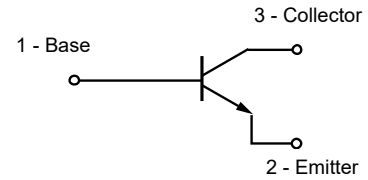


Feature

- This device is Pb-Free, Halogen Free/BFR Free and Rohs compliant.



Mechanical Characteristics

- Lead finish:100% matte Sn(Tin)
- Mounting position: Any
- Qualified max reflow temperature:260°C
- Device meets MSL 1 requirements
- Pure tin plating: 7 ~ 17 um
- Pin flatness : ≤3mil

Structure

NPN epitaxial planar silicon transistor

Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=1.0mA, I_B=0$	40			V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=10uA, I_E=0$	60			V
Emitter -Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10uA, I_C=0$	6.0			V
Collector Current DC	I_C			200		mA
Base Cutoff Current	I_{BL}	$V_{CE}=30V, V_{EB}=3.0V$			50	nA
Collector Cutoff Current	I_{CEX}	$V_{CE}=30V, V_{EB}=3.0V$			50	nA

Absolute maximum rating@25°C

Rating	Symbol	Value	Units
Total Device Dissipation $T_A=25^\circ C$	P_D	200	mW
Operating Temperature	T_J	-55 to +150	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Absolute maximum rating@25°C

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
DC Current Gain	H_{FE}	$I_C=10mA, V_{CE}=1.0V$	100		300	-
DC Current Gain	H_{FE}	$I_C=50mA, V_{CE}=1.0V$	60		-	-
DC Current Gain	H_{FE}	$I_C=100mA, V_{CE}=1.0V$	30		-	-
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=50mA, I_B=5.0mA$	-		0.3	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=50mA, I_B=5.0mA$	-		0.95	V

Small-Signal Characteristics

Parameter	Symbol	Conditions	Min.	Max.	Units
Current-Gain-Bandwidth Product	f_T	$I_C=10mA, V_{CE}=20V, f=100MHz$	300	-	MHz
Output Capacitance	C_{obo}	$V_{CB}=5.0V, I_E=0, f=1.0MHz$	-	4.0	pF
Input Capacitance	C_{ibo}	$V_{EB}=0.5V, I_C=0, f=1.0MHz$	-	8.0	pF
Input Impedance	h_{ie}	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	1.0	10	$k\Omega$
Voltage Feedback Ratio	h_{re}	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	0.5	8.0	$\times 10^{-4}$
Small-Signal Current Gain	h_{fe}	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	100	400	-
Output Admittance	h_{oe}	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	1.0	40	umhos
Noise Figure	NF	$V_{CE}=5.0V, I_C=0.1mA, f=1.0kHz$ $R_S=1.0k\Omega$	-	5.0	dB

Switching Characteristics

Parameter	Symbol	Conditions	Min.	Max.	Units
Delay Time	t_d	$V_{CC}=3.0V, V_{BE}=-0.5V.$ $I_C=10mA, I_{B1}=1.0mA$	-	35	ns
Rise Time	t_r	$V_{CC}=3.0V, V_{BE}=-0.5V.$ $I_C=10mA, I_{B1}=1.0mA$	-	35	
Storage Time	t_s	$V_{CC}=3.0V$ $I_C=10mA, I_{B1}=I_{B2}=1.0mA$	-	200	
Fall Time	t_f	$V_{CC}=3.0V$ $I_C=10mA, I_{B1}=I_{B2}=1.0mA$	-	50	

