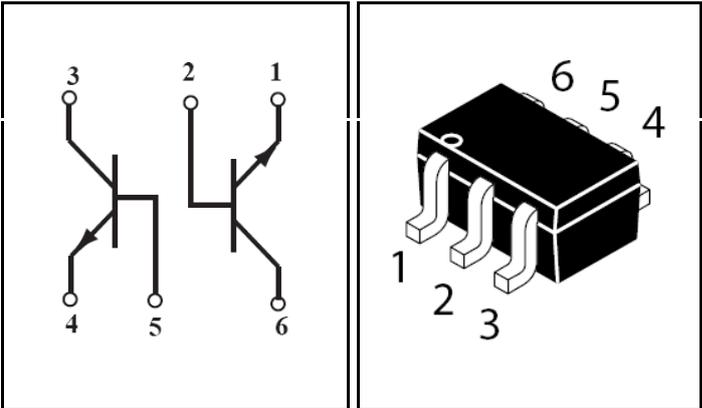# LITEON LITE-ON SEMICONDUCTORS

MMDT3904

NPN/NPN Multi-Chip Transistor

FEATURES
- Ideal for low power amplification and switching

MECHANICAL DATA
- Case: SOT-363 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℃

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current -Continuous	I_C	200	mA
Collector Power Dissipation	P_C	200	mW
Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55~+150	℃

Electrical Characteristics @ T_A = 25℃ unless otherwise specified

Characteristic	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	I_C=10μA,I_E=0	V_{CBO}	60			V
Collector-emitter breakdown voltage	I_C=1mA,I_B=0	V_{CEO}	40			V
Emitter-base breakdown voltage	I_E=10μA,I_C=0	V_{EBO}	5			V
Collector-base cut-off current	V_{CB}=30V,I_E=0	I_{CBO}			0.05	uA
Emitter-base cut-off current	V_{EB}=5V,I_C=0	I_{EBO}			0.05	uA
DC current gain	V_{CE}=1V,I_C=0.1mA	h_{FE1}	40			
	V_{CE}=1V,I_C=1mA	h_{FE2}	70			
	V_{CE}=1V,I_C=10mA	h_{FE3}	100		300	
	V_{CE}=1V,I_C=50mA	h_{FE4}	60			
	V_{CE}=1V,I_C=100mA	h_{FE5}	30			
Collector-emitter saturation voltage	I_C=10mA,I_B=1mA	V_{CE}(sat)1			0.2	V
	I_C=50mA,I_B=5mA	V_{CE}(sat)2			0.3	V
Base-emitter saturation voltage	I_C=10mA,I_B=1mA	V_{BE}(sat)1	0.65		0.85	V
	I_C=50mA,I_B=5mA	V_{BE}(sat)2			0.95	V
Transition frequency	V_{CE}=20V,I_C=10mA, f=100MHz	f_T	300			MHz
Collector output capacitance	V_{CB}=5V,I_E=0,f=1MHz	Cob			4	pF
Noise figure	V_{CE}=5V,I_C=0.1mA,f=1kHz, R_S=1KΩ	NF			5	dB
Delay time	V_{CC}=3V, V_{BE}=-0.5V	T_d			35	nS
Rise time	I_C=10mA , I_{B1}=-I_{B2}=1mA	T_r			35	nS
Storage time	V_{CC}=3V, I_C=10mA	T_s			200	nS
Fall time	I_{B1}=-I_{B2}=1mA	T_f			50	nS

