RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

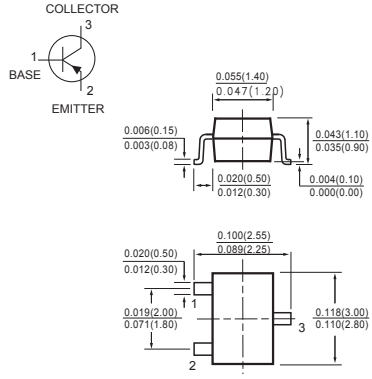
MMBT3906

SOT-23 BIPOLAR TRANSISTORS
TRANSISTOR(PNP)

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

MECHANICAL DATA
* Case: Molded plastic
* Epoxy: UL 94V-O rate flame retardant
* Lead: MIL-STD-202E method 208C guaranteed
* Mounting position: Any
* Weight: 0.008 gram

SOT-23



Dimensions in inches and (millimeters)

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS
Ratings at 25 °C ambient temperature unless otherwise specified.
Single phase, half wave, 60 Hz, resistive or inductive load.
For capacitive load, derate current by 20%.

MAXIMUM RATINGS (@ T_A = 25°C unless otherwise noted)

RATINGS	SYMBOL	VALUE	UNITS
Max. Steady State Power Dissipation (1) @TA=25°C Derate above 25°C	P_D	300	mW
Max. Operating Temperature Range	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

ELECTRICAL CHARACTERISTICS (@ T_A = 25°C unless otherwise noted)

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	-	-	417	°C/W

Notes : 1.Alumina=0.4*0.3*0.024in.99.5% alumina.
2."Fully ROHS Compliant", "100% Sn plating(Pb-free)".

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ELECTRICAL CHARACTERISTICS ($@T_A$=25°C unless otherwise noted)

Chatacteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (2) (I_C= -1.0 mAdc, I_B= 0)	$V_{(BR)CEO}$	-40	-	Vdc
Collector-Base Breakdown Voltage (I_C= -100uAdc, I_E= 0)	$V_{(BR)CBO}$	-40	-	Vdc
Emitter-Base Breakdown Voltage (I_E= -100uAdc, I_C= 0)	$V_{(BR)EBO}$	-5.0	-	Vdc
Base Cutoff Current (V_{CE}= -30Vdc, V_{EB}= -3.0Vdc)	I_{BL}	-	-50	nAdc
Collector Cutoff Current (V_{CE}= -30Vdc, V_{EB}= -3.0Vdc)	I_{CEX}	-	-50	nAdc
ON CHARACTERISTICS(1)				
DC Current Gain (I_C= -0.1mAdc, V_{CE}= -1.0Vdc)	h_{FE}	60	-	-
(I_C= -1.0mAdc, V_{CE}= -1.0Vdc)		80	-	
(I_C= -10mAdc, V_{CE}= -1.0Vdc)		100	300	
(I_C= -50mAdc, V_{CE}= -1.0Vdc)		60	-	
(I_C= -100mAdc, V_{CE}= -1.0Vdc)		30	-	
Collector-Emitter Saturation Voltage (I_C= -10mAdc, I_B= -1.0mAdc)	$V_{CE(sat)}$	-	-0.25	Vdc
(I_C= -50mAdc, I_B= -5.0mAdc)		-	-0.4	
Base-Emitter Saturation Voltage (I_C= -10mAdc, I_B= -1.0mAdc)	$V_{BE(sat)}$	-0.65	-0.85	Vdc
(I_C= -50mAdc, I_B= -5.0mAdc)		-	-0.95	
SMALL-SIGNAL CHARACTERISTICS				
Current-Gain-Bandwidth Product (I_C= -10mAdc, V_{CE}= -20Vdc, f= 100MHz)	f_T	250	-	MHz
Output Capacitance (V_{CB}= -5.0Vdc, I_E= 0, f= 1.0MHz)	C_{obo}	-	4.5	pF
Input Capacitance (V_{EB}= -0.5Vdc, I_C= 0, f= 1.0MHz)	C_{ibo}	-	10	pF
Input Impedance (V_{CE}= -10Vdc, I_C= -1.0mAdc, f= 1.0kHz)	h_{ie}	2.0	12	kΩ
Voltage Feedback Ratio (V_{CE}= -10Vdc, I_C= -1.0mAdc, f= 1.0kHz)	h_{re}	0.1	10	X 10^{-4}
Small-Signal Current Gain (V_{CE}= -10Vdc, I_C= -10mAdc, f= 1.0kHz)	h_{fe}	100	400	-
Output Admittance (V_{CE}= -10Vdc, I_C= -1.0mAdc, f= 1.0kHz)	h_{oe}	3.0	60	umhos
Noise Figure (V_{CE}= -5.0Vdc, I_C= -100uAdc, RS= 1.0kΩ, f= 1.0kHz)	NF	-	4.0	dB
SWITCHING CHARACTERISTICS				
Delay Time (V_{CC}= -3.0Vdc, V_{BE}= 0.5Vdc, I_C= -10mAdc, I_{B1}= -1.0mAdc)	t_d	-	35	ns
Rise Time	t_r	-	35	
Storage Time (V_{CC}= -3.0Vdc, I_C= -10mAdc, I_{B1}= I_{B2}= -1.0mAdc)	t_s	-	225	ns
Fall Time	t_f	-	75	

