

## NPN SWITCHING TRANSISTOR

### FEATURES

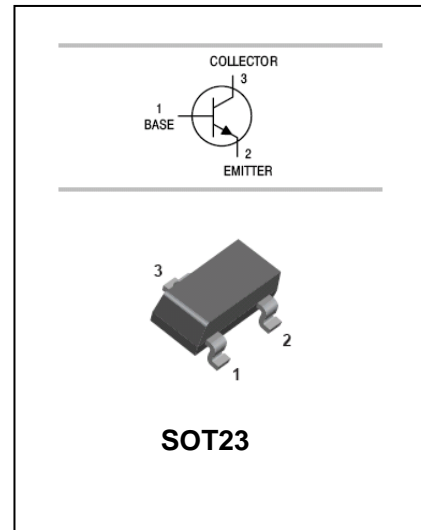
- Epitaxial planar die construction.
- Complementary PNP type available (MMBT3906).
- Collector Current Capability  $I_{CM} = 200\text{mA}$ .
- Collector-emitter Voltage  $V_{CEO} = 40\text{V}$ .
- MSL 3



### APPLICATIONS

- General switching and amplification

### ORDERING INFORMATION



Type No.	Marking	Package Code
MMBT3904X	1AM	SOT23

### MAXIMUM RATING @ $T_a = 25^\circ\text{C}$ unless otherwise specified

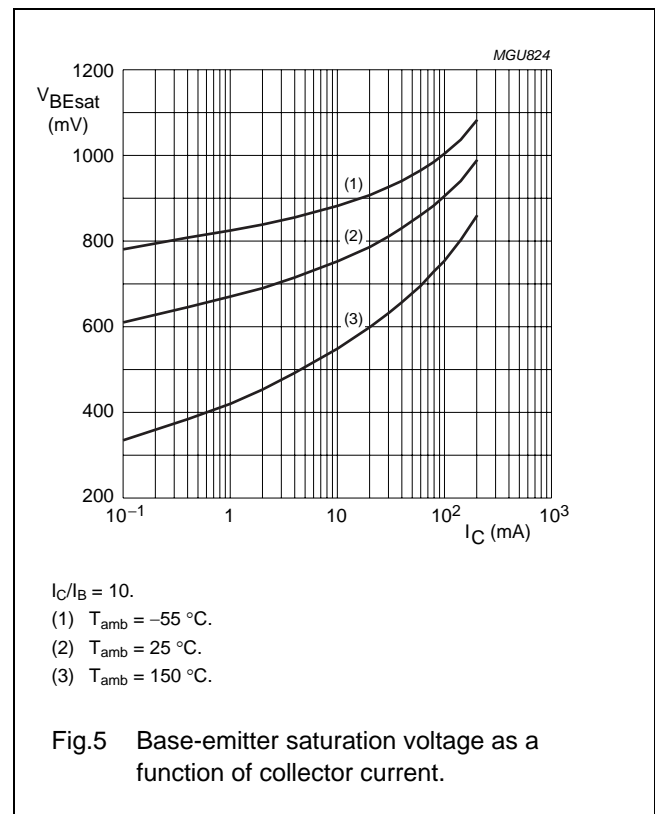
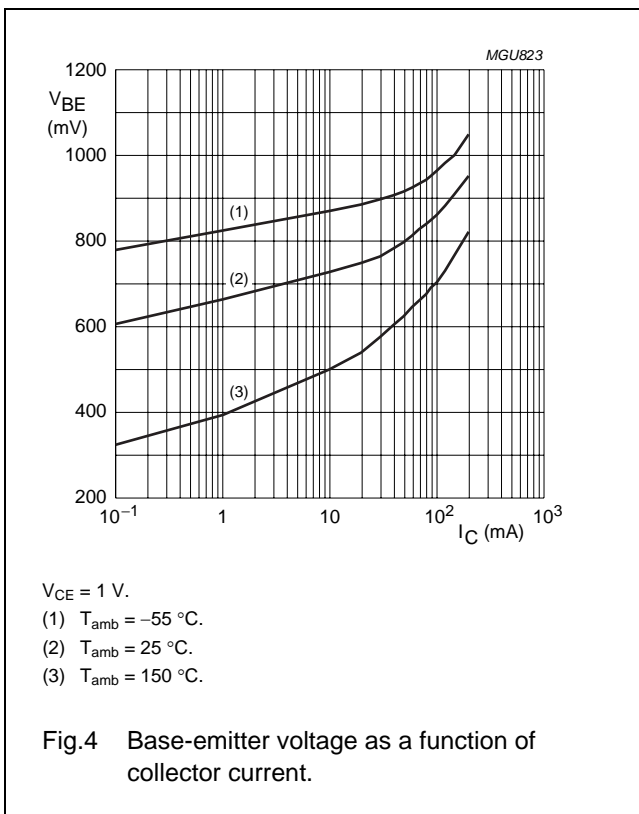
