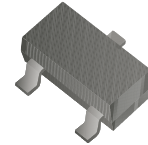


General Purpose Transistors NPN

RoHS Device

Halogen Free



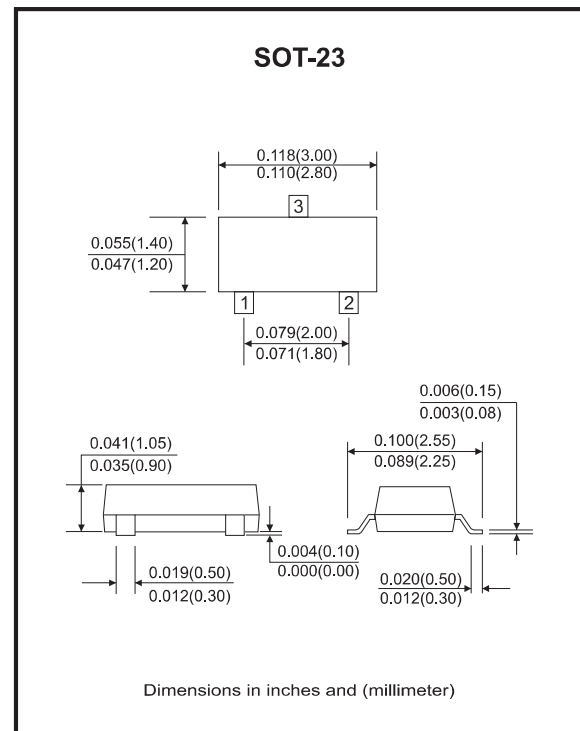
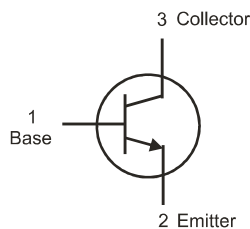
Features

- NPN silicon epitaxial planar transistor for switching and amplifier application.

Mechanical data

- Case: SOT-23, molded plastic.
- Terminals: solderable per MIL-STD-750, method 2026.
- Approx. weight: 0.008 grams

Circuit Diagram

Maximum Ratings (at $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Units
Collector-Base voltage	V_{CB0}	75	V
Collector-Emitter voltage	V_{CE0}	40	V
Emitter-Base voltage	V_{EB0}	6.0	V
Collector current-continuous	I_C	600	mA
Power dissipation	P_C	300	mW
Thermal resistance, junction to ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction temperature	T_J	150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@TA=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Max.	Units
Collector-Base breakdown voltage	$V_{(BR)CBO}$	$I_C=10\mu A, I_E=0$	75		V
Collector-Emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=10mA, I_B=0$	40		V
Emitter-Base breakdown voltage	$V_{(BR)EBO}$	$I_E=10\mu A, I_C=0$	6		V
Collector cut-off current	I_{CBO}	$V_{CB}=60V, I_E=0$		0.01	μA
Collector cut-off current	I_{CEO}	$V_{CE}=30V, V_{BE(off)}=3V$		0.01	μA
Emitter cut-off current	I_{EBO}	$V_{EB}=3V, I_C=0$		0.1	μA
DC current gain	$h_{FE(1)}$	$V_{CE}=10V, I_C=150mA$	100	300	
	$h_{FE(2)}$	$V_{CE}=10V, I_C=0.1mA$	40		
	$h_{FE(3)}$	$V_{CE}=10V, I_C=500mA$	42		
Collector-Emitter saturation voltage	$V_{CE(sat)}$	$I_C=150mA, I_B=15mA$ $I_C=500mA, I_B=50mA$		0.3 1	V
Base-Emitter saturation voltage	$V_{BE(sat)}$	$I_C=150mA, I_B=15mA$ $I_C=500mA, I_B=50mA$		1.2 2.0	V
Transition frequency	f_T	$V_{CE}=20V, I_C=20mA$ $f=100MHz$	300		MHz
Delay time (see fig.1)	t_d	$V_{CC}=30V, V_{BE(off)}=-0.5V$ $I_C=150mA, I_{B1}=15mA$		10	nS
Rise time (see fig.1)	t_r			25	nS
Storage time (see fig.2)	t_s	$V_{CC}=30V, I_C=150mA$ $I_{B1}=-I_{B2}=15mA$		225	nS
Fall time (see fig.2)	t_f			60	nS

Notes:

1. Pulse test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2.0\%$.

Rating and Characteristic Curves

Fig.1 - Static Characteristic

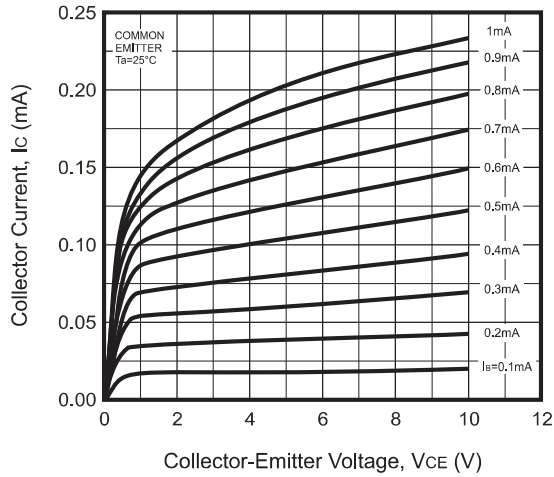


Fig.2 - $h_{FE} - I_c$

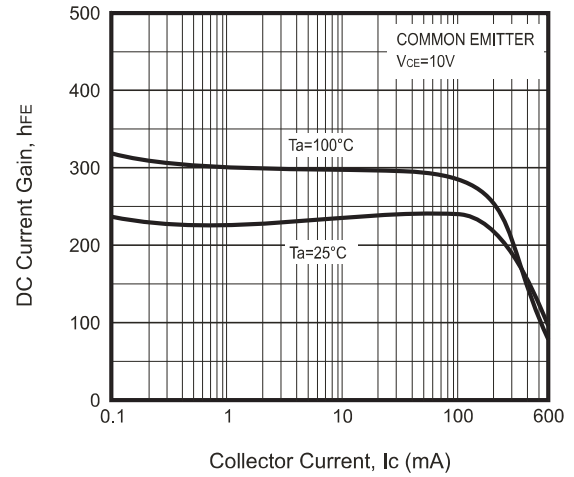


Fig.3 - $V_{CEsat} - I_c$

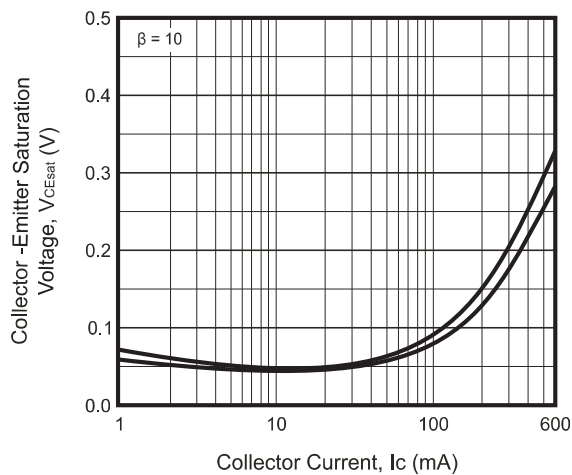


Fig.4 - $V_{BEsat} - I_c$

