

# Dual Transistor - Power Management

## NPN/PNP Dual (Complementary)

### Features

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

### MAXIMUM RATINGS

#### Q1

| Rating                    | Symbol    | Value | Unit |
|---------------------------|-----------|-------|------|
| Collector-Base Voltage    | $V_{CBO}$ | 50    | Vdc  |
| Collector-Emitter Voltage | $V_{CEO}$ | 50    | Vdc  |
| Collector Current         | $I_C$     | 100   | mAdc |

#### Q2

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

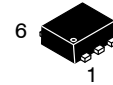
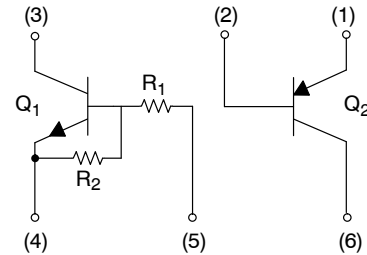
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-4 @ Minimum Pad.



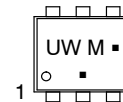
ON Semiconductor®

<http://onsemi.com>



SOT-563  
CASE 463A  
STYLE 1

### MARKING DIAGRAM



UW = Specific Device Code

M = Date Code

■ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device      | Package              | Shipping†        |
|-------------|----------------------|------------------|
| EMF23XV6T5  | SOT-563<br>(Pb-Free) | 8000/Tape & Reel |
| EMF23XV6T5G | SOT-563<br>(Pb-Free) | 8000/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.

# EMF23XV6T5

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

### Q1: NPN

|                                                                                                 |                      |     |     |      |      |
|-------------------------------------------------------------------------------------------------|----------------------|-----|-----|------|------|
| Collector-Base Cutoff Current (V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0)                      | I <sub>CBO</sub>     | –   | –   | 100  | nAdc |
| Collector-Emitter Cutoff Current (V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0)                   | I <sub>CEO</sub>     | –   | –   | 500  | nAdc |
| Emitter-Base Cutoff Current (V <sub>EB</sub> = 6.0 V, I <sub>C</sub> = 0)                       | I <sub>EBO</sub>     | –   | –   | 0.5  | mAdc |
| Collector-Base Breakdown Voltage (I <sub>C</sub> = 10 μA, I <sub>E</sub> = 0)                   | V <sub>(BR)CBO</sub> | 50  | –   | –    | Vdc  |
| Collector-Emitter Breakdown Voltage (Note 3) (I <sub>C</sub> = 2.0 mA, I <sub>B</sub> = 0)      | V <sub>(BR)CEO</sub> | 50  | –   | –    | Vdc  |
| DC Current Gain (V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5.0 mA)                               | h <sub>FE</sub>      | 35  | 60  | –    | –    |
| Collector-Emitter Saturation Voltage (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.3 mA)          | V <sub>CE(sat)</sub> | –   | –   | 0.25 | Vdc  |
| Output Voltage (on) (V <sub>CC</sub> = 5.0 V, V <sub>B</sub> = 2.5 V, R <sub>L</sub> = 1.0 kΩ)  | V <sub>OL</sub>      | –   | –   | 0.2  | Vdc  |
| Output Voltage (off) (V <sub>CC</sub> = 5.0 V, V <sub>B</sub> = 0.5 V, R <sub>L</sub> = 1.0 kΩ) | V <sub>OH</sub>      | 4.9 | –   | –    | Vdc  |
| Input Resistor                                                                                  | R1                   | 7.0 | 10  | 13   | kΩ   |
| Resistor Ratio                                                                                  | R1/R2                | 0.8 | 1.0 | 1.2  | –    |

### Q2: PNP

|                                                                                                          |                      |      |     |      |     |
|----------------------------------------------------------------------------------------------------------|----------------------|------|-----|------|-----|
| Collector-Base Breakdown Voltage (I <sub>C</sub> = –50 μAdc, I <sub>E</sub> = 0)                         | V <sub>(BR)CBO</sub> | –60  | –   | –    | Vdc |
| Collector-Emitter Breakdown Voltage (I <sub>C</sub> = –1.0 mAdc, I <sub>B</sub> = 0)                     | V <sub>(BR)CEO</sub> | –50  | –   | –    | Vdc |
| Emitter-Base Breakdown Voltage (I <sub>E</sub> = –50 μAdc, I <sub>C</sub> = 0)                           | V <sub>(BR)EBO</sub> | –6.0 | –   | –    | Vdc |
| Collector-Base Cutoff Current (V <sub>CB</sub> = –30 Vdc, I <sub>E</sub> = 0)                            | I <sub>CBO</sub>     | –    | –   | –0.5 | nA  |
| Emitter-Base Cutoff Current (V <sub>EB</sub> = –5.0 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> | –    | –   | –0.5 | Vdc |
| DC Current Gain (Note 3) (V <sub>CE</sub> = –6.0 Vdc, I <sub>C</sub> = –1.0 mAdc)                        | h <sub>FE</sub>      | 120  | –   | 560  | –   |
| Transition Frequency (V <sub>CE</sub> = –12 Vdc, I <sub>C</sub> = –2.0 mAdc, f = 30 MHz)                 | f <sub>T</sub>       | –    | 140 | –    | MHz |
| Output Capacitance (V <sub>CB</sub> = –12 Vdc, I <sub>E</sub> = 0 Adc, f = 1.0 MHz)                      | C <sub>OB</sub>      | –    | 3.5 | –    | pF  |