Typical Characteristics

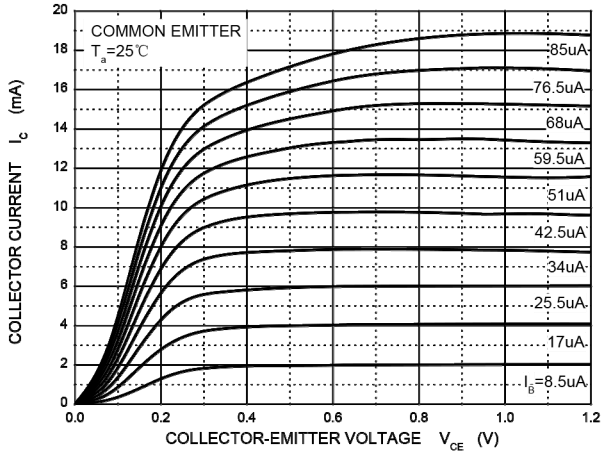


Fig 1. Static Characteristic

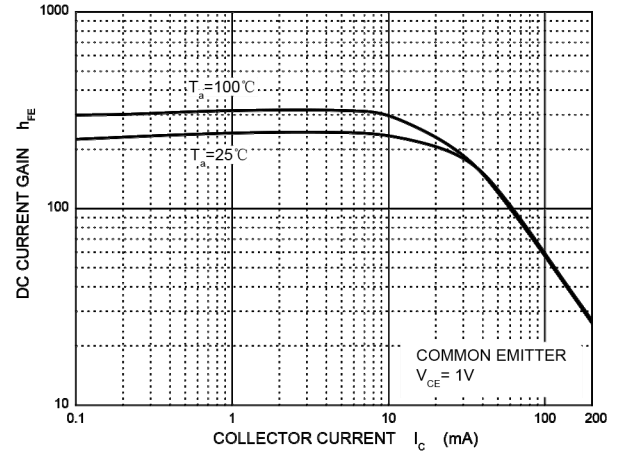


Fig 2. h_{FE} vs I_C

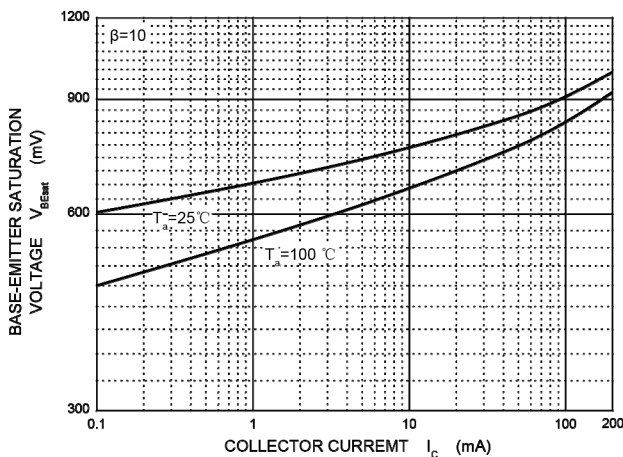


Fig 3. $V_{BE(sat)}$ vs I_C

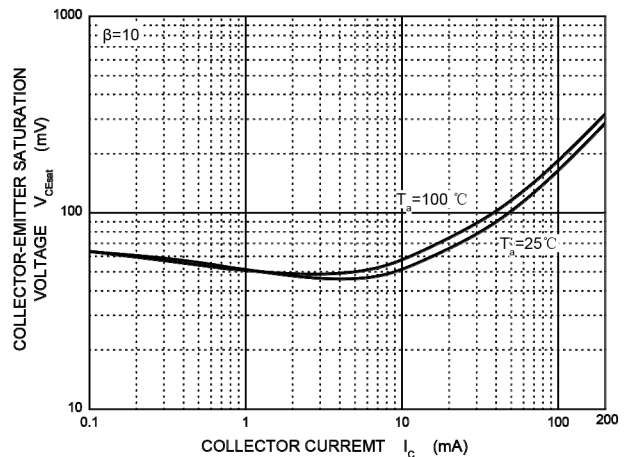


Fig 4. $V_{CE(sat)}$ vs I_C

