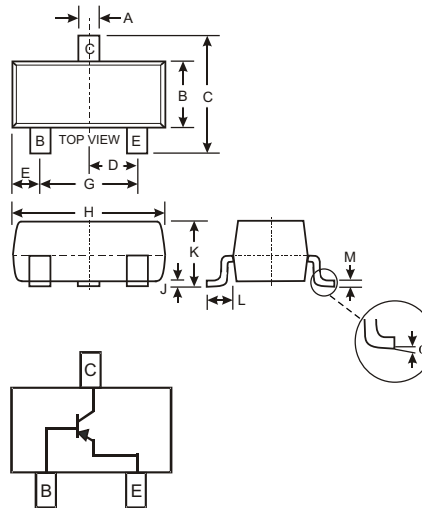


Features

Epitaxial Planar Die Construction
Complementary NPN Type Available (MMBT3904)
Ideal for Medium Power Amplification and Switching
Lead Free/RoHS Compliant (Note 2)
Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

Case: SOT-23
Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
Moisture Sensitivity: Level 1 per J-STD-020C
Terminal Connections: See Diagram
Terminals: Solderable per MIL-STD-202, Method 208
Lead Free Plating (Matte Tin)
Finish annealed over Alloy 42 leadframe).
Marking (See Page 2): K3N
Ordering & Date Code Information: See Page 2
Weight: 0.008 grams (approximate)



SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
E	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
	0	8
All Dimensions in mm		

Maximum Ratings @ T_A = 25 °C unless otherwise specified

Characteristic	Symbol	MMBT3906	Unit
Collector-Base Voltage	V _{CB0}	-40	V
Collector-Emitter Voltage	V _{CE0}	-40	V
Emitter-Base Voltage	V _{EB0}	-5.0	V
Collector Current - Continuous (Note 1)	I _C	-200	mA
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

- 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.

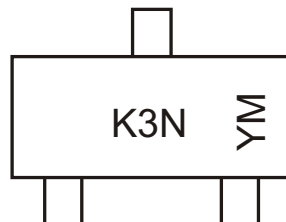
Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 3)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-40		V	$I_C = -10\text{ A}$, $I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-40		V	$I_C = -1.0\text{mA}$, $I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5.0		V	$I_E = -10\text{ A}$, $I_C = 0$
Collector Cutoff Current	I_{CEX}		-50	nA	$V_{CE} = -30\text{V}$, $V_{EB(OFF)} = -3.0\text{V}$
	I_{CBO}		-50	nA	$V_{CB} = -30\text{V}$, $I_E = 0$
Base Cutoff Current	I_{BL}		-50	nA	$V_{CE} = -30\text{V}$, $V_{EB(OFF)} = -3.0\text{V}$
ON CHARACTERISTICS (Note 3)					
DC Current Gain	h_{FE}	60 80 100 60 30	300		$I_C = -100\mu\text{A}$, $V_{CE} = -1.0\text{V}$ $I_C = -1.0\text{mA}$, $V_{CE} = -1.0\text{V}$ $I_C = -10\text{mA}$, $V_{CE} = -1.0\text{V}$ $I_C = -50\text{mA}$, $V_{CE} = -1.0\text{V}$ $I_C = -100\text{mA}$, $V_{CE} = -1.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$		-0.25 -0.40	V	$I_C = -10\text{mA}$, $I_B = -1.0\text{mA}$ $I_C = -50\text{mA}$, $I_B = -5.0\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	-0.65	-0.85 -0.95	V	$I_C = -10\text{mA}$, $I_B = -1.0\text{mA}$ $I_C = -50\text{mA}$, $I_B = -5.0\text{mA}$
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}		4.5	pF	$V_{CB} = -5.0\text{V}$, $f = 1.0\text{MHz}$, $I_E = 0$
Input Capacitance	C_{ibo}		10	pF	$V_{EB} = -0.5\text{V}$, $f = 1.0\text{MHz}$, $I_C = 0$
Input Impedance	h_{ie}	2.0	12	k	$V_{CE} = 10\text{V}$, $I_C = 1.0\text{mA}$, $f = 1.0\text{kHz}$
Voltage Feedback Ratio	h_{re}	0.1	10	$\times 10^{-4}$	
Small Signal Current Gain	h_{fe}	100	400		
Output Admittance	h_{oe}	3.0	60	S	
Current Gain-Bandwidth Product	f_T	250		MHz	$V_{CE} = -20\text{V}$, $I_C = -10\text{mA}$, $f = 100\text{MHz}$
Noise Figure	NF		4.0	dB	$V_{CE} = -5.0\text{V}$, $I_C = -100\text{ A}$, $R_S = 1.0\text{k}$ $f = 1.0\text{kHz}$
SWITCHING CHARACTERISTICS					
Delay Time	t_d		35	ns	$V_{CC} = -3.0\text{V}$, $I_C = -10\text{mA}$, $V_{BE(off)} = 0.5\text{V}$, $I_{B1} = -1.0\text{mA}$
Rise Time	t_r		35	ns	
Storage Time	t_s		225	ns	$V_{CC} = -3.0\text{V}$, $I_C = -10\text{mA}$, $I_{B1} = I_{B2} = -1.0\text{mA}$
Fall Time	t_f		75	ns	

Ordering Information (Note 4)

Device	Packaging	Shipping
MMBT3906 -7-F	SOT-23	3000/Tape & Reel

- Notes: 3. Short duration test pulse used to minimize self-heating effect.
 4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

