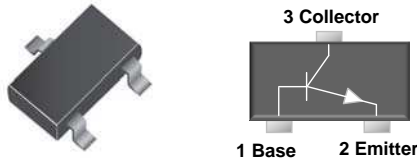


Small Signal Transistor

SOT-23

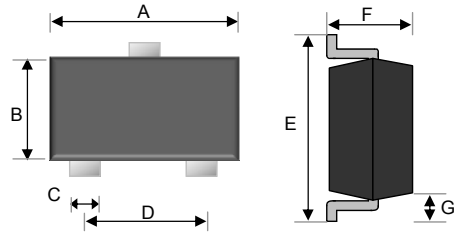


Features

- ✧ Epitaxial planar die construction
- ✧ Surface device type mounting
- ✧ Moisture sensitivity level 1
- ✧ Matte Tin(Sn) lead finish with Nickel(Ni) underplate
- ✧ Pb free version and RoHS compliant
- ✧ Green compound (Halogen free) with suffix "G" on packing code and prefix "G" on date code

Mechanical Data

- ✧ Case : SOT- 23 small outline plastic package
- ✧ Terminal: Matte tin plated, lead free., solderable per MIL-STD-202, Method 208 guaranteed
- ✧ High temperature soldering guaranteed: 260°C/10s
- ✧ Weight : 0.008gram (approximately)
- ✧ Marking Code : 1P

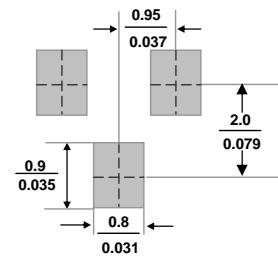


Dimensions	Unit (mm)		Unit (inch)	
	Min	Max	Min	Max
A	2.80	3.00	0.110	0.118
B	1.20	1.40	0.047	0.055
C	0.30	0.50	0.012	0.020
D	1.80	2.00	0.071	0.079
E	2.25	2.55	0.089	0.100
F	0.90	1.20	0.035	0.043
G	0.550 REF		0.022 REF	

Ordering Information

Package	Part No.	Packing	Marking
SOT-23	MMBT2222A RF	3K / 7" Reel	1P
SOT-23	MMBT2222A RFG	3K / 7" Reel	1P

Suggested PAD Layout



Maximum Ratings and Electrical Characteristics

Rating at 25°C ambient temperature unless otherwise specified.

Maximum Ratings

Type Number	Symbol	Value	Units
Power Dissipation	P_D	300	mW
Collector-Base Voltage	V_{CBO}	75	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	600	mA
Thermal Resistance (Junction to Ambient) (Note 1)	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to + 150	°C

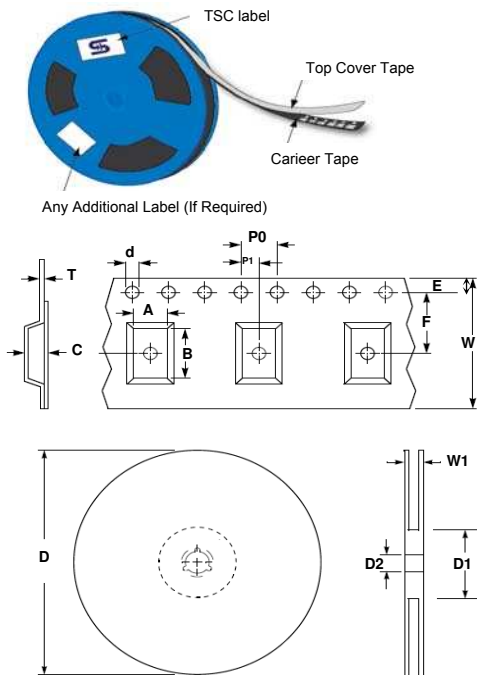
Notes:1. Valid provided that electrodes are kept at ambient temperature

