

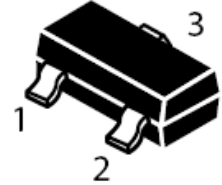
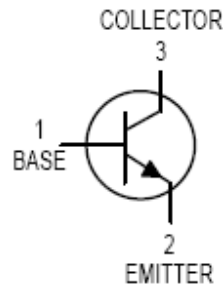
NPN General Purpose Transistor

FEATURES

- Ideal for Medium Power Amplification and Switching
- Complementary PNP Type available(MMST3906)

MECHANICAL DATA

- Case: SOT-323 Plastic
- Case material: "Green" molding compound, UL flammability classification 94V-0, (No Br. Sb. Cl)
- Lead Free in RoHS 2002/95/EC Compliant



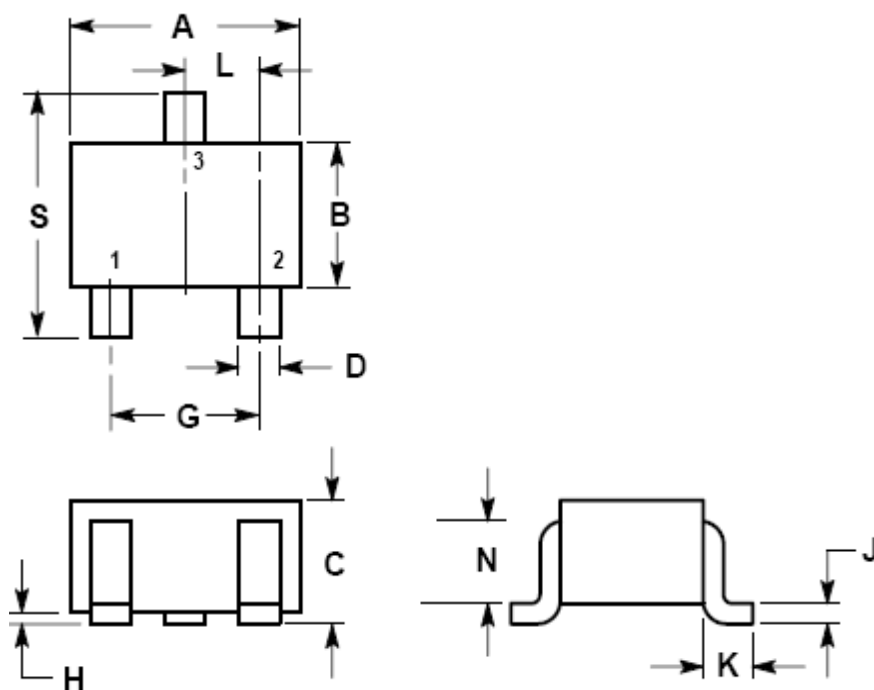
Maximum Ratings @ $T_A = 25^\circ\text{C}$

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current -Continuous	I_C	200	mA
Total Power Dissipation FR-4 board	P_D	150	mW
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55~+150	$^\circ\text{C}$

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

Characteristic	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	$I_C=10\mu\text{A}, I_E=0$	V_{CBO}	60			V
Collector-emitter breakdown voltage	$I_C=1\text{mA}, I_B=0$	V_{CEO}	40			V
Emitter-base breakdown voltage	$I_E=10\mu\text{A}, I_C=0$	V_{EBO}	6			V
Collector-emitter cut-off current	$V_{CE}=30\text{V}, V_{BE(off)}=3\text{V}$	I_{CEX}			0.05	μA
DC current gain	$V_{CE}=1\text{V}, I_C=0.1\text{mA}$	h_{FE1}	40			
	$V_{CE}=1\text{V}, I_C=1\text{mA}$	h_{FE2}	70			
	$V_{CE}=1\text{V}, I_C=10\text{mA}$	h_{FE3}	100		300	
	$V_{CE}=1\text{V}, I_C=50\text{mA}$	h_{FE4}	60			
	$V_{CE}=1\text{V}, I_C=100\text{mA}$	h_{FE5}	30			
Collector-emitter saturation voltage	$I_C=10\text{mA}, I_B=1\text{mA}$	$V_{CE(sat)1}$			0.2	V
	$I_C=50\text{mA}, I_B=5\text{mA}$	$V_{CE(sat)2}$			0.3	V
Base-emitter saturation voltage	$I_C=10\text{mA}, I_B=1\text{mA}$	$V_{BE(sat)1}$	0.65		0.85	V
	$I_C=50\text{mA}, I_B=5\text{mA}$	$V_{BE(sat)2}$			0.95	V
Transition frequency	$V_{CE}=20\text{V}, I_C=10\text{mA}, f=100\text{MHz}$	f_T	300			MHz
Output Capacitance	$V_{CB}=5\text{V}, I_E=0, f=1\text{MHz}$	C_{ob}			4	pF
Delay time	$V_{CC}=3\text{V}, V_{BE(off)}=0.5\text{V}$	T_d			35	nS
Rise time	$I_C=10\text{mA}, I_{B1}=1\text{mA}$	T_r			35	nS
Storage time	$V_{CC}=3.0\text{V}, I_C=10\text{mA}$	T_s			200	nS
Fall time	$I_{B1}=-I_{B2}=1\text{mA}$	T_f			50	nS

