Dual General Purpose NPN Transistors

HBN3904S6R

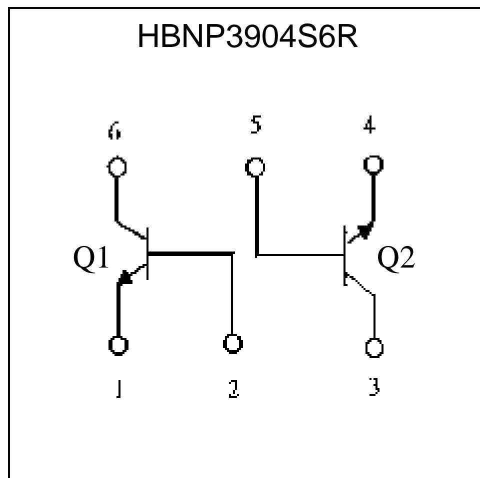
Description

The HBN3904S6R is a spin-off of our popular SOT-23/SOT-323 three-leaded devices. It is designed for general purpose amplifier applications and is housed in the SOT-363R six-leaded surface mount package. By putting two discrete devices in one package, this device is ideal for low power surface mount applications where board space is at a premium.

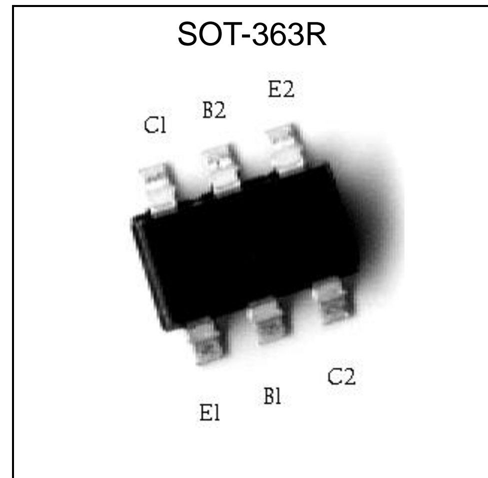
Features

- H_{FE}, 100--300
- Low $V_{CE(sat)}$, ≤0.4V
- Pb-free lead plating and halogen-free package
- Reduces board space.
- Reduces component count
- Simplifies circuit design

Equivalent Circuit

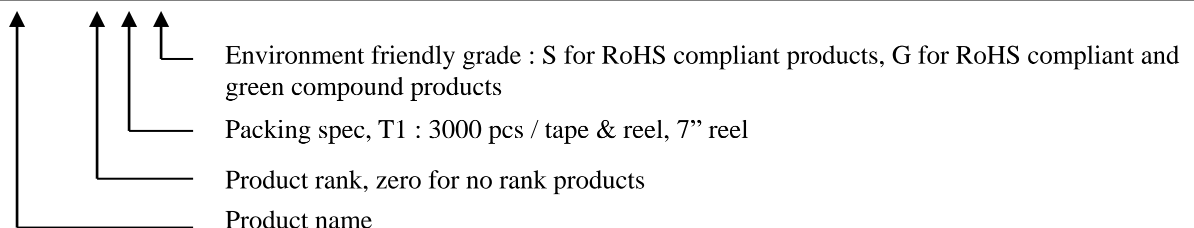


Outline



Ordering Information

Device	Package	Shipping
HBN3904S6R-0-T1-G	SOT-363 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel



The following characteristics apply to both Tr 1 and Tr 2

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	200	mA
Total Package Dissipation@T_A=25℃	P_D	200 (Note 1)	mW
Operating Junction Temperature Range	Tj	-55~+150	°C
Storage Temperature Range	Tstg	-55~+150	°C