SOT-363 Outline Dimension
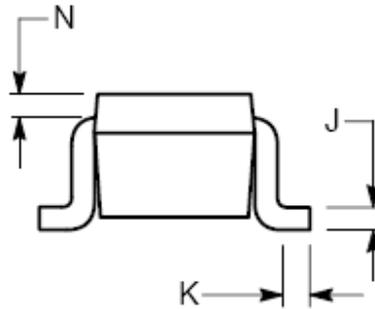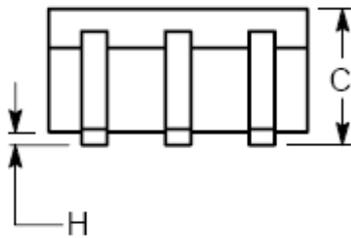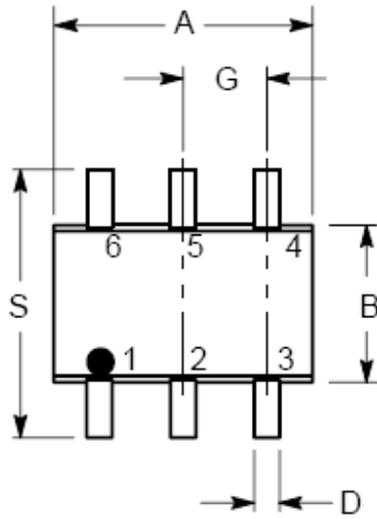
Symbol	Dimension In Millimeters	
	Min	Max.
A	1.89	2.20
B	1.15	1.35
C	0.80	1.10
D	0.10	0.30
G	0.65 BSC	
H	---	0.10
J	0.10	0.25
K	0.10	0.30
N	0.20 REF	
S	2.00	2.20

Device Marking :

