



**THE DATASHEET OF
MMDT2227M-7**

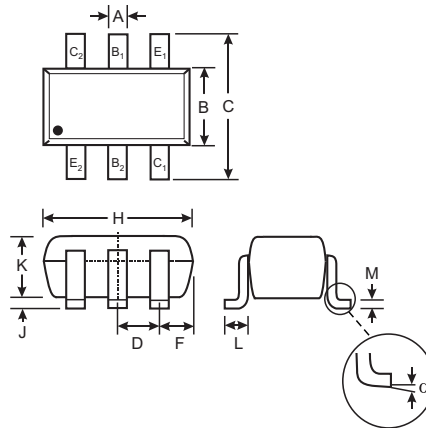


Features

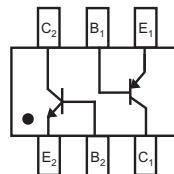
- Complementary Pair
- Epitaxial Planar Die Construction
- One 2222A Type (NPN),
- One 2907A Type (PNP)
- Ideal for Low Power Amplification and Switching
- Lead Free By Design/RoHS Compliant (Note 2)**
- "Green Device" (Note 3)**

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 3
- Marking (See Page 3): K27
- Weight: 0.006 grams (approximate)



Note: E1, B1, and C1 = 2907A Type (PNP),
E2, B2, and C2 = 2222A Type (NPN).
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
	0	8	
All Dimensions in mm			

Maximum Ratings, 2222A Type (NPN)

@ T_A = 25 C unless otherwise specified

Characteristic	Symbol	2222A (NPN)	Unit
Collector-Base Voltage	V _{CBO}	75	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	6.0	V
Collector Current - Continuous	I _C	600	mA

Maximum Ratings, 2907A Type (PNP)

@ T_A = 25 C unless otherwise specified

Characteristic	Symbol	2907A (PNP)	Unit
Collector-Base Voltage	V _{CBO}	-60	V
Collector-Emitter Voltage	V _{CEO}	-60	V
Emitter-Base Voltage	V _{EBO}	-5.0	V
Collector Current - Continuous	I _C	-600	mA

Maximum Ratings, Total

@ T_A = 25 C unless otherwise specified

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 1)	P _d	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	R _{JA}	417	C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	C

- Note:
- 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>.
 - No purposefully added lead.
 - Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.

Electrical Characteristics, 2222A Type (NPN)

 @ $T_A = 25\text{ C}$ unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 4)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	75		V	$I_C = 10\text{ A}, I_E = 0$
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	$I_E = 10\text{ A}, I_C = 0$
Collector Cutoff Current	I_{CBO}		10	nA A	$V_{CB} = 60\text{ V}, I_E = 0$ $V_{CB} = 60\text{ V}, I_E = 0, T_A = 150\text{ C}$
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	$V_{CE} = 60\text{ V}, V_{EB(OFF)} = 3.0\text{ V}$
ON CHARACTERISTICS (Note 4)					
DC Current Gain	h_{FE}	35 50 75 100 40 50 35	300		$I_C = 100\text{ A}, V_{CE} = 10\text{ V}$ $I_C = 1.0\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 10\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 150\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 500\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 10\text{ mA}, V_{CE} = 10\text{ V}, T_A = -55\text{ C}$ $I_C = 150\text{ mA}, V_{CE} = 1.0\text{ V}$
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	$I_C = 150\text{ mA}, I_B = 15\text{ mA}$ $I_C = 500\text{ mA}, I_B = 50\text{ mA}$
SMALL SIGNAL CHARACTERISTICS					
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	$V_{CE} = 20\text{ V}, I_C = 20\text{ mA},$ $f = 100\text{ MHz}$
SWITCHING CHARACTERISTICS					
Delay Time	t_d		10	ns	$V_{CC} = 30\text{ V}, I_C = 150\text{ mA},$ $V_{BE(off)} = -0.5\text{ V}, I_{B1} = 15\text{ mA}$
Rise Time	t_r		25	ns	
Storage Time	t_s		225	ns	$V_{CC} = 30\text{ V}, I_C = 150\text{ mA},$ $I_{B1} = I_{B2} = 15\text{ mA}$
Fall Time	t_f		60	ns	

 Note: 4. Pulse test: Pulse width 300 μ s, duty cycle 2%.

