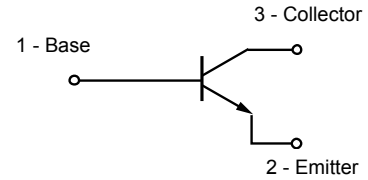


### Feature

- 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 $T_A=25^\circ C$	$P_D$	150	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	$H_{FE}$	$I_C=0.1\text{mA}, V_{CE}=1.0\text{V}$	40		-	-
		$I_C=1.0\text{mA}, V_{CE}=1.0\text{V}$	70		-	
		$I_C=10\text{mA}, V_{CE}=1.0\text{V}$	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	$V_{CE(sat)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$	-		0.2	V
		$I_C=50\text{mA}, I_B=5.0\text{mA}$	-		0.3	
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$	0.65		0.85	V
		$I_C=50\text{mA}, I_B=5.0\text{mA}$	-		0.95	

## Small-Signal Characteristics

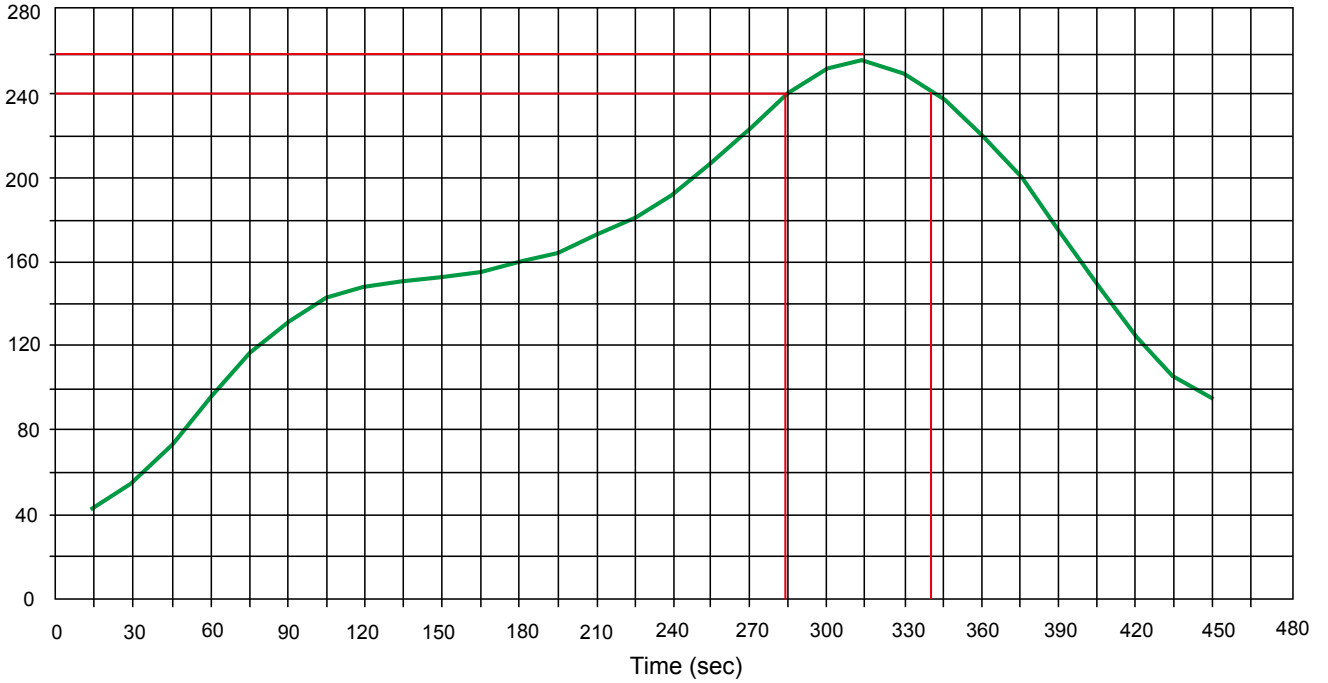
Parameter	Symbol	Conditions	Min.	Max.	Units
Current-Gain-Bandwidth Product	$f_T$	$I_C=10\text{mA}, V_{CE}=20\text{V}, f=100\text{MHz}$	300	-	MHz
Output Capacitance	$C_{obo}$	$V_{CB}=5.0\text{V}, I_E=0, f=1.0\text{MHz}$	-	4.0	pF
Input Capacitance	$C_{ibo}$	$V_{EB}=0.5\text{V}, I_C=0, f=1.0\text{MHz}$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