SOT-323 Outline Dimension



Symbol	Dimension In Millimeters	
	Min	Max.
A	1.80	2.20
B	1.15	1.35
C	0.80	1.00
D	0.30	0.40
G	1.20	1.40
H	0.00	0.10
J	0.10	0.25
K	0.425 REF	
L	0.650 BSC	
N	0.700 REF	
S	2.00	2.40

Device Marking :

Device P/N	Marking code
MMST3904	AM

Electrical characteristic curves

Fig.1 Turn-On Time

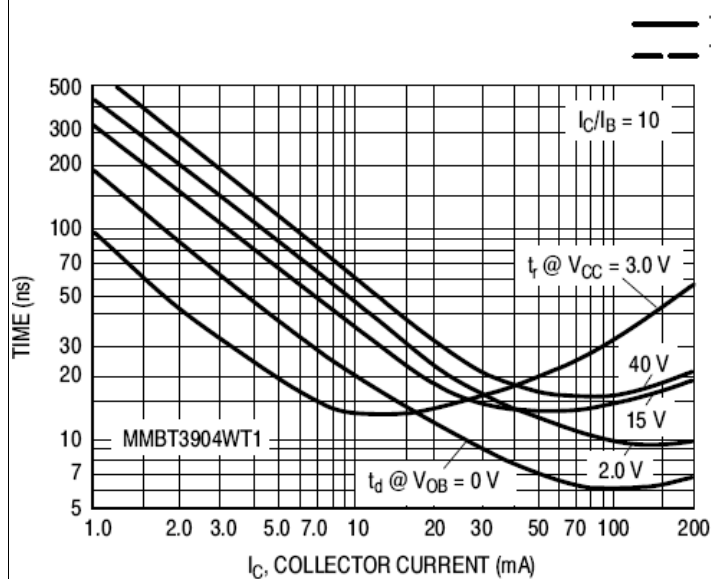


