



**THE DATASHEET OF  
DMB2227A-7**

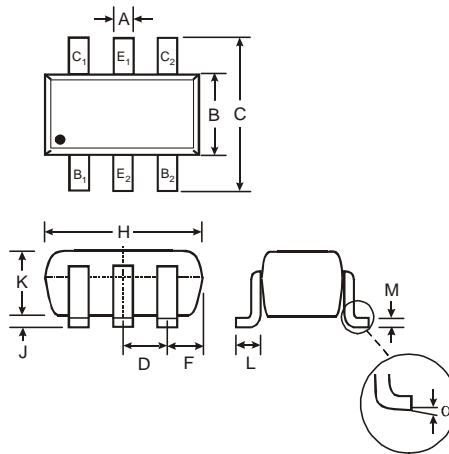


**Features**

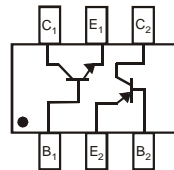
- Complementary Pair
- Epitaxial Planar Die Construction
- One 2222A Type (NPN),  
One 2907A Type (PNP)
- Ideal for Low Power Amplification and Switching
- **Lead Free By Design/RoHS Compliant (Note 2)**
- **"Green Device" (Note 3)**

**Mechanical Data**

- Case: SOT-26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish - Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Ordering & Date Code Information: See Page 6
- Marking Information: See Page 6
- Weight: 0.006 grams (approximate)



Note: E1, B1, and C1 = 2222A Type (NPN)  
E2, B2, and C2 = 2907A Type (PNP)  
Type marking indicates orientation



SOT-26			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
F	-	-	0.55
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
alpha	0°	8°	-
<b>All Dimensions in mm</b>			

**Maximum Ratings: 2222A Type (NPN)** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	2222A (NPN)	Unit
Collector-Base Voltage	V <sub>CB0</sub>	75	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	6.0	V
Collector Current - Continuous	I <sub>C</sub>	600	mA

**Maximum Ratings: 2907A Type (PNP)** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	2907A (PNP)	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-60	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-60	V
Emitter-Base Voltage	V <sub>EBO</sub>	-5.0	V
Collector Current - Continuous	I <sub>C</sub>	-600	mA

**Maximum Ratings: Total** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 1)	P <sub>D</sub>	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	R <sub>thetaJA</sub>	417	°C/W
Operating and Storage Temperature Range	T <sub>j</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; 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>.
  2. No purposefully added lead.
  3. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).

NEW PRODUCT

**Electrical Characteristics: 2222A Type (NPN)** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition	
<b>OFF CHARACTERISTICS (Note 4)</b>						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	75	—	V	$I_C = 10\mu\text{A}, I_E = 0$	
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40	—	V	$I_C = 10\text{mA}, I_B = 0$	
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6.0	—	V	$I_E = 10\mu\text{A}, I_C = 0$	
Collector Cutoff Current	$I_{CBO}$	—	10	nA	$V_{CB} = 60\text{V}, I_E = 0$	
Collector Cutoff Current	$I_{CEX}$	—	10	nA	$V_{CE} = 60\text{V}, V_{EB(OFF)} = 3.0\text{V}$	
Emitter Cutoff Current	$I_{EBO}$	—	10	nA	$V_{EB} = 3.0\text{V}, I_C = 0$	
Base Cutoff Current	$I_{BL}$	—	20	nA	$V_{CE} = 60\text{V}, V_{EB(OFF)} = 3.0\text{V}$	
<b>ON CHARACTERISTICS (Note 4)</b>						
DC Current Gain	$h_{FE}$	35	—	—	$I_C = 100\mu\text{A}, V_{CE} = 10\text{V}$	
		50	—			$I_C = 1.0\text{mA}, V_{CE} = 10\text{V}$
		75	—			$I_C = 10\text{mA}, V_{CE} = 10\text{V}$
		100	300			$I_C = 150\text{mA}, V_{CE} = 10\text{V}$
		40	—			$I_C = 500\text{mA}, V_{CE} = 10\text{V}$
		50	—			$I_C = 10\text{mA}, V_{CE} = 10\text{V}, T_A = -55^\circ\text{C}$
35	—	$I_C = 150\text{mA}, V_{CE} = 1.0\text{V}$				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.3 1.0	V	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$	
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	0.6	1.2 2.0	V	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$	
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Output Capacitance	$C_{obo}$	—	8	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}, I_E = 0$	
Input Capacitance	$C_{ibo}$	—	25	pF	$V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$	
Current Gain-Bandwidth Product	$f_T$	300	—	MHz	$V_{CE} = 20\text{V}, I_C = 20\text{mA}, f = 100\text{MHz}$	
<b>SWITCHING CHARACTERISTICS</b>						
Delay Time	$t_d$	—	10	ns	$V_{CC} = 30\text{V}, I_C = 150\text{mA}$	
Rise Time	$t_r$	—	25	ns	$V_{BE(off)} = -0.5\text{V}, I_{B1} = 15\text{mA}$	
Storage Time	$t_s$	—	225	ns	$V_{CC} = 30\text{V}, I_C = 150\text{mA}$	
Fall Time	$t_f$	—	60	ns	$I_{B1} = I_{B2} = 15\text{mA}$	