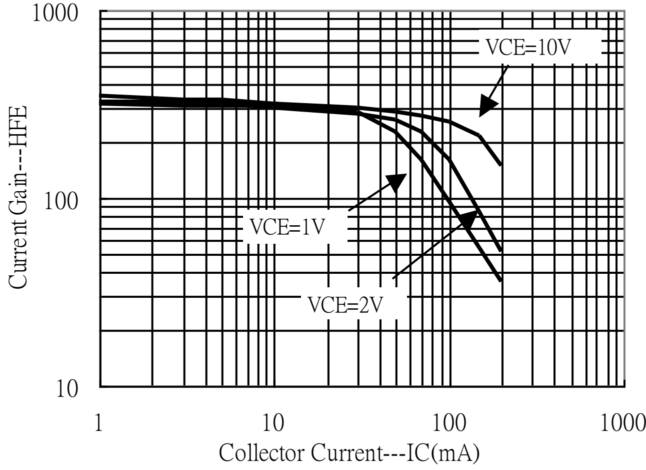
Note 1:Device mounted on a FR-4 glass epoxy PCB with area measuring 1.0×0.75×0.062in. 150mW per element can't be exceeded.

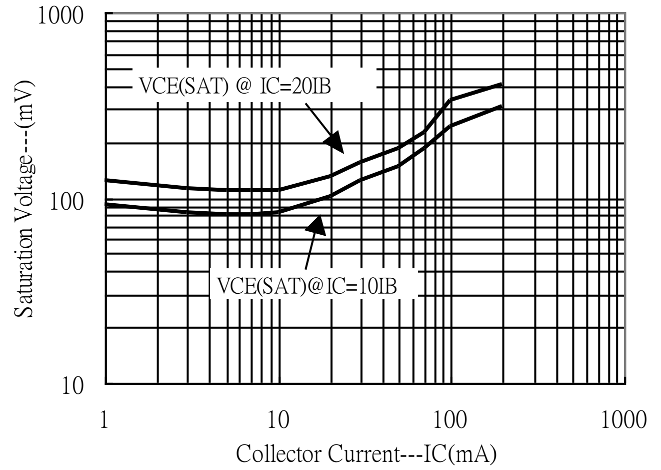
Characteristics (Ta=25°C)

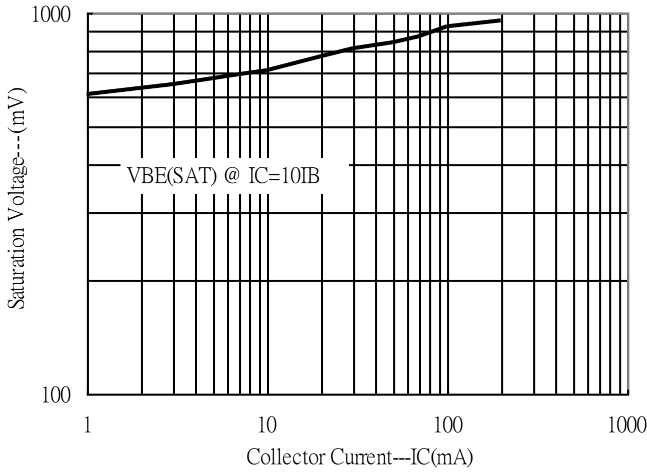
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	60	-	-	V	I_C=10μA
BV_{CEO}	40	-	-	V	I_C=1mA
BV_{EBO}	6	-	-	V	I_E=10μA
I_{CBO}	-	-	100	nA	V_{CB}=50V
I_{CEX}	-	-	50	nA	V_{CE}=30V, V_{EB}=3V
I_{EBO}	-	-	100	nA	V_{EB}=5V
$V_{CE(sat)}$	-	-	0.2	V	I_C=10mA, I_B=1mA
$V_{CE(sat)}$	-	-	0.3	V	I_C=50mA, I_B=5mA
$V_{BE(sat)}$	-	-	0.85	V	I_C=10mA, I_B=1mA
$V_{BE(sat)}$	-	-	0.95	V	I_C=50mA, I_B=5mA
h_{FE}	40	-	-	-	V_{CE}=1V, I_C=100μA
h_{FE}	70	-	-	-	V_{CE}=1V, I_C=1mA
h_{FE}	100	-	300	-	V_{CE}=1V, I_C=10mA
h_{FE}	60	-	-	-	V_{CE}=1V, I_C=50mA
*h_{FE}	30	-	-	-	V_{CE}=1V, I_C=100mA
f_T	-	300	-	MHz	V_{CE}=20V, I_C=10mA, f=100MHz
Cob	-	-	4	pF	V_{CB}=5V, f=1MHz
td	-	-	35	ns	V_{CC}=3V, V_{BE}=-0.5V, I_C=10mA, I_B1=1mA
tr	-	-	35	ns	
tstg	-	-	200	ns	V_{CC}=3V, I_C=10mA, I_B1= -I_B2=1mA
tf	-	-	50	ns	