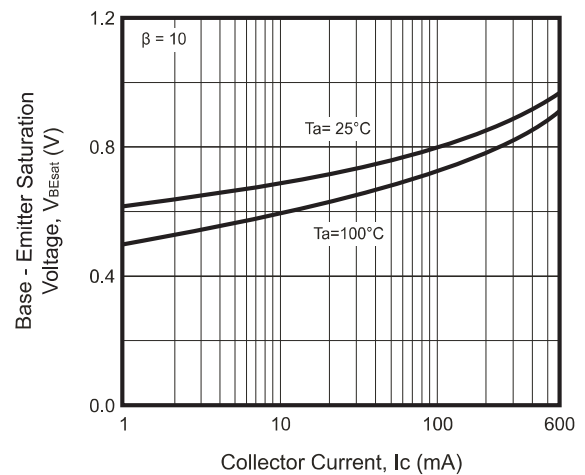


Fig.5 - $I_c - V_{BE}$

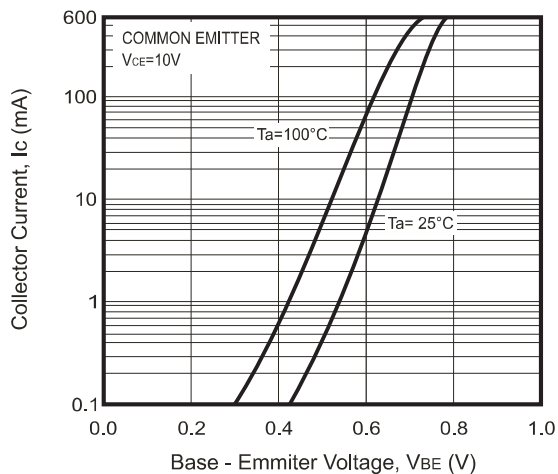
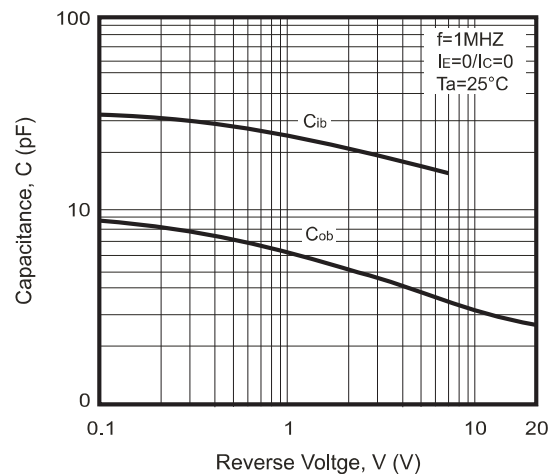


Fig.7 - $C_{ob}/C_{ib} - V_{CB}/V_{EB}$



Rating and Characteristic Curves

Fig.7 - F_T — I_C

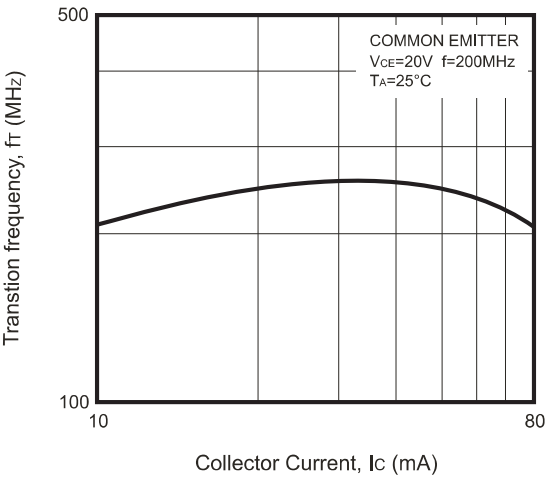
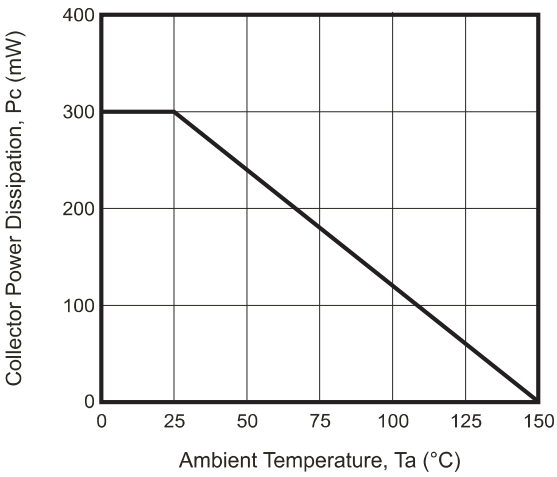
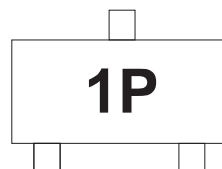