Notes: 4. Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

## Electrical Characteristics: 2907A Type (PNP) @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 4)</b>					
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	-60	—	V	I <sub>C</sub> = -10μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	-60	—	V	I <sub>C</sub> = -10mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	-5.0	—	V	I <sub>E</sub> = -10μA, I <sub>C</sub> = 0
Collector Cutoff Current	I <sub>CBO</sub>	—	-10	nA μA	V <sub>CB</sub> = -50V, I <sub>E</sub> = 0 V <sub>CB</sub> = -50V, I <sub>E</sub> = 0, T <sub>A</sub> = 125°C
Collector Cutoff Current	I <sub>CEX</sub>	—	-50	nA	V <sub>CE</sub> = -30V, V <sub>EB(OFF)</sub> = -0.5V
Base Cutoff Current	I <sub>BL</sub>	—	-50	nA	V <sub>CE</sub> = -30V, V <sub>EB(OFF)</sub> = -0.5V
<b>ON CHARACTERISTICS (Note 4)</b>					
DC Current Gain	h <sub>FE</sub>	75 100 100 100 50	— — — 300 —	—	I <sub>C</sub> = -100μA, V <sub>CE</sub> = -10V I <sub>C</sub> = -1.0mA, V <sub>CE</sub> = -10V I <sub>C</sub> = -10mA, V <sub>CE</sub> = -10V I <sub>C</sub> = -150mA, V <sub>CE</sub> = -10V I <sub>C</sub> = -500mA, V <sub>CE</sub> = -10V
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	—	-0.4 -1.6	V	I <sub>C</sub> = -150mA, I <sub>B</sub> = -15mA I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	—	-1.3 -2.6	V	I <sub>C</sub> = 150mA, I <sub>B</sub> = 15mA I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	C <sub>obo</sub>	—	8.0	pF	V <sub>CB</sub> = -10V, f = 1.0MHz, I <sub>E</sub> = 0
Input Capacitance	C <sub>ibo</sub>	—	30	pF	V <sub>EB</sub> = -2.0V, f = 1.0MHz, I <sub>C</sub> = 0
Current Gain-Bandwidth Product	f <sub>T</sub>	200	—	MHz	V <sub>CE</sub> = -20V, I <sub>C</sub> = -50mA, f = 100MHz
<b>SWITCHING CHARACTERISTICS</b>					
Turn-On Time	t <sub>on</sub>	—	45	ns	V <sub>CC</sub> = -30V, I <sub>C</sub> = -150mA, I <sub>B1</sub> = -15mA
Delay Time	t <sub>d</sub>	—	10	ns	
Rise Time	t <sub>r</sub>	—	40	ns	
Turn-Off Time	t <sub>off</sub>	—	100	ns	V <sub>CC</sub> = -6.0V, I <sub>C</sub> = -150mA, I <sub>B1</sub> = I <sub>B2</sub> = -15mA
Storage Time	t <sub>s</sub>	—	80	ns	
Fall Time	t <sub>f</sub>	—	30	ns	

