

## MMBT3906 TRANSISTOR (PNP)

SOT-23



1. BASE
2. EMITTER
3. COLLECTOR

### FEATURES

- As complementary type, the NPN transistor MMBT3904 is Recommended
- Epitaxial planar die construction

### MARKING: 2A

### MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Units
$V_{CB0}$	Collector-Base Voltage	-40	V
$V_{CE0}$	Collector-Emitter Voltage	-40	V
$V_{EBO}$	Emitter-Base Voltage	-5	V
$I_C$	Collector Current -Continuous	-0.2	A
$P_C$	Collector Power Dissipation	0.3	W
$T_J$	Junction Temperature	150	$^{\circ}\text{C}$
$T_{stg}$	Storage Temperature	-55-150	$^{\circ}\text{C}$

### ELECTRICAL CHARACTERISTICS ( $T_{amb}=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = -10\mu\text{A}, I_E = 0$	-40		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -1\text{mA}, I_B = 0$	-40		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = -10\mu\text{A}, I_C = 0$	-5		V
Collector cut-off current	$I_{CBO}$	$V_{CB} = -40\text{V}, E = 0$		-0.1	$\mu\text{A}$
Collector cut-off current	$I_{CEX}$	$V_{CE} = -30\text{V}, V_{BE(off)} = -3\text{V}$		-50	nA
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -5\text{V}, I_C = 0$		-0.1	$\mu\text{A}$
DC current gain	$h_{FE(1)}$	$V_{CE} = -1\text{V}, I_C = -10\text{mA}$	100	300	
	$h_{FE(2)}$	$V_{CE} = -1\text{V}, I_C = -50\text{mA}$	60		
	$h_{FE(3)}$	$V_{CE} = -1\text{V}, I_C = -100\text{mA}$	30		
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -50\text{mA}, I_B = -5\text{mA}$		-0.4	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -50\text{mA}, I_B = -5\text{mA}$		-0.95	V
Transition frequency	$f_T$	$V_{CE} = -20\text{V}, I_C = -10\text{mA}, f = 100\text{MHz}$	250		MHz
Delay Time	$t_d$	$V_{CC} = -3.0\text{V}, V_{BE} = -0.5\text{V}$		35	nS
Rise Time	$t_r$	$I_C = -10\text{mA}, I_{B1} = -1.0\text{mA}$		35	nS
Storage Time	$t_s$	$V_{CC} = -3.0\text{V}, I_C = -10\text{mA}$		225	nS
Fall Time	$t_f$	$I_{B1} = I_{B2} = -1.0\text{mA}$		75	nS

