

# EMF23XV6T5

## Product Preview

# Dual Transistor - Power Management

## NPN/PNP Dual (Complimentary)

- Low  $V_{CE(SAT)}$ ,  $< 0.5$  V
- This is a Pb-Free Device

### 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

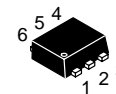
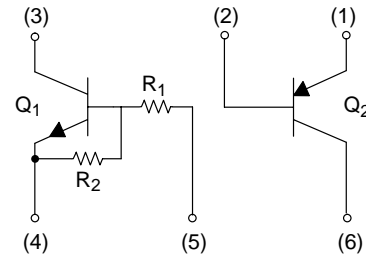
Characteristic (One Junction Heated)	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	357 (Note 1) 2.9 (Note 1)	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	350 (Note 1)	$^\circ\text{C/W}$
Characteristic (Both Junctions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

1. FR-4 @ Minimum Pad.



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SOT-563  
CASE 463A  
PLASTIC

### MARKING DIAGRAM



UW = Specific Device Code  
D = Date Code

### ORDERING INFORMATION

Device	Package	Shipping†
EMF23XV6T5	SOT-563	2 mm Pitch 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.

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

# EMF23XV6T5

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>Q1: NPN</b>					
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) (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

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

# EMF23XV6T5

## TYPICAL ELECTRICAL CHARACTERISTICS — Q1, NPN

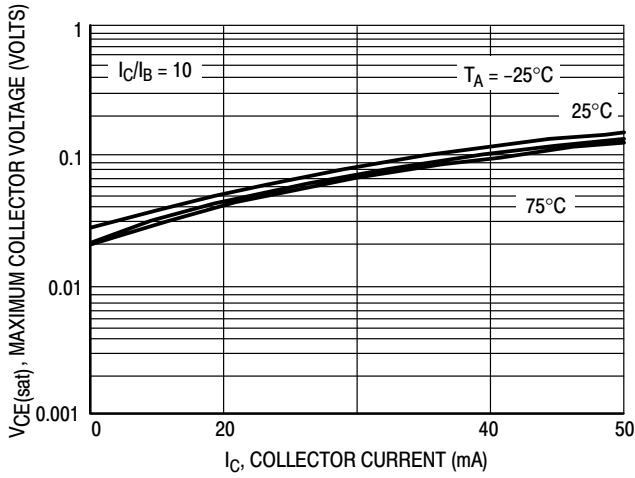


Figure 1.  $V_{CE(sat)}$  versus  $I_C$

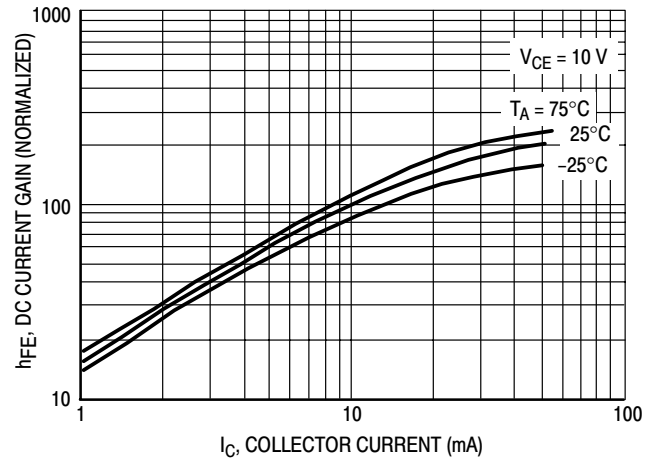


Figure 2. DC Current Gain

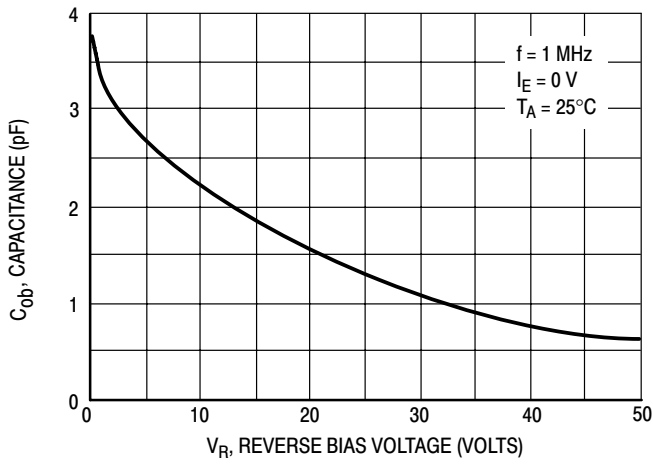


Figure 3. Output Capacitance

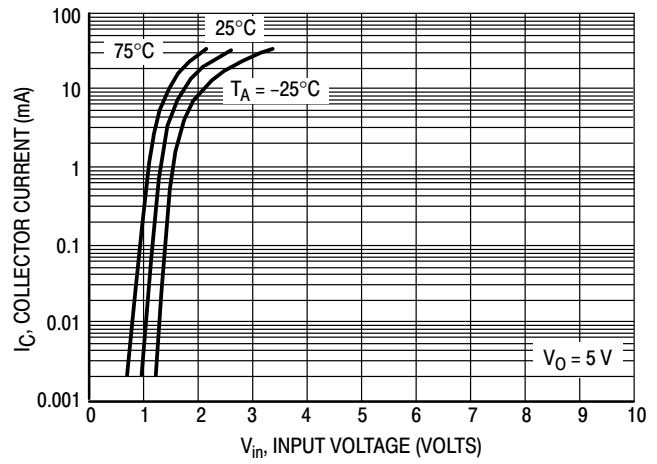


Figure 4. Output Current versus Input Voltage

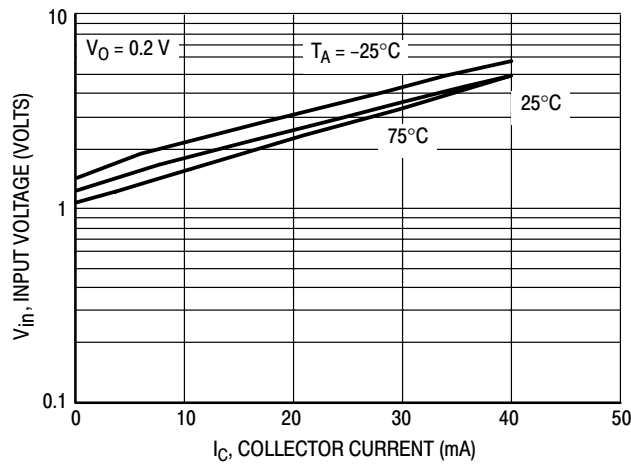


Figure 5. Input Voltage versus Output Current

# EMF23XV6T5

## TYPICAL ELECTRICAL CHARACTERISTICS – Q2, PNP

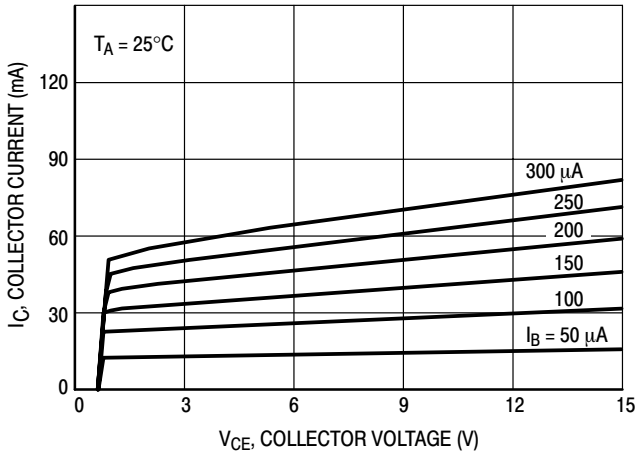


Figure 6.  $I_C - V_{CE}$

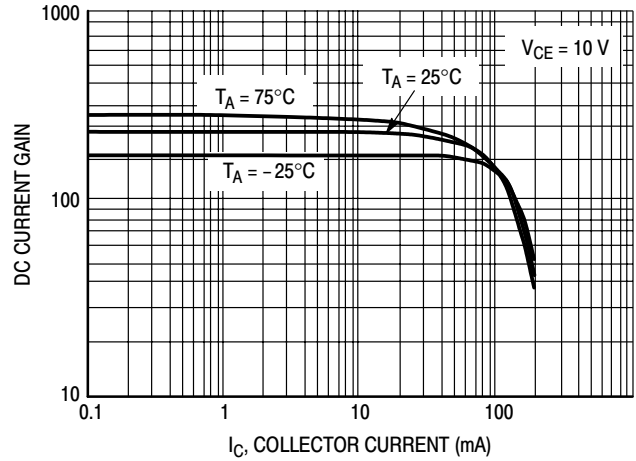


Figure 7. DC Current Gain