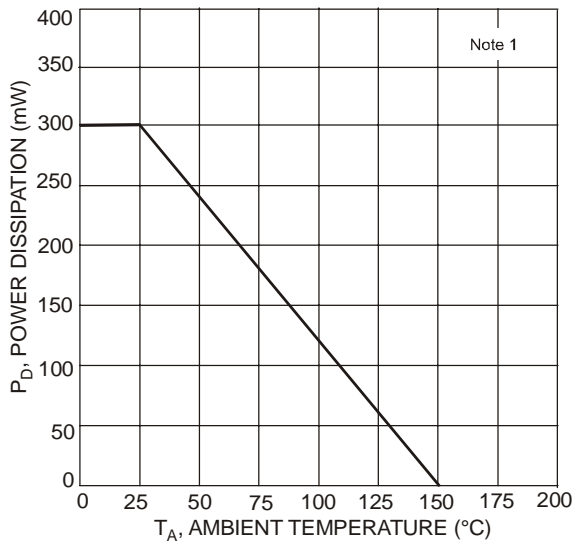


Fig. 1, Max Power Dissipation vs. Ambient Temperature

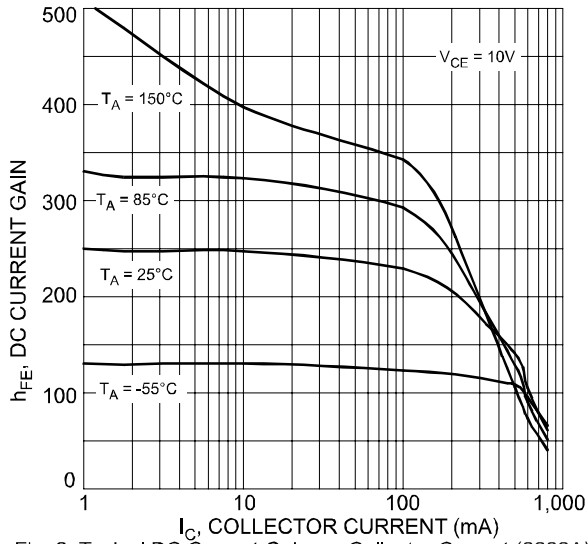


Fig. 2 Typical DC Current Gain vs. Collector Current (2222A)

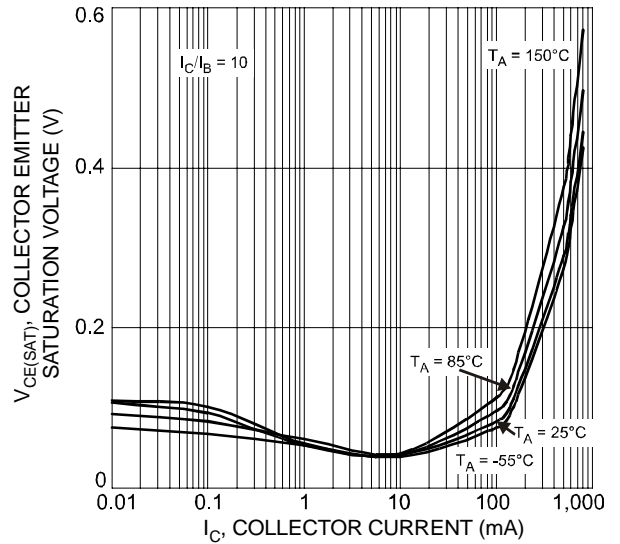


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current (2222A)