## Switching Characteristics

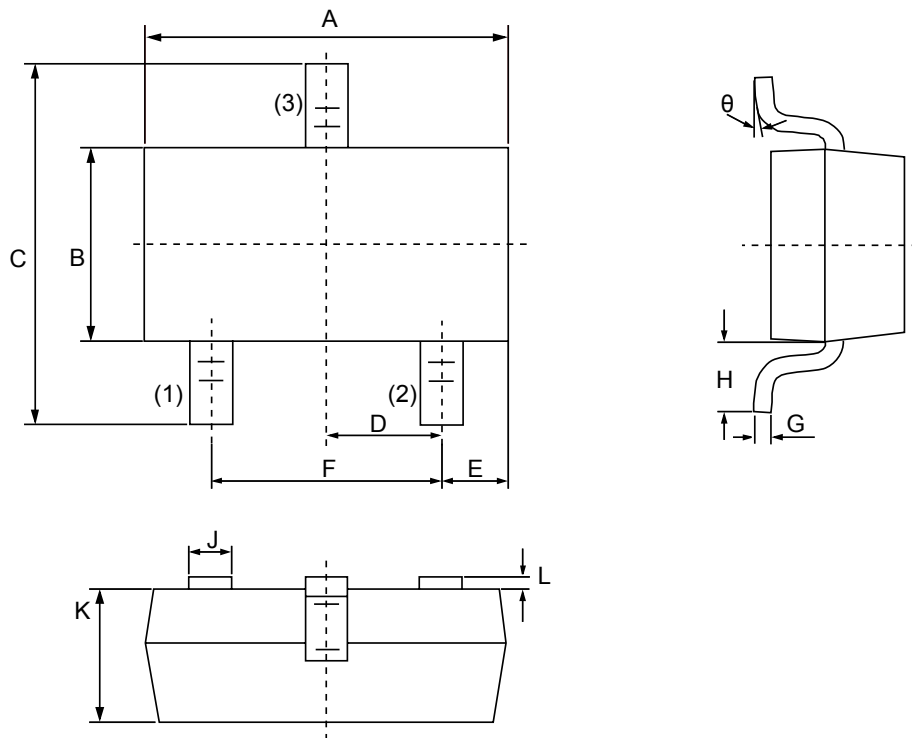
Parameter	Symbol	Conditions	Min.	Max.	Units
Delay Time	$t_d$	$V_{CC}=3.0\text{V}, V_{BE}=-0.5\text{V}$ $I_C=10\text{mA}, I_{B1}=1.0\text{mA}$	-	35	ns
Rise Time	$t_r$		-	35	
Storage Time	$t_s$	$V_{CC}=3.0\text{V}$	-	200	
Fall Time	$t_f$	$I_C=10\text{mA}, I_{B1}=I_{B2}=1.0\text{mA}$	-	50	

Solder Reflow Recommendation

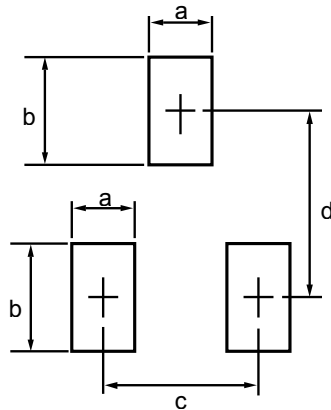
Peak Temp=257°C, Ramp Rate=0.802deg. °C/sec



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	2.50	0.0830	0.0984
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	0.085	0.177	0.0034	0.0070
H	0.45	0.60	0.0180	0.0236
J	0.37	0.50	0.0150	0.0200
K	0.89	1.11	0.0350	0.0440
L	0.013	0.100	0.0005	0.0040
$\theta$	0°	10°	0°	10°




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

Ordering information

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


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