

# Dual Transistor - Power Management

## NPN/PNP Dual (Complementary)

### EMF18XV6T5

#### 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

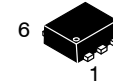
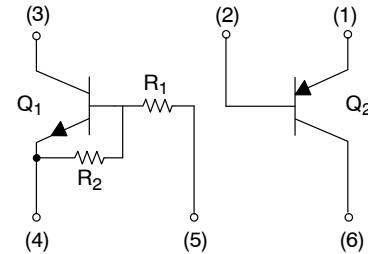
Rating	Symbol	Value	Unit
Collector - Emitter Voltage	$V_{CEO}$	-60	V
Collector - Base Voltage	$V_{CBO}$	-50	V
Emitter - Base Voltage	$V_{EBO}$	-6.0	V
Collector Current - Continuous	$I_C$	-100	mAdc

#### THERMAL CHARACTERISTICS

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

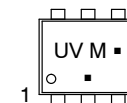
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR-4 @ Minimum Pad.



SOT-563  
CASE 463A  
PLASTIC

#### MARKING DIAGRAM



UV = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
EMF18XV6T5G	SOT-563 (Pb-Free)	8000/Tape & Reel
EMF18XV6T1G	SOT-563 (Pb-Free)	4000/Tape & Reel

<sup>†</sup>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.

# EMF18XV6T5

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C) (Note 2)

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>	-	-	0.1	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 4) (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>	80	140	-	
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> = 3.5 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	32.9	47	61.1	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 4) (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 4) (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

