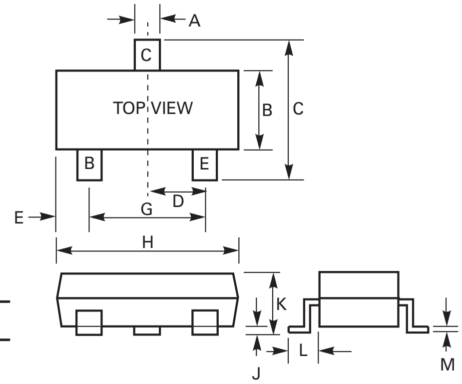
2N3906 / MMBT3906

PNP SMALL SIGNAL TRANSISTORS

Features

- Epitaxial Planar Die Construction
- Available in Both Through-Hole and Surface Mount Packages
- Suitable for Switching and Amplifier Applications
- Complementary NPN Types Available (2N3904/MMBT3904)

MMBT3906

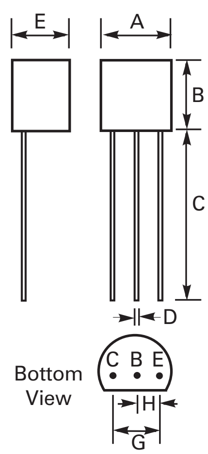


SOT-23		
Dim	**Min**	**Max**
A	0.37	0.51
B	1.19	1.40
C	2.10	2.50
D	0.89	1.05
E	0.45	0.61
G	1.78	2.05
H	2.65	3.05
J	0.013	0.15
K	0.89	1.10
L	0.45	0.61
M	0.076	0.178
All Dimensions in mm		

Mechanical Data

- Case: TO-92/SOT-23, Molded Plastic
- Leads/Terminals: Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking: TO-92 Type Number
  SOT-23 2A, 3N, R2A, K3N
- Approx Weight: TO-92 0.18 grams
  SOT-23 0.008 grams

2N3906



TO-92		
Dim	**Min**	**Max**
A	4.32	4.83
B	4.32	4.78
C	12.50	15.62
D	0.36	0.56
E	3.15	3.94
G	2.29	2.79
H	1.14	1.40
All Dimensions in mm		

Maximum Ratings

@ T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-40	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Collector Current - Continuous	I_C	-100	mA
Collector Current - Peak	I_{CM}	-200	mA
Power Dissipation TO-92 (2N3906) (Note 1) SOT-23 (MMBT3906) (Note 2) T_{SB} = 50 °C	P_d	 500 300	mW
Operating and Storage Temperature Range	T_j, T_{STG}	-55 to +150	°C

Notes: 1. Leads maintained at a distance of 2.0mm from body at specified ambient temperature (TO-92).
2. Device mounted on ceramic substrate 0.7mm x 2.5 cm^2 area (SOT-23).
3. Pulse test: Pulse width ≤ 300µs, duty cycle ≤ 2%.