Device P/N	Marking code
MMDT3904	MA

Figure 1. Capacitance
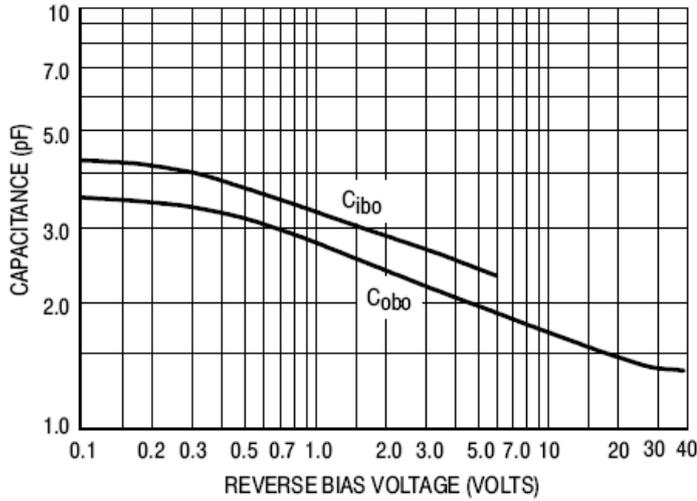
Figure 2. Charge Data
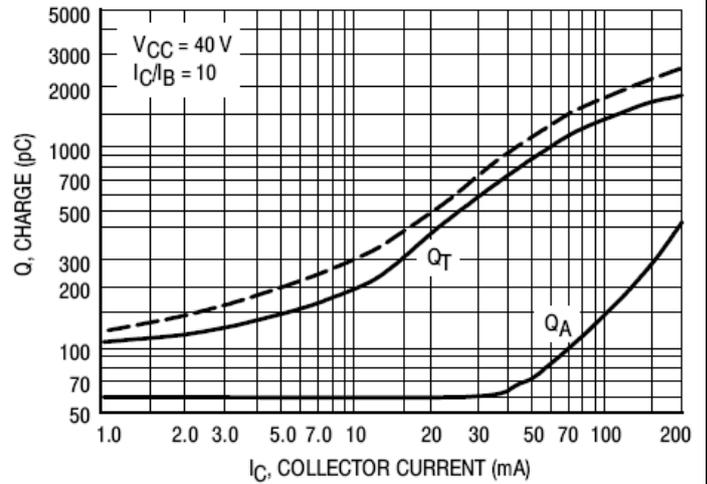
Figure 3. Turn–On Time
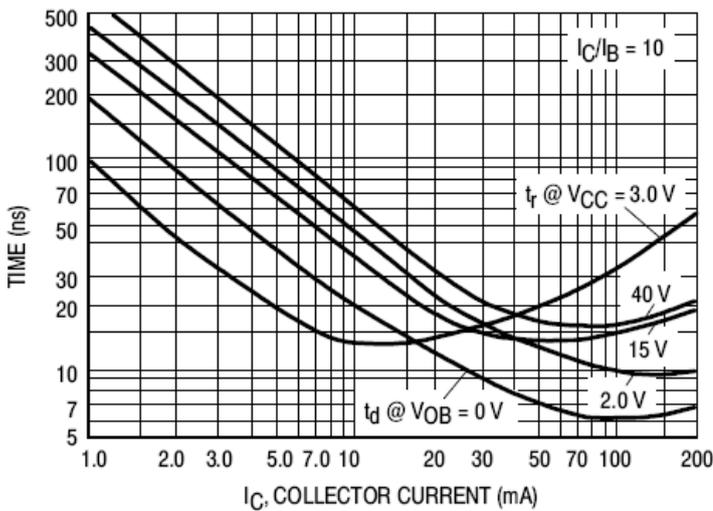