### CLASSIFICATION OF $h_{FE1}$

Rank	O	Y
Range	100-200	200-300

# Typical Characteristics

# MMBT3906

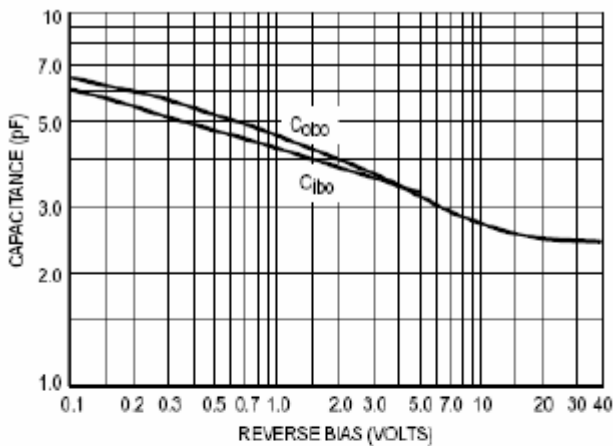


Figure 1 Capacitance

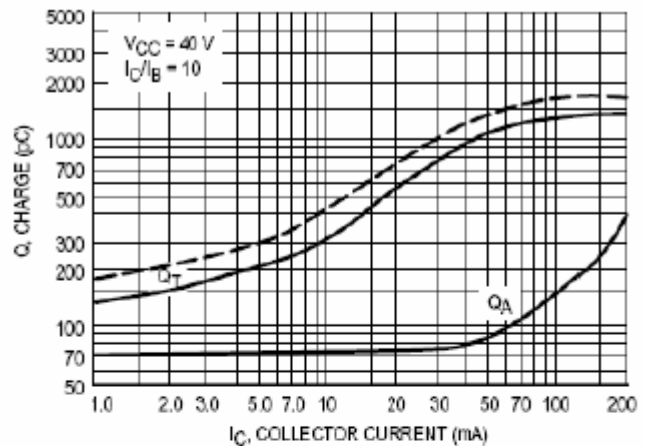


Figure 2 Charge Data

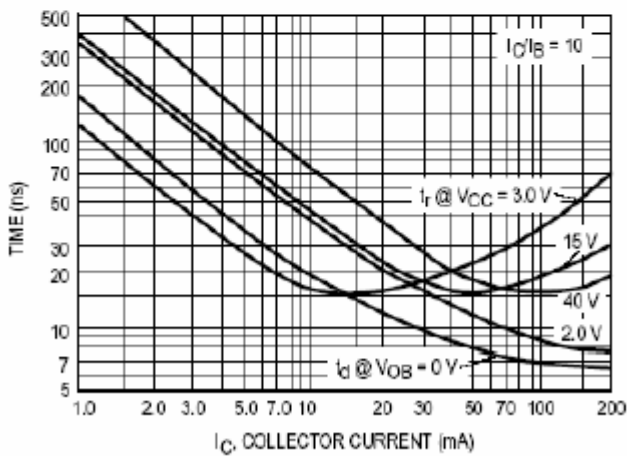


Figure 3 Turn-On Time

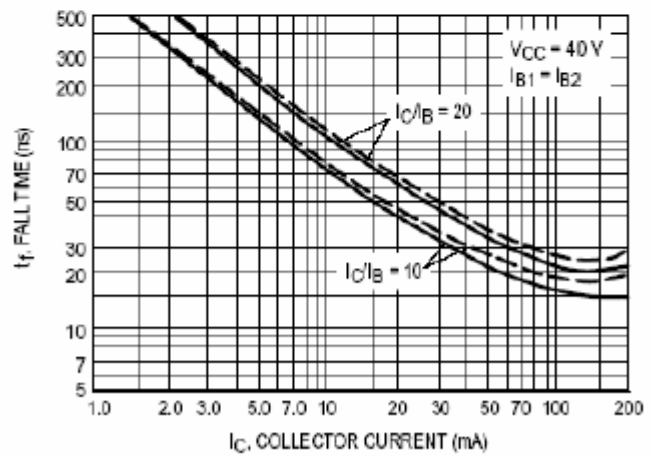


Figure 4 Fall Time

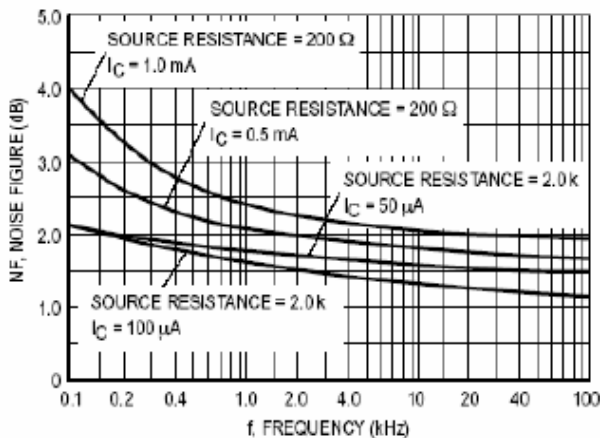


Figure 5

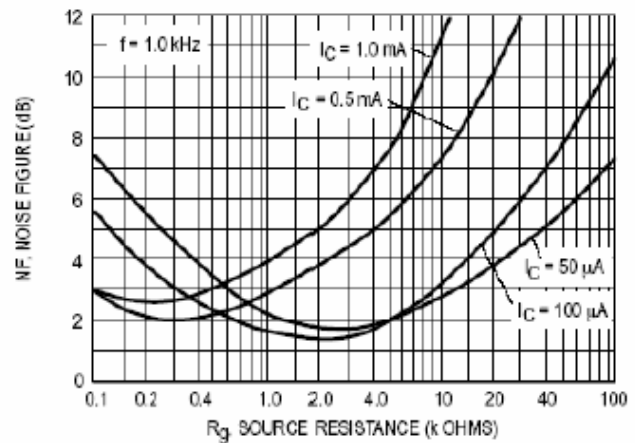


Figure 6

### h PARAMETERS

( $V_{CE} = -10$  Vdc,  $f = 1.0$  kHz,  $T_A = 25^\circ\text{C}$ )

