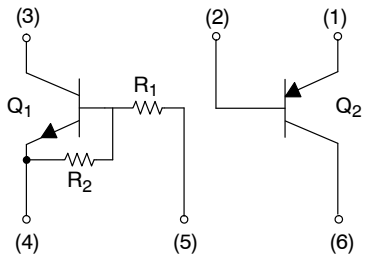
Dual Transistor - Power Management

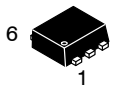
NPN/PNP Dual (Complementary)

EMF18XV6T5



Features

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



SOT−563
CASE 463A
PLASTIC

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

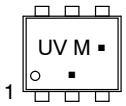
THERMAL CHARACTERISTICS

Characteristic (One Junction Heated)	Symbol	Max	Unit
Total Device Dissipation T_A = 25°C Derate above 25°C	P_D	357 (Note 1) 2.9 (Note 1)	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	350 (Note 1)	°C/W
Characteristic (Both Junctions Heated)	**Symbol**	**Max**	**Unit**
Total Device Dissipation T_A = 25°C Derate above 25°C	P_D	500 (Note1) 4.0 (Note 1)	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	250 (Note 1)	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°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.

MARKING DIAGRAM



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

ORDERING INFORMATION

Device	Package	Shipping†
EMF18XV6T5G	SOT−563 (Pb−Free)	8000/Tape & Reel
EMF18XV6T1G	SOT−563 (Pb−Free)	4000/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.

ELECTRICAL CHARACTERISTICS (T_A = 25°C) (Note 2)

Characteristic	Symbol	Min	Typ	Max	Unit
Q1: NPN					
Collector-Base Cutoff Current (V_{CB} = 50 V, I_E = 0)	I_{CBO}	–	–	100	nAdc
Collector-Emitter Cutoff Current (V_{CE} = 50 V, I_B = 0)	I_{CEO}	–	–	500	nAdc
Emitter-Base Cutoff Current (V_{EB} = 6.0 V, I_C = 0)	I_{EBO}	–	–	0.1	mAdc
Collector-Base Breakdown Voltage (I_C = 10 μA, I_E = 0)	$V_{(BR)CBO}$	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 4) (I_C = 2.0 mA, I_B = 0)	$V_{(BR)CEO}$	50	–	–	Vdc
DC Current Gain (V_{CE} = 10 V, I_C = 5.0 mA)	h_{FE}	80	140	–	
Collector-Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.3 mA)	$V_{CE(sat)}$	–	–	0.25	Vdc
Output Voltage (on) (V_{CC} = 5.0 V, V_B = 3.5 V, R_L = 1.0 kΩ)	V_{OL}	–	–	0.2	Vdc
Output Voltage (off) (V_{CC} = 5.0 V, V_B = 0.5 V, R_L = 1.0 kΩ)	V_{OH}	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_C = −50 μAdc, I_E = 0)	$V_{(BR)CBO}$	−60	–	–	Vdc
Collector−Emitter Breakdown Voltage (I_C = −1.0 mAdc, I_B = 0)	$V_{(BR)CEO}$	−50	–	–	Vdc
Emitter−Base Breakdown Voltage (I_E = −50 μAdc, I_E = 0)	$V_{(BR)EBO}$	−6.0	–	–	Vdc
Collector−Base Cutoff Current (V_{CB} = −30 Vdc, I_E = 0)	I_{CBO}	–	–	−0.5	nA
Emitter−Base Cutoff Current (V_{EB} = −5.0 Vdc, I_B = 0)	I_{EBO}	–	–	−0.5	μA
Collector−Emitter Saturation Voltage (Note 4) (I_C = −50 mAdc, I_B = −5.0 mAdc)	$V_{CE(sat)}$	–	–	−0.5	Vdc
DC Current Gain (Note 4) (V_{CE} = −6.0 Vdc, I_C = −1.0 mAdc)	h_{FE}	120	–	560	–
Transition Frequency (V_{CE} = −12 Vdc, I_C = −2.0 mAdc, f = 30 MHz)	f_T	–	140	–	MHz
Output Capacitance (V_{CB} = −12 Vdc, I_E = 0 Adc, f = 1.0 MHz)	C_{OB}	–	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%.

