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# EMZ1DXV6T1, EMZ1DXV6T5

## Dual General Purpose Transistors

### NPN/PNP Dual (Complementary)

This transistor is designed for general purpose amplifier applications. It is housed in the SOT-563 which is designed for low power surface mount applications.

#### Features

- Lead-Free Solder Plating
- Low  $V_{CE(SAT)}$ ,  $< 0.5$  V
- These are Pb-Free Devices

#### MAXIMUM RATINGS

| Rating                         | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector - Emitter Voltage    | $V_{CEO}$ | -60   | V    |
| Collector - Base Voltage       | $V_{CBO}$ | -50   | V    |
| Emitter - Base Voltage         | $V_{EBO}$ | -6.0  | V    |
| Collector Current - Continuous | $I_C$     | -100  | mAdc |

#### THERMAL CHARACTERISTICS

| Characteristic<br>(One Junction Heated)   | Symbol          | Max                          | Unit                       |
|---|-----------------|------------------------------|----------------------------|
| Total Device Dissipation<br>$T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 357 (Note 1)<br>2.9 (Note 1) | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance,<br>Junction-to-Ambient  | $R_{\theta JA}$ | 350<br>(Note 1)              | $^\circ\text{C}/\text{W}$  |
| Characteristic<br>(Both Junctions Heated)   | Symbol          | Max                          | Unit                       |
| Total Device Dissipation<br>$T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 500 (Note 1)<br>4.0 (Note 1) | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance,<br>Junction-to-Ambient  | $R_{\theta JA}$ | 250<br>(Note 1)              | $^\circ\text{C}/\text{W}$  |
| Junction and Storage<br>Temperature Range   | $T_J, T_{stg}$  | -55 to +150                  | $^\circ\text{C}$           |

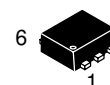
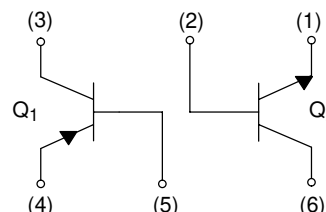
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-4 @ Minimum Pad.



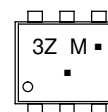
ON Semiconductor®

<http://onsemi.com>



SOT-563  
CASE 463A  
STYLE 1

#### MARKING DIAGRAM



3Z = Specific Device Code  
M = Month Code  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

# EMZ1DXV6T1, EMZ1DXV6T5

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

| Characteristic   | Symbol               | Min  | Typ | Max  | Unit |
|--|----------------------|------|-----|------|------|
| <b>Q1: PNP</b>   |                      |      |     |      |      |
| Collector-Base Breakdown Voltage<br>(I <sub>C</sub> = -50 μAdc, I <sub>E</sub> = 0)                      | V <sub>(BR)CBO</sub> | -60  | -   | -    | Vdc  |
| Collector-Emitter Breakdown Voltage<br>(I <sub>C</sub> = -1.0 mAdc, I <sub>B</sub> = 0)                  | V <sub>(BR)CEO</sub> | -50  | -   | -    | Vdc  |
| Emitter-Base Breakdown Voltage<br>(I <sub>E</sub> = -50 μAdc, I <sub>E</sub> = 0)                        | V <sub>(BR)EBO</sub> | -6.0 | -   | -    | Vdc  |
| Collector-Base Cutoff Current<br>(V <sub>CB</sub> = -30 Vdc, I <sub>E</sub> = 0)                         | I <sub>CBO</sub>     | -    | -   | -0.5 | nA   |
| Emitter-Base Cutoff Current<br>(V <sub>EB</sub> = -5.0 Vdc, I <sub>B</sub> = 0)                          | I <sub>EBO</sub>     | -    | -   | -0.5 | μA   |
| Collector-Emitter Saturation Voltage (Note 2)<br>(I <sub>C</sub> = -50 mAdc, I <sub>B</sub> = -5.0 mAdc) | V <sub>CE(sat)</sub> | -    | -   | -0.5 | Vdc  |
| DC Current Gain (Note 2)<br>(V <sub>CE</sub> = -6.0 Vdc, I <sub>C</sub> = -1.0 mAdc)                     | h <sub>FE</sub>      | 120  | -   | 560  | -    |
| Transition Frequency<br>(V <sub>CE</sub> = -12 Vdc, I <sub>C</sub> = -2.0 mAdc, f = 30 MHz)              | f <sub>T</sub>       | -    | 140 | -    | MHz  |
| Output Capacitance<br>(V <sub>CB</sub> = -12 Vdc, I <sub>E</sub> = 0 Adc, f = 1 MHz)                     | C <sub>OB</sub>      | -    | 3.5 | -    | pF   |