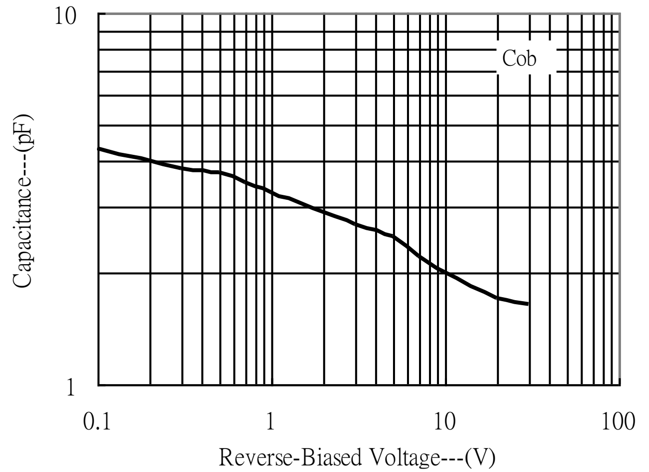
*Pulse Test: Pulse Width ≤380us, Duty Cycle≤2%

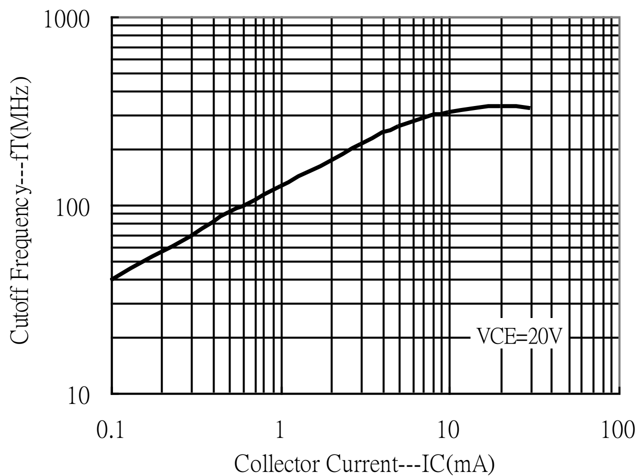