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

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

# EMF18XV6T5

## TYPICAL ELECTRICAL CHARACTERISTICS — Q1, NPN

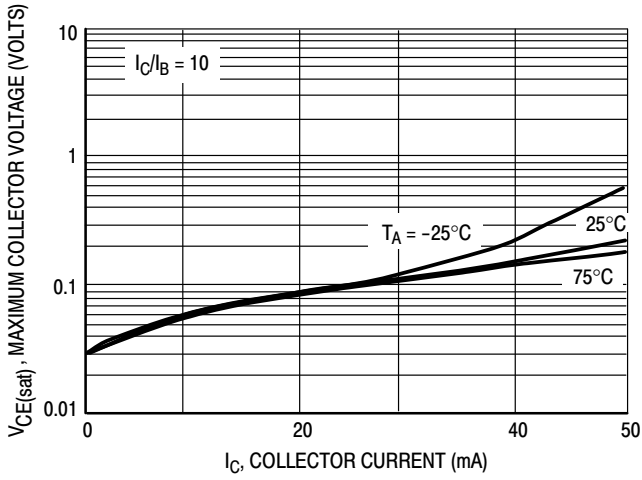


Figure 1.  $V_{CE(sat)}$  versus  $I_C$

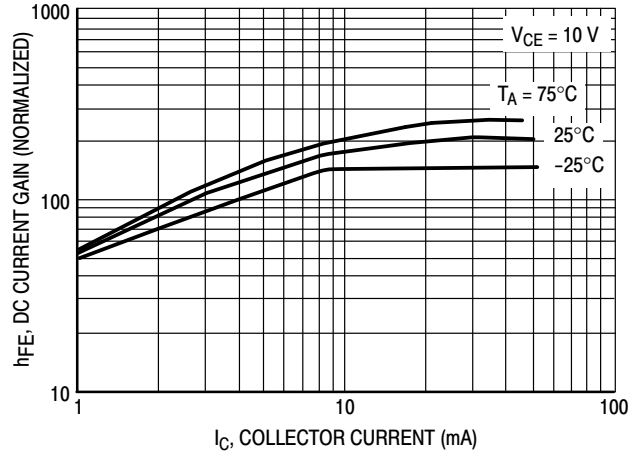


Figure 2. DC Current Gain

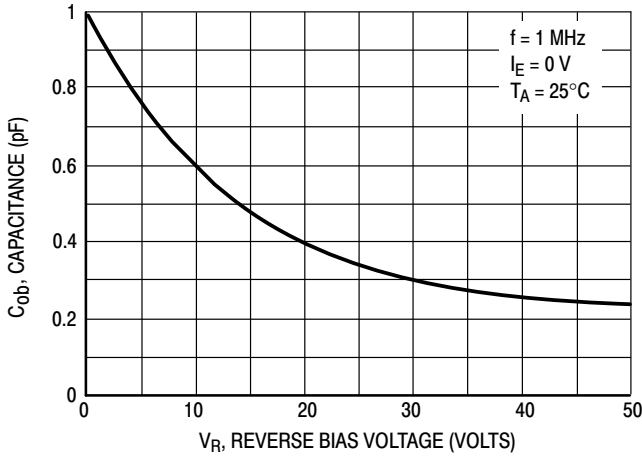


Figure 3. Output Capacitance

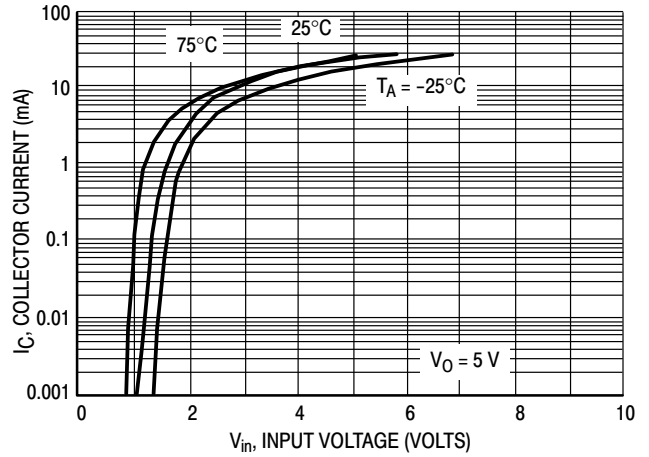


Figure 4. Output Current versus Input Voltage

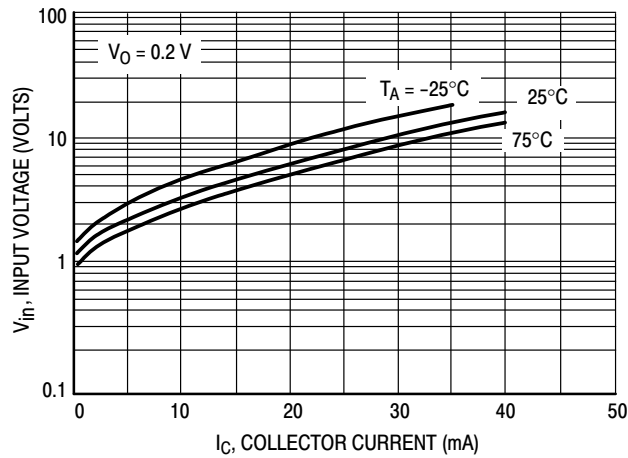


Figure 5. Input Voltage versus Output Current