Note : Pulse Test: Pulse Width≤300ms,Duty Cycle≤2.0%

RATING AND CHARACTERISTICS CURVES (MMBT3906)

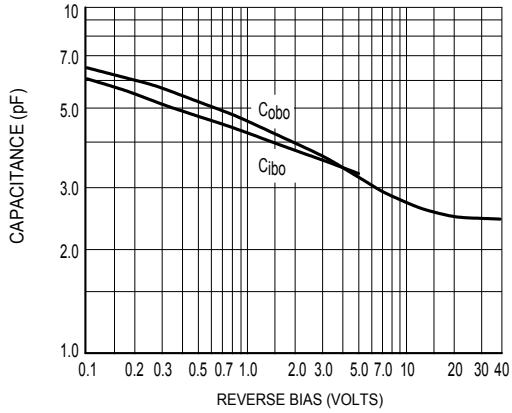

Figure 1 Capacitance

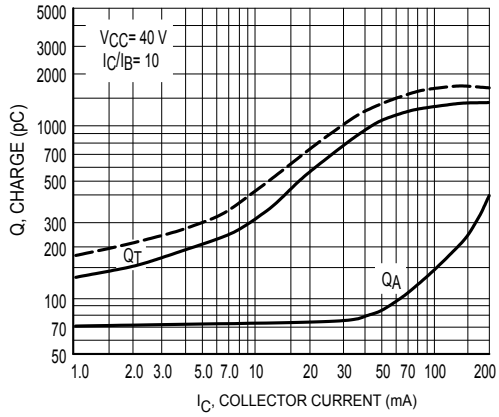

Figure 2 Charge Data

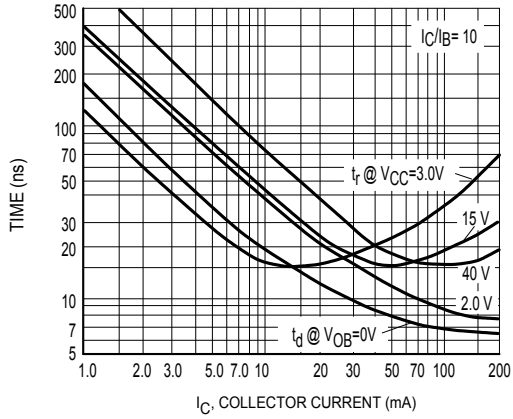

Figure 3 Turn-On Time

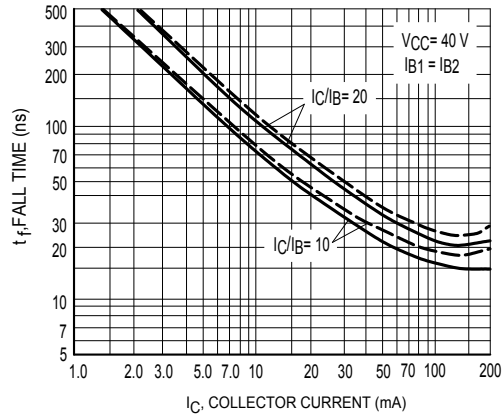

Figure 4 Fall Time

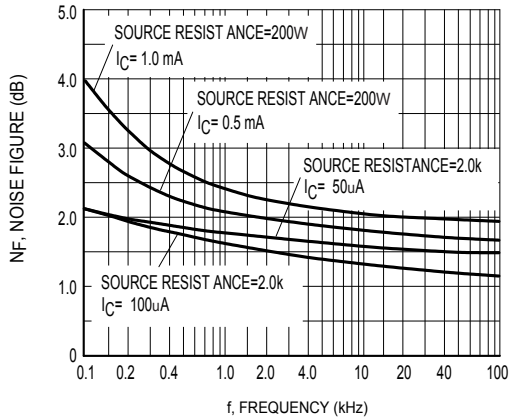

Figure 5

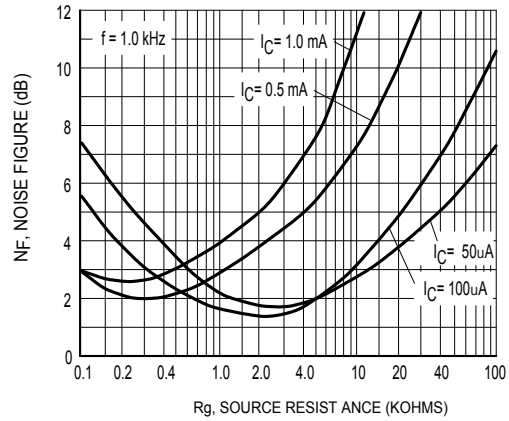

Figure 6

RATING AND CHARACTERISTICS CURVES (MMBT3906)

