Complementary Dual General Purpose Amplifier Transistor

PNP and NPN Surface Mount

Features

• High Voltage and High Current: $V_{CEO} = 50 \text{ V}$, $I_C = 200 \text{ mA}$

• High h_{FE} : $h_{FE} = 200 \sim 400$

• Moisture Sensitivity Level: 1

• ESD Rating - Human Body Model: 3A

- Machine Model: C

• Pb-Free Package is Available

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

| Rating | Symbol | Value | Unit |
|--------------------------------|----------------------|-------|------|
| Collector-Base Voltage | V _{(BR)CBO} | 60 | Vdc |
| Collector-Emitter Voltage | V _{(BR)CEO} | 50 | Vdc |
| Emitter-Base Voltage | V _{(BR)EBO} | 7.0 | Vdc |
| Collector Current - Continuous | I _C | 200 | mAdc |

THERMAL CHARACTERISTICS

| Characteristic (One Junction Heated) | Symbol | Max | Unit |
|--|-----------------------------------|--|-------------|
| Total Device Dissipation T _A = 25°C Derate above 25°C | P _D | 187 (Note 1) 256 (Note 2) 1.5 (Note 1) 2.0 (Note 2) | mW mW/°C |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 670 (Note 1) 490 (Note 2) | °C/W |
| Characteristic (Both Junctions Heated) | Symbol | Max | Unit |
| Total Device Dissipation T _A = 25°C Derate above 25°C | P _D | 250 (Note 1) 385 (Note 2) 2.0 (Note 1) 3.0 (Note 2) | mW mW/°C |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 493 (Note 1) 325 (Note 2) | °C/W |
| Thermal Resistance, Junction-to-Lead | $R_{	heta JL}$ | 188 (Note 1) 208 (Note 2) | °C/W |
| Junction and Storage Temperature | T _J , T _{stg} | -55 to +150 | °C |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

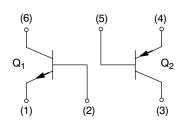
1. FR-4 @ Minimum Pad

2. FR-4 @ 1.0 x 1.0 inch Pad



ON Semiconductor®

http://onsemi.com





SC-88 CASE 419B

MARKING DIAGRAM



3Z = Device Code

M = Date Code

= Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device* | Package | Shipping [†] |
|----------|--------------------|-----------------------|
| UMZ1NT1 | SC-88 | 3000 / Tape & Reel |
| UMZ1NT1G | SC-88 (Pb-Free) | 3000 / Tape & Reel |

*The "T1" suffix refers to a 7 inch 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.

Q1: NPN
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

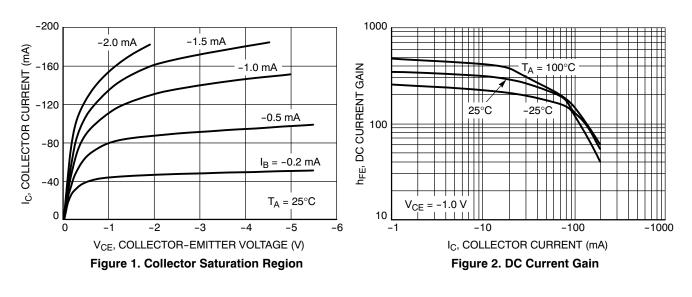
| Characteristic | Symbol | Min | Тур | Max | Unit |
|--|-----------------------|-------------|-------------|-------------------|----------------------|
| Collector-Emitter Breakdown Voltage (I _C = 2.0 mAdc, I _B = 0) | V _(BR) CEO | 50 | - | - | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 10 \mu Adc, I_E = 0$) | V _(BR) CBO | 60 | - | - | Vdc |
| Emitter-Base Breakdown Voltage ($I_E = 10 \mu Adc, I_C = 0$) | V _{(BR)EBO} | 7.0 | - | - | Vdc |
| Collector-Base Cutoff Current (V _{CB} = 45 Vdc, I _E = 0) | I _{CBO} | - | - | 0.1 | μAdc |
| Collector-Emitter Cutoff Current | I _{CEO} | - - - | - - - | 0.1 2.0 1.0 | μAdc μAdc mAdc |
| DC Current Gain (Note 3) (V _{CE} = 6.0 Vdc, I _C = 2.0 mAdc) | h _{FE} | 200 | - | 400 | - |
| Collector-Emitter Saturation Voltage (I _C = 100 mAdc, I _B = 10 mAdc) | V _{CE(sat)} | 0.15 | - | 0.25 | Vdc |
| Transistor Frequency | f _T | - | 114 | - | MHz |

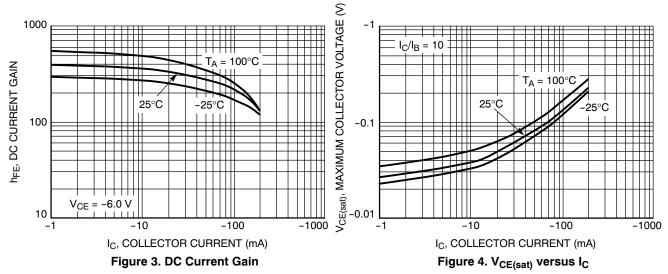
^{3.} Pulse Test: Pulse Width \leq 300 $\mu\text{s},\,\text{D.C.} \leq$ 2%.