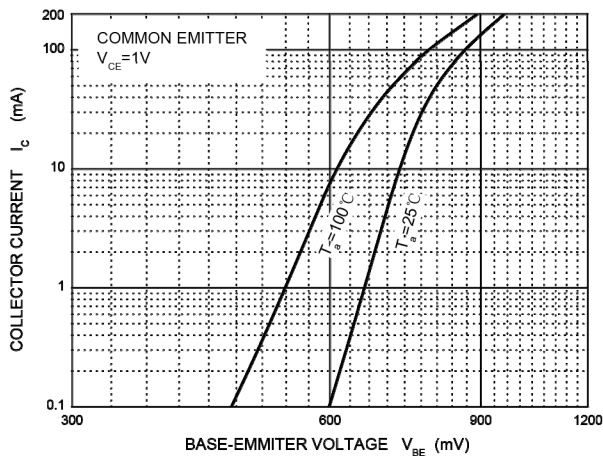


Fig 5. I_C vs V_{BE}

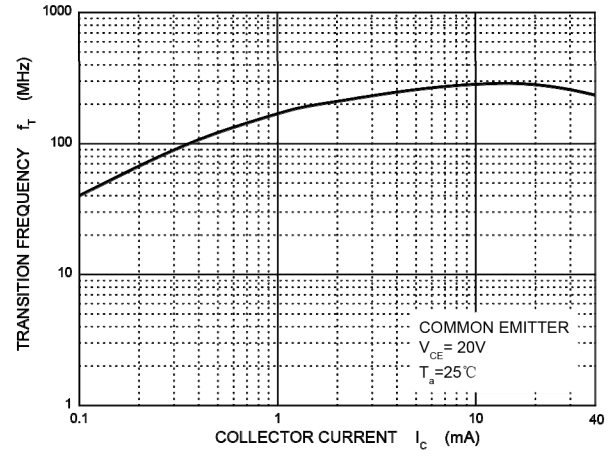


Fig 6. f_T vs I_C

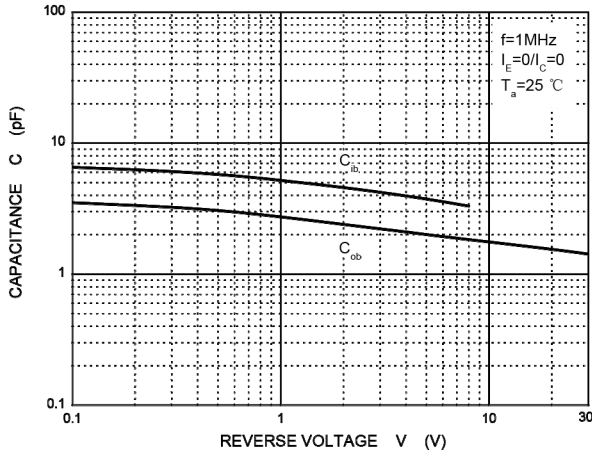


Fig 7. C_{ob}/C_{ib} ----- V_{CB}/V_{EB}

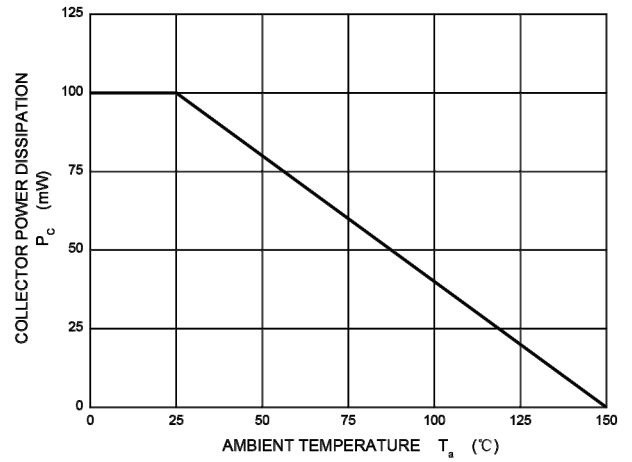
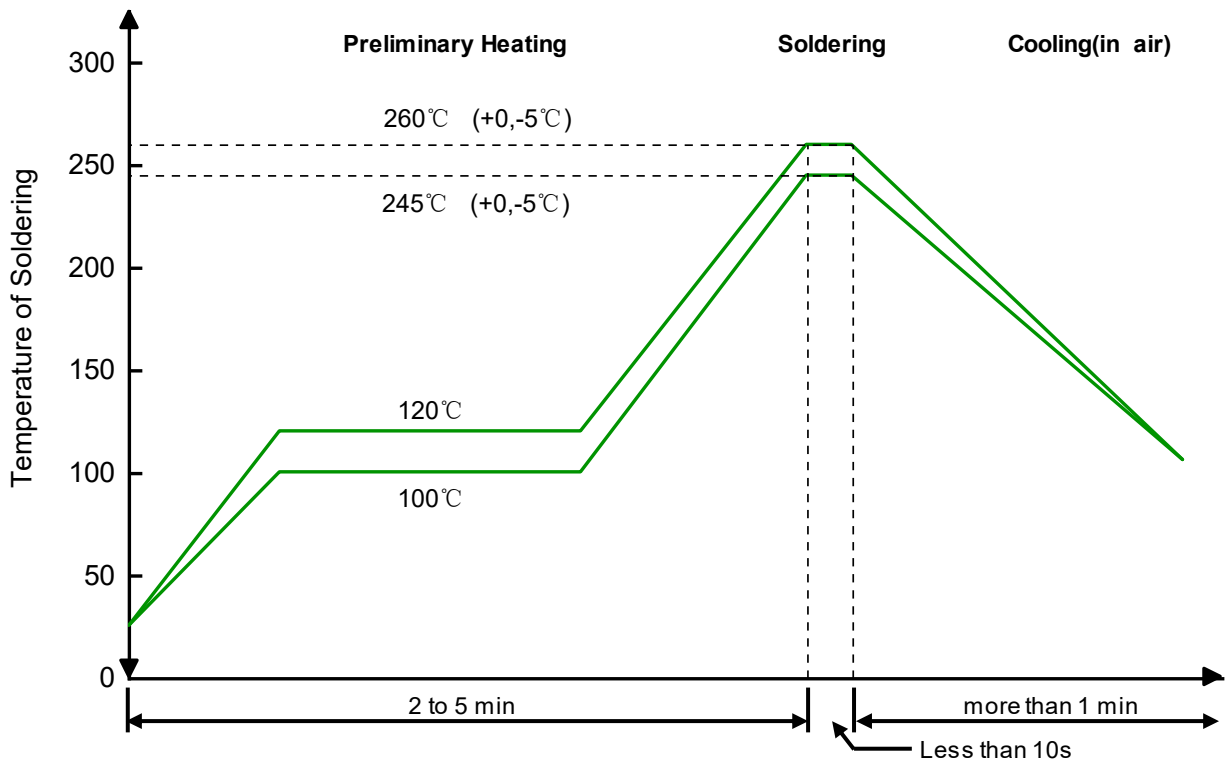