Fig.2 Rise Time

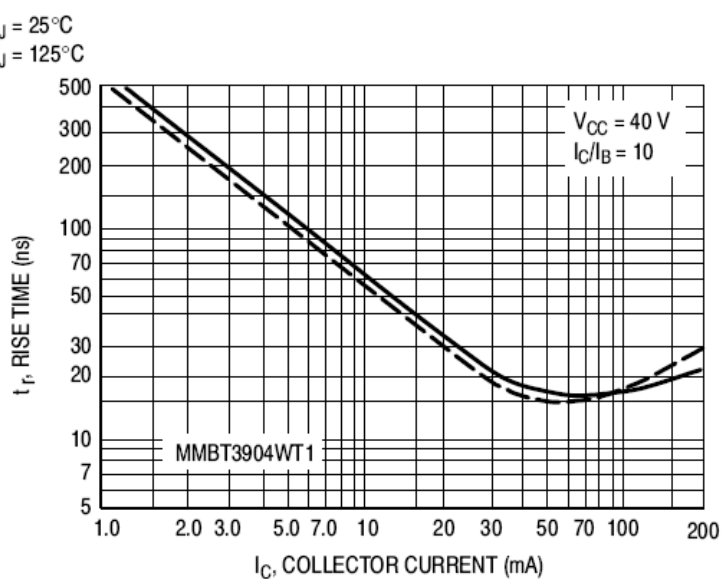


Fig.3 Storage Time

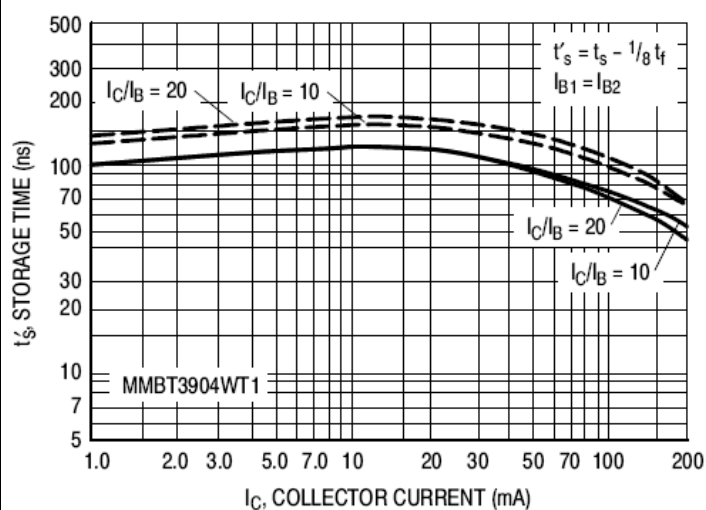


Fig.4 Fall Time

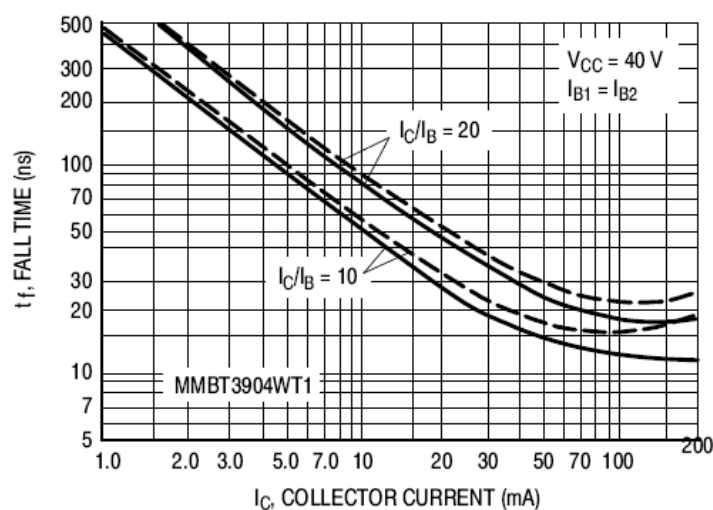


Fig.5 Noise Figure

($V_{CE} = 5.0 V_{dc}$, $T_A = 25^\circ C$, Bandwidth = 1.0 Hz)

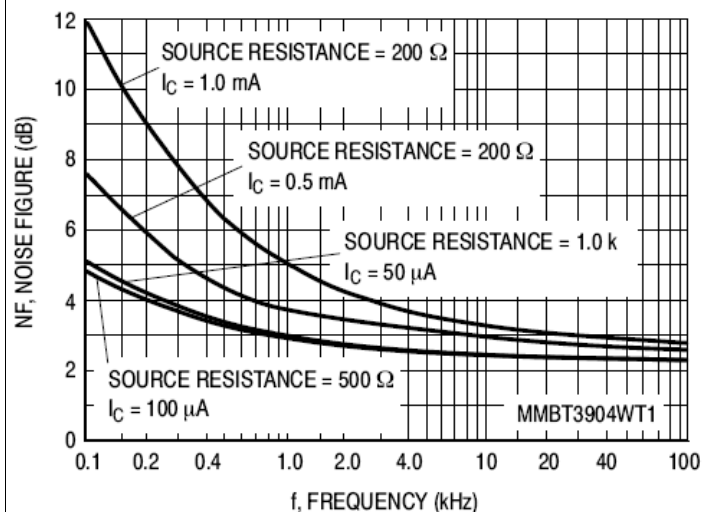
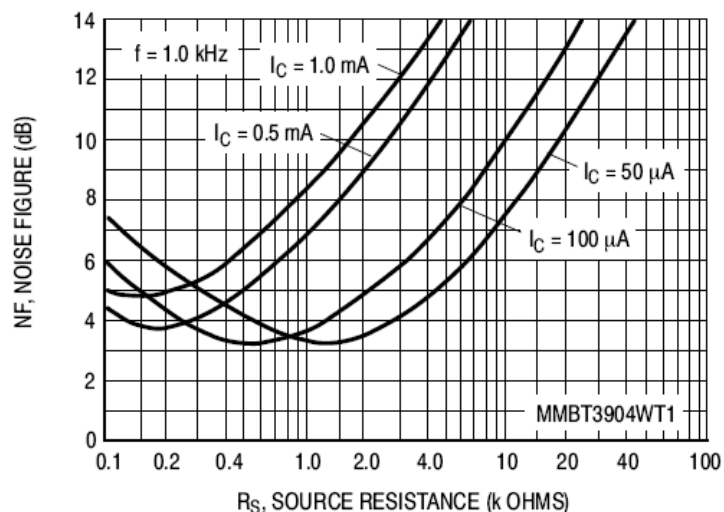