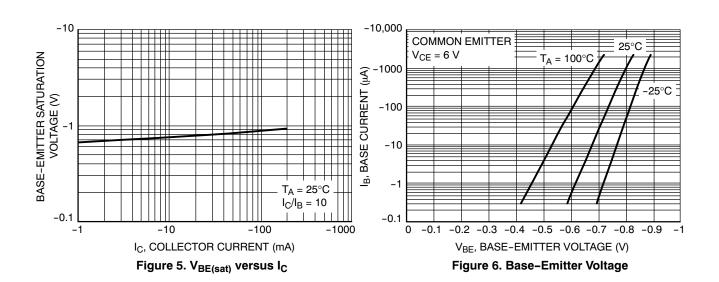
Q2: PNP ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Тур | Max | Unit |
|--|----------------------|-------------|-------------|----------------------|----------------------|
| Collector–Emitter Breakdown Voltage $(I_C = 2.0 \text{ mAdc}, I_B = 0)$ | V _{(BR)CEO} | -50 | - | - | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 10 \mu Adc, I_E = 0$) | V _{(BR)CBO} | -60 | - | - | Vdc |
| Emitter-Base Breakdown Voltage ($I_E = 10 \mu Adc, I_C = 0$) | V _{(BR)EBO} | -7.0 | - | - | Vdc |
| Collector-Base Cutoff Current (V _{CB} = 45 Vdc, I _E = 0) | I _{CBO} | - | - | -0.1 | μAdc |
| | I _{CEO} | - - - | - - - | -0.1 -2.0 -1.0 | μAdc μAdc mAdc |
| DC Current Gain (Note 3) (V _{CE} = 6.0 Vdc, I _C = 2.0 mAdc) | h _{FE} | 200 | - | 400 | - |
| Collector–Emitter Saturation Voltage (I _C = 100 mAdc, I _B = 10 mAdc) | V _{CE(sat)} | -0.15 | - | -0.3 | Vdc |
| Transistor Frequency | f _T | - | 142 | - | MHz |

TYPICAL ELECTRICAL CHARACTERISTICS: PNP TRANSISTOR







TYPICAL ELECTRICAL CHARACTERISTICS: NPN TRANSISTOR

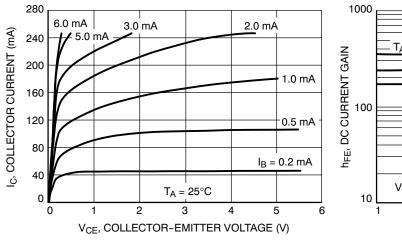
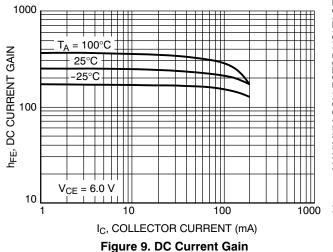


Figure 7. Collector Saturation Voltage

Figure 8. DC Current Gain



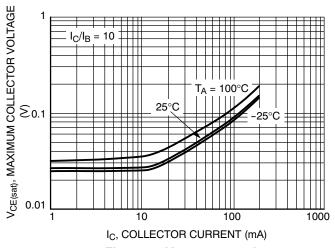
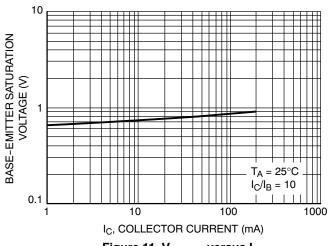


Figure 10. V_{CE(sat)} versus I_C



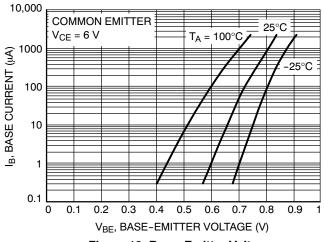
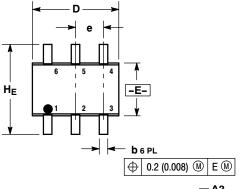


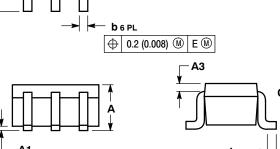
Figure 11. V_{BE(sat)} versus I_C

Figure 12. Base-Emitter Voltage

PACKAGE DIMENSIONS

SC-88/SC70-6/SOT-363 CASE 419B-02 ISSUE W



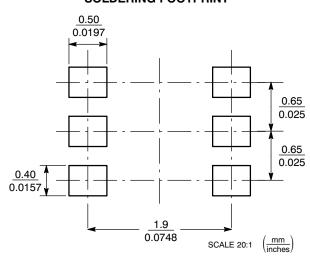


NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI
- Y14.5M, 1982. 2. CONTROLLING DIMENSION: INCH.
- 3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

| | MILLIMETERS | | | INCHES | | | |
|-----|-------------|---------|------|-----------|---------|-------|--|
| DIM | MIN | NOM | MAX | MIN | NOM | MAX | |
| Α | 0.80 | 0.95 | 1.10 | 0.031 | 0.037 | 0.043 | |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 | |
| A3 | | 0.20 RE | F | 0.008 REF | | | |
| b | 0.10 | 0.21 | 0.30 | 0.004 | 0.008 | 0.012 | |
| С | 0.10 | 0.14 | 0.25 | 0.004 | 0.005 | 0.010 | |
| D | 1.80 | 2.00 | 2.20 | 0.070 | 0.078 | 0.086 | |
| Е | 1.15 | 1.25 | 1.35 | 0.045 | 0.049 | 0.053 | |
| е | 0.65 BSC | | | 0 | .026 BS | С | |
| L | 0.10 | 0.20 | 0.30 | 0.004 | 0.008 | 0.012 | |
| HE | 2.00 | 2.10 | 2.20 | 0.078 | 0.082 | 0.086 | |

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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