Electrical Characteristics, 2907A Type (PNP) @ $T_A = 25\text{ C}$ unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-60		V	$I_C = -10\text{ A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-60		V	$I_C = -10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5.0		V	$I_E = -10\text{ A}, I_C = 0$
Collector Cutoff Current	I_{CBO}		-10	nA A	$V_{CB} = -50\text{V}, I_E = 0$ $V_{CB} = -50\text{V}, I_E = 0, T_A = 125\text{ C}$
Collector Cutoff Current	I_{CEX}		-50	nA	$V_{CE} = -30\text{V}, V_{EB(OFF)} = -0.5\text{V}$
Base Cutoff Current	I_{BL}		-50	nA	$V_{CE} = -30\text{V}, V_{EB(OFF)} = -0.5\text{V}$
ON CHARACTERISTICS (Note 5)					
DC Current Gain	h_{FE}	75 100 100 100 50	300		$I_C = -100\mu\text{A}, V_{CE} = -10\text{V}$ $I_C = -1.0\text{mA}, V_{CE} = -10\text{V}$ $I_C = -10\text{mA}, V_{CE} = -10\text{V}$ $I_C = -150\text{mA}, V_{CE} = -10\text{V}$ $I_C = -500\text{mA}, V_{CE} = -10\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$		-0.4 -1.6	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	$V_{BE(SAT)}$		-1.3 -2.6	V	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}		8.0	pF	$V_{CB} = -10\text{V}, f = 1.0\text{MHz}, I_E = 0$
Input Capacitance	C_{ibo}	—	30	pF	$V_{EB} = -2.0\text{V}, f = 1.0\text{MHz}, I_C = 0$
Current Gain-Bandwidth Product	f_T	200		MHz	$V_{CE} = -20\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$
SWITCHING CHARACTERISTICS					
Turn-On Time	t_{on}		45	ns	$V_{CC} = -30\text{V}, I_C = -150\text{mA}, I_{B1} = -15\text{mA}$
Delay Time	t_d		10	ns	
Rise Time	t_r		40	ns	
Turn-Off Time	t_{off}		100	ns	$V_{CC} = -6.0\text{V}, I_C = -150\text{mA}, I_{B1} = I_{B2} = -15\text{mA}$
Storage Time	t_s		80	ns	
Fall Time	t_f		30	ns	

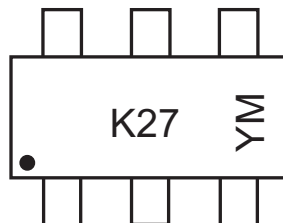
Note: 5. Short duration pulse test used to minimize self-heating effect.

Ordering Information (Note 6)

Device	Packaging	Shipping
MMDT2227M-7	SOT-26	3000/Tape & Reel

Note: 6. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



K27 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year ex: S = 2005
 M = Month ex: 9 = September

