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Lead-free Green

EMF21

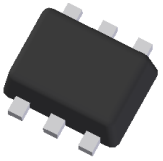
COMPLEX TRANSISTOR ARRAY

Features

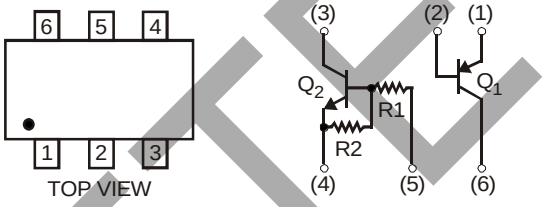
- Epitaxial Planar Die Construction
- One PNP Bipolar Transistor and One NPN Pre-Biased Transistor
- Ultra-Small Surface Mount Package
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

Mechanical Data

- Case: SOT-563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed Over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.003 grams (approximate)



SOT-563



Schematic and Pin Configuration

Maximum Ratings, Total Device @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3)	P_D	300	mW
Thermal Resistance, Junction to Ambient Air (Note 3)	$R_{\theta JA}$	417	°C/W
Operating and Storage Temperature Range	T_j, T_{STG}	-55 to +150	°C

Maximum Ratings, PNP Transistor, Q_1 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-15	V
Collector-Emitter Voltage	V_{CEO}	-12	V
Emitter-Base Voltage	V_{EBO}	-6	V
Continuous Collector Current	I_C	-500	mA
Peak Pulsed Collector Current	I_{CP}	-1.0	A

Maximum Ratings, Pre-Biased NPN Transistor, Q_2 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	50	V
Input Voltage	V_{IN}	-10 to +40	V
Collector Current	I_C	100	mA
Output Current	I_O	50	mA

Notes:
1. No purposefully added lead.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
3. Device mounted on FR-4 PCB; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

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Electrical Characteristics, PNP Transistor, Q_1 @T_A = 25°C unless otherwise specified

Characteristic (Note 4)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-15	—	—	V	I_C = -10μA, I_E = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-12	—	—	V	I_C = -1.0mA, I_B = 0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-6	—	—	V	I_E = -10μA, I_C = 0
Collector Cutoff Current	I_{CBO}	—	—	-100	nA	V_{CB} = -15V, I_E = 0
Collector Cutoff Current	I_{EBO}	—	—	-100	nA	V_{EB} = -6V, I_C = 0
DC Current Gain	h_{FE}	270	—	680	—	V_{CE} = -2.0V, I_C = -10mA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	-100	-250	mV	I_C = -200mA, I_B = -10mA
Gain-Bandwidth Product	f_T	—	280	—	MHz	V_{CE} = -2.0V, I_E = 10mA, f = 100MHz
Collector Output Capacitance	C_{obo}	—	5	—	pF	V_{CB} = -10V, I_E = 0, f = 1MHz

Electrical Characteristics, Pre-Biased NPN Transistor, Q_2 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	$V_{I(off)}$	—	—	0.5	V	V_{CC} = 5V, I_O = 100μA
	$V_{I(on)}$	3	—	—	V	V_O = 0.3V, I_O = 10mA
Output Voltage	$V_{O(on)}$	—	0.1	0.3	V	I_O/ I_I = 10mA/0.5 mA
Input Current	I_I	—	—	0.88	mA	V_I = 5V
Output Current	$I_{O(off)}$	—	—	0.5	μA	V_{CC} = 50V, V_I = 0V
DC Current Gain	G_I	30	—	—	—	V_O = 5V, I_O = 5mA
Gain-Bandwidth Product (Note 5)	f_T	—	250	—	MHz	V_{CE} = 10V, I_E = -5mA, f = 100MHz
Input Resistance	R_1	7	10	13	kΩ	—
Resistance Ratio	R_2/R_1	0.8	1	1.2	—	—

Notes: 4. Short duration pulse test used to minimize self-heating effect.
5. Characteristics of the transistor. For reference only.

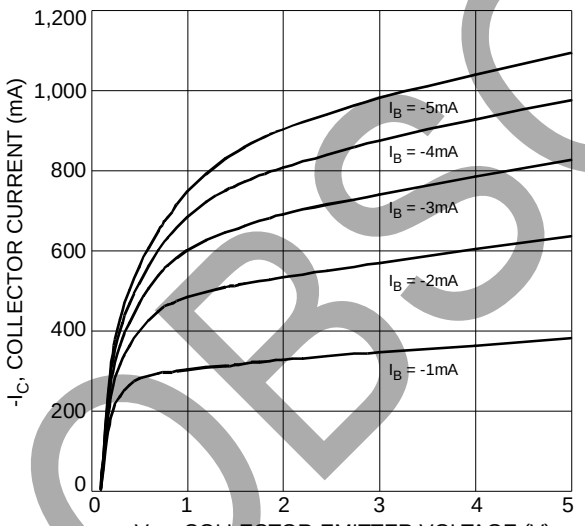

Fig. 1 Typical Collector Current
vs. Collector-Emitter Voltage (Q1, PNP)