Electrical Characteristics @ T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
DC Current Gain	h_{FE}	50 70 100 60 30	— — 300 — —	—	$-V_{CE}$ = 1.0V,- I_C = 0.1mA $-V_{CE}$ = 1.0V,- I_C = 1.0mA $-V_{CE}$ = 1.0V,- I_C = 10mA $-V_{CE}$ = 1.0V,- I_C = 50mA $-V_{CE}$ = 1.0V,- I_C = 100mA
Collector Saturation Voltage	$V_{CE(SAT)}$	—	0.25 0.40	V	(Note 3) $-I_C$ = 10mA,- I_B = 1.0mA $-I_C$ = 50mA,- I_B = 5.0mA
Base Saturation Voltage	$V_{BE(SAT)}$	—	0.85 0.95	V	(Note 3) $-I_C$ = 10mA, $-I_B$ = 1.0mA $-I_C$ = 50mA, $-I_B$ = 5.0mA
Collector Cutoff Current	I_{CEX}	—	50	nA	$-V_{EB}$ = 3.0V, $-V_{CE}$ = 30V
Emitter Cutoff Current	I_{BL}	—	50	nA	$-V_{EB}$ = 3.0V, $-V_{CE}$ = 30V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	40	—	V	$-I_C$ = 10µA, $-I_E$ = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40	—	V	$-I_C$ = 1.0mA,- I_B = 0 (Note 3)
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5.0	—	V	$-I_E$ = 10µA,- I_C = 0
Gain Bandwidth Product	f_T	250	—	MHz	$-V_{CE}$ = 20V, $-I_C$ = 10mA, f = 100MHz
Collector-Base Capacitance	C_{CBO}	—	4.5	pF	$-V_{CB}$ = 5.0V, $-I_E$ = 0, f = 100kHz
Emitter-Base Capacitance	C_{EBO}	—	10	pF	$-V_{EB}$ = 0.5V, $-I_C$ = 0, f = 100kHz
Noise Figure	NF	—	5.0	dB	$-V_{CE}$ = 5.0V, $-I_C$ = 100µA, R_G = 1.0kΩ, f = 10 to 15000Hz
Delay Time	t_d	—	35	ns	$-I_{B1}$ = 1.0mA, $-I_C$ = 10mA, V_{CC} = 3.0V, $V_{BE(off)}$ = 0.5V
Rise Time	t_r	—	35	ns	$-I_{B1}$ = 1.0mA,- I_C = 10mA, $-V_{CC}$ = 3.0V, $-V_{BE(off)}$ = 0.5V
Storage Time	t_s	—	225	ns	$-I_{B1}$ =- I_{B2} = 1.0mA, $-I_C$ = 10mA, $-V_{CC}$ = 3.0V
Fall Time	t_f	—	75	ns	$-I_{B1}$ =- I_{B2} = 1.0mA, $-I_C$ = 10mA, $-V_{CC}$ = 3.0V
Thermal Resistance, Junction to Ambient TO-92, (2N3906) SOT-23,(MMBT3906)	$R_{\theta JA}$	—	250 625	K/W	Note 1 Note 2

Notes:
1. Leads maintained at a distance of 2.0mm from body at specified ambient temperature (TO-92).
2. Device mounted on ceramic substrate 0.7mm x 2.5 cm^2 area (SOT-23).
3. Pulse test: Pulse width ≤ 300µs, duty cycle ≤ 2%.