- Device mounted on a FR-4 glass epoxy printed circuit board using the minimum recommended footprint.
- Pulse Test: Pulse Width ≤ 300 μs, DC ≤ 2%.

# EMF23XV6T5

[查询"EMF23XV6-D"供应商](#)

## TYPICAL ELECTRICAL CHARACTERISTICS — Q1, NPN

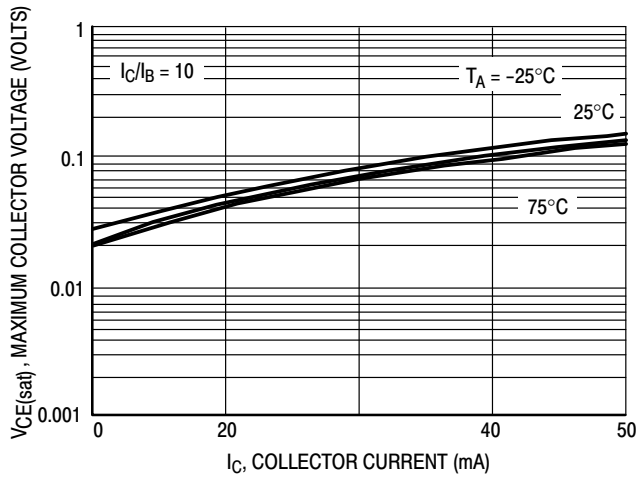


Figure 1.  $V_{CE(sat)}$  versus  $I_C$

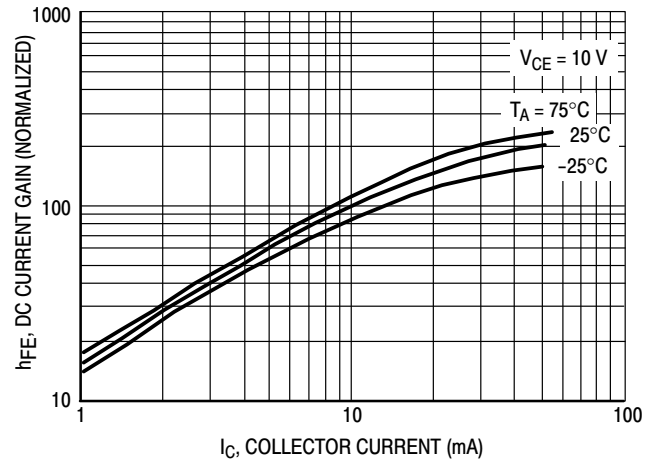


Figure 2. DC Current Gain

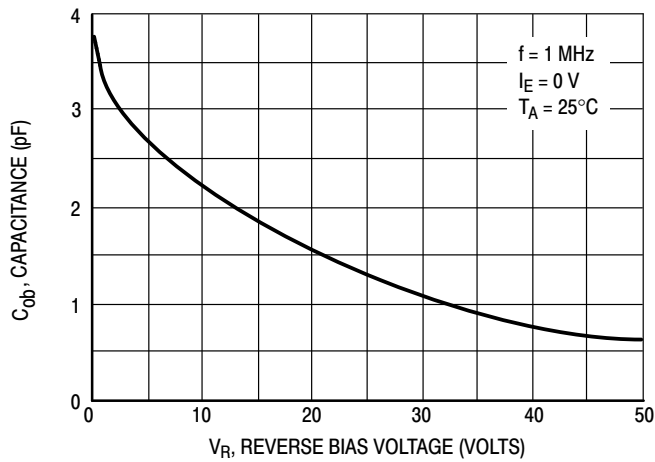


Figure 3. Output Capacitance

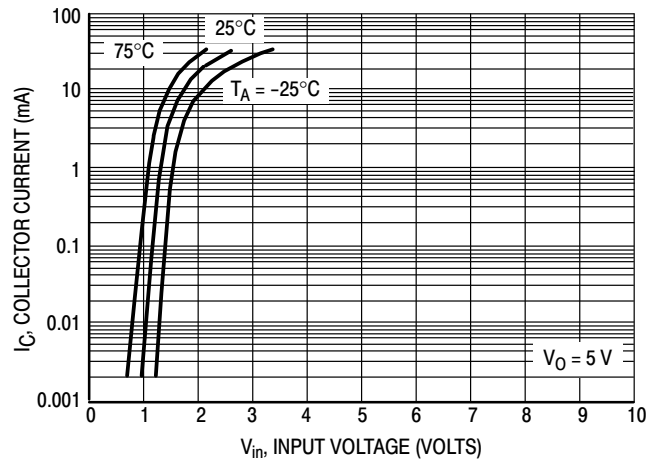


Figure 4. Output Current versus Input Voltage

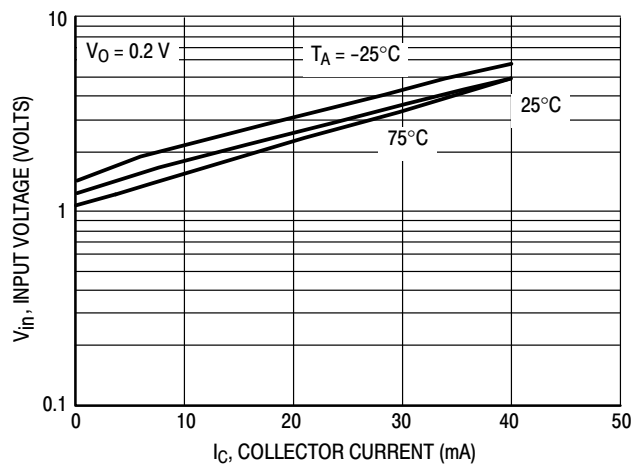