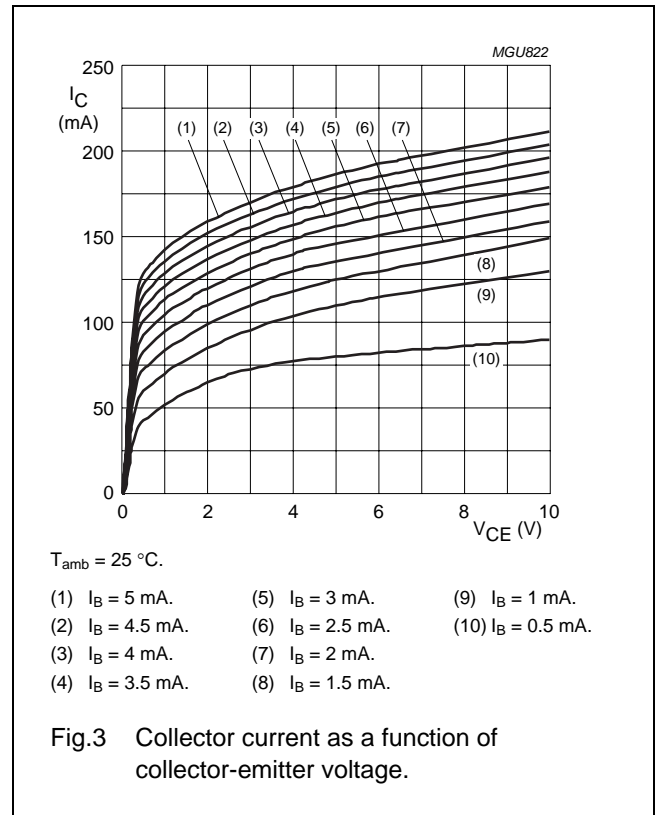
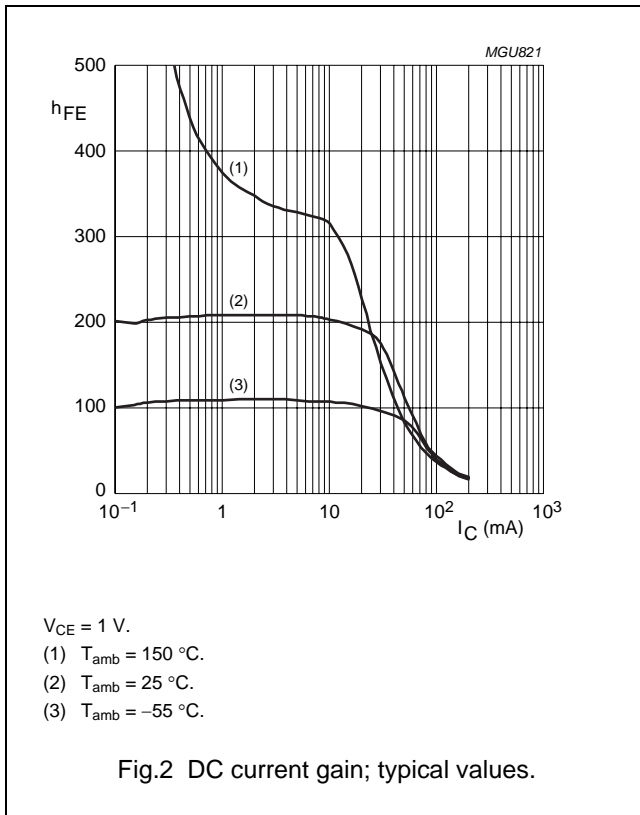
SYMBOL	PARAMETER	CONDITIONS	Value	UNIT
$V_{CBO}$	collector-base voltage	open emitter	60	V
$V_{CEO}$	collector-emitter voltage	open base	40	V
$V_{EBO}$	emitter-base voltage	open collector	6	V
$I_C$	collector current (DC)		200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25^\circ\text{C}$	200	mW
$T_{stg}$	storage temperature		-55 to +150	$^\circ\text{C}$
$T_j$	junction temperature		150	$^\circ\text{C}$
$T_{amb}$	operating ambient temperature		-55 to +150	$^\circ\text{C}$