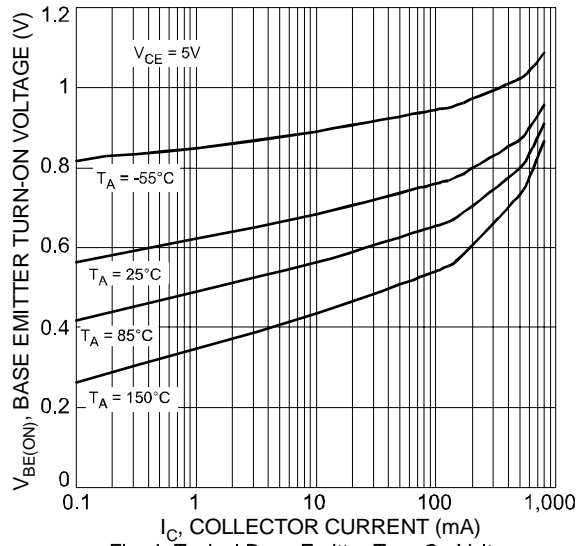


Fig. 4 Typical Base Emitter Turn-On Voltage vs. Collector Current (2222A)

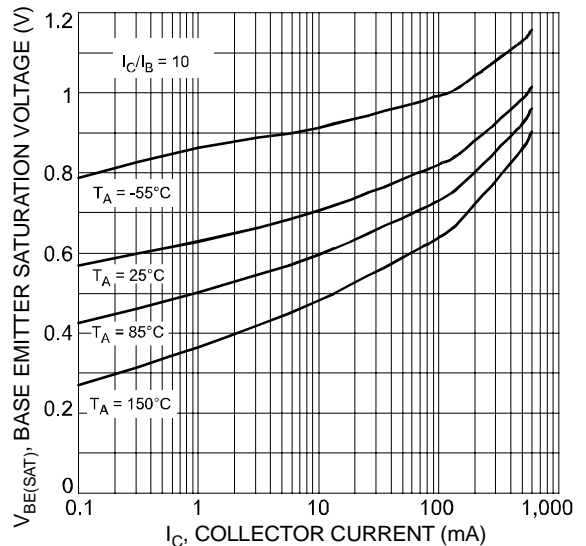


Fig. 5 Typical Base Emitter Saturation Voltage vs. Collector Current (2222A)

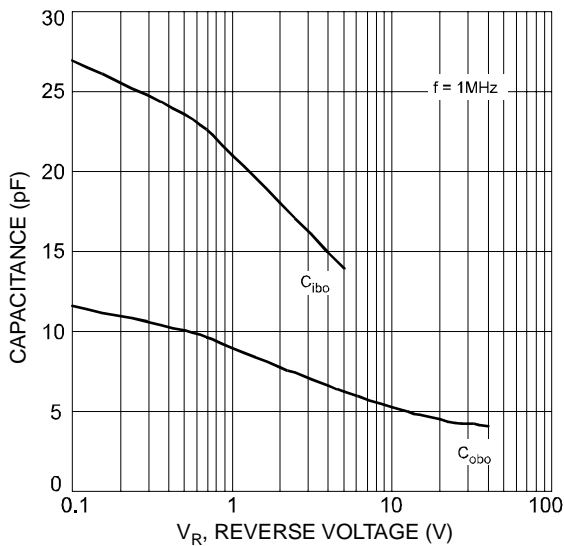


Fig. 6 Typical Capacitance Characteristics (2222A)

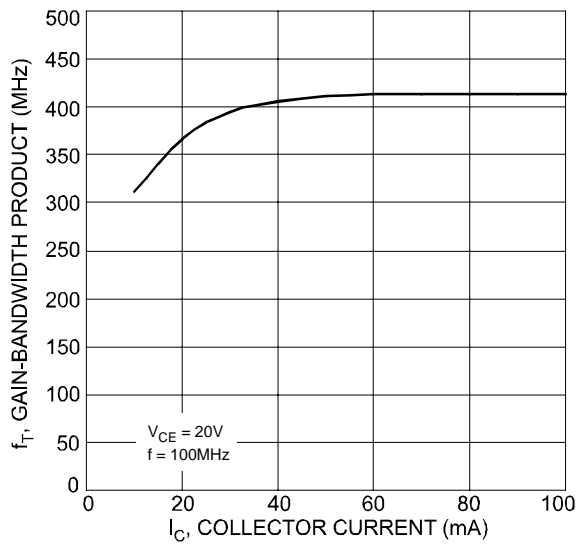


Fig. 7 Typical Gain-Bandwidth Product vs. Collector Current (2222A)