TYPICAL ELECTRICAL CHARACTERISTICS — Q1, NPN

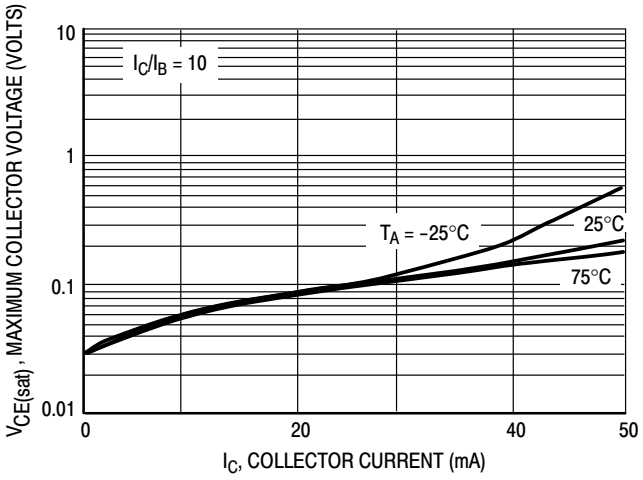


Figure 1. $V_{CE(sat)}$ versus I_C

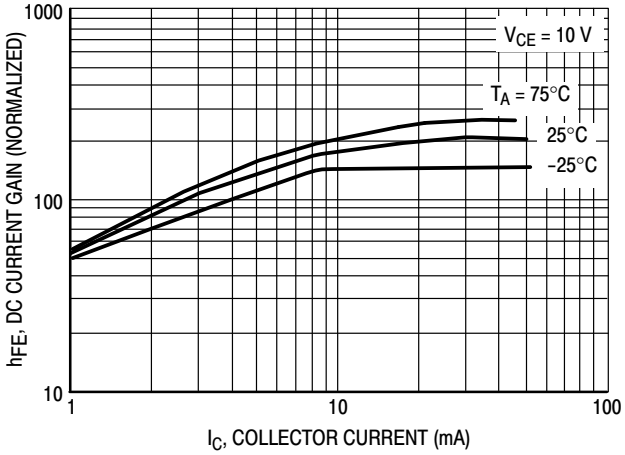


Figure 2. DC Current Gain

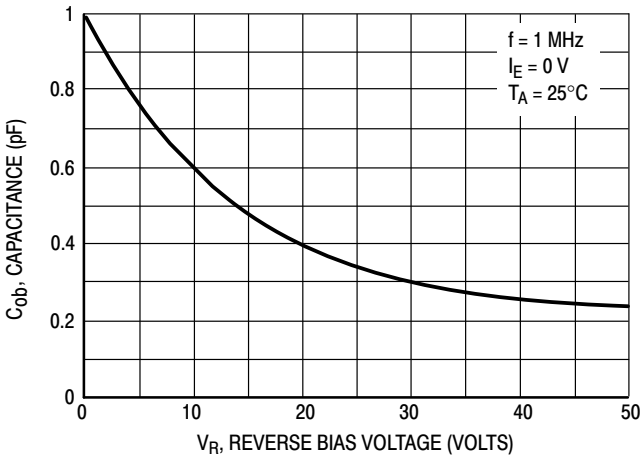


Figure 3. Output Capacitance

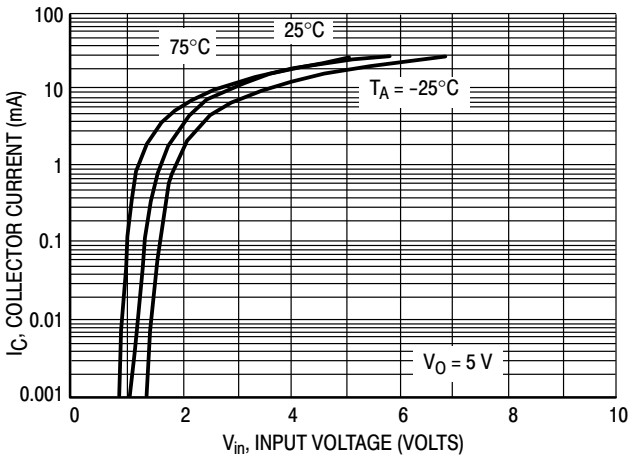


Figure 4. Output Current versus Input Voltage

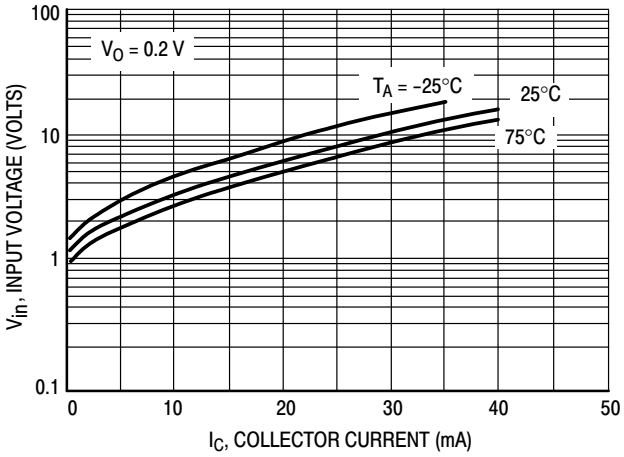


Figure 5. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS – Q2, PNP

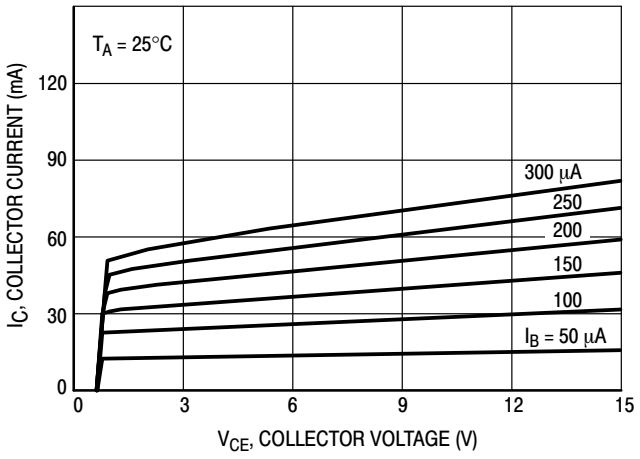


Figure 6. I_C – V_{CE}

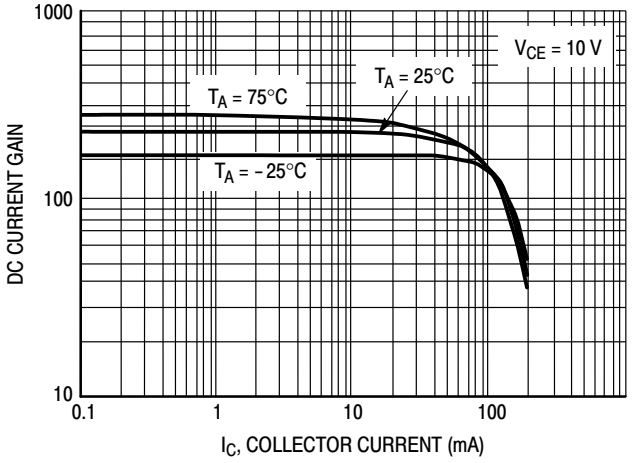


Figure 7. DC Current Gain

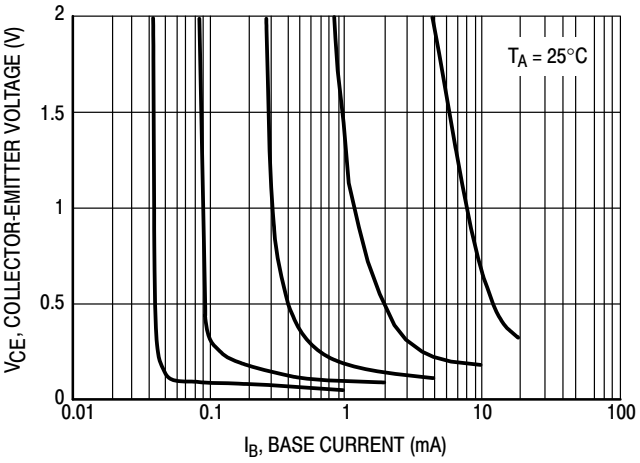


Figure 8. Collector Saturation Region

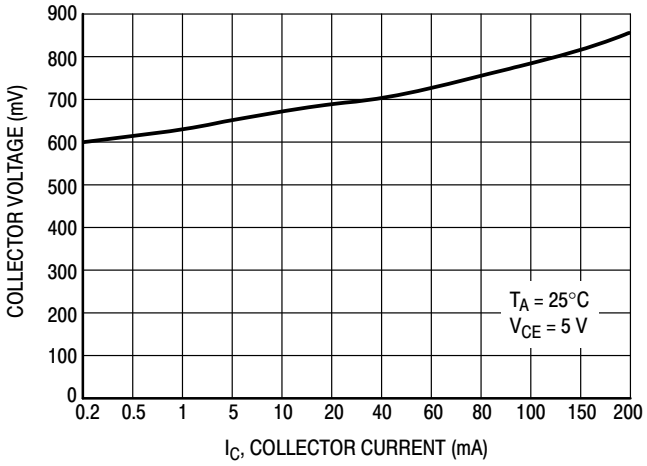


Figure 9. On Voltage