Figure 4. Rise Time
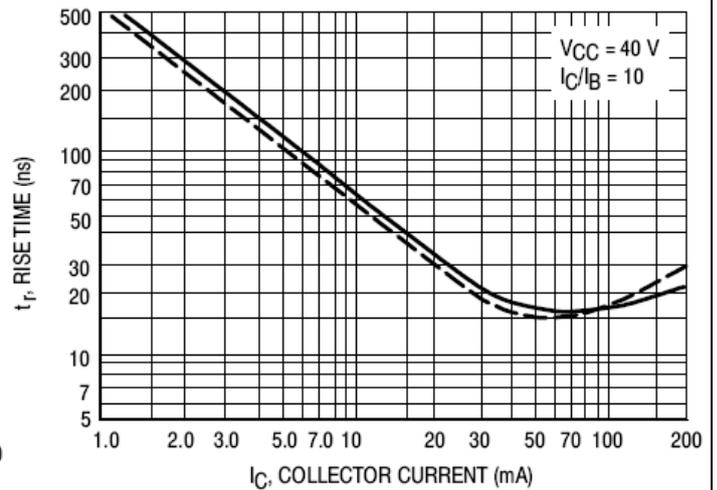
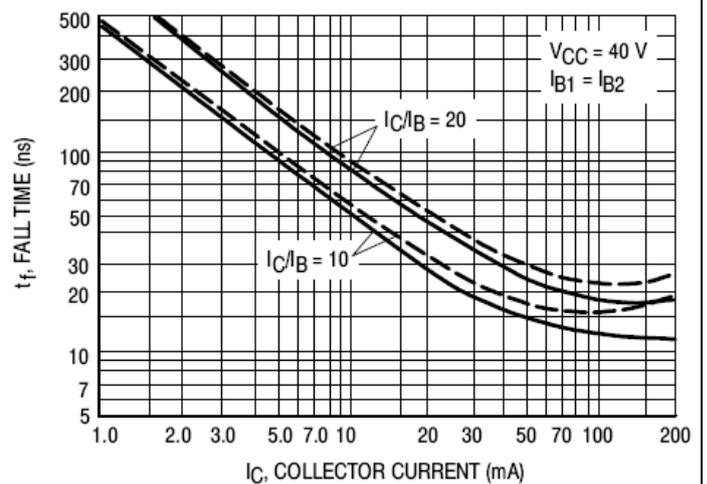
Figure 5. Storage Time
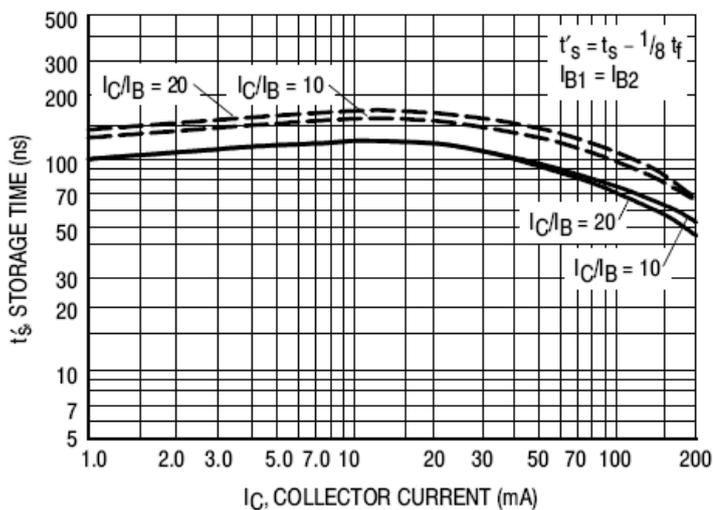
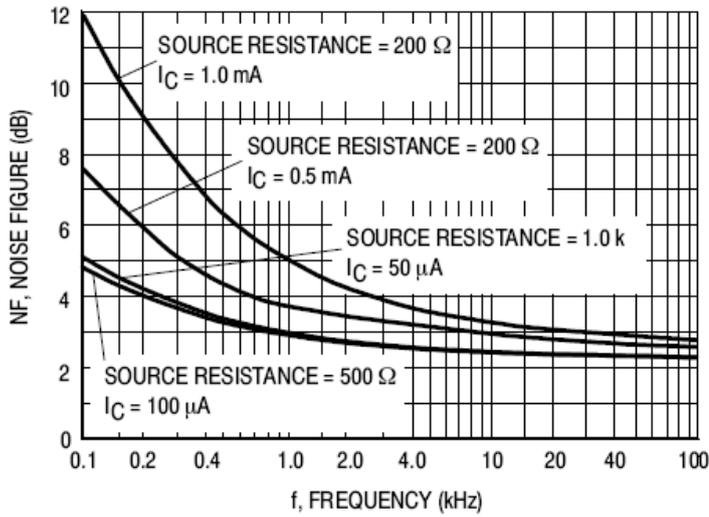
Figure 6. Fall Time

