



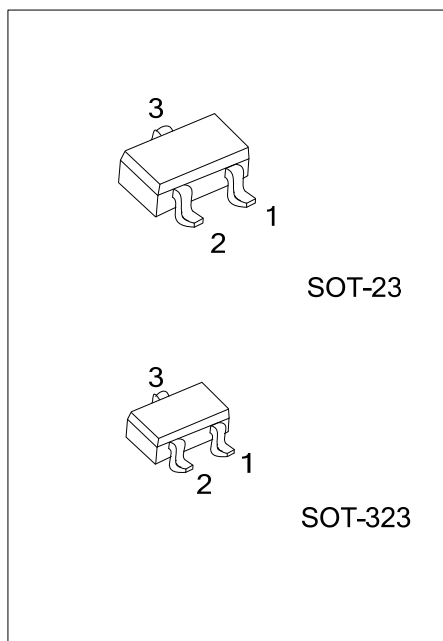
## MMBT3904

## NPN EPITAXIAL SILICON TRANSISTOR

### GENERAL PURPOSE APPLICATION

#### ■ FEATURES

- \* Collector-Emitter Voltage:  $V_{CEO}=40V$
- \* Collector Dissipation:  $P_{D(MAX)}=350mW$
- \* Complementary to UTC MMBT3906

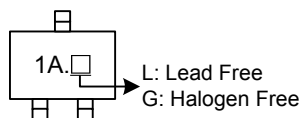


#### ■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
MMBT3904L-AE3-R	MMBT3904G-AE3-R	SOT-23	E	B	C	Tape Reel
MMBT3904L-AL3-R	MMBT3904G-AL3-R	SOT-323	E	B	C	Tape Reel

MMBT3904L-AE3-R	(1)Packing Type (2)Package Type (3)Lead Free	(1) R: Tape Reel (2) AE3: SOT-23, AL3: SOT-323 (3) G: Halogen Free, L: Lead Free
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#### ■ MARKING



■ ABSOLUTE MAXIMUM RATING (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Base Voltage	$V_{CBO}$	60	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	200	mA
Collector Dissipation	$P_C$	350	mW
Junction Temperature	$T_J$	+150	°C
Storage Temperature	$T_{STG}$	-55 ~ +150	°C