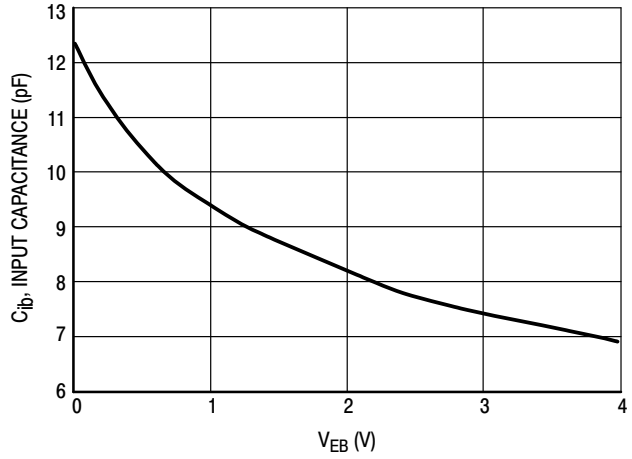


Figure 10. Capacitance

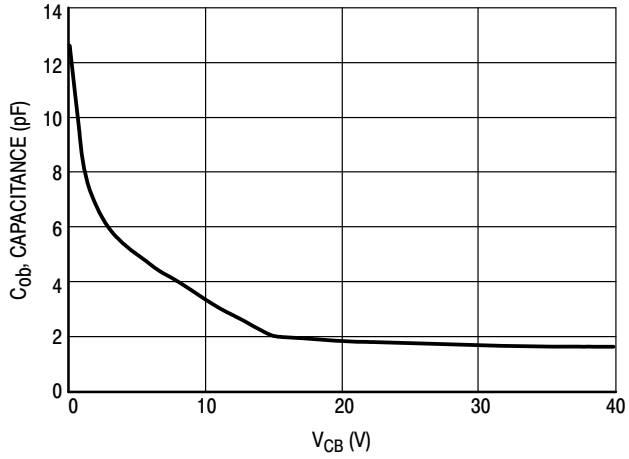
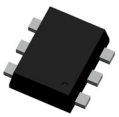


Figure 11. Capacitance

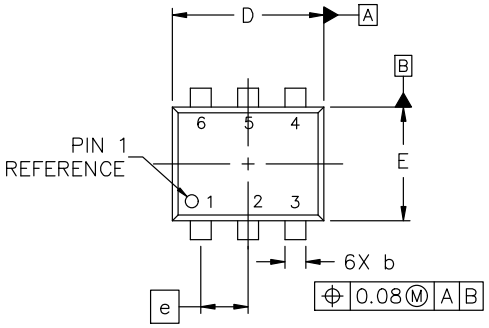
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS



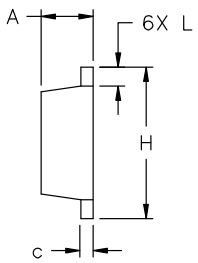
SOT−563−6 1.60x1.20x0.55, 0.50P
CASE 463A
ISSUE J

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.

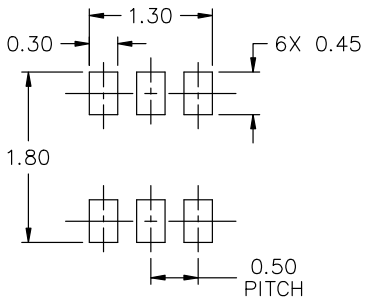


TOP VIEW



SIDE VIEW

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



RECOMMENDED MOUNTING 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.

STYLE 1:
PIN 1. EMITTER 1
2. BASE 1
3. COLLECTOR 2
4. EMITTER 2
5. BASE 2
6. COLLECTOR 1

STYLE 2:
PIN 1. EMITTER 1
2. EMITTER 2
3. BASE 2
4. COLLECTOR 2
5. BASE 1
6. COLLECTOR 1

STYLE 3:
PIN 1. CATHODE 1
2. CATHODE 1
3. ANODE/ANODE 2
4. CATHODE 2
5. CATHODE 2
6. ANODE/ANODE 1

STYLE 4:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

STYLE 5:
PIN 1. CATHODE
2. CATHODE
3. ANODE
4. ANODE
5. CATHODE
6. CATHODE

STYLE 6:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. ANODE
6. CATHODE

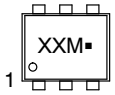
STYLE 8:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 9:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 10:
PIN 1. CATHODE 1
2. N/C
3. CATHODE 2
4. ANODE 2
5. N/C
6. ANODE 1

STYLE 11:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

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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