

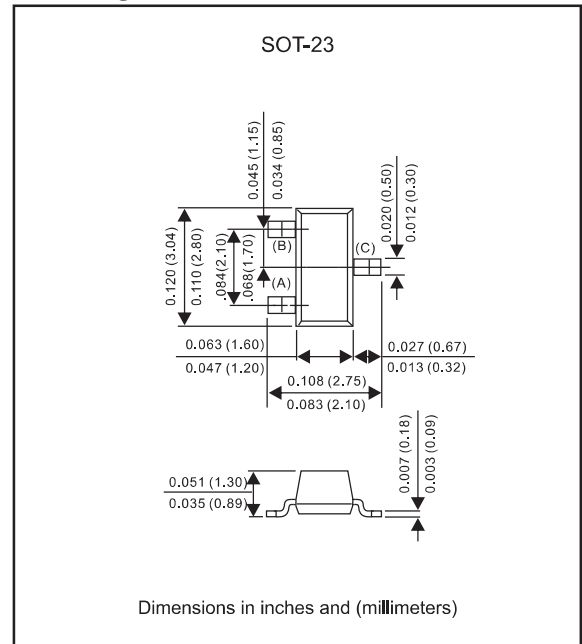
Features

- 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

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	$^{\circ}C$

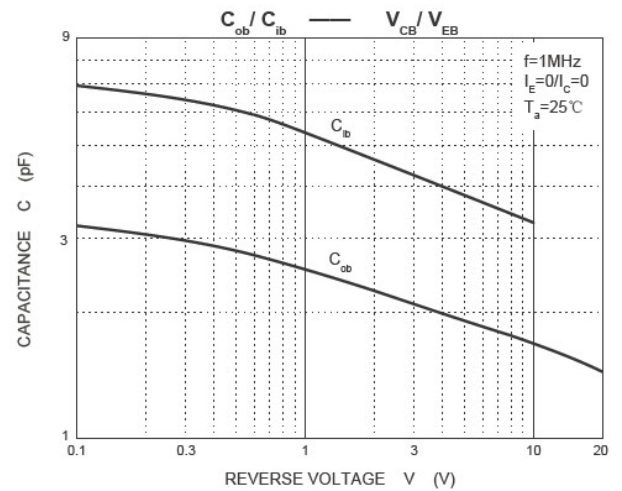
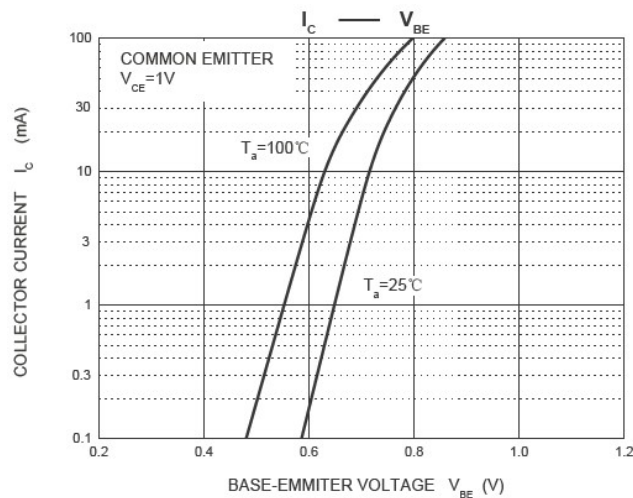
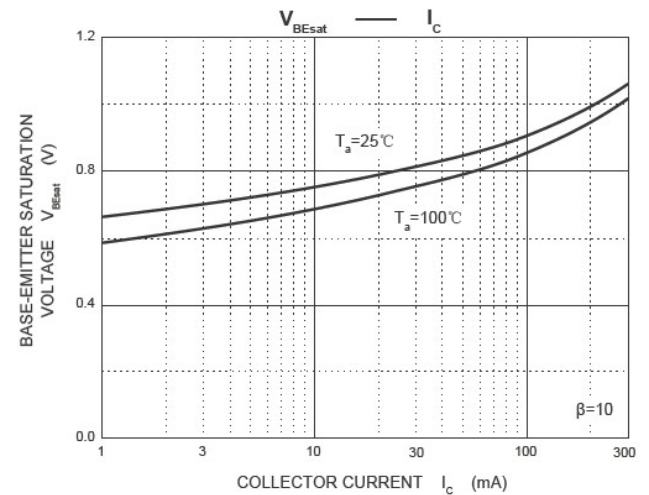
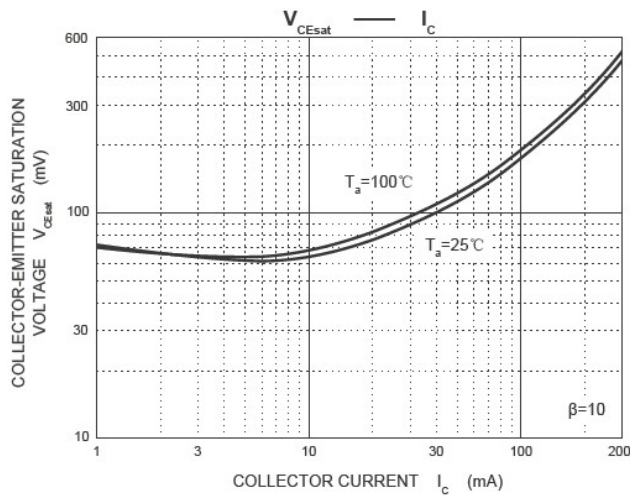
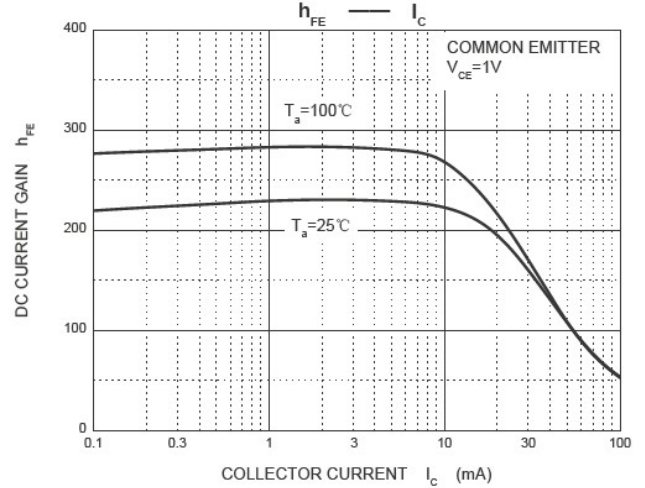
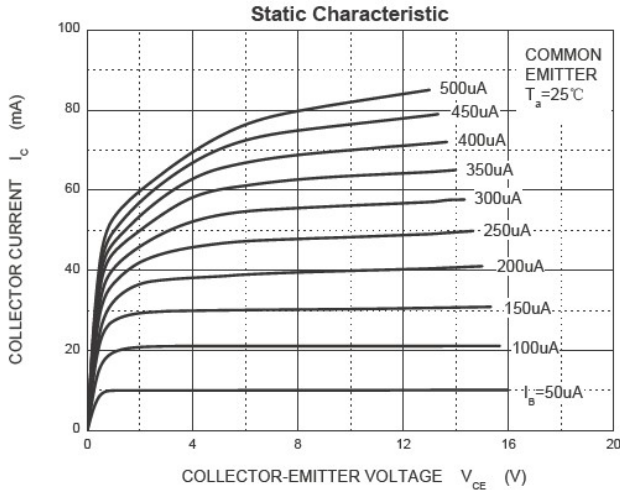
Electrical characteristics (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