Fig.6 Noise Figure



Electrical characteristic curves

Fig.7 Current Gain

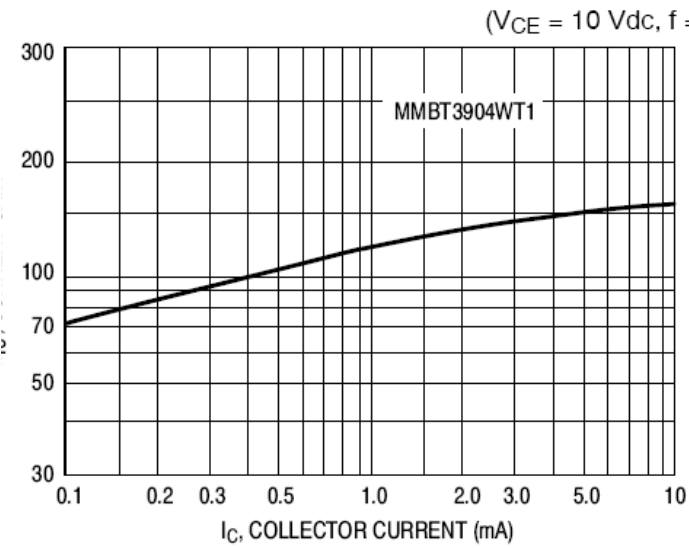


Fig.8 Output Admittance

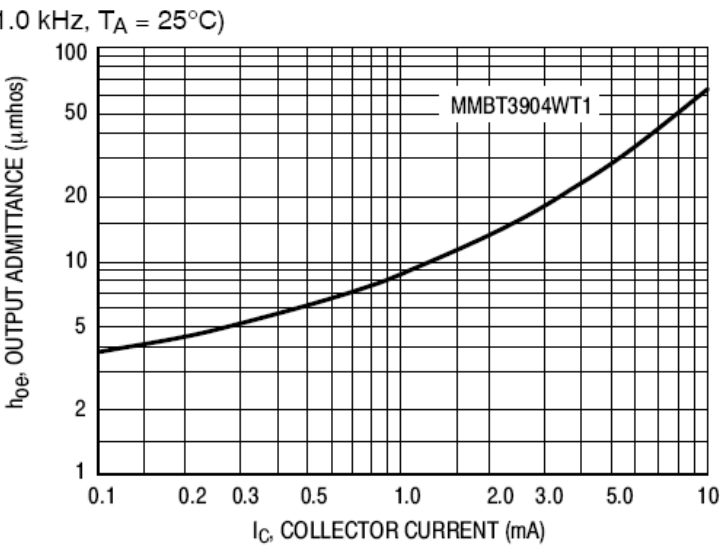