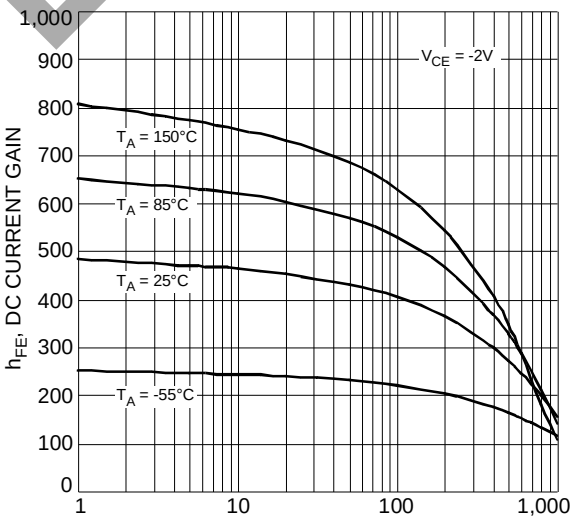

Fig. 2 Typical DC Current Gain
vs. Collector Current (Q1, PNP)

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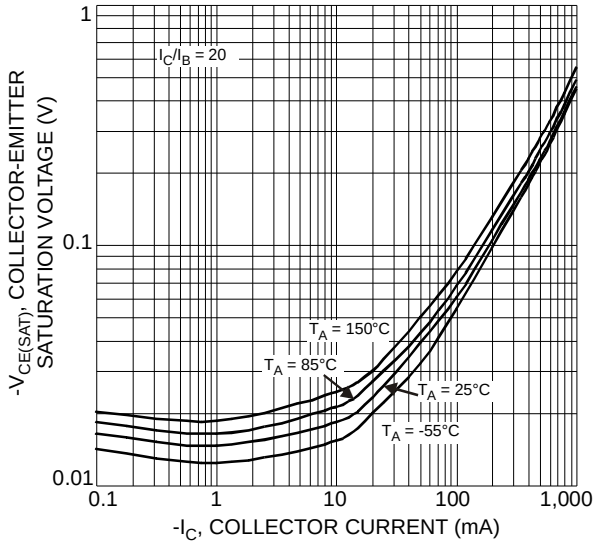

Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current (Q1, PNP)

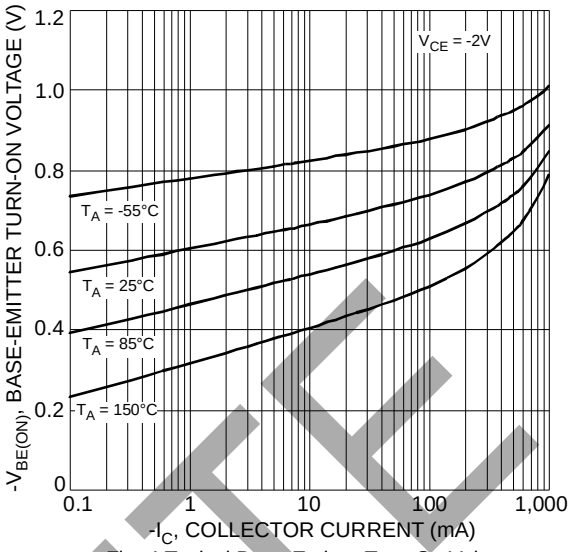

Fig. 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current (Q1, PNP)

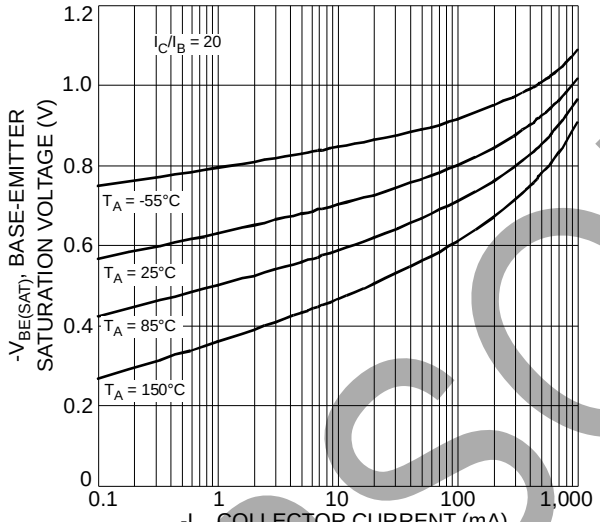

Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current (Q1, PNP)

