

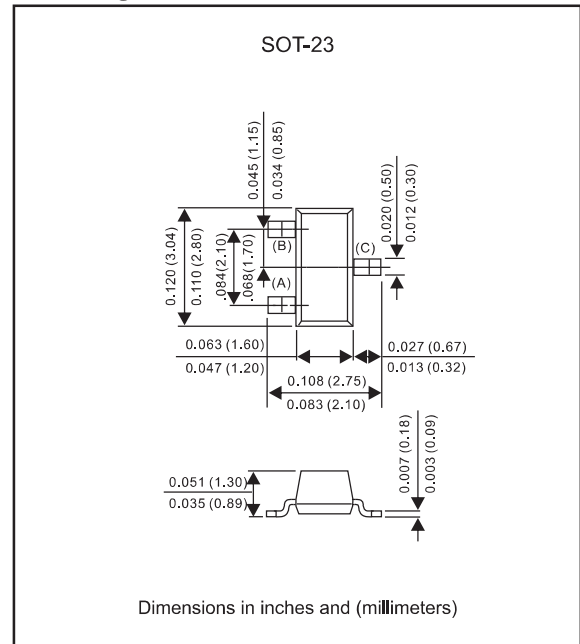
### Features

- High collector-emitter breakdown voltage. ( $BV_{CEO}$  40V Min. @  $I_C=1mA$ )
- Small load switch transistor with high gain and low saturation voltage, is designed for general purpose amplifier and switching applications at collector current.
- Capable of 200mW power dissipation.
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228
- Compliant to Halogen-free
- Suffix "-Q1" for AEC-Q101

### Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any

### Package outline



### Maximum ratings (AT $T_A=25^{\circ}C$ unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Collector-base voltage		$V_{CBO}$			60	V
Collector-emitter voltage		$V_{CEO}$			40	V
Emitter-base voltage		$V_{EBO}$			6.0	V
Collector current - continuous		$I_C$			200	mA
Collector Power Dissipation		$P_D$			200	mW
Thermal resistance	Junction to ambient	$R_{\theta JA}$			625	$^{\circ}C/W$
Operating junction temperature range		$T_J$	-55		+150	$^{\circ}C$
Storage temperature range		$T_{STG}$	-55		+150	$^{\circ}C$