Fig.9 Input Impedance

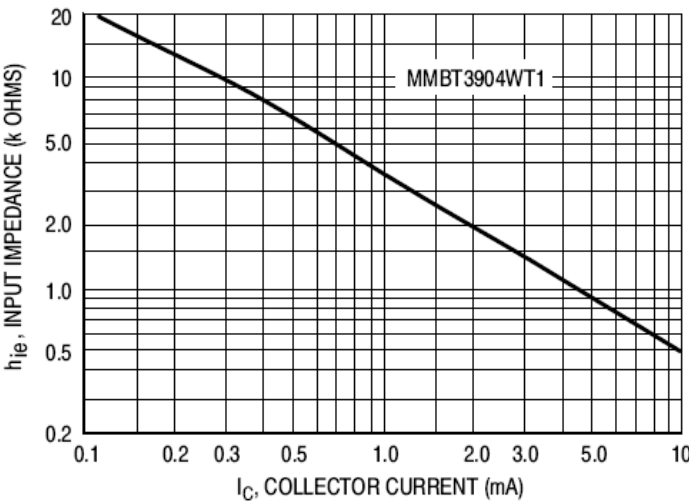


Fig.10 Voltage Feedback Ratio

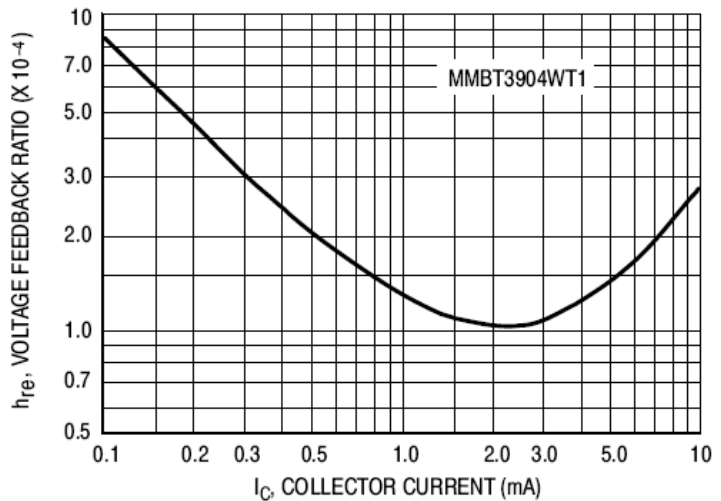
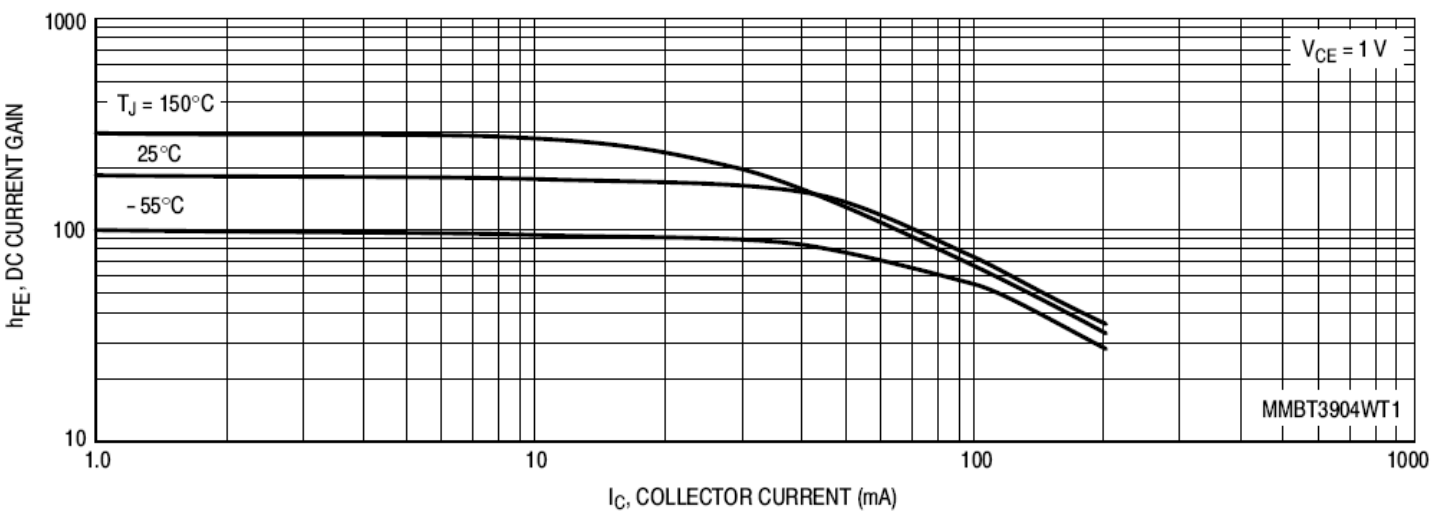