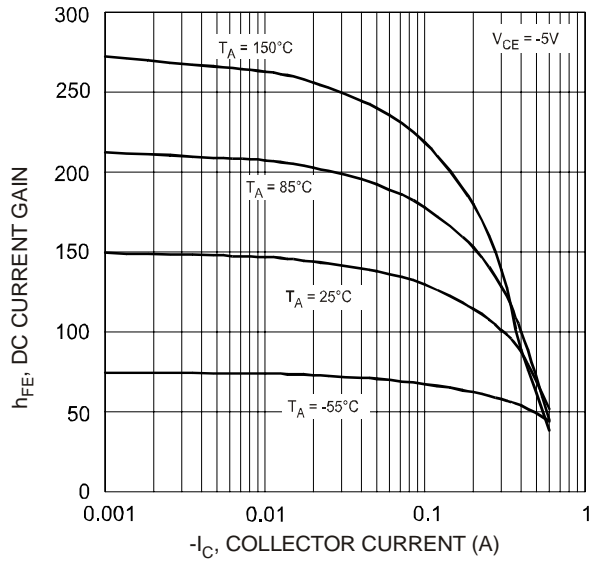


Fig. 8 Typical DC Current Gain vs. Collector Current (2907A)

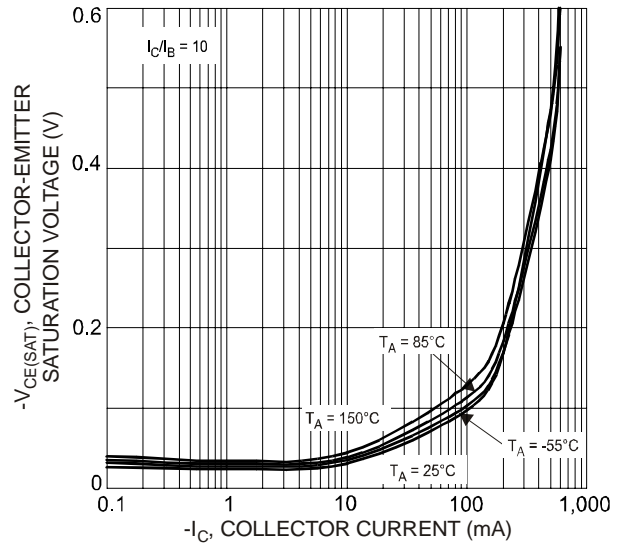


Fig. 9 Typical Collector-Emitter Saturation Voltage vs. Collector Current (2907A)

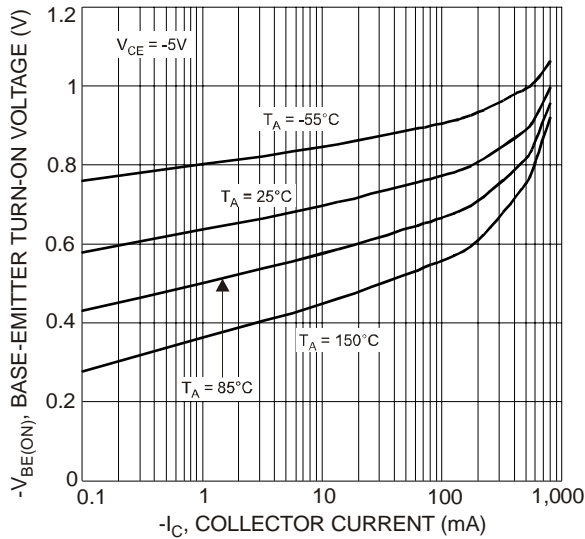


Fig. 10 Typical Base-Emitter Turn-On Voltage vs. Collector Current (2907A)