Fig 8. P_c ----- T_a

Solder Reflow Recommendation

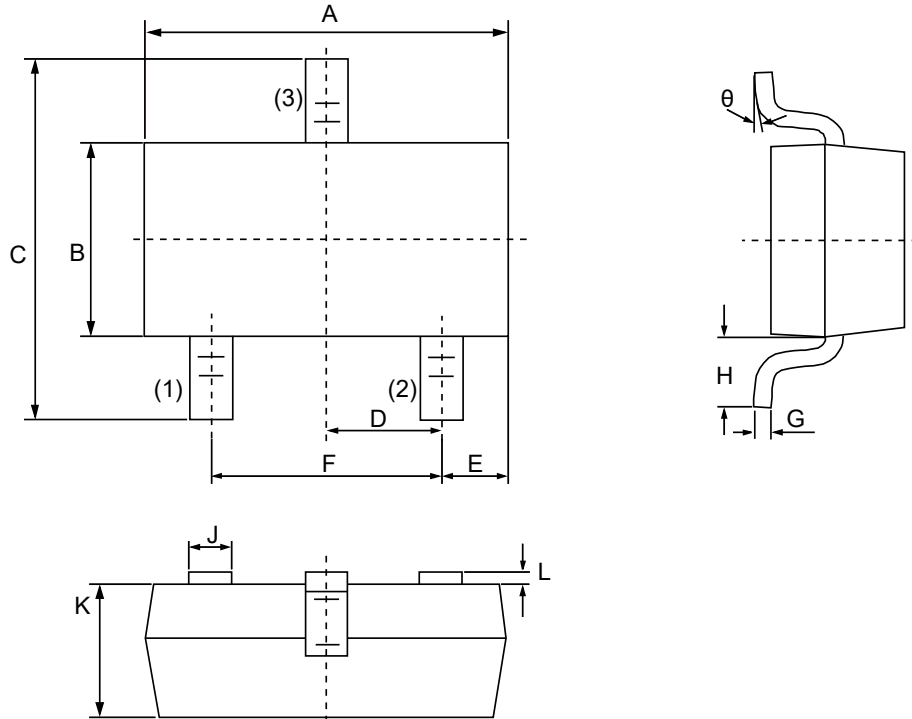


Remark: Pb free for 260°C; Pb for 245°C.