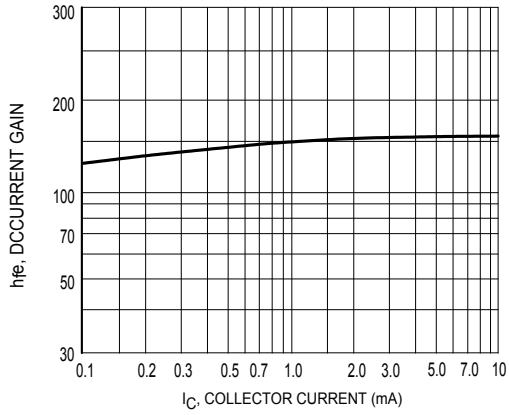

Figure 7 Current Gain

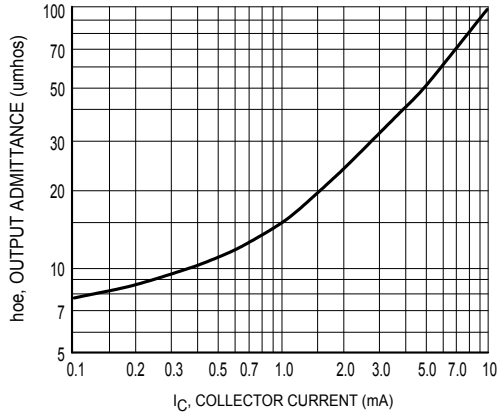

Figure 8 Output Admittance

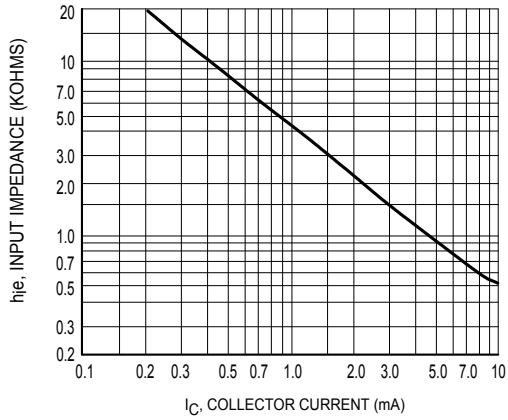

Figure 9 Input Impedance

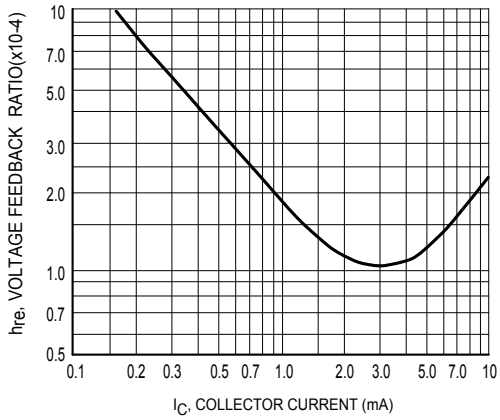

Figure 10 Voltage Feedback Ratio

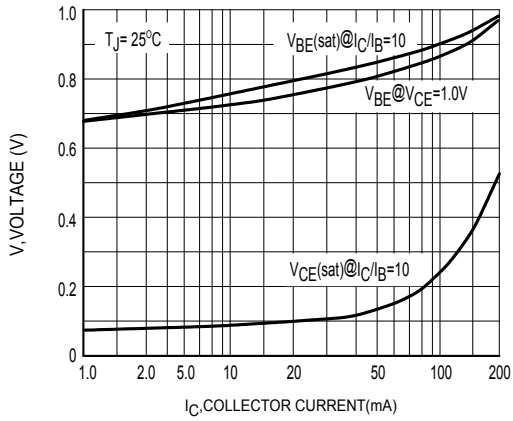

Figure 11 "ON" Voltages

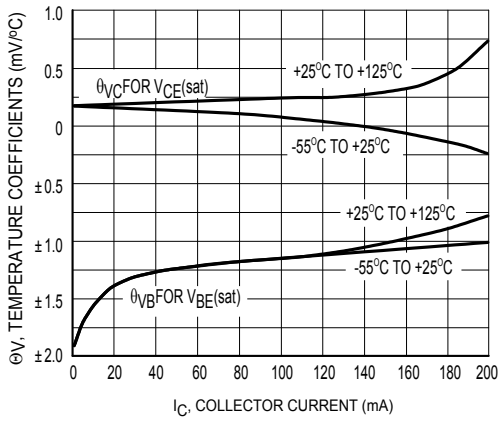

Figure 12 Temperature Coefficients

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