Figure 5. Input Voltage versus Output Current

# EMF23XV6T5

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## TYPICAL ELECTRICAL CHARACTERISTICS – Q2, PNP

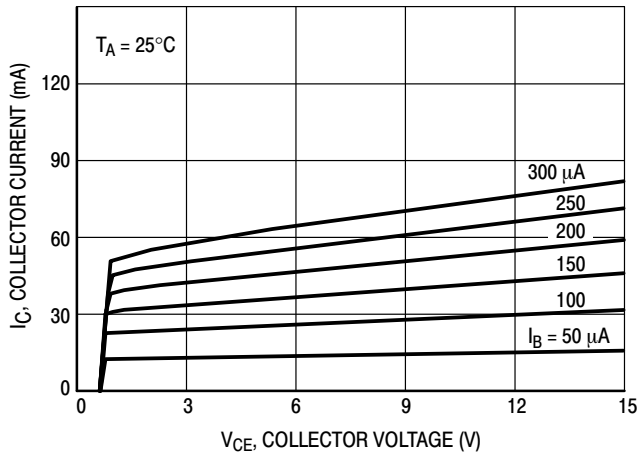


Figure 6.  $I_C - V_{CE}$

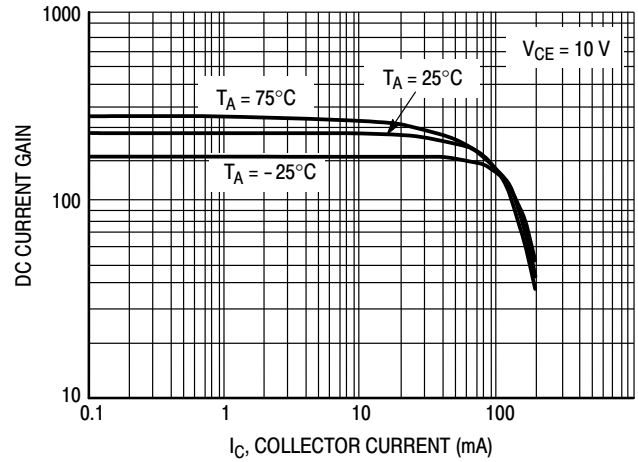


Figure 7. DC Current Gain

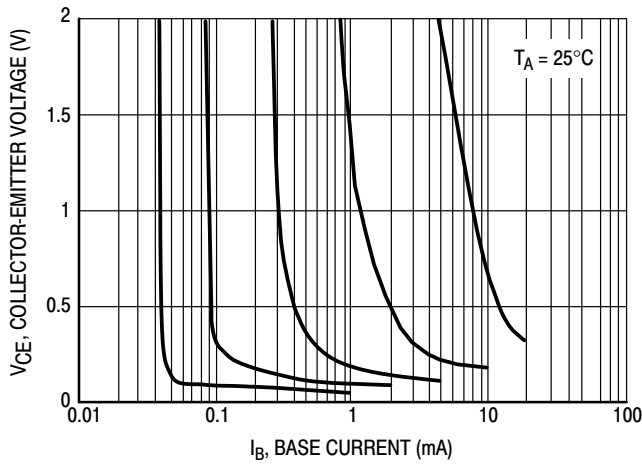


Figure 8. Collector Saturation Region

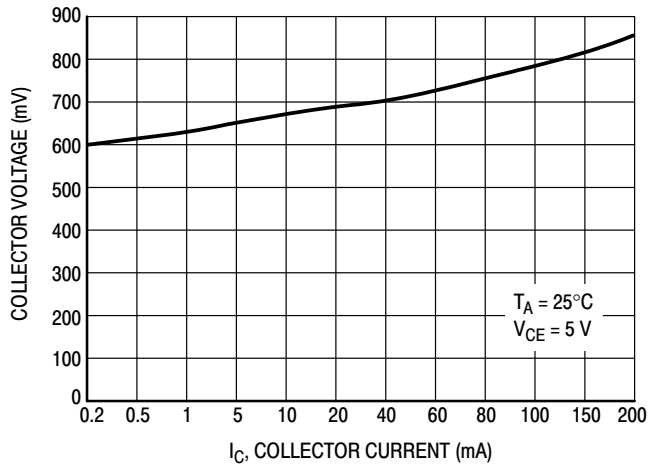


Figure 9. On Voltage

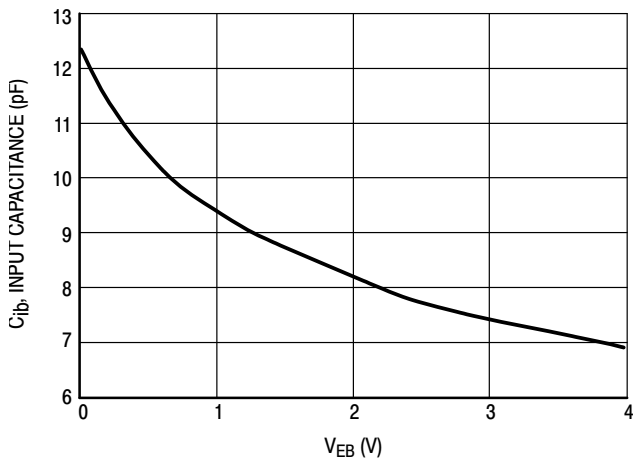


Figure 10. Capacitance

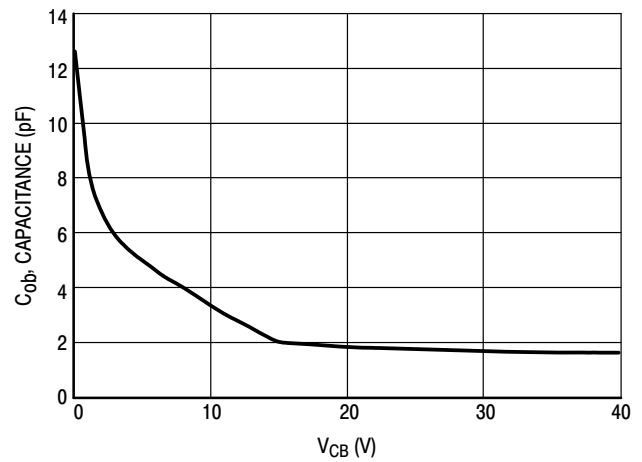


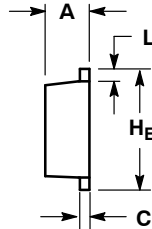