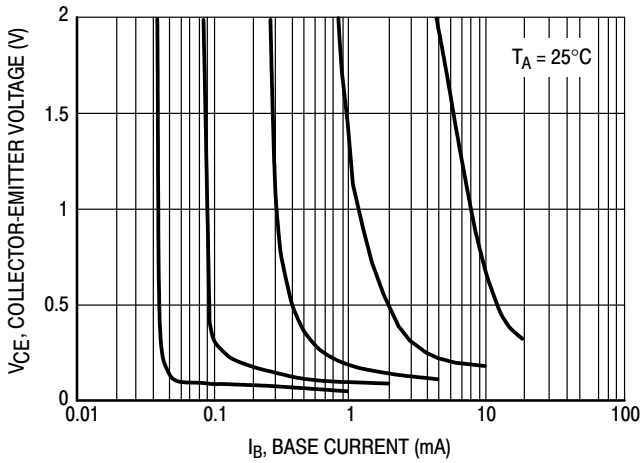


Figure 8. Collector Saturation Region

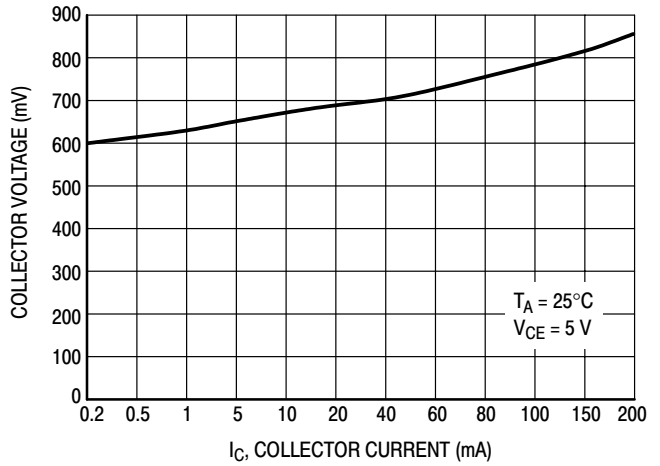


Figure 9. On Voltage

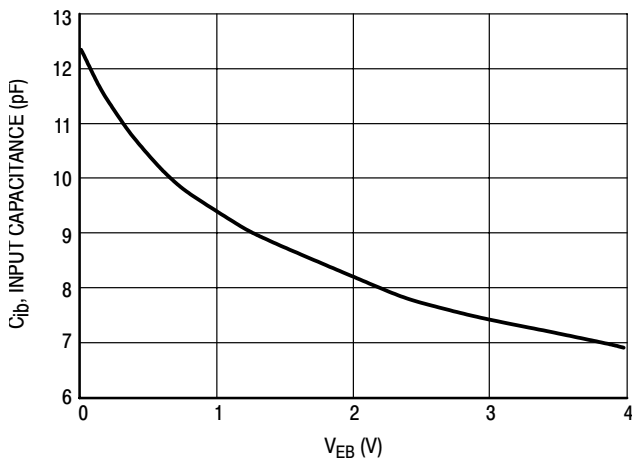


Figure 10. Capacitance

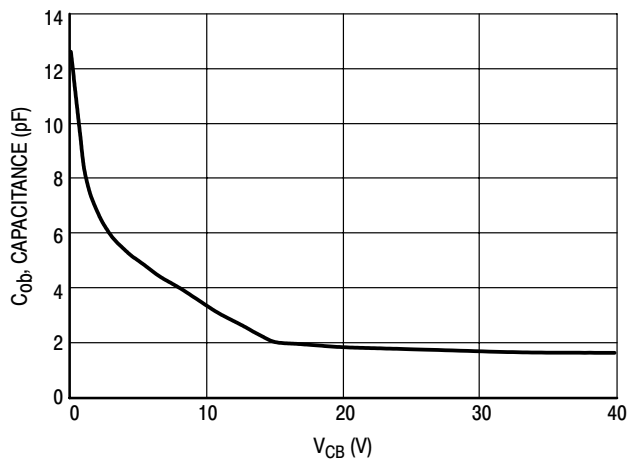
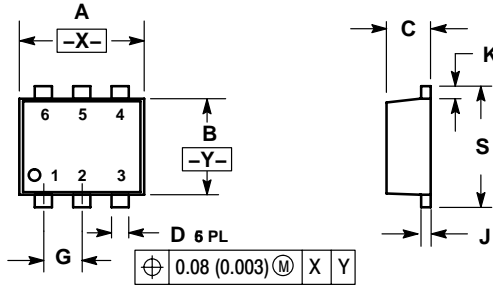


Figure 11. Capacitance

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## PACKAGE DIMENSIONS

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



NOTES:

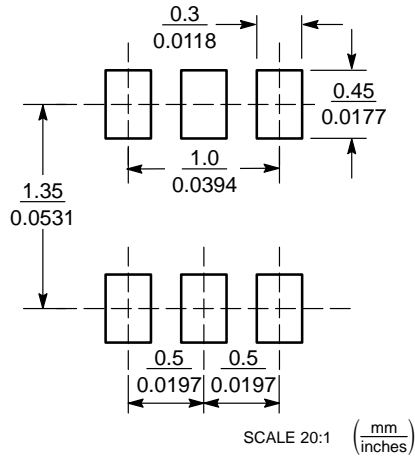
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.50	1.70	0.059	0.067
B	1.10	1.30	0.043	0.051
C	0.50	0.60	0.020	0.024
D	0.17	0.27	0.007	0.011
G	0.50 BSC		0.020 BSC	
J	0.08	0.18	0.003	0.007
K	0.10	0.30	0.004	0.012
S	1.50	1.70	0.059	0.067

STYLE 1:

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

### SOLDERING FOOTPRINT\*



### SOT-563

\*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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