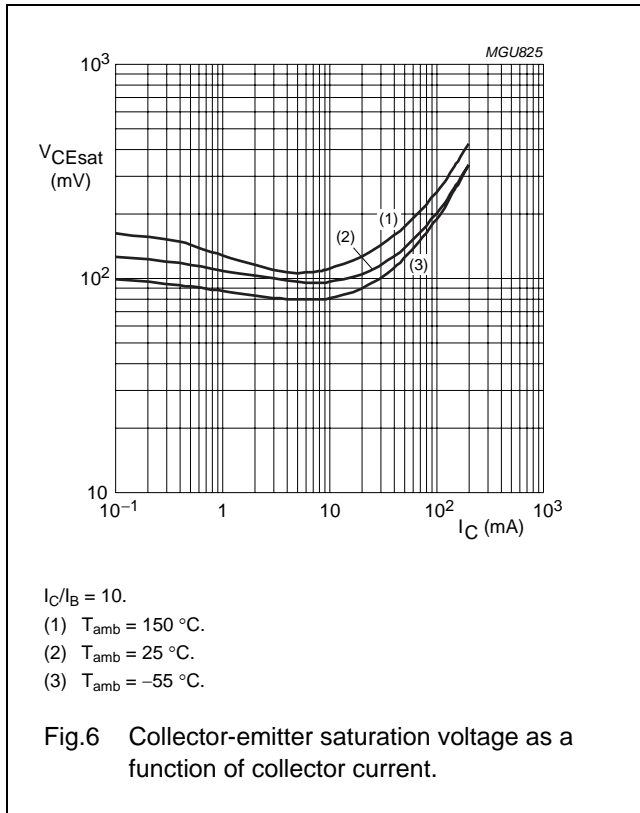
**NPN SWITCHING TRANSISTOR**
**ELECTRICAL CHARACTERISTICS @ Ta=25°C unless otherwise specified**

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0; V_{CB} = 60 V$	-	0.1	$\mu A$
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = 5 V$	-	0.1	$\mu A$
$h_{FE}$	DC current gain	$V_{CE} = 1 V;$ $I_C = 10mA$ $I_C = 50mA$ $I_C = 100mA$	100 60 30	- 300 -	
$V_{CE(sat)}$	collector-emitter saturation voltage	$I_C = 10mA; I_B = 1mA$	-	200	mV
		$I_C = 50mA; I_B = 5mA$	-	300	mV
$V_{BE(sat)}$	base-emitter saturation voltage	$I_C = 10mA; I_B = 1mA$	650	850	mV
		$I_C = 50mA; I_B = 5mA$	-	950	mV
$f_T$	transition frequency	$I_C = 10mA; V_{CE} = 20V;$ $f = 100MHz$	300	-	MHz
Switching times (between 10% and 90% levels);					
$t_d$	delay time	$V_{CC} = 3V_{dc}, V_{BE} = -0.5V_{dc}$	-	35	ns
$t_r$	rise time	$I_C = 10mA_{dc}, I_{B1} = 1mA_{dc}$	-	35	ns
$t_s$	storage time	$V_{CC} = 3V_{dc}, I_C = 10mA_{dc}$	-	200	ns
$t_f$	fall time	$I_{B1} = I_{B2} = 1mA_{dc}$	-	50	ns

 Note Pulse test:  $t_p \leq 300 ms; d \leq 0.02$ .