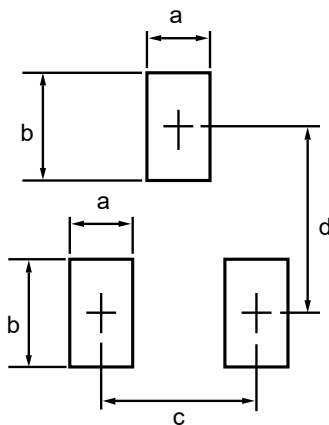
Ordering information

Device	Package	Reel	Shipping
PT23T3904	SOT-23 (Pb-Free)	7"	3000 / Tape & Reel

Product dimension(SOT-23)

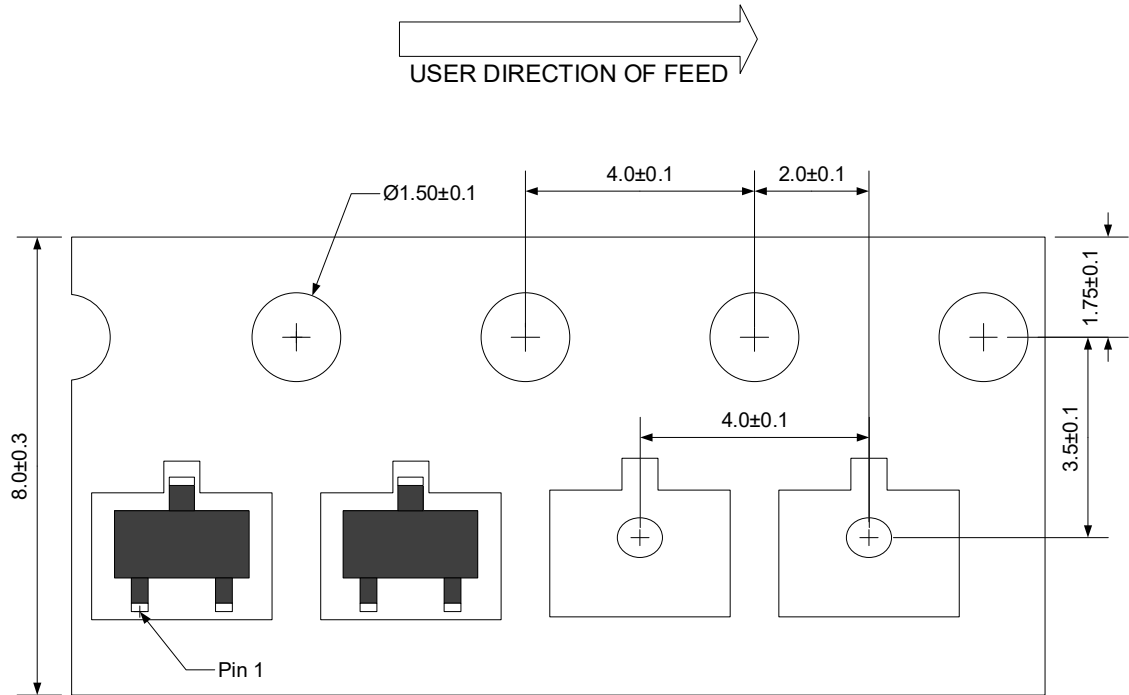


Dim	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	2.80	3.00	0.1102	0.1197
B	1.20	1.40	0.0472	0.0551
C	2.10	2.55	0.0830	0.1004
D	0.89	1.02	0.0350	0.0401
E	0.45	0.60	0.0177	0.0236
F	1.78	2.04	0.0701	0.0807
G	0.08	0.177	0.0031	0.0070
H	0.45	0.60	0.0180	0.0236
J	0.37	0.50	0.0150	0.0200
K	0.89	1.15	0.0350	0.0452
L	0.000	0.100	0.0000	0.0040
θ	0°	10°	0°	10°



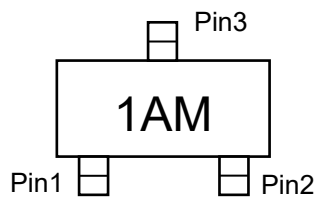
Dim	Millimeters	
	MIN	MAX
a	--	0.7
b	--	1.2
c	--	2.04
d	--	2.2

Load with information




Unit:mm

Marking information




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