## Q2: NPN

|  |                      |     |     |     |     |
|--|----------------------|-----|-----|-----|-----|
| Collector-Base Breakdown Voltage<br>(I <sub>C</sub> = 50 μAdc, I <sub>E</sub> = 0)                     | V <sub>(BR)CBO</sub> | 60  | -   | -   | Vdc |
| Collector-Emitter Breakdown Voltage<br>(I <sub>C</sub> = 1.0 mAdc, I <sub>B</sub> = 0)                 | V <sub>(BR)CEO</sub> | 50  | -   | -   | Vdc |
| Emitter-Base Breakdown Voltage<br>(I <sub>E</sub> = 50 μAdc, I <sub>E</sub> = 0)                       | V <sub>(BR)EBO</sub> | 7.0 | -   | -   | Vdc |
| Collector-Base Cutoff Current<br>(V <sub>CB</sub> = 60 Vdc, I <sub>E</sub> = 0)                        | I <sub>CBO</sub>     | -   | -   | 0.5 | μA  |
| Emitter-Base Cutoff Current<br>(V <sub>EB</sub> = 7.0 Vdc, I <sub>B</sub> = 0)                         | I <sub>EBO</sub>     | -   | -   | 0.5 | μA  |
| Collector-Emitter Saturation Voltage (Note 3)<br>(I <sub>C</sub> = 50 mAdc, I <sub>B</sub> = 5.0 mAdc) | V <sub>CE(sat)</sub> | -   | -   | 0.4 | Vdc |
| DC Current Gain (Note 3)<br>(V <sub>CE</sub> = 6.0 Vdc, I <sub>C</sub> = 1.0 mAdc)                     | h <sub>FE</sub>      | 120 | -   | 560 | -   |
| Transition Frequency<br>(V <sub>CE</sub> = 12 Vdc, I <sub>C</sub> = 2.0 mAdc, f = 30 MHz)              | f <sub>T</sub>       | -   | 180 | -   | MHz |
| Output Capacitance<br>(V <sub>CB</sub> = 12 Vdc, I <sub>C</sub> = 0 Adc, f = 1 MHz)                    | C <sub>OB</sub>      | -   | 2.0 | -   | pF  |

2. Pulse Test: Pulse Width ≤ 300 μs, D.C. ≤ 2%.

3. Device mounted on a FR-4 glass epoxy printed circuit board using the minimum recommended footprint.

## ORDERING INFORMATION

| Device      | Package  | Shipping†                |
|-------------|----------|--------------------------|
| EMZ1DXV6T1  | SOT-563* | 4000 Units / Tape & Reel |
| EMZ1DXV6T1G | SOT-563* | 4000 Units / Tape & Reel |
| EMZ1DXV6T5  | SOT-563* | 8000 Units / Tape & Reel |
| EMZ1DXV6T5G | SOT-563* | 8000 Units / 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.

\*This package is inherently Pb-Free.