Small Signal Transistor

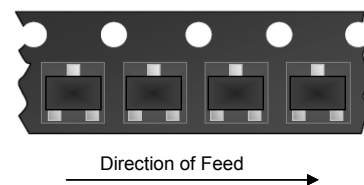
Electrical Characteristics

Type Number	Symbol	Min	Max	Units	
Collector-Base Breakdown Voltage	$I_C=10\mu A$ $I_E=0$	$V_{(BR)CBO}$	75	-	V
Collector-Emitter Breakdown Voltage	$I_C=10mA$ $I_B=0$	$V_{(BR)CEO}$	40	-	V
Emitter-Base Breakdown Voltage	$I_E=10\mu A$ $I_C=0$	$V_{(BR)EBO}$	6	-	V
Collector Cut-off Current	$V_{CB}=60V$ $I_E=0$	I_{CBO}	-	0.01	μA
Collector Cut-off Current	$V_{CE}=60V$ $V_{BE(off)}=3.0V$	I_{CEX}	-	0.01	μA
Emitter Cut-off Current	$V_{EB}=3.0V$ $I_C=0$	I_{EBO}	-	0.01	μA
DC current gain	$V_{CE}=10V$ $I_C=500mA$	h_{FE}	40	-	
	$V_{CE}=10V$ $I_C=150mA$		100	300	
	$V_{CE}=10V$ $I_C=10mA$		75	-	
	$V_{CE}=10V$ $I_C=1mA$		50	-	
	$V_{CE}=10V$ $I_C=0.1mA$		35	-	
Collector-Emitter saturation voltage	$I_C=500mA$ $I_B=50mA$	$V_{CE(sat)}$	-	1.0	V
Base-Emitter saturation voltage	$I_C=500mA$ $I_B=50mA$	$V_{BE(sat)}$	-	2.0	V
Transition frequency	$V_{CE}=20V$ $I_C=20mA$ $f=100MHz$	f_T	300	-	MHz
Output capacitance	$V_{CB}=10V$ $I_E=0$ $f=1.0MHz$	C_{obo}	8		pF
Input capacitance	$V_{EB}=0.5V$ $I_C=0$ $f=1.0MHz$	C_{ibo}	25		pF
Delay time	$V_{CC}=30V$ $V_{BE(off)}=-0.5V$ $I_C=150mA$ $I_{B1}=15mA$	t_d	-	10	nS
Rise time	$V_{CC}=30V$ $V_{BE(off)}=-0.5V$ $I_C=150mA$ $I_{B1}=15mA$	t_r	-	25	nS
Storage time	$V_{CC}=30V$ $I_C=150mA$ $I_{B1}=-I_{B2}=15mA$	t_s	-	225	nS
Fall time	$V_{CC}=30V$ $I_C=150mA$ $I_{B1}=-I_{B2}=15mA$	t_f	-	60	nS

Tape & Reel specification



Item	Symbol	Dimension(mm)
Carrier width	A	3.15 ±0.10
Carrier length	B	2.77 ±0.10
Carrier depth	C	1.22 ±0.10
Sprocket hole	d	1.50 ± 0.10
Reel outside diameter	D	178 ± 1
Reel inner diameter	D1	55 Min
Feed hole width	D2	13.0 ± 0.20
Sprocket hole position	E	1.75 ± 0.10
Punch hole position	F	3.50 ± 0.05
Sprocket hole pitch	P0	4.00 ± 0.10
Embossment center	P1	2.00 ± 0.05
Overall tape thickness	T	0.229 ± 0.013
Tape width	W	8.10 ± 0.20
Reel width	W1	12.30 ± 0.20