Figure 7. Noise Figure

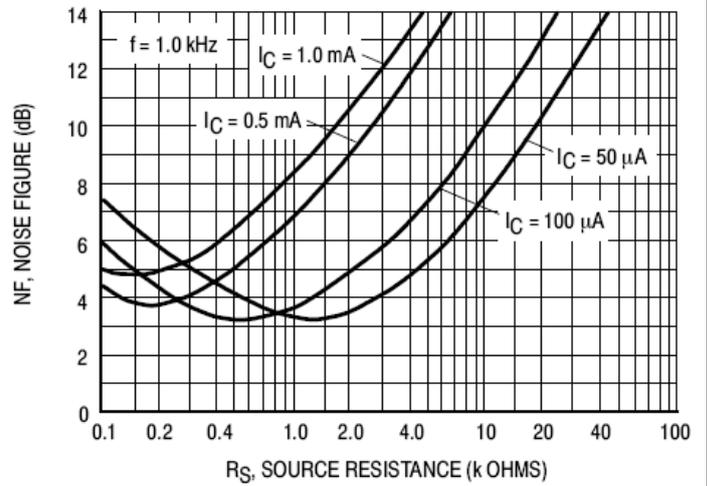**Figure 8. Noise Figure**

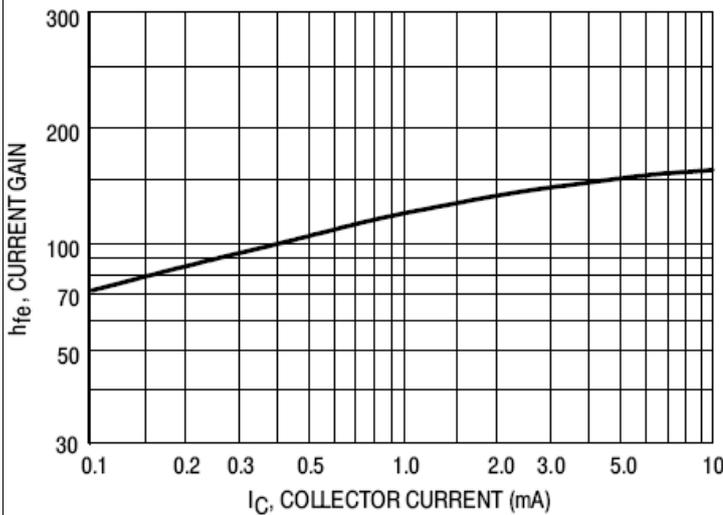**Figure 9. Current Gain**
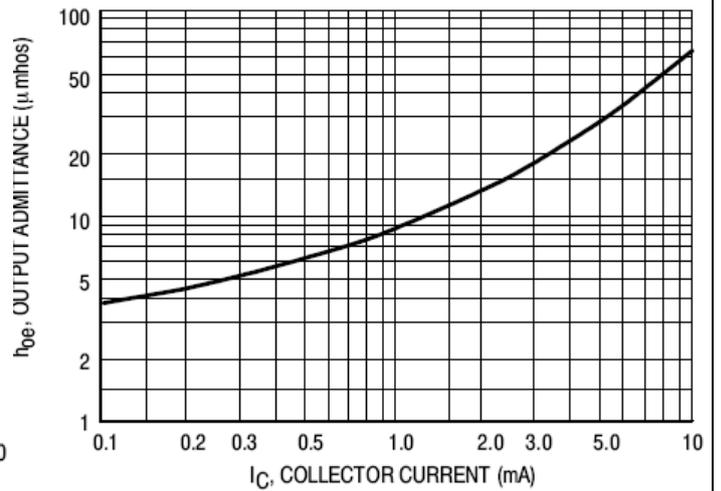

