

Electrical Characteristics, 2222A Type (NPN)

 @ T_A = 25 °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 A, I _E = 0
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	40		V	I _C = 10mA, I _B = 0
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	6.0		V	I _E = 10 A, I _C = 0
Collector Cutoff Current	I _{CBO}		10	nA A	V _{CB} = 60V, I _E = 0 V _{CB} = 60V, I _E = 0, T _A = 150 °C
Collector Cutoff Current	I _{CEX}		10	nA	V _{CE} = 60V, V _{EB(OFF)} = 3.0V
Emitter Cutoff Current	I _{EBO}		10	nA	V _{EB} = 3.0V, I _C = 0
Base Cutoff Current	I _{BL}		20	nA	V _{CE} = 60V, V _{EB(OFF)} = 3.0V
ON CHARACTERISTICS (Note 4)					
DC Current Gain	h _{FE}	35 50 75 100 40 50 35	300		I _C = 100 A, V _{CE} = 10V I _C = 1.0mA, V _{CE} = 10V I _C = 10mA, V _{CE} = 10V I _C = 150mA, V _{CE} = 10V I _C = 500mA, V _{CE} = 10V I _C = 10mA, V _{CE} = 10V, T _A = -55 °C I _C = 150mA, V _{CE} = 1.0V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}		0.3 1.0	V	I _C = 150mA, I _B = 15mA I _C = 500mA, I _B = 50mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	0.6	1.2 2.0	V	I _C = 150mA, I _B = 15mA I _C = 500mA, I _B = 50mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C _{obo}		8	pF	V _{CB} = 10V, f = 1.0MHz, I _E = 0
Input Capacitance	C _{ibo}	—	25	pF	V _{EB} = 0.5V, f = 1.0MHz, I _C = 0
Current Gain-Bandwidth Product	f _T	300		MHz	V _{CE} = 20V, I _C = 20mA, f = 100MHz
SWITCHING CHARACTERISTICS					
Delay Time	t _d		10	ns	V _{CC} = 30V, I _C = 150mA, V _{BE(off)} = - 0.5V, I _{B1} = 15mA
Rise Time	t _r		25	ns	
Storage Time	t _s		225	ns	V _{CC} = 30V, I _C = 150mA, I _{B1} = I _{B2} = 15mA
Fall Time	t _f		60	ns	

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

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

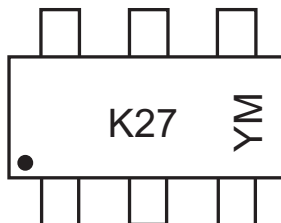
Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-60		V	$I_C = -10\text{ A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-60		V	$I_C = -10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5.0		V	$I_E = -10\text{ A}, I_C = 0$
Collector Cutoff Current	I_{CBO}		-10	nA A	$V_{CB} = -50\text{V}, I_E = 0$ $V_{CB} = -50\text{V}, I_E = 0, T_A = 125^\circ\text{C}$
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