# EMZ1DXV6T1, EMZ1DXV6T5

## TYPICAL ELECTRICAL CHARACTERISTICS – Q1, PNP

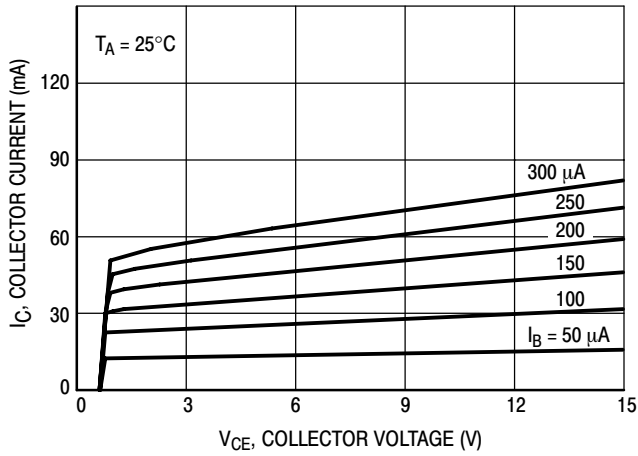


Figure 1.  $I_C - V_{CE}$

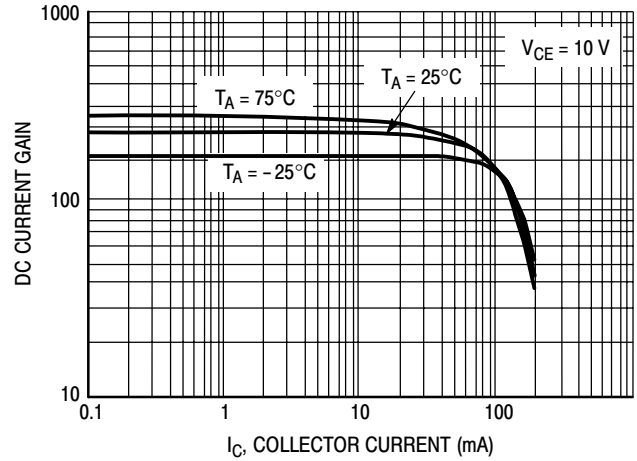


Figure 2. DC Current Gain

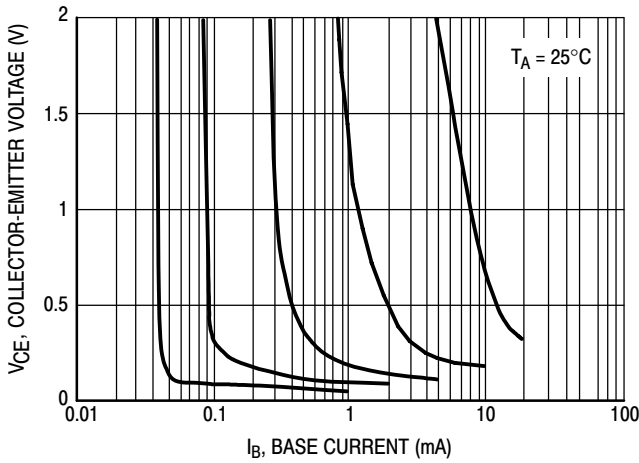


Figure 3. Collector Saturation Region

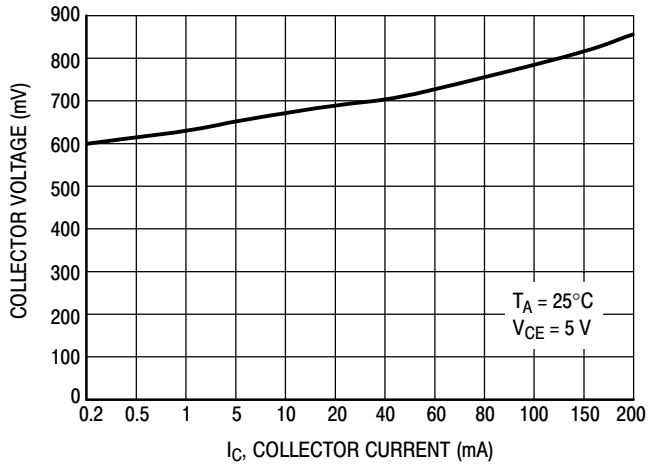


Figure 4. On Voltage

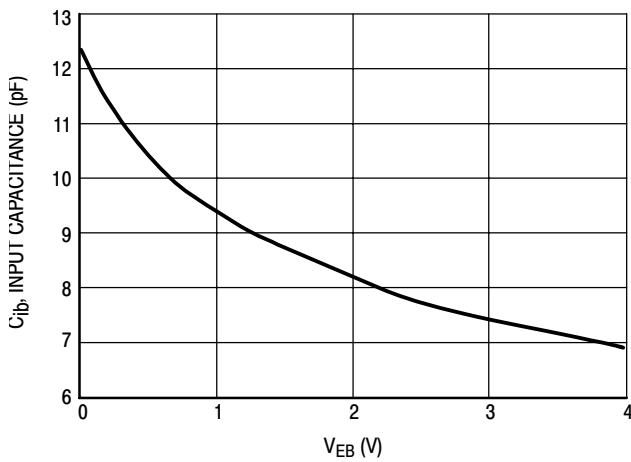


Figure 5. Capacitance

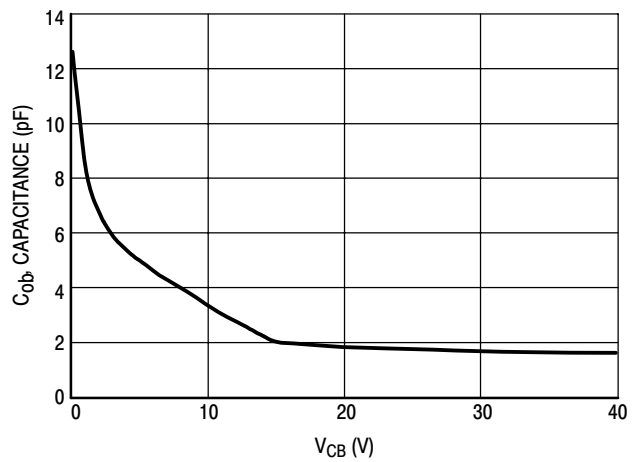


Figure 6. Capacitance

# EMZ1DXV6T1, EMZ1DXV6T5

## TYPICAL ELECTRICAL CHARACTERISTICS – Q2, NPN

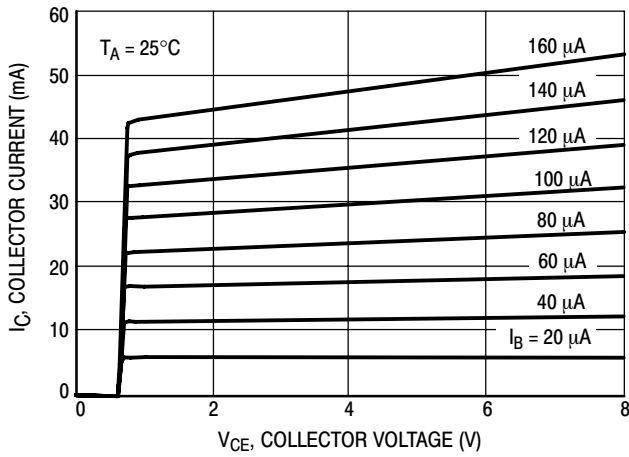


Figure 1.  $I_C - V_{CE}$

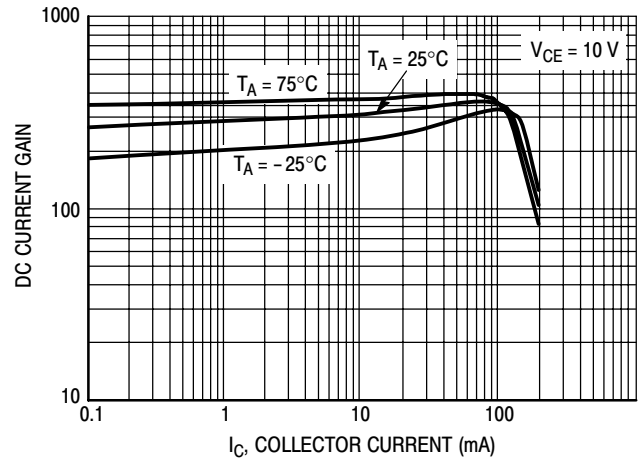


Figure 2. DC Current Gain

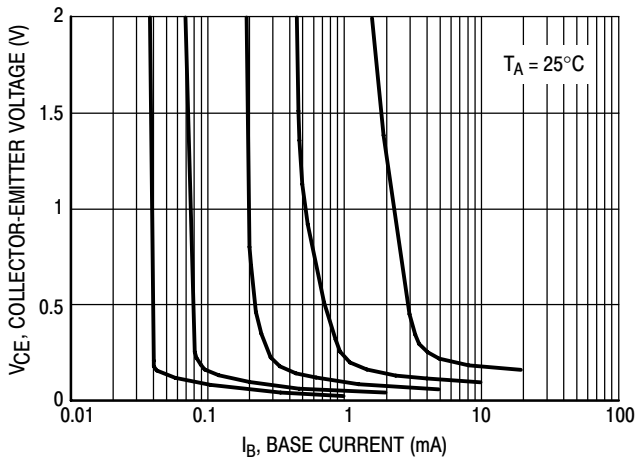