Figure 10. Output Admittance
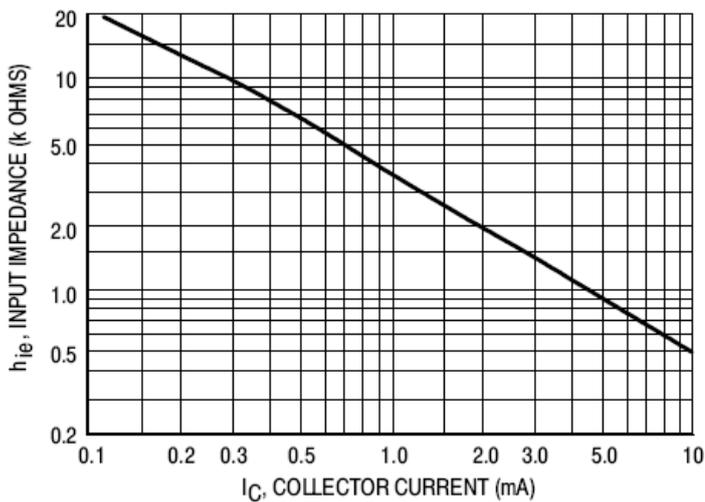

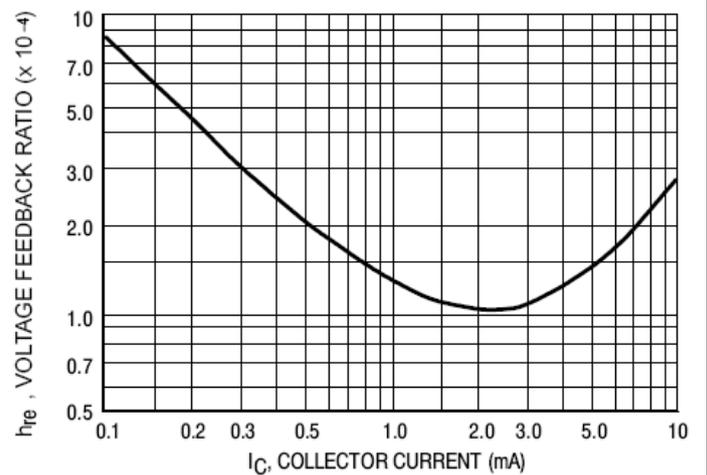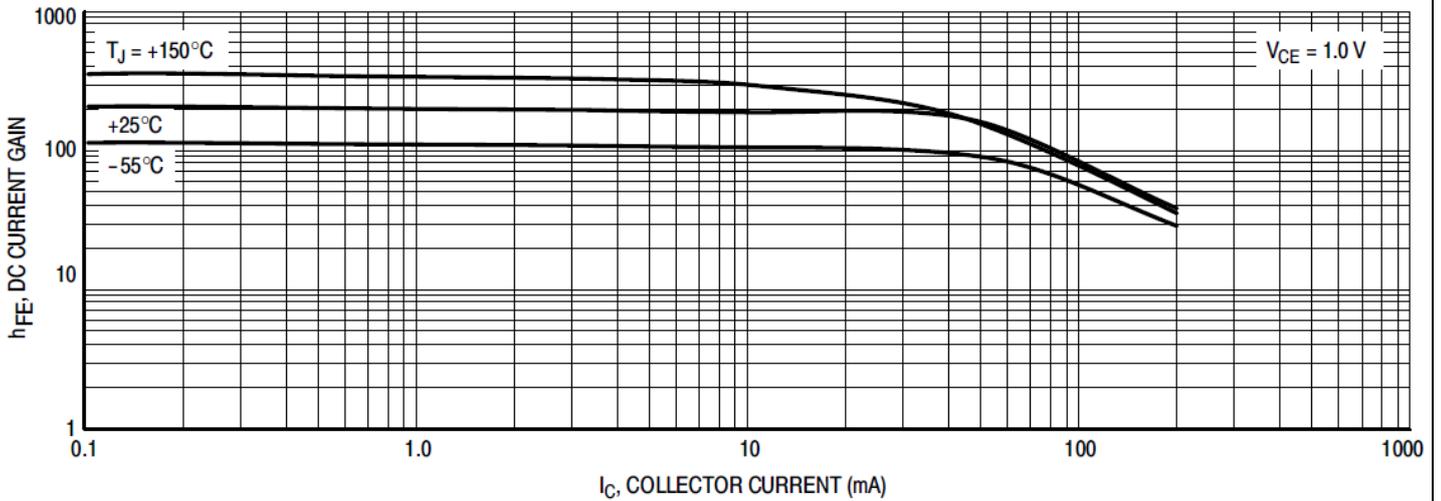**Figure 11. Input Impedance**