Fig.11 DC Current Gain



Electrical characteristic curves

Fig.12 Collector Saturation Region

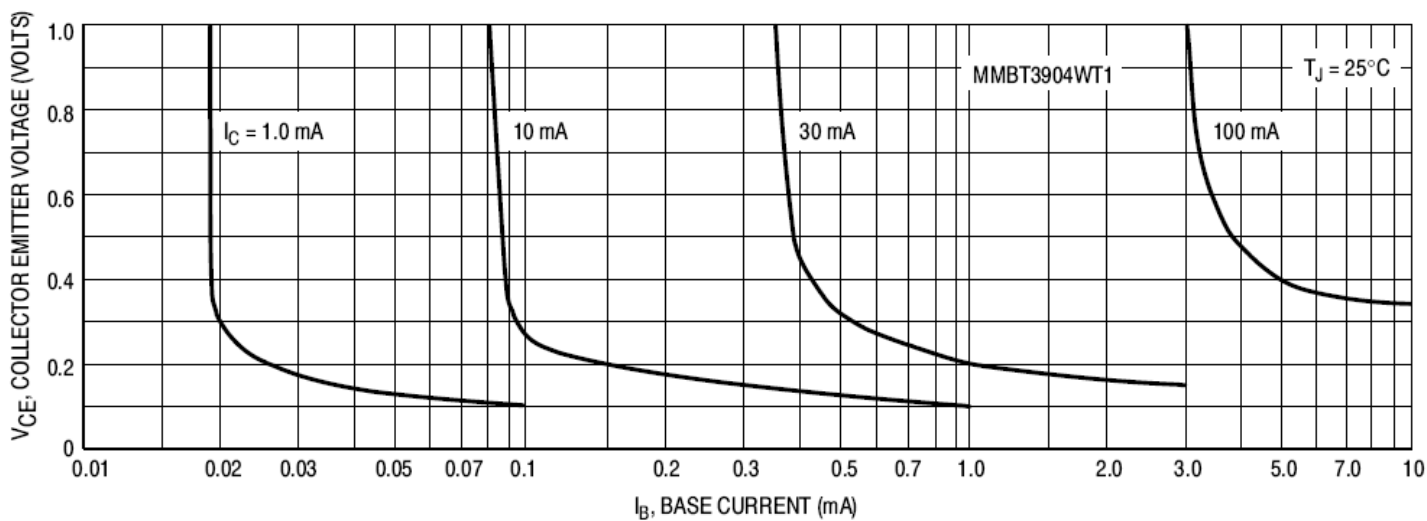


Fig.13 Collector Emitter Saturation Voltage vs. Collector Current