Typical Characteristics

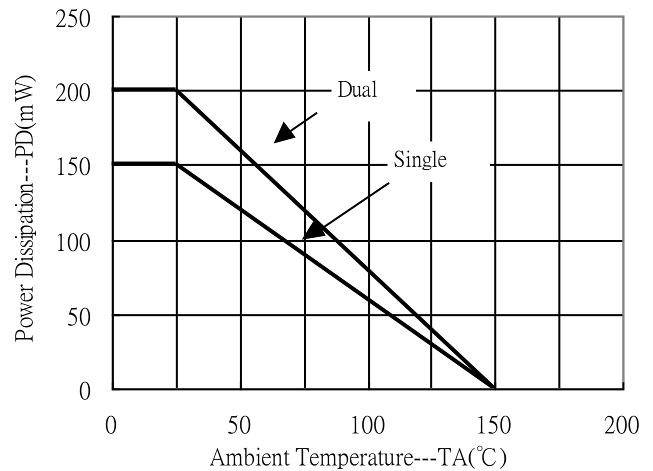




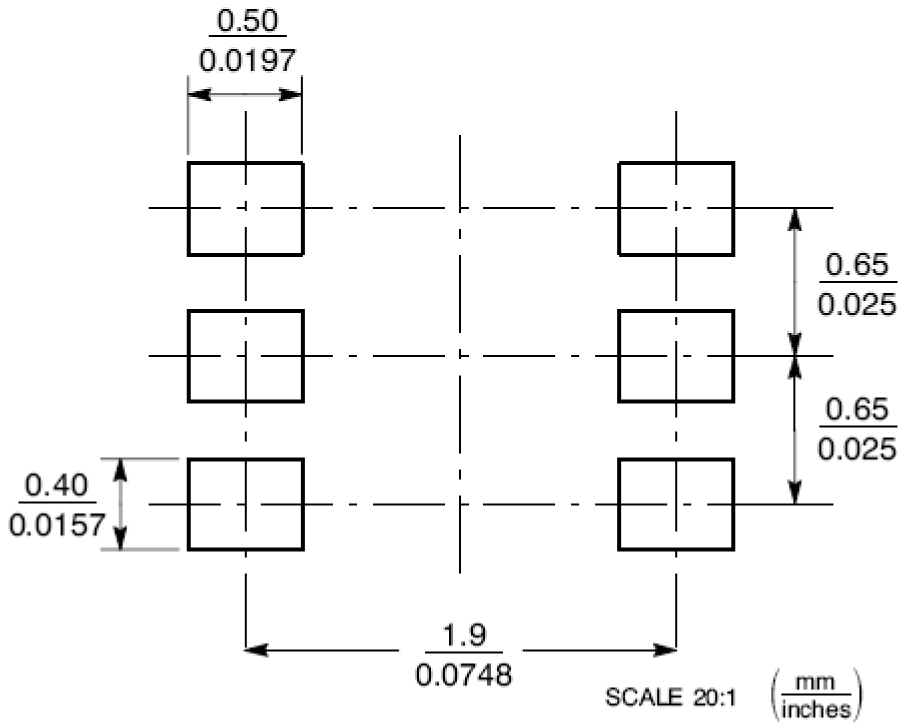