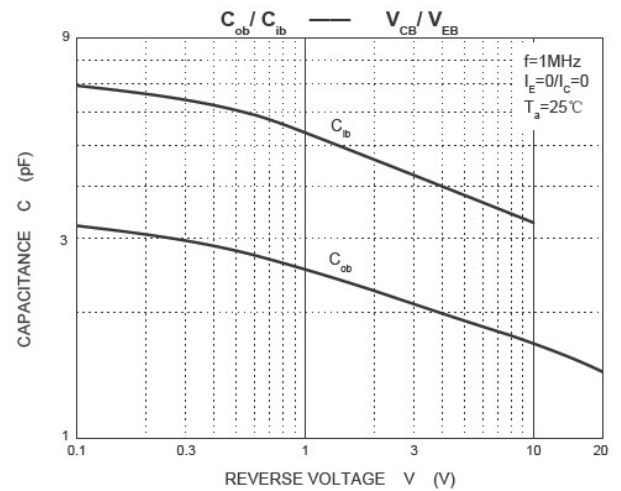
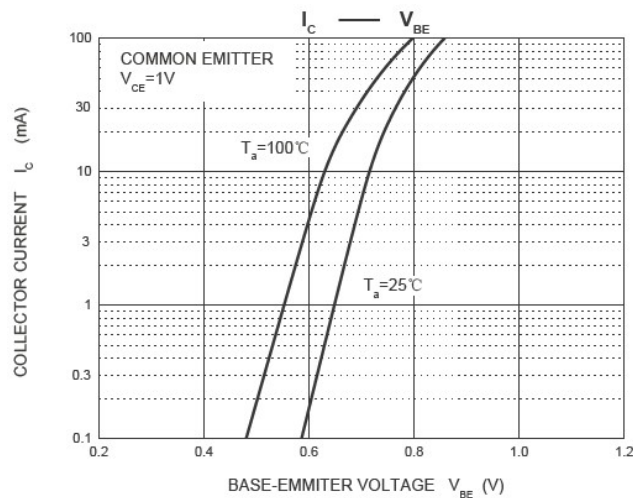
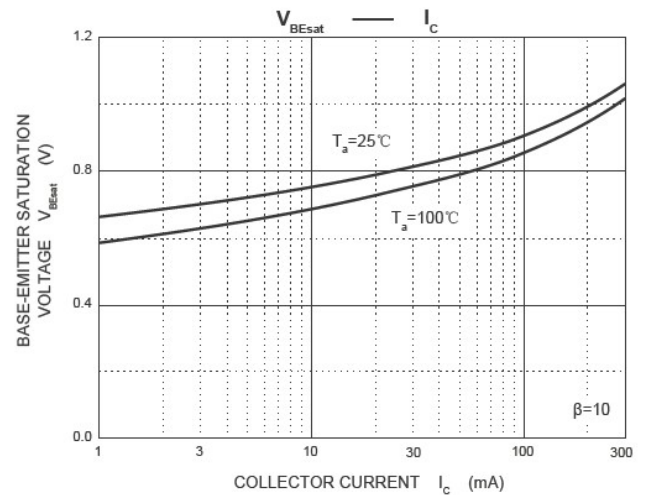
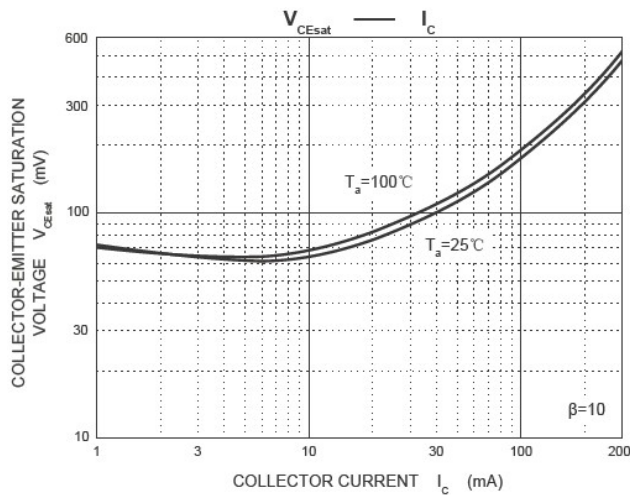
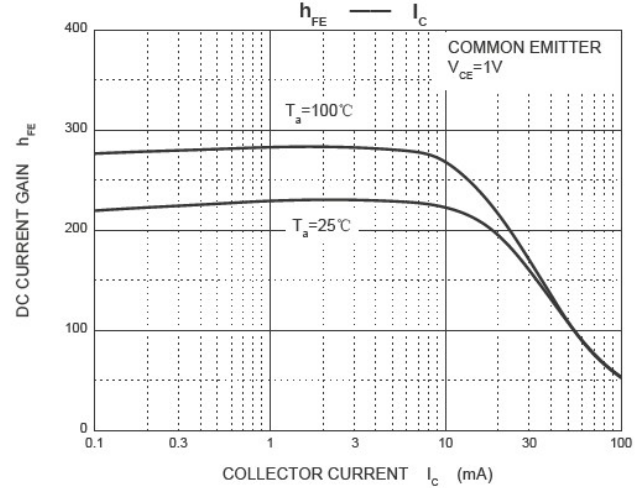
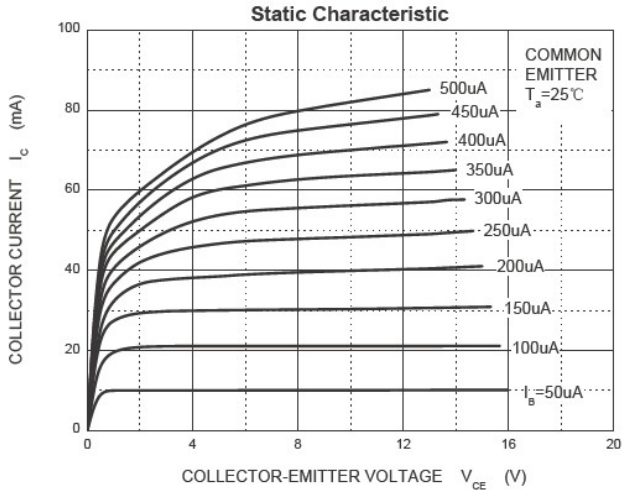
### Electrical characteristics (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Collector-base breakdown voltage	$I_C = 10\mu\text{A}, I_E = 0$	$V_{(BR)CBO}$	60			V
Collector-emitter breakdown voltage	$I_C = 1\text{mA}, I_B = 0$	$V_{(BR)CEO}$	40			V
Emitter-base breakdown voltage	$I_E = 10\mu\text{A}, I_C = 0$	$V_{(BR)EBO}$	6.0			V
Collector cutoff current	$V_{CE} = 30\text{V}, V_{EB} = 3.0\text{V}$	$I_{CEX}$			50	nA
Collector cutoff current	$V_{CB} = 60\text{V}, I_E = 0\text{V}$	$I_{CBO}$			100	nA
Emitter cutoff current	$V_{EB} = 5\text{V}, I_C = 0\text{V}$	$I_{EBO}$			100	nA
DC current gain	$I_C = 10\text{mA}, V_{CE} = 1.0\text{V}$	$h_{FE}$	100		300	-
	$I_C = 50\text{mA}, V_{CE} = 1.0\text{V}$		60			
	$I_C = 100\text{mA}, V_{CE} = 1.0\text{V}$		30			
Collector-emitter saturation voltage	$I_C = 50\text{mA}, I_B = 5.0\text{mA}$	$V_{CE(sat)}$			0.3	V
Base-emitter saturation voltage	$I_C = 50\text{mA}, I_B = 5.0\text{mA}$	$V_{BE(sat)}$			0.95	V
Current-gain-bandwidth product	$I_C = 10\text{mA}, V_{CE} = 20\text{V}, f = 100\text{MHz}$	$f_T$	300			MHz
Delay time	$V_{CC} = 3.0\text{V}, V_{BE} = -0.5\text{V}, I_C = 10\text{mA}, I_{B1} = 1.0\text{mA}$	$t_d$			35	ns
Rise time		$t_r$			35	
Storage time		$t_s$			200	
Fall time		$t_f$			50	