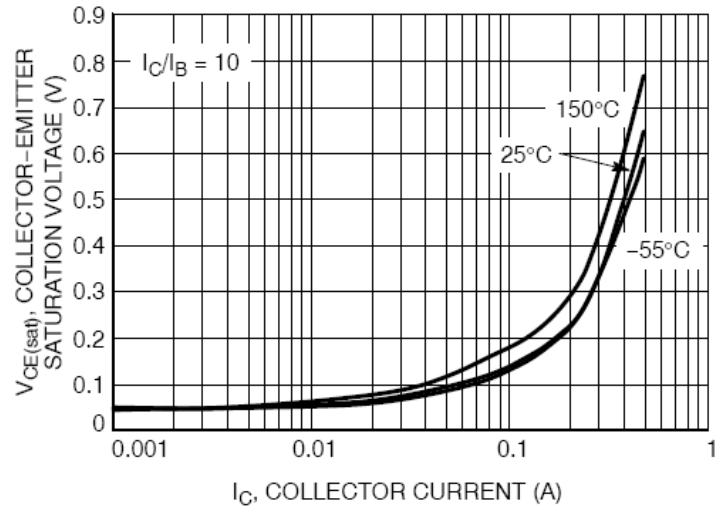


Fig.14 Base Emitter Saturation Voltage Vs. Collector Current

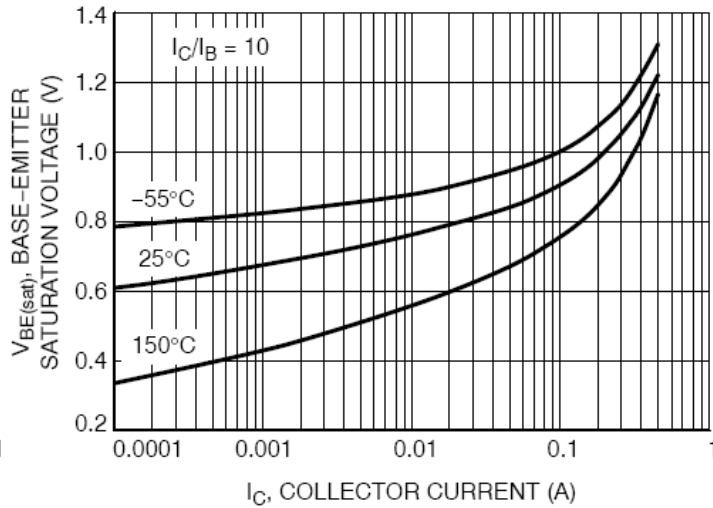
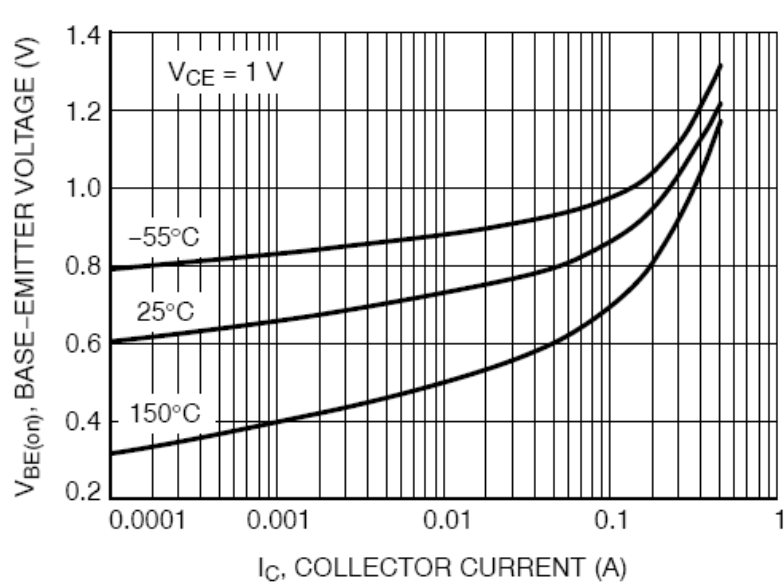