Figure 12. Voltage Feedback Ratio

Fig.13 DC Current Gain

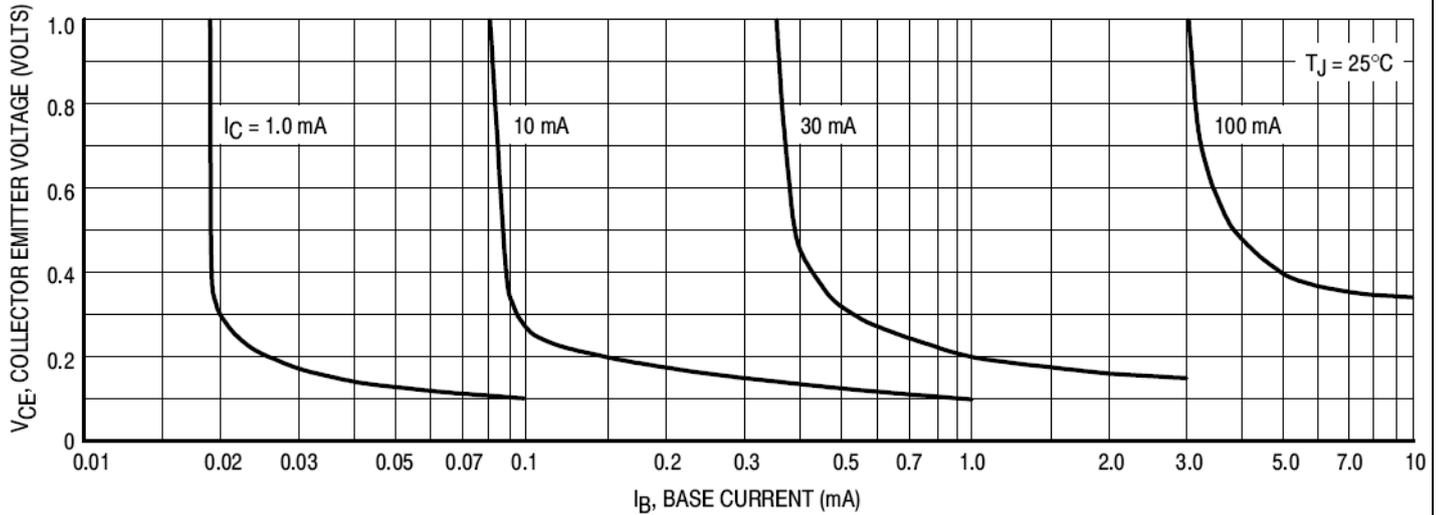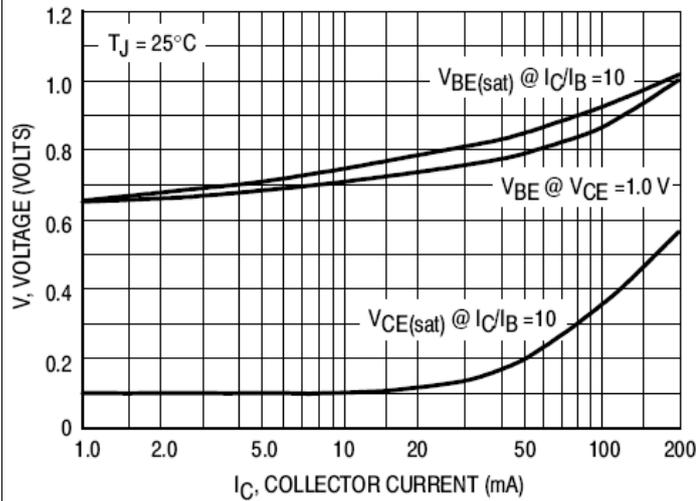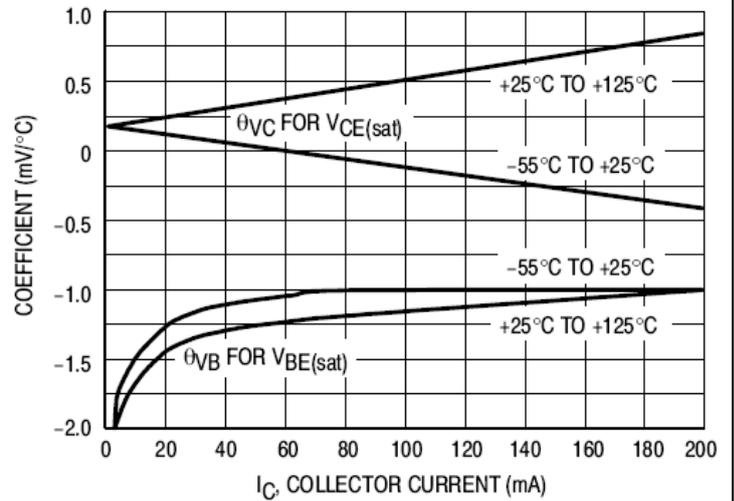**Fig.14 Collector Saturation Region**

Figure 15. "ON" VoltagesFigure

16. Temperature Coefficients

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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-363

Device Code ← **XXX M**

Pb free

" ● " or " ● ● ": Traceability Code

Odd Year	Even Year
1	E
2	F
3	H
4	J
5	K
6	L
7	N
8	P
9	U
T	X
V	Y
C	Z

Month Code