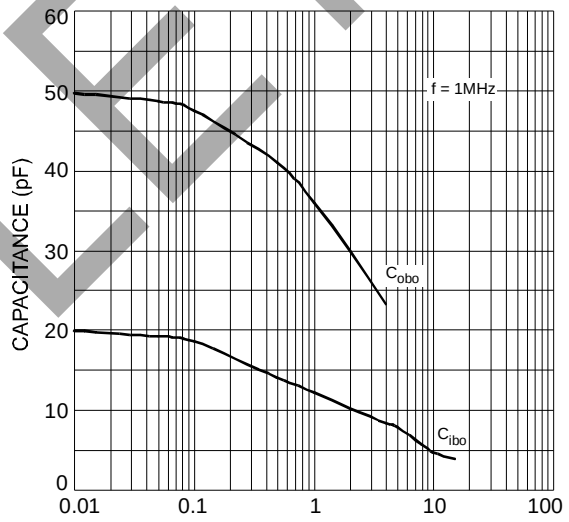

Fig. 6 Typical Capacitance Characteristics (Q1, PNP)

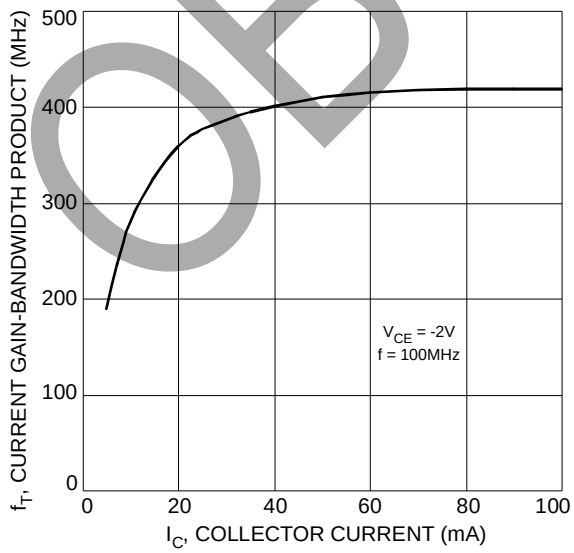

Fig. 7 Typical Gain-Bandwidth Product vs. Emitter Current (Q1, PNP)

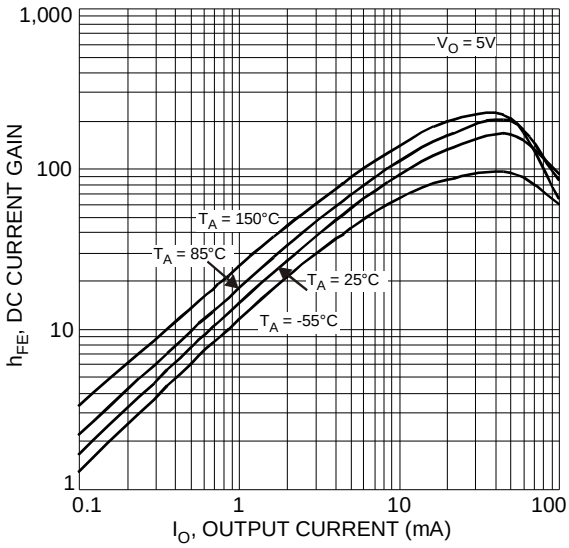

Fig. 8 Typical DC Current Gain vs. Output Current (Q2, NPN PBT)

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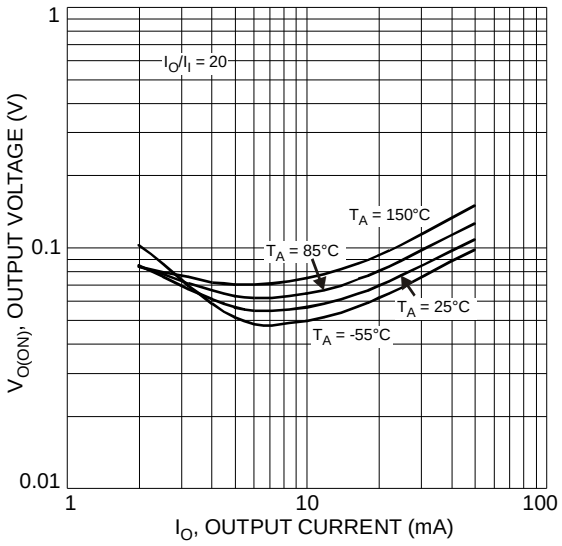

Fig. 9 Typical Output Voltage vs. Output Current (Q2, NPN PBT)