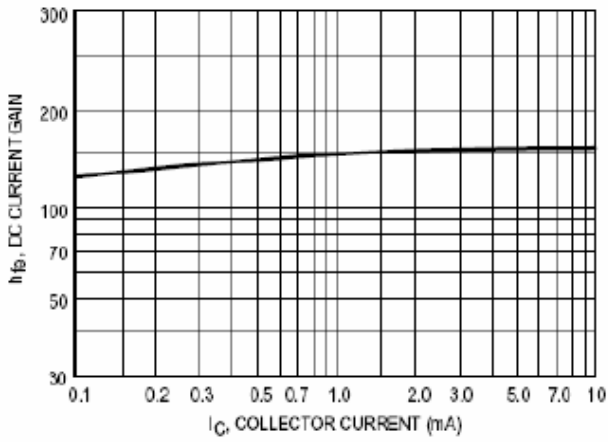


Figure 7 Current Gain

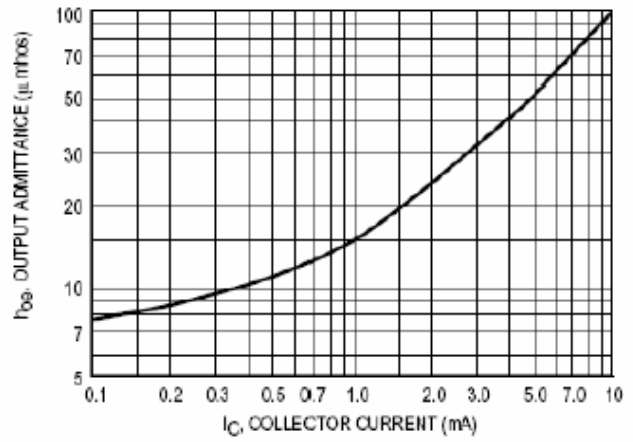


Figure 8 Output Admittance

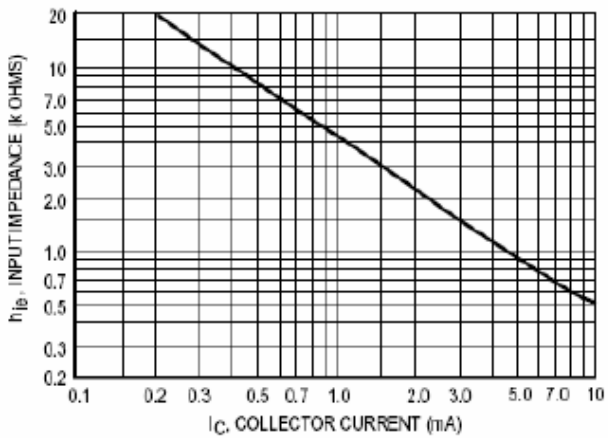


Figure 9 Input Impedance

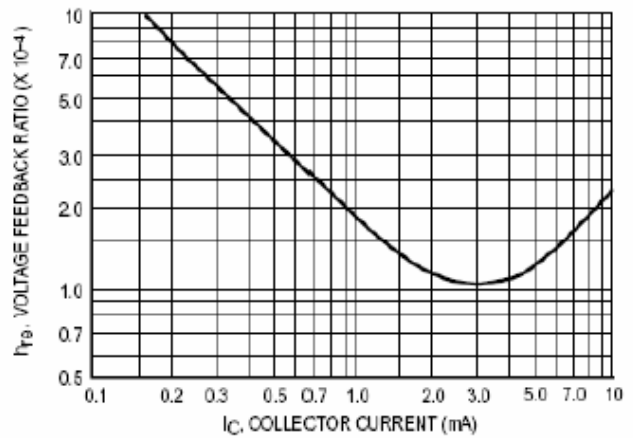


Figure 10 Voltage Feedback Ratio

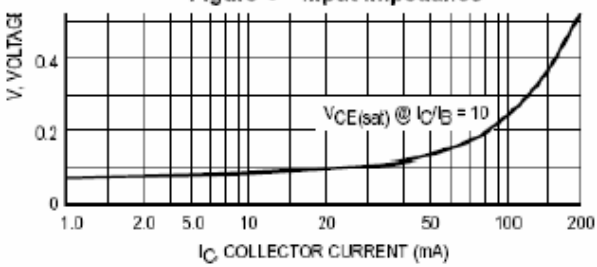


Figure 11 "ON" Voltages

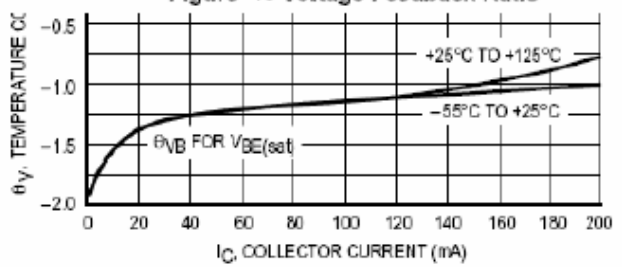


Figure 12 Temperature Coefficients