# EMF18XV6T5

## TYPICAL ELECTRICAL CHARACTERISTICS – Q2, PNP

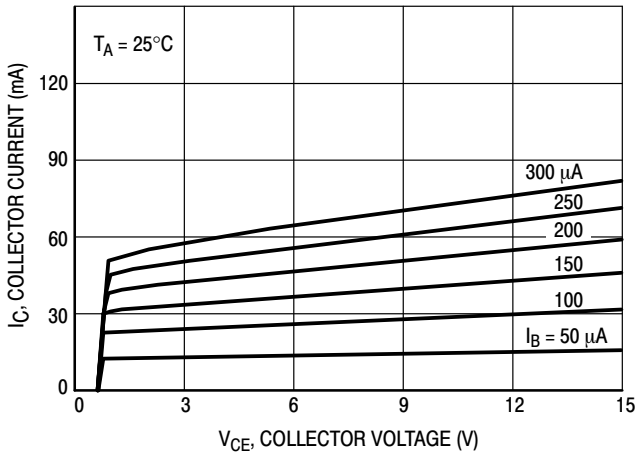


Figure 6.  $I_C - V_{CE}$

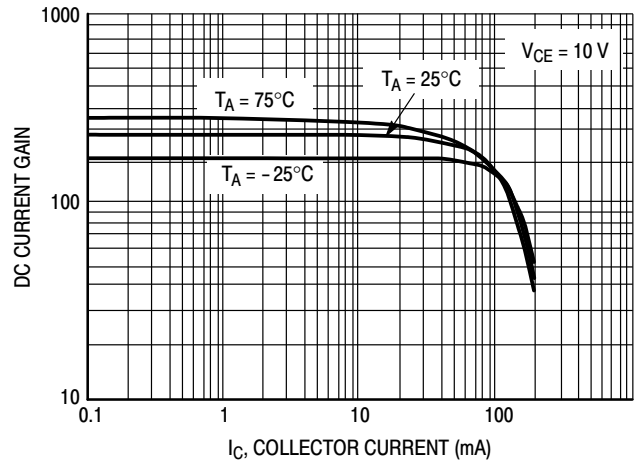


Figure 7. DC Current Gain

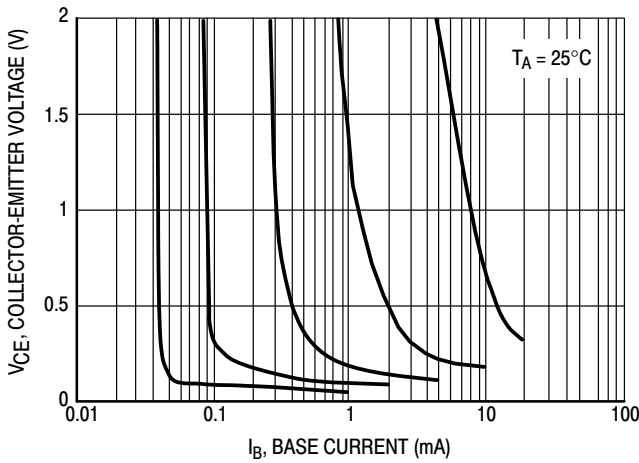


Figure 8. Collector Saturation Region

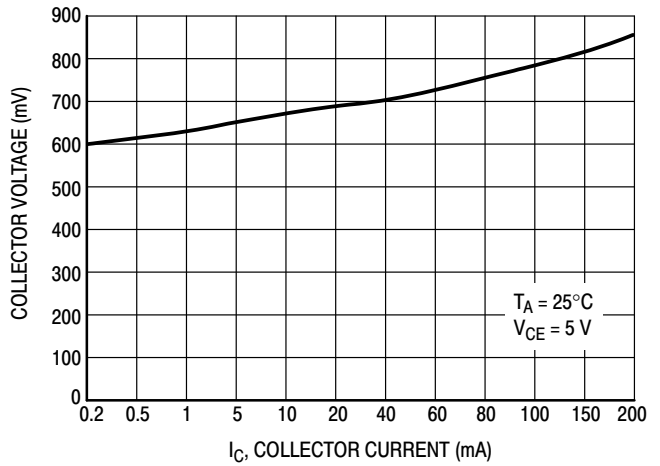


Figure 9. On Voltage

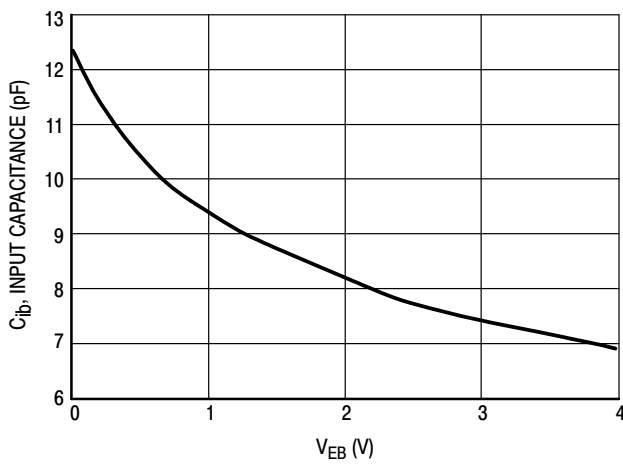


Figure 10. Capacitance

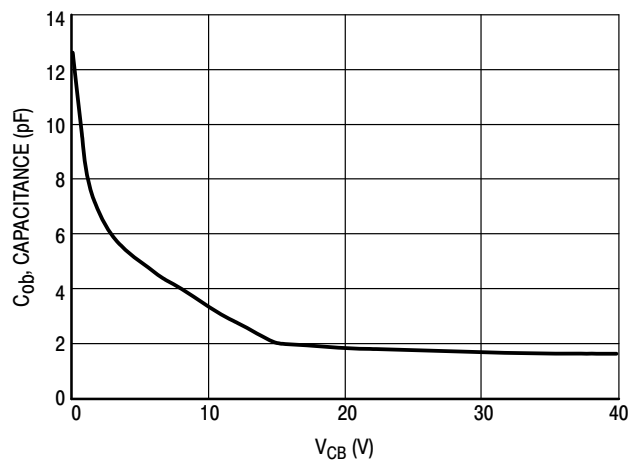


Figure 11. Capacitance

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

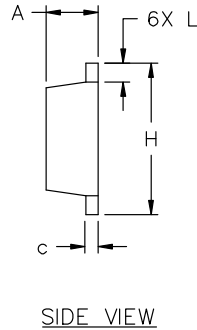
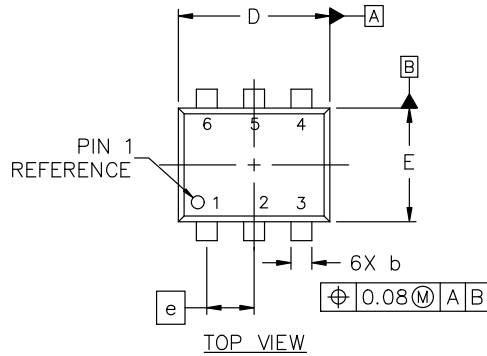