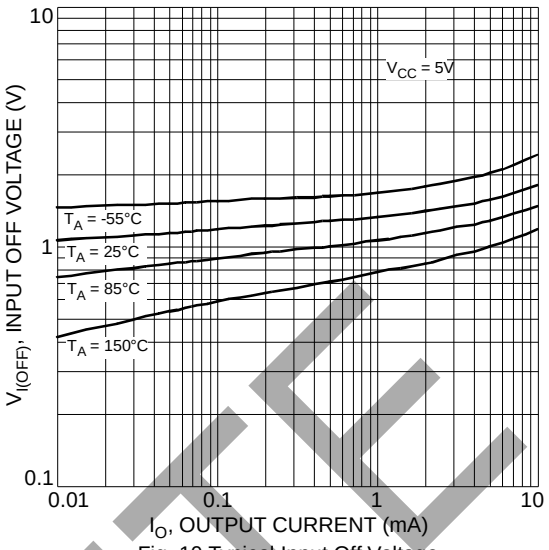

Fig. 10 Typical Input Off Voltage vs. Output Current (Q2, NPN PBT)

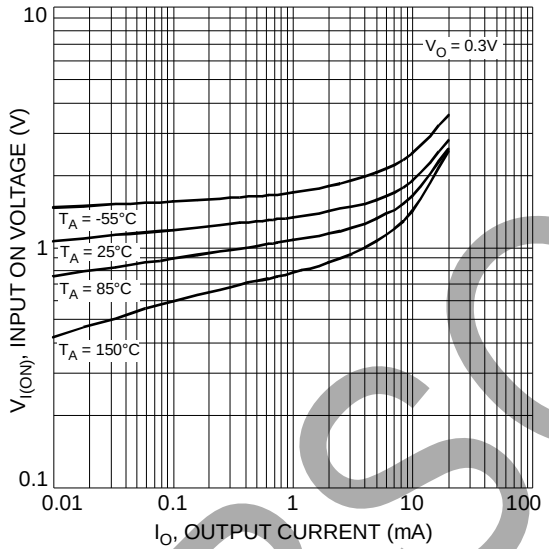

Fig. 11 Typical Input On Voltage vs. Output Current (Q2, NPN PBT)

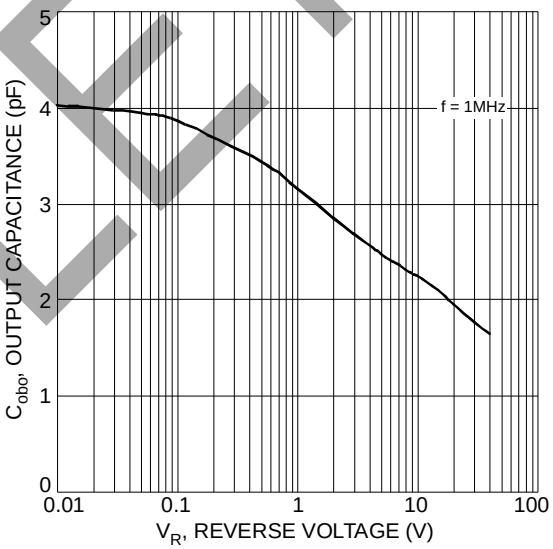

Fig. 12 Typical Output Capacitance Characteristics (Q2, NPN PBT)

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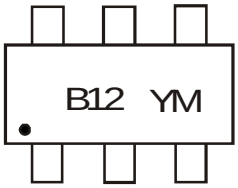
Ordering Information (Note 6)

Device	Packaging	Shipping
EMF21-7	SOT-563	3000/Tape & Reel

Notes: 6. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



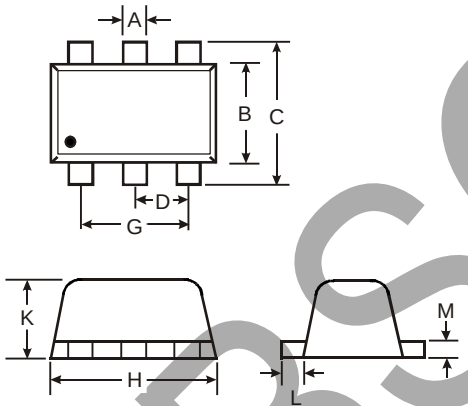
B12 = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: U = 2007
M = Month ex: 9 = September

Date Code Key

Year	2007	2008	2009	2010	2011	2012
Code	U	V	W	X	Y	Z

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Package Outline Dimensions



SOT-563			
Dim	**Min**	**Max**	**Typ**
A	0.15	0.30	0.25
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	0.50	-	-
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.56	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

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