Rating and Characteristic Curves

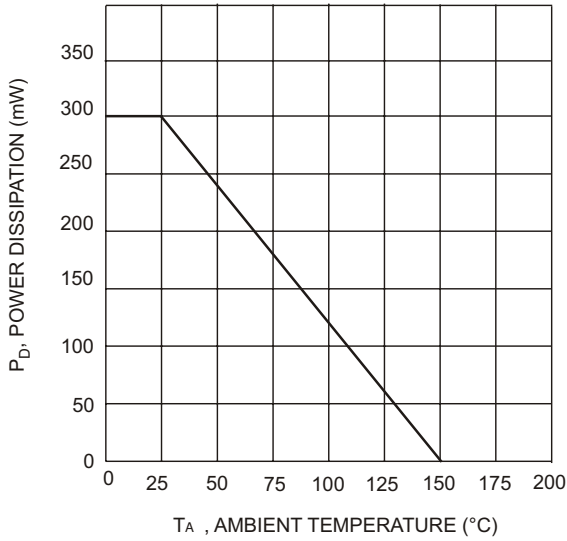


Fig. 1 Max Power Dissipation vs Ambient Temperature

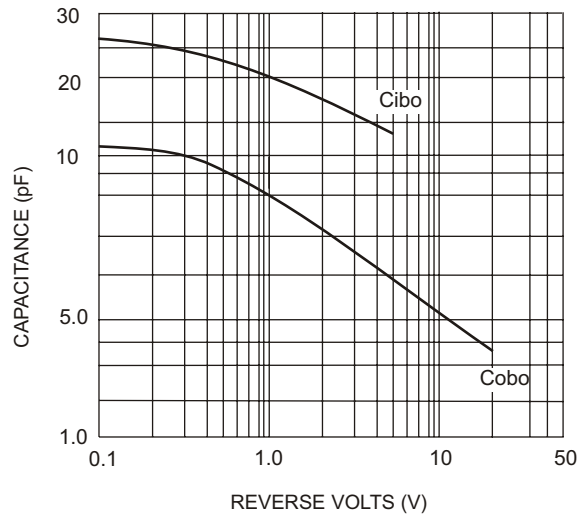


Fig. 2 Typical Capacitance

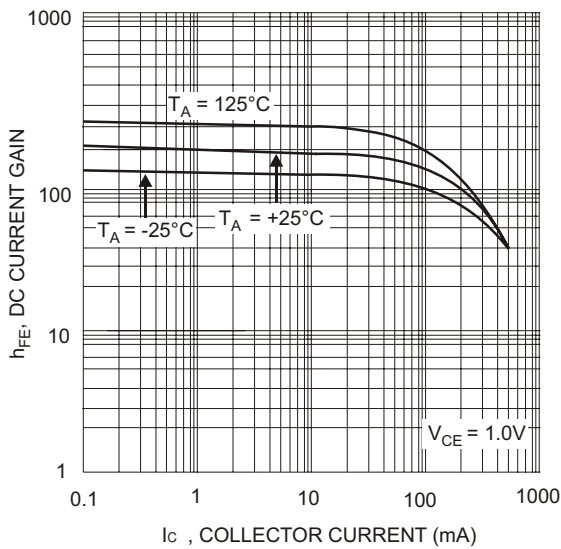


Fig.3 Typical DC Current Gain vs Collector Current

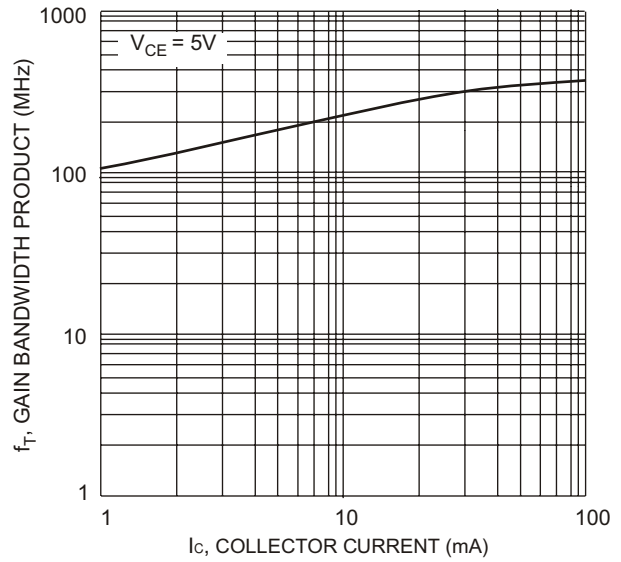


Fig. 4 Gain Bandwidth Product vs. Collector Current

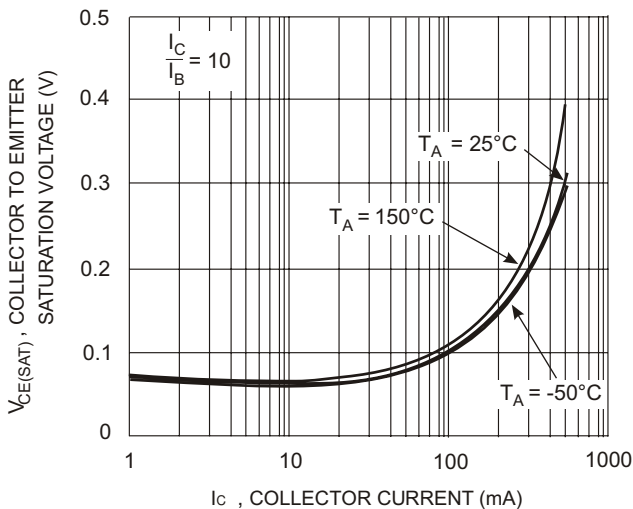


Fig. 5 Collector Emitter Saturation Voltage vs. Collector Current

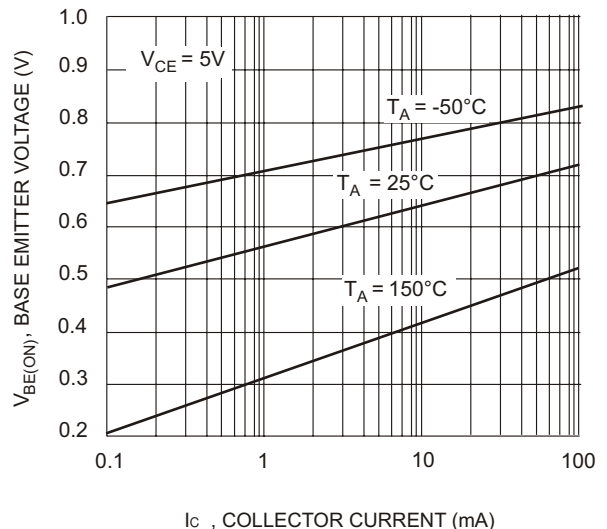


Fig. 6 Base Emitter Voltage vs. Collector Current