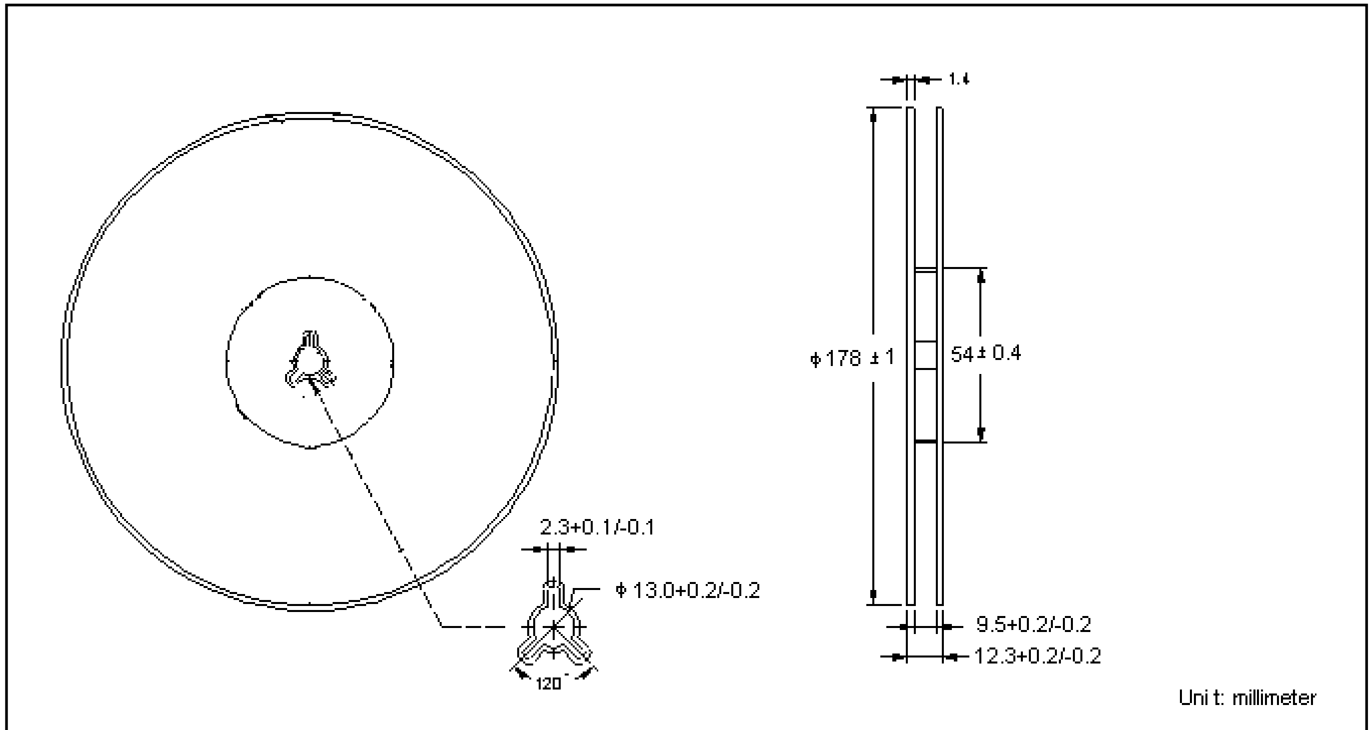




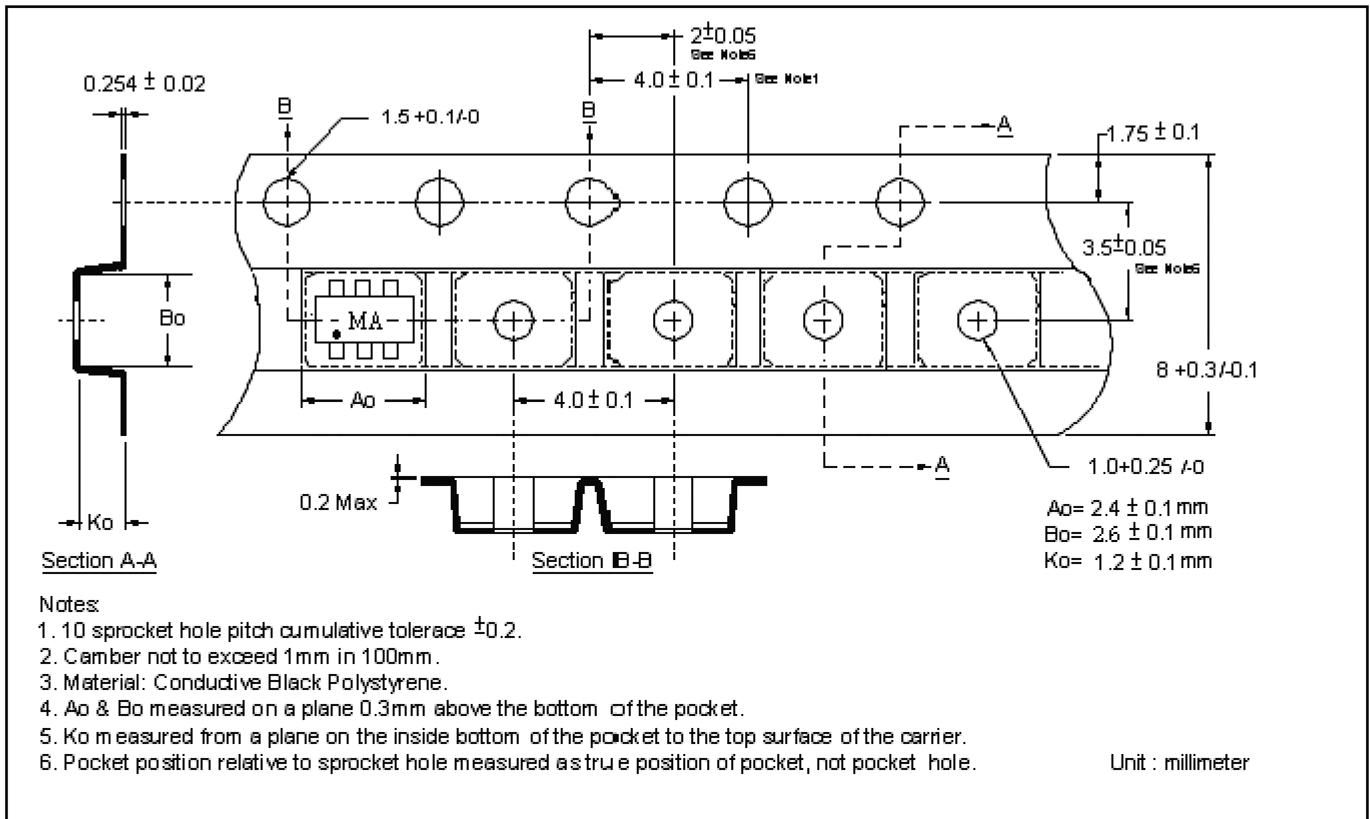
Recommended Soldering Footprint



Reel Dimension