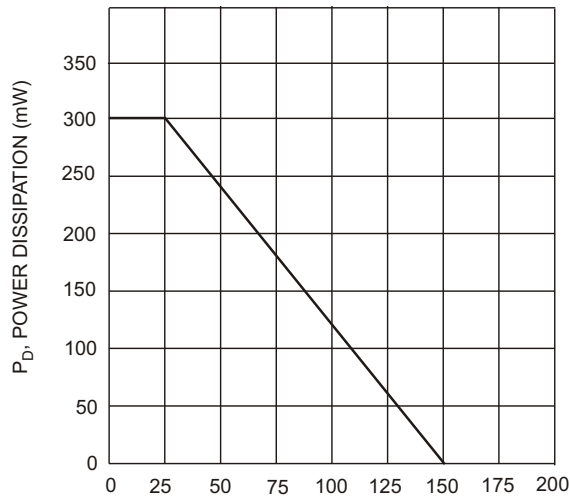
Marking Information


K3N = Product Type Marking Code
 YM = Date Code Marking
 Y = Year ex: N = 2002
 M = Month ex: 9 = September

Date Code Key

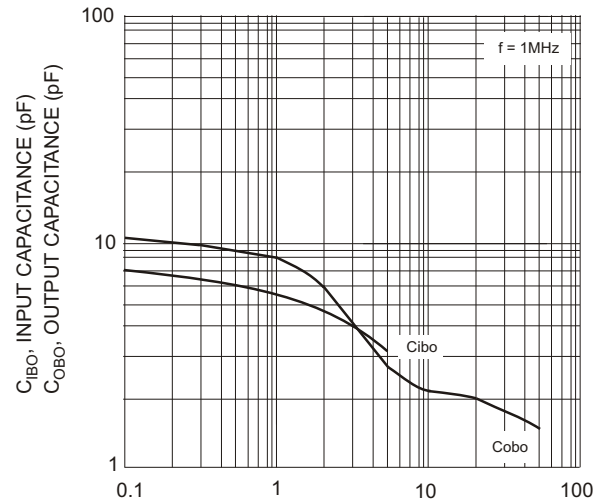
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Code	J	K	L	M	N	P	R	S	T	U	V	W

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



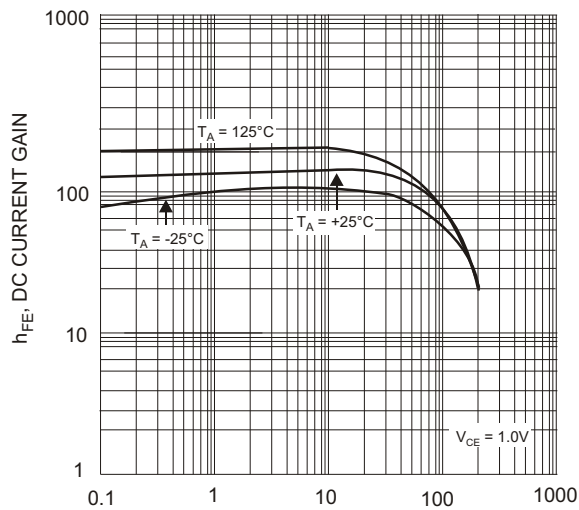
T_A , AMBIENT TEMPERATURE ($^{\circ}\text{C}$)

Fig. 1, Max Power Dissipation vs Ambient Temperature



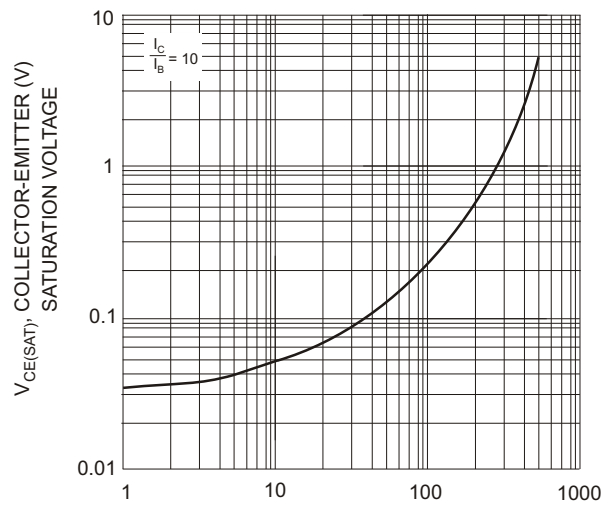
V_{CB} , COLLECTOR-BASE VOLTAGE (V)

Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage



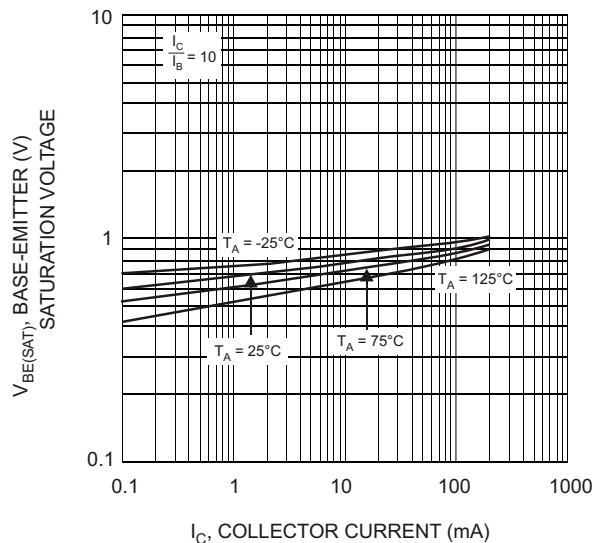
I_C , COLLECTOR CURRENT (mA)

Fig. 3, Typical DC Current Gain vs Collector Current



I_C , COLLECTOR CURRENT (mA)

Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current



I_C , COLLECTOR CURRENT (mA)

Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

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