Fig.15 Base Emitter Voltage vs. Collector Current



Electrical characteristic curves

Fig.16 Temperature Coefficients

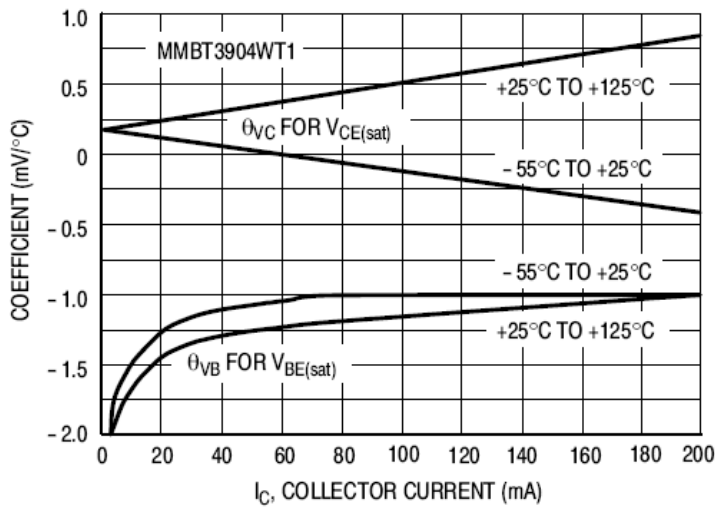


Fig.17 Capacitance

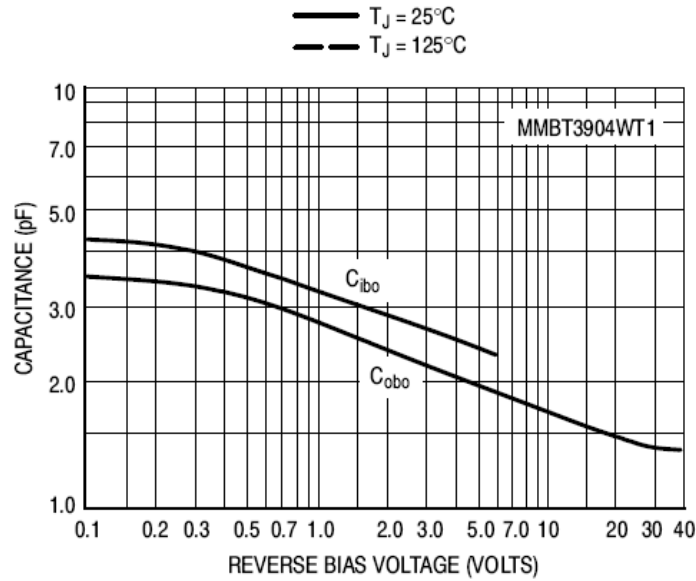


Fig.18 Current Gain Bandwidth Product Vs. Collector Current

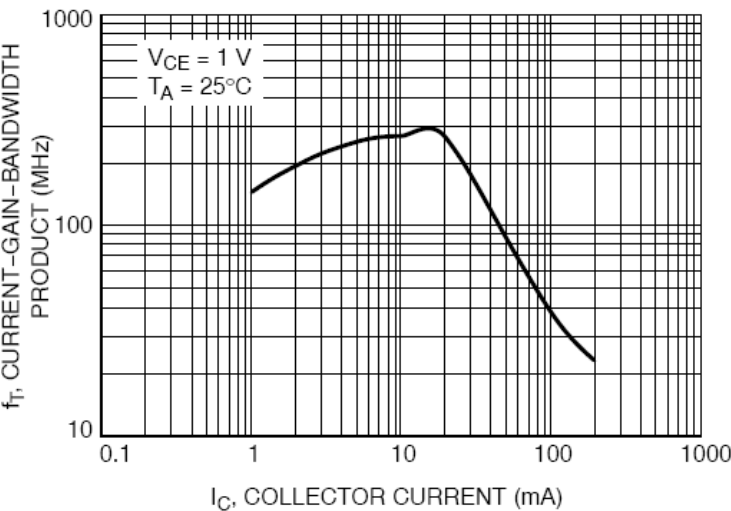
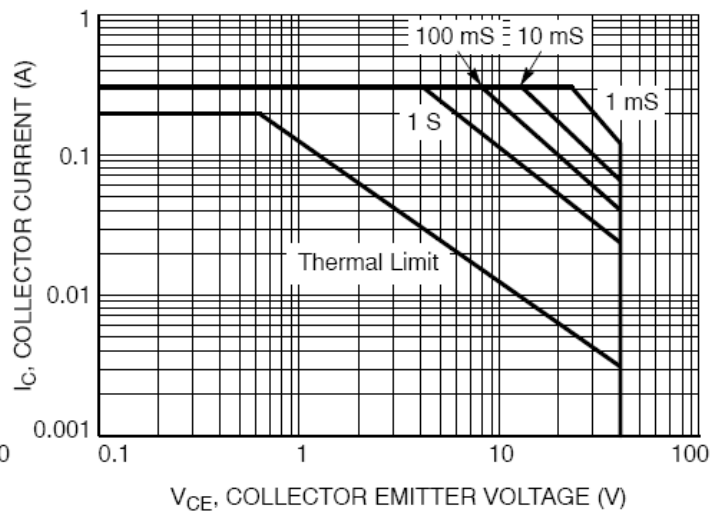


Fig.19 Safe Operation Area



Important Notice and Disclaimer

LSC reserves the right to make changes to this document and its products and specifications at any time without notice. Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

LSC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does LSC assume any liability for application assistance or customer product design. LSC does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

No license is granted by implication or otherwise under any intellectual property rights of LSC.

LSC products are not authorized for use as critical components in life support devices or systems without express written approval of LSC.

New Marking Rule Notification

Range: In order to have well management in process control, the new marking rule is applied to small signal device including Switching Diode, Transistor and Schottky Diode.

Package: SOT-23 / SOT-323 / SOT-523