Fig.8 - P_C — T_a



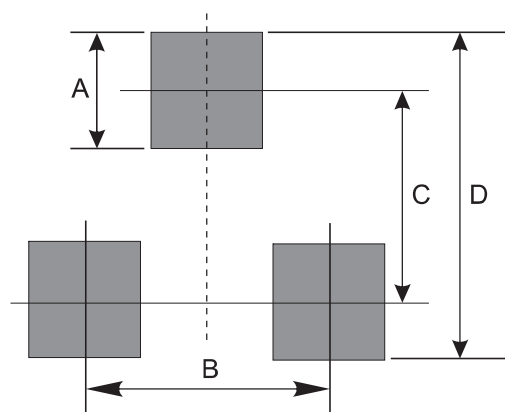
Marking Code

Part Number	Marking Code
MMBT2222A	1P



Suggested PAD Layout

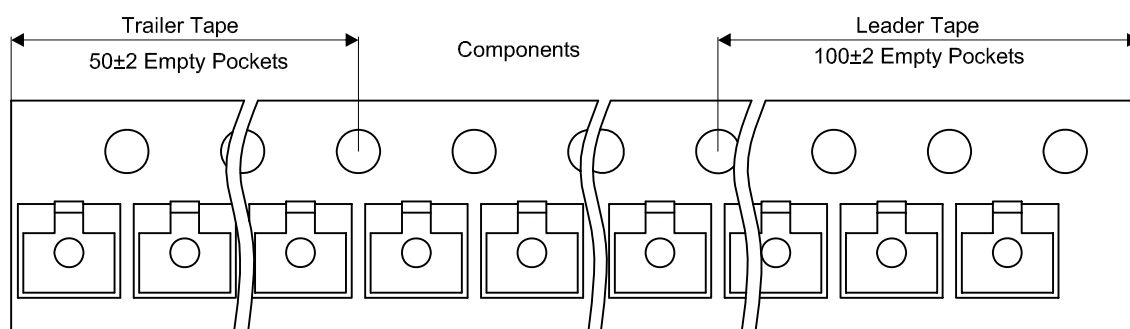
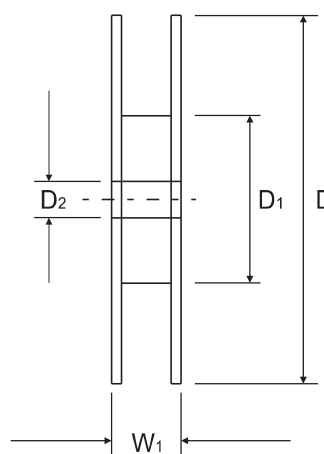
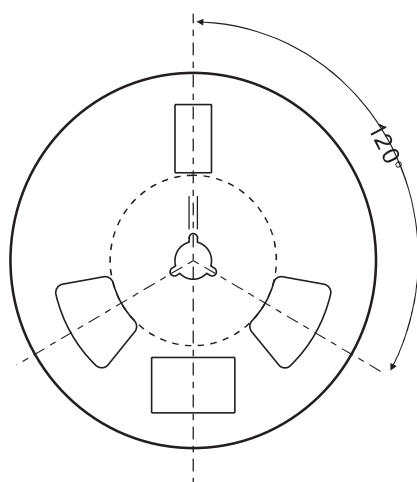
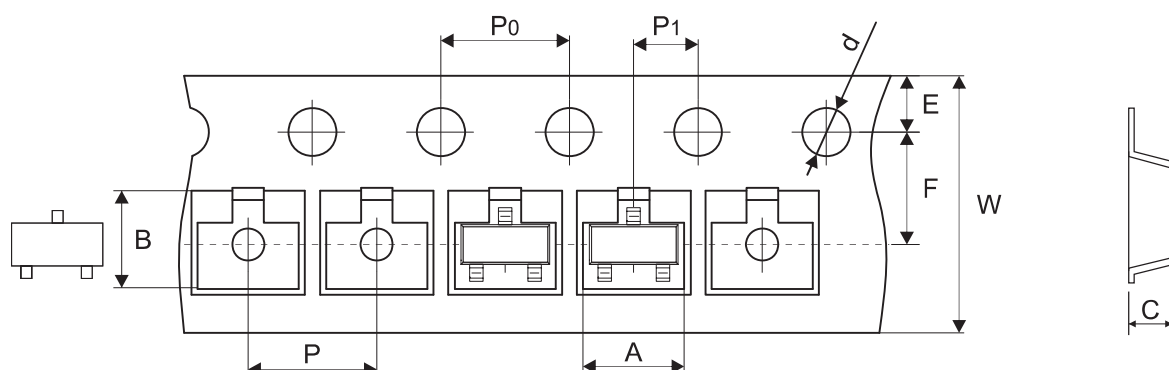
SIZE	SOT-23	
	(mm)	(inch)
A	0.80	0.031
B	1.90	0.075
C	2.02	0.080
D	2.82	0.111



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-23	3,000	7

Reel Taping Specification



SOT-23	SYMBOL	A	B	C	d	D	D ₁	D ₂
	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	1.50 + 0.10 - 0.00	178.00 ± 1.00	54.60 ± 1.00	13.30 ± 1.00
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	0.059 + 0.004 - 0.000	7.008 ± 0.039	2.150 ± 0.039	0.524 ± 0.039

SOT-23	SYMBOL	E	F	P	P ₀	P ₁	W	W ₁
	(mm)	1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	8.00 + 0.30 - 0.10	11.10 ± 0.20
	(inch)	0.069 ± 0.004	0.138 ± 0.002	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.315 + 0.012 - 0.004	0.437 ± 0.008

Company reserves the right to improve product design , functions and reliability without notice.

Rev:1.0