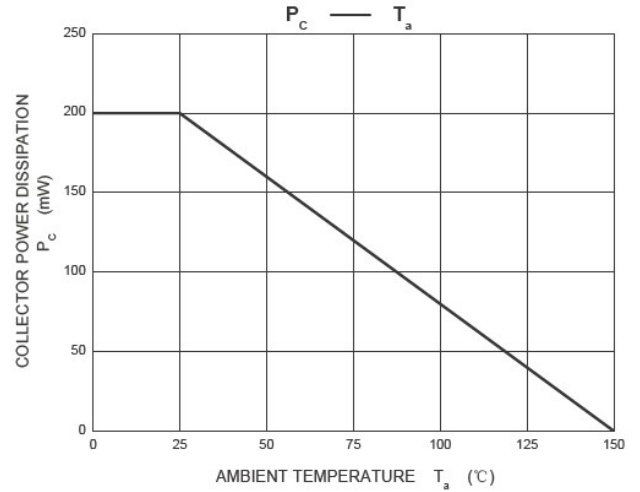
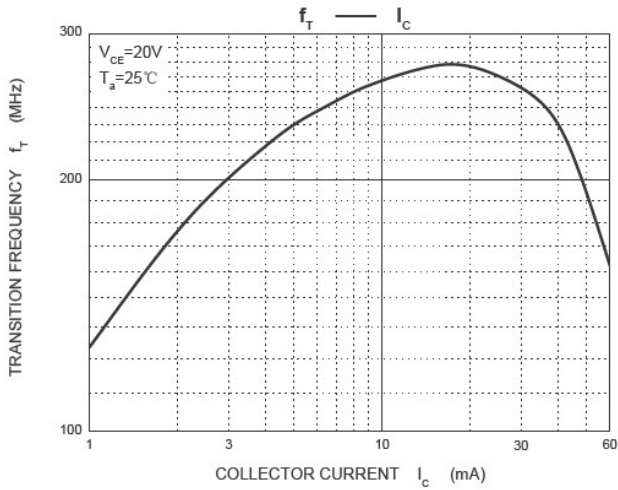
### Classification of $h_{FE}$

HFE	100-300	
RANK	L	H
RANGE	100-200	200-300

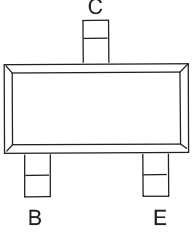
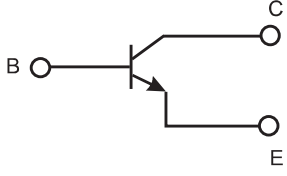
### Typical characteristics



### Typical characteristics



### Pinning information

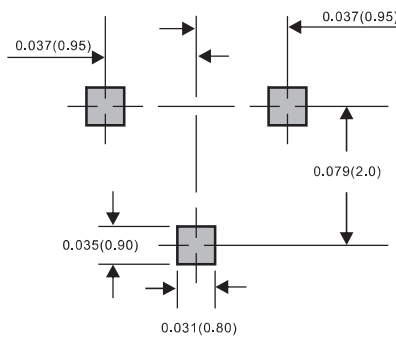
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

### Marking

Type number	Marking code
MMBT3904-Q1	1AM

### Suggested solder pad layout

#### SOT-23



Dimensions in inches and (millimeters)