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	$V_{CC} = 3.0\text{V}, V_{BE} = -0.5\text{V}, I_C = 10\text{mA}, I_{B1} = 1.0\text{mA}$	td			35	ns
Rise time		tr			35	
Storage time		ts			200	
Fall time		tf			50	

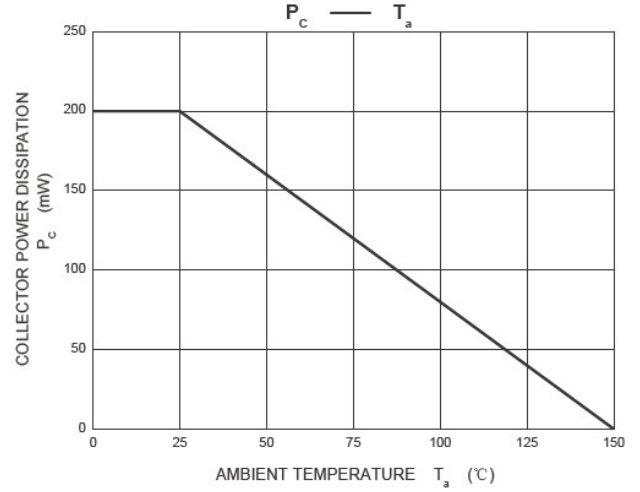
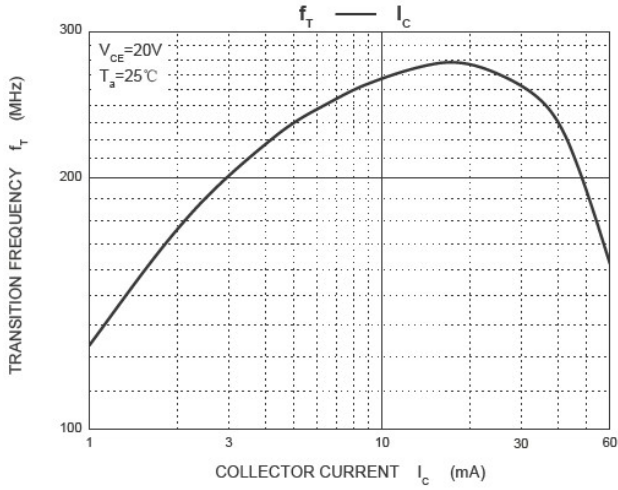
Classification of h_{FE}

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

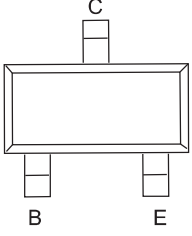
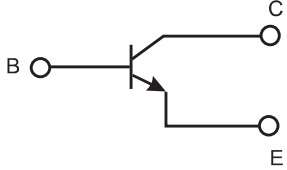
Typical characteristics



Typical characteristics



Pinning information

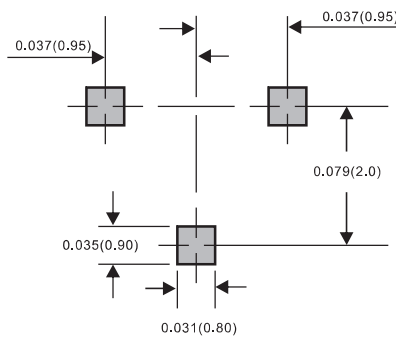
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
MMBT3904	1AM

Suggested solder pad layout

SOT-23



Dimensions in inches and (millimeters)