 5. $V_{BE(sat)}$ versus I_C

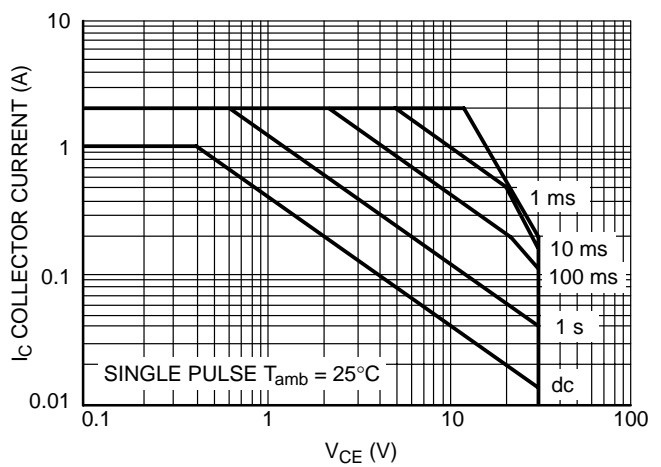


Figure 6. Safe Operating Area

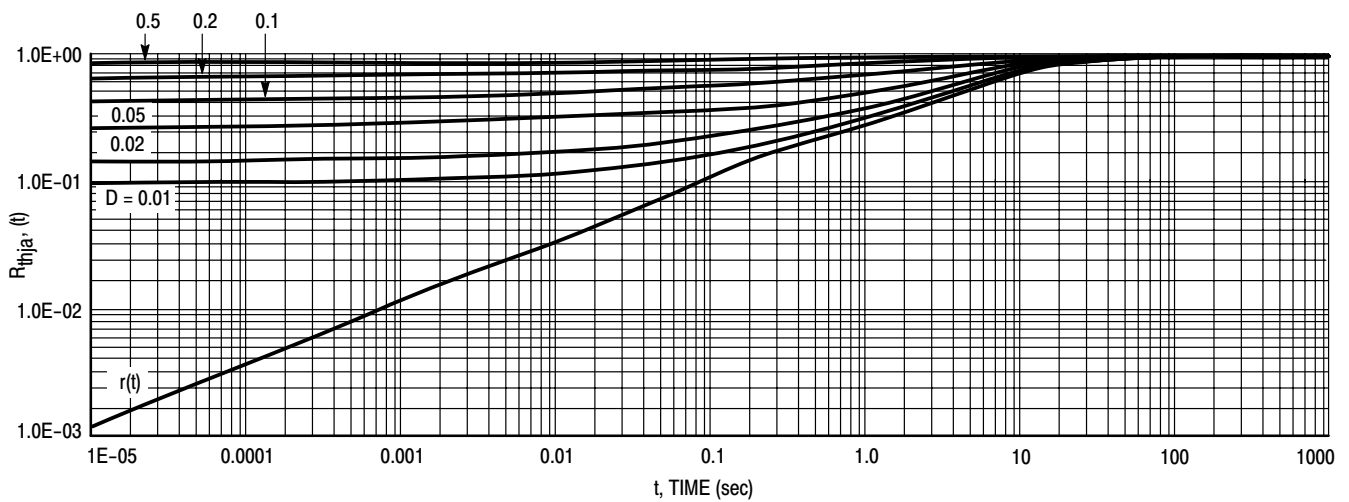
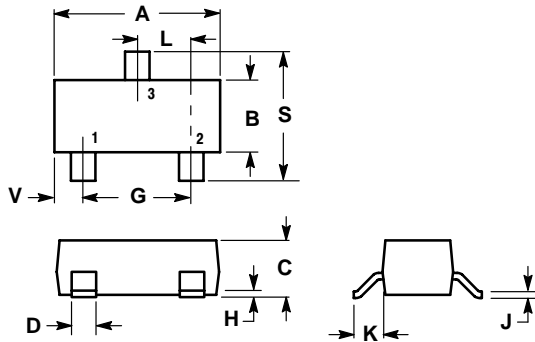


Figure 7. Normalized Thermal Response

NSS30101LT1G

PACKAGE DIMENSIONS

SOT-23 (TO-236)
CASE 318-08
ISSUE AH



NOTES:

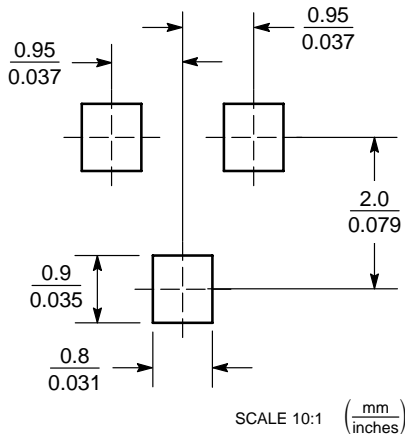
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-03 AND -07 OBSOLETE, NEW STANDARD 318-08.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|--------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.1102 | 0.1197 | 2.80 | 3.04 |
| B | 0.0472 | 0.0551 | 1.20 | 1.40 |
| C | 0.0350 | 0.0440 | 0.89 | 1.11 |
| D | 0.0150 | 0.0200 | 0.37 | 0.50 |
| G | 0.0701 | 0.0807 | 1.78 | 2.04 |
| H | 0.0005 | 0.0040 | 0.013 | 0.100 |
| J | 0.0034 | 0.0070 | 0.085 | 0.177 |
| K | 0.0140 | 0.0285 | 0.35 | 0.69 |
| L | 0.0350 | 0.0401 | 0.89 | 1.02 |
| S | 0.0830 | 0.1039 | 2.10 | 2.64 |
| V | 0.0177 | 0.0236 | 0.45 | 0.60 |

STYLE 6:

1. BASE
2. EMITTER
3. COLLECTOR

SOLDERING FOOTPRINT*



*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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