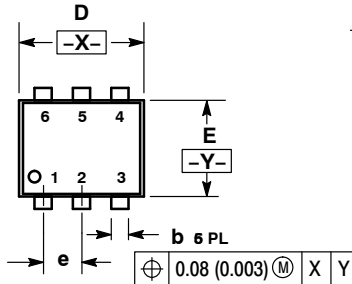
Figure 11. Capacitance

# EMF23XV6T5

[查询"EMF23XV6-D"供应商](#)

## PACKAGE DIMENSIONS

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



### NOTES:

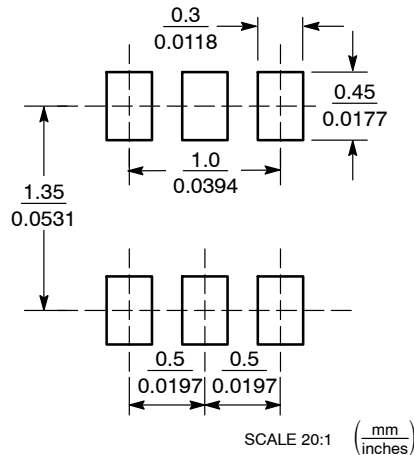
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

| 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_E | 1.50        | 1.60 | 1.70 | 0.059    | 0.062 | 0.066 |

### STYLE 1:

- PIN 1. EMITTER 1
- BASE 1
- COLLECTOR 2
- EMITTER 2
- BASE 2
- COLLECTOR 1

## 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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