**NPN SWITCHING TRANSISTOR**

 TYPICAL CHARACTERISTICS @  $T_a=25^\circ\text{C}$  unless otherwise specified


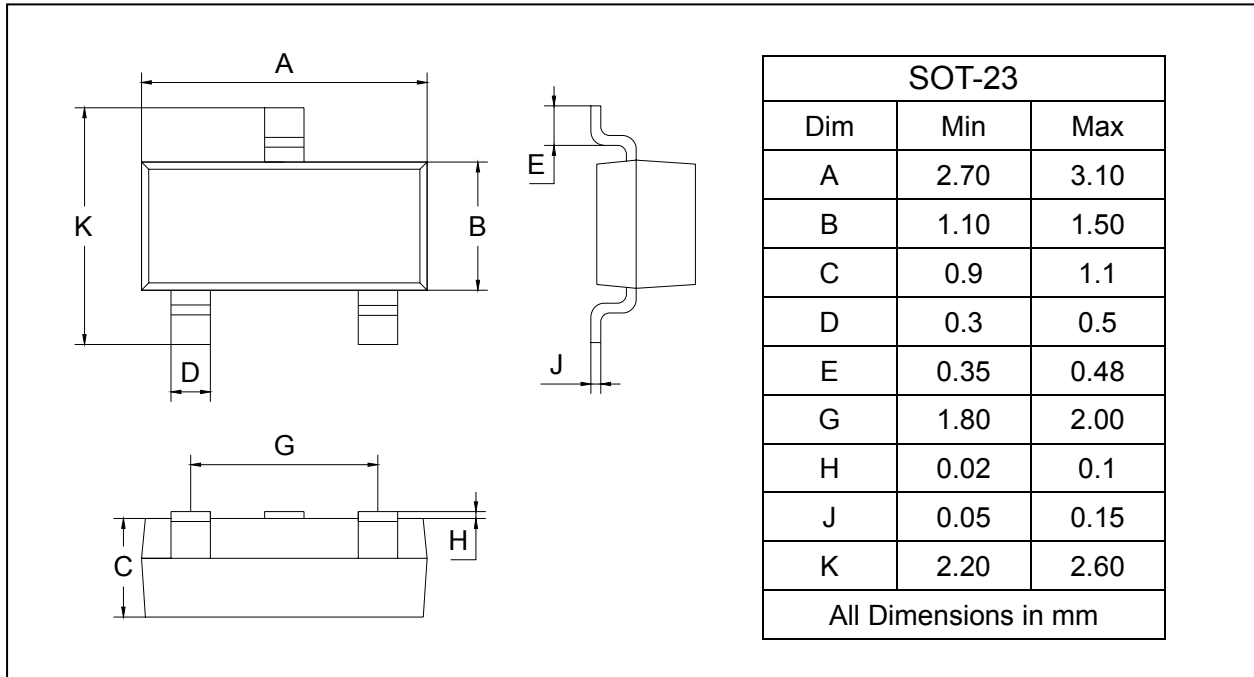
**NPN SWITCHING TRANSISTOR**


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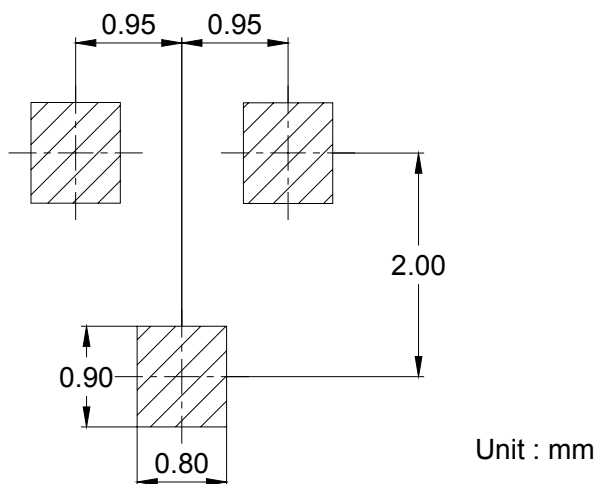
### PACKAGE OUTLINE

Plastic surface mounted package

SOT23



### SOLDERING FOOTPRINT



### PACKAGE INFORMATION

Device	Package	Shipping
MMBT3904	SOT23	3000/Tape&Reel

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