Figure 3. Collector Saturation Region

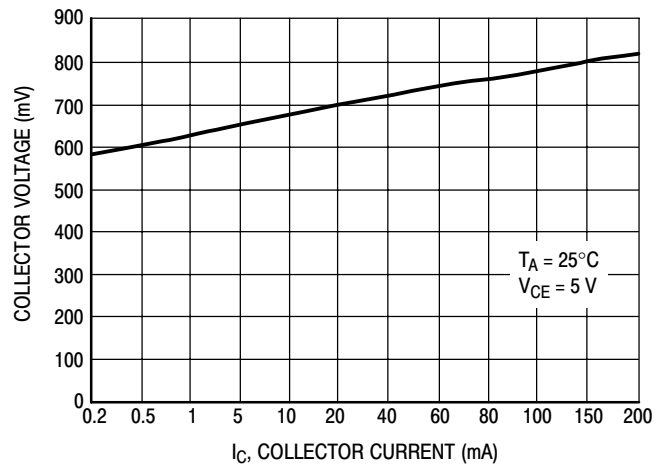


Figure 4. On Voltage

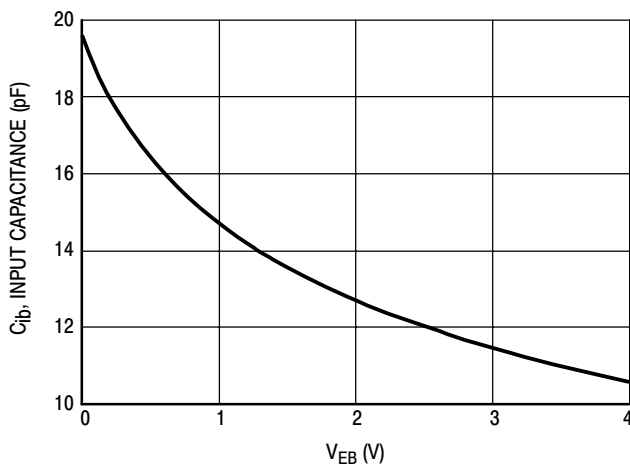


Figure 5. Capacitance

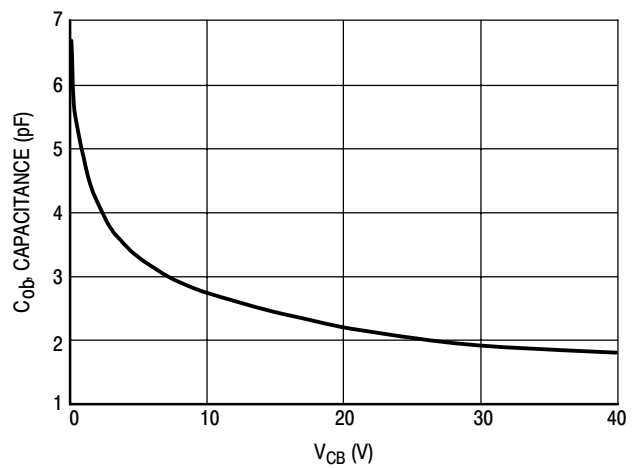
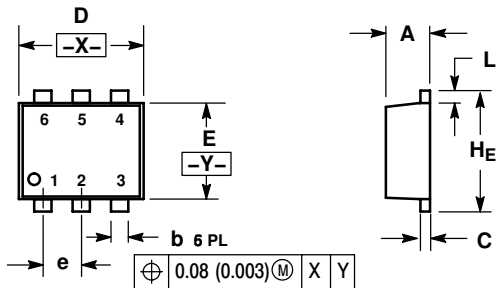


Figure 6. Capacitance

# EMZ1DXV6T1, EMZ1DXV6T5

## PACKAGE DIMENSIONS

SOT-563, 6 LEAD  
CASE 463A-01  
ISSUE F



NOTES:

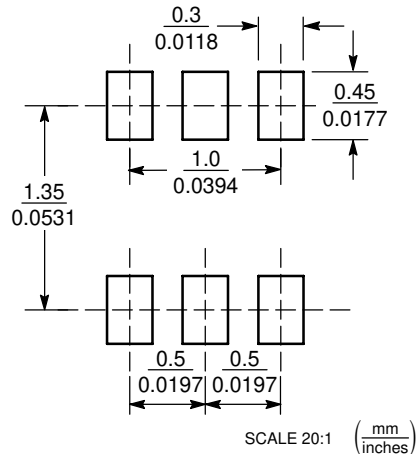
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

| DIM            | MILLIMETERS |      |      | INCHES   |       |       |
|----------------|-------------|------|------|----------|-------|-------|
|                | MIN         | NOM  | MAX  | MIN      | NOM   | MAX   |
| A              | 0.50        | 0.55 | 0.60 | 0.020    | 0.021 | 0.023 |
| b              | 0.17        | 0.22 | 0.27 | 0.007    | 0.009 | 0.011 |
| C              | 0.08        | 0.12 | 0.18 | 0.003    | 0.005 | 0.007 |
| D              | 1.50        | 1.60 | 1.70 | 0.059    | 0.062 | 0.066 |
| E              | 1.10        | 1.20 | 1.30 | 0.043    | 0.047 | 0.051 |
| e              | 0.5 BSC     |      |      | 0.02 BSC |       |       |
| L              | 0.10        | 0.20 | 0.30 | 0.004    | 0.008 | 0.012 |
| H <sub>E</sub> | 1.50        | 1.60 | 1.70 | 0.059    | 0.062 | 0.066 |

STYLE 1:

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

### SOLDERING FOOTPRINT\*



SCALE 20:1 ( $\frac{\text{mm}}{\text{inches}}$ )

\*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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