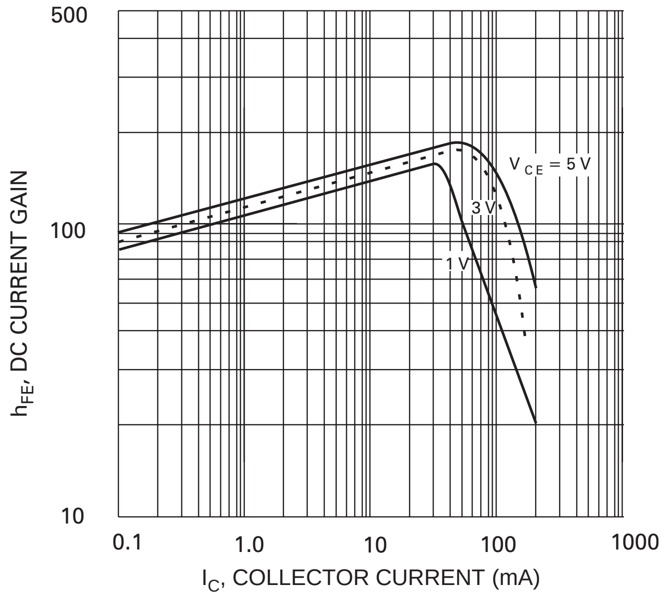


Fig. 1, DC Current Gain vs Collector Current

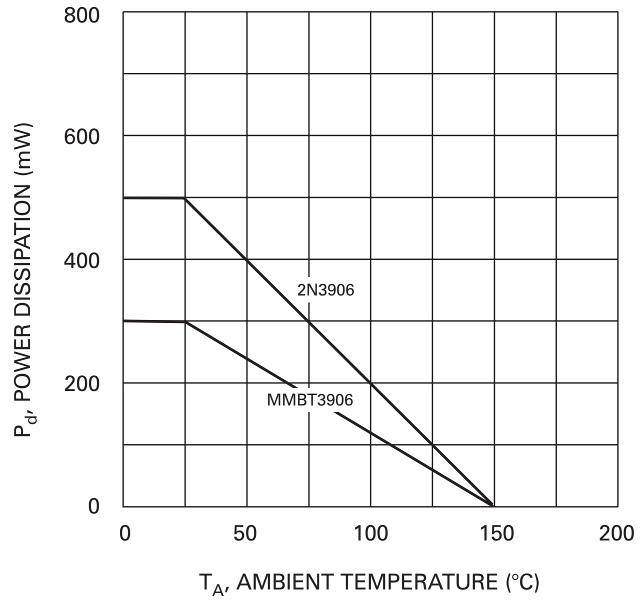


Fig. 2, Max Power Dissipation vs Ambient Temperature

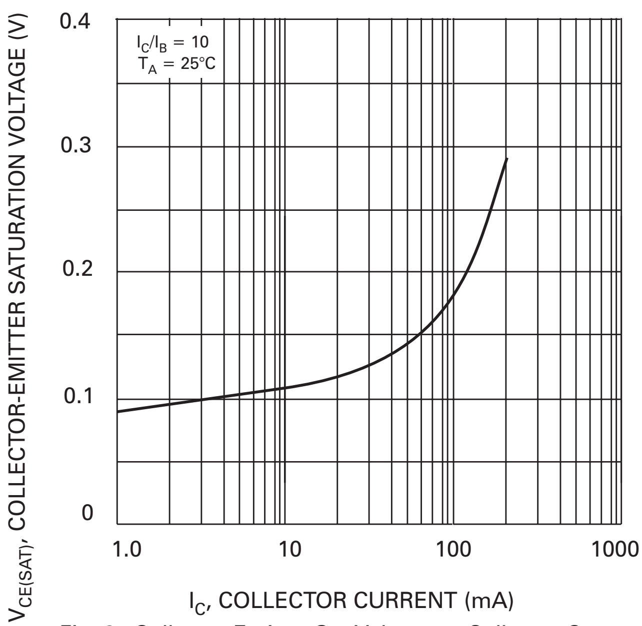


Fig. 3, Collector-Emitter Sat Voltage vs Collector Current

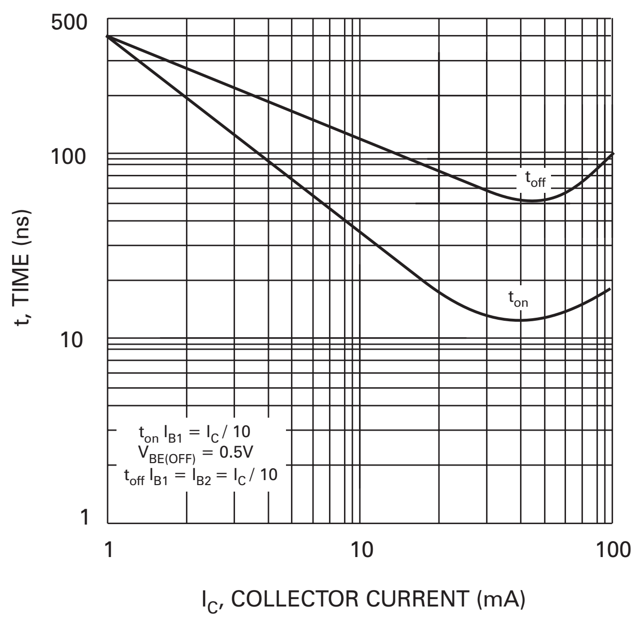


Fig. 4, Turn-On & Turn-Off Times vs Collector Current