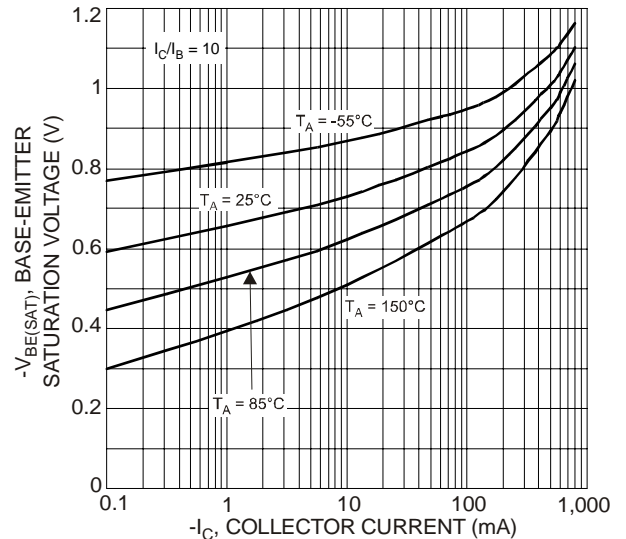


Fig. 11 Typical Base-Emitter Saturation Voltage vs. Collector Current (2907A)

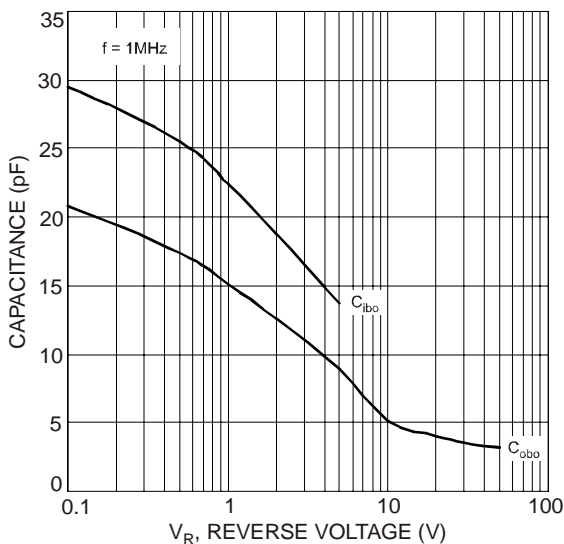


Fig. 12 Typical Capacitance Characteristics (2907A)

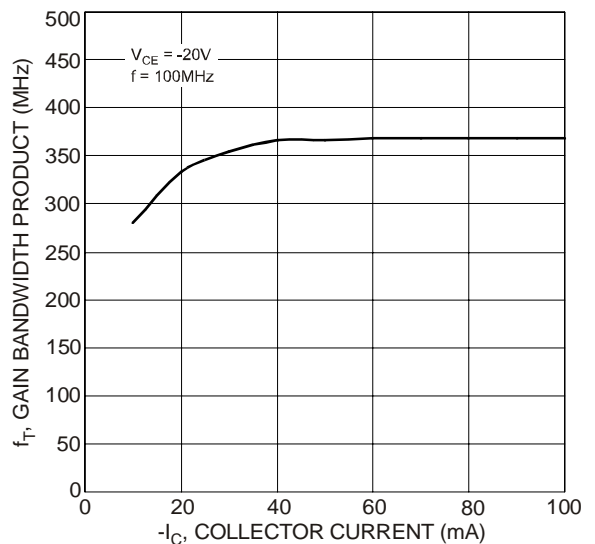


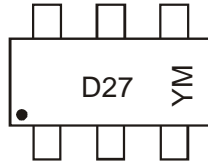
Fig. 13 Typical Gain-Bandwidth Product vs. Collector Current (2907A)

## Ordering Information (Note 5)

Device	Packaging	Shipping
DMB2227A-7	SOT-26	3000/Tape & Reel

Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



D27 = 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

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