**SOT-563-6 1.60x1.20x0.55, 0.50P**  
**CASE 463A**  
**ISSUE J**

DATE 15 FEB 2024

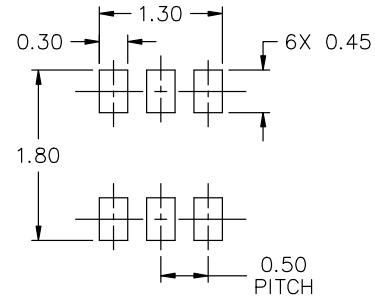
**NOTES:**

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.



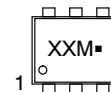
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.50	0.55	0.60
b	0.17	0.22	0.27
c	0.08	0.13	0.18
D	1.50	1.60	1.70
E	1.10	1.20	1.30
e	0.50 BSC		
H	1.50	1.60	1.70
L	0.10	0.20	0.30

- |  |   |  |
|--|---|--|
| <p><b>STYLE 1:</b><br/>         PIN 1. EMITTER 1<br/>         2. BASE 1<br/>         3. COLLECTOR 2<br/>         4. EMITTER 2<br/>         5. BASE 2<br/>         6. COLLECTOR 1</p> | <p><b>STYLE 2:</b><br/>         PIN 1. EMITTER 1<br/>         2. EMITTER 2<br/>         3. BASE 2<br/>         4. COLLECTOR 2<br/>         5. BASE 1<br/>         6. COLLECTOR 1</p>  | <p><b>STYLE 3:</b><br/>         PIN 1. CATHODE 1<br/>         2. CATHODE 1<br/>         3. ANODE/ANODE 2<br/>         4. CATHODE 2<br/>         5. CATHODE 2<br/>         6. ANODE/ANODE 1</p> |
| <p><b>STYLE 4:</b><br/>         PIN 1. COLLECTOR<br/>         2. COLLECTOR<br/>         3. BASE<br/>         4. EMITTER<br/>         5. COLLECTOR<br/>         6. COLLECTOR</p>      | <p><b>STYLE 5:</b><br/>         PIN 1. CATHODE<br/>         2. CATHODE<br/>         3. ANODE<br/>         4. ANODE<br/>         5. CATHODE<br/>         6. CATHODE</p>                | <p><b>STYLE 6:</b><br/>         PIN 1. CATHODE<br/>         2. ANODE<br/>         3. CATHODE<br/>         4. CATHODE<br/>         5. CATHODE<br/>         6. CATHODE</p>                       |
| <p><b>STYLE 7:</b><br/>         PIN 1. CATHODE<br/>         2. ANODE<br/>         3. CATHODE<br/>         4. CATHODE<br/>         5. ANODE<br/>         6. CATHODE</p>               | <p><b>STYLE 8:</b><br/>         PIN 1. DRAIN<br/>         2. DRAIN<br/>         3. GATE<br/>         4. SOURCE<br/>         5. DRAIN<br/>         6. DRAIN</p>                        | <p><b>STYLE 9:</b><br/>         PIN 1. SOURCE 1<br/>         2. GATE 1<br/>         3. DRAIN 2<br/>         4. SOURCE 2<br/>         5. GATE 2<br/>         6. DRAIN 1</p>                     |
| <p><b>STYLE 10:</b><br/>         PIN 1. CATHODE 1<br/>         2. N/C<br/>         3. CATHODE 2<br/>         4. ANODE 2<br/>         5. N/C<br/>         6. ANODE 1</p>              | <p><b>STYLE 11:</b><br/>         PIN 1. EMITTER 2<br/>         2. BASE 2<br/>         3. COLLECTOR 1<br/>         4. EMITTER 1<br/>         5. BASE 1<br/>         6. COLLECTOR 2</p> |  |



\* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

**GENERIC MARKING DIAGRAM\***



- XX = Specific Device Code
- M = Month Code
- = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

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<b>DESCRIPTION:</b>	<b>SOT-563-6 1.60x1.20x0.55, 0.50P</b>	<b>PAGE 1 OF 1</b>

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