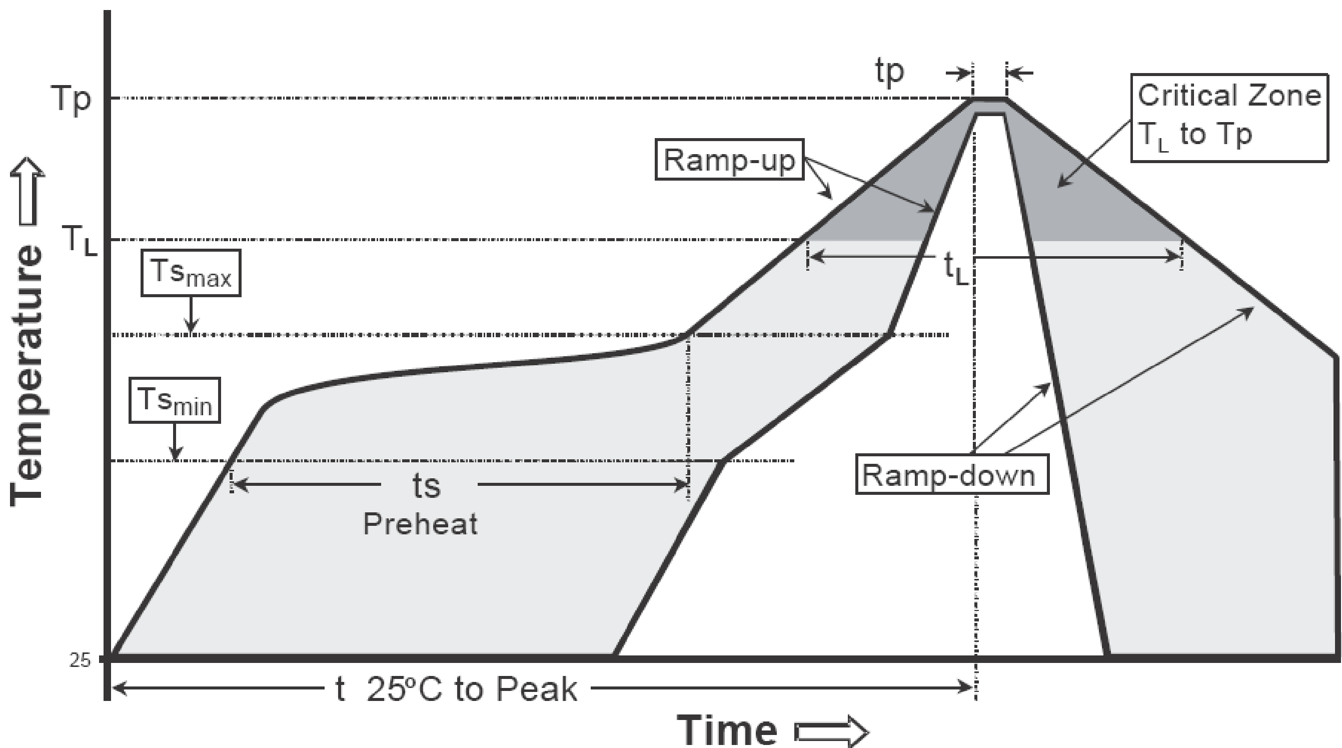
Carrier Tape Dimension



Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