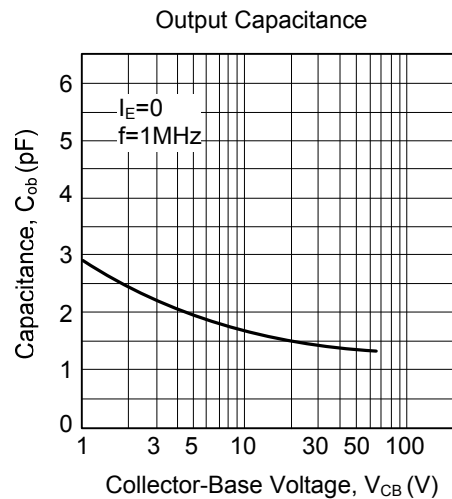
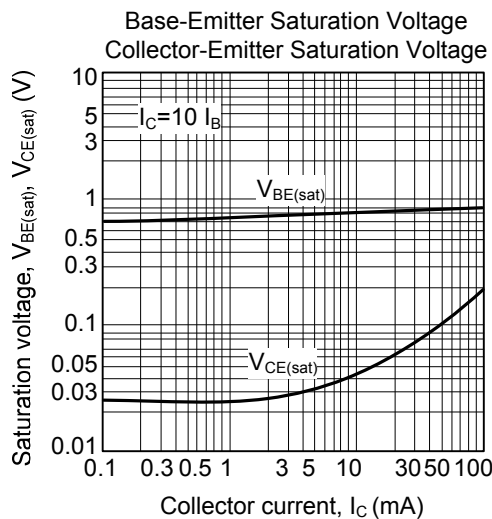
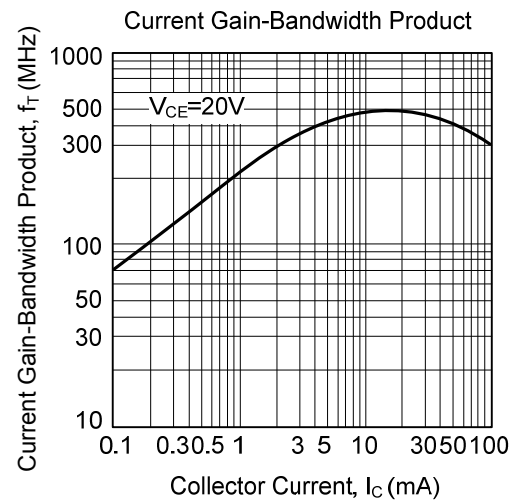
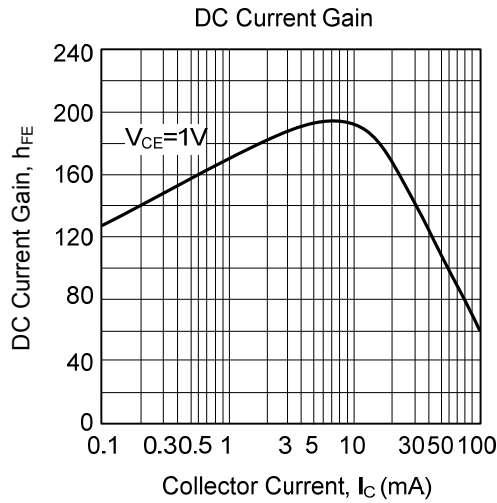
Note Absolute maximum ratings are those values beyond which the device could be permanently damaged.  
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	$V_{CBO}$	$I_C=10\mu A, I_E=0$	60			V
Collector-emitter breakdown voltage(Note)	$V_{CEO}$	$I_C=1mA, I_B=0$	40			V
Emitter-base breakdown voltage	$V_{EBO}$	$I_E=10\mu A, I_C=0$	6			V
Collector-emitter saturation voltage (Note)	$V_{CE(SAT)1}$	$I_C=10mA, I_B=1mA$			0.2	V
	$V_{CE(SAT)2}$	$I_C=50mA, I_B=5mA$			0.3	V
Base-emitter saturation voltage (Note)	$V_{BE(SAT)1}$	$I_C=10mA, I_B=1mA$	0.65		0.85	V
	$V_{BE(SAT)2}$	$I_C=50mA, I_B=5mA$			0.95	V
Collector Cut-off Current	$I_{CEX}$	$V_{CE}=30V, V_{EB}=3V$			50	nA
Base Cut-off Current	$I_{BL}$	$V_{CE}=30V, V_{EB}=3V$			50	nA
DC current gain (note)	$h_{FE1}$	$V_{CE}=1V, I_C=0.1mA$	40			
	$h_{FE2}$	$V_{CE}=1V, I_C=1mA$	70			
	$h_{FE3}$	$V_{CE}=1V, I_C=10mA$	100		300	
	$h_{FE4}$	$V_{CE}=1V, I_C=50mA$	60			
	$h_{FE5}$	$V_{CE}=1V, I_C=100mA$	30			
Current gain bandwidth product	$f_T$	$V_{CE}=20V, I_C=10mA, f=100MHz$	300			MHz
Output Capacitance	$C_{OB}$	$V_{CB}=5V, I_E=0, f=1MHz$			4	pF
Turn on time	$t_{ON}$	$V_{CC}=3V, V_{BE}=0.5V, I_C=10mA, I_{B1}=1mA$			70	ns
Turn off time	$t_{OFF}$	$I_{B1}=1mA, I_{B2}=1mA$			250	ns

Note: Pulse test: PW≤300μs, Duty Cycle≤2%

■ TYPICAL CHARACTERISTICS



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