Date Code Key

Year	2005	2006	2007	2008	2009	2010	2011	2012
Code	S	T	U	V	W	X	Y	Z

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

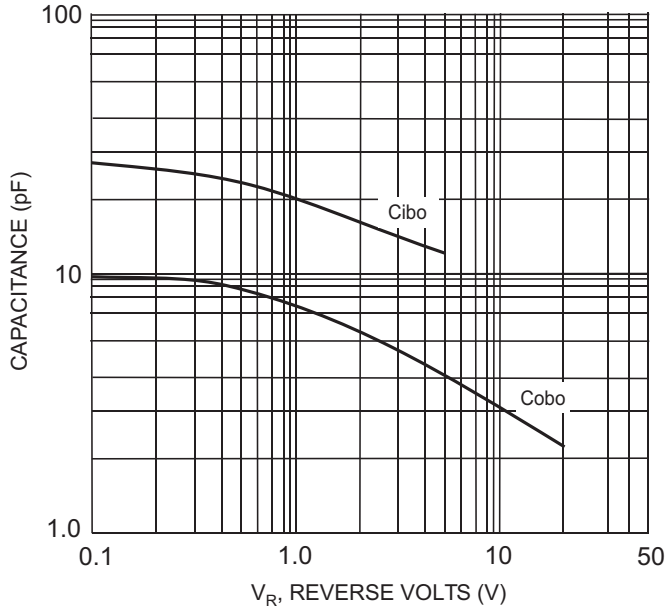


Fig. 1 (2222A) Typical Capacitance

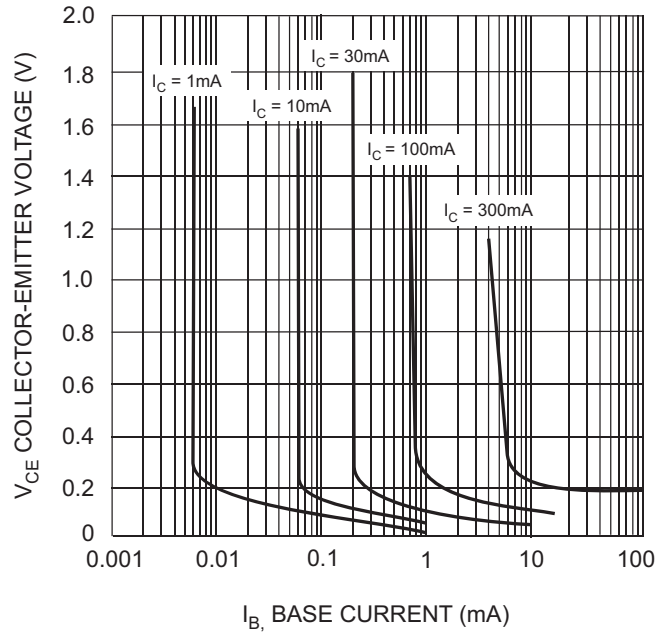


Fig. 2 (2222A) Typical Collector Saturation Region

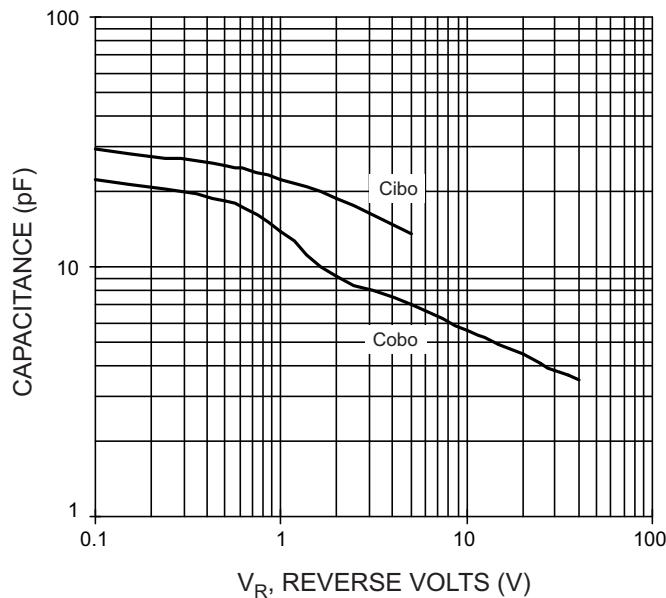


Fig. 3 (2907A) Typical Capacitance

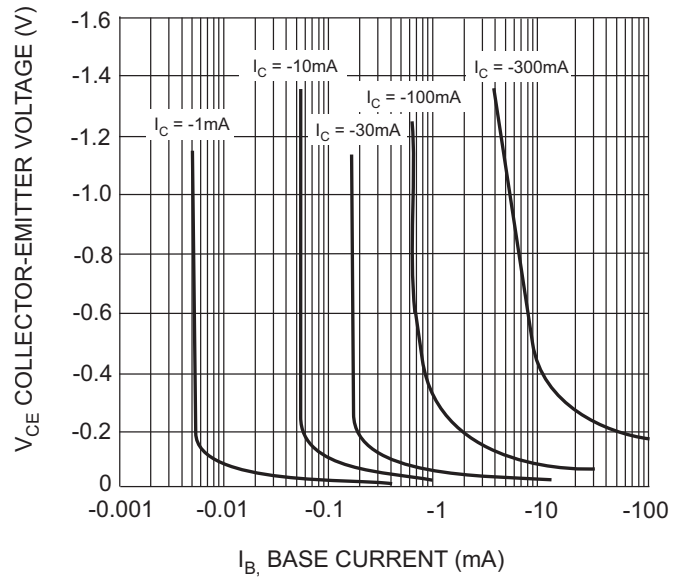


Fig. 4 (2907A) Typical Collector Saturation Region

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