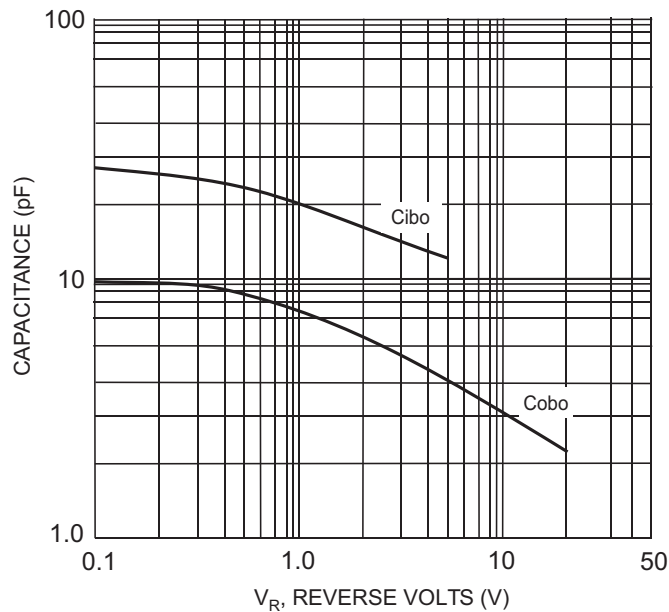


Fig. 1 (2222A) Typical Capacitance

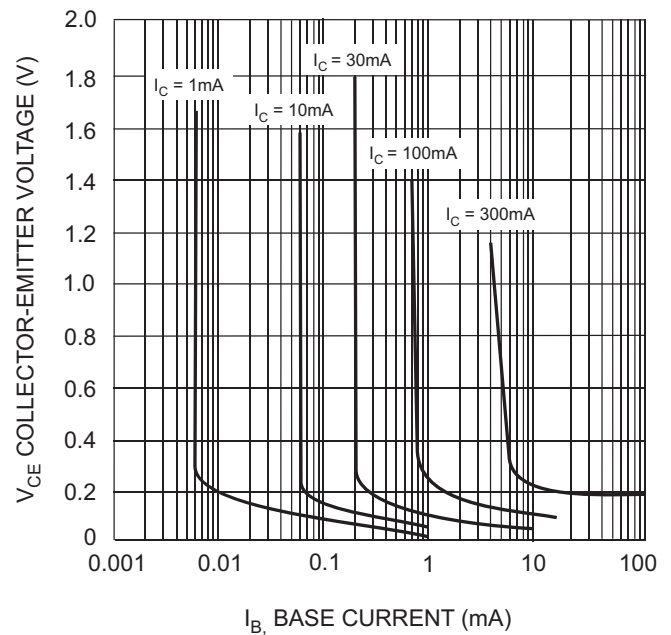


Fig. 2 (2222A) Typical Collector Saturation Region

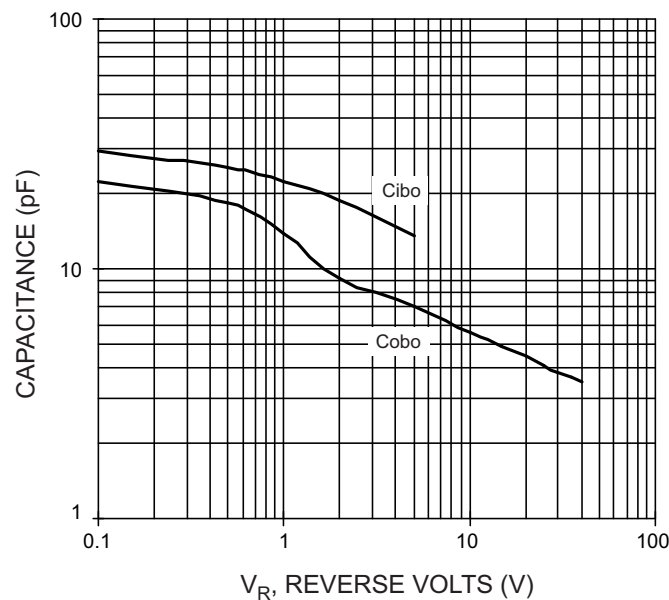


Fig. 3 (2907A) Typical Capacitance

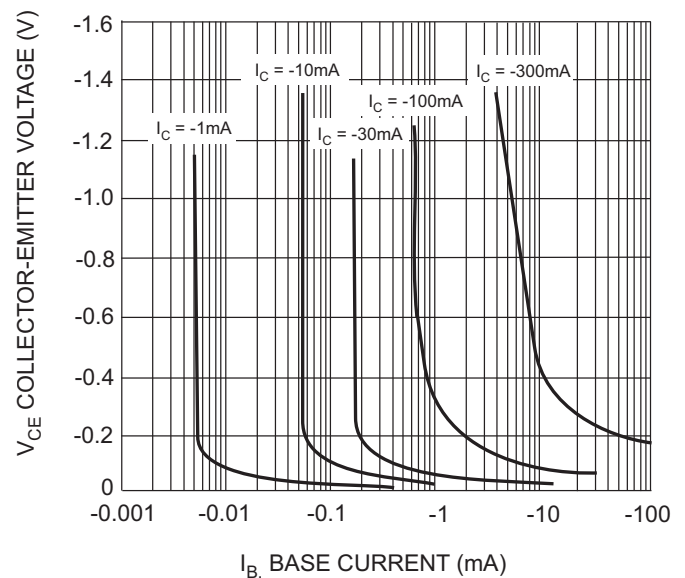


Fig. 4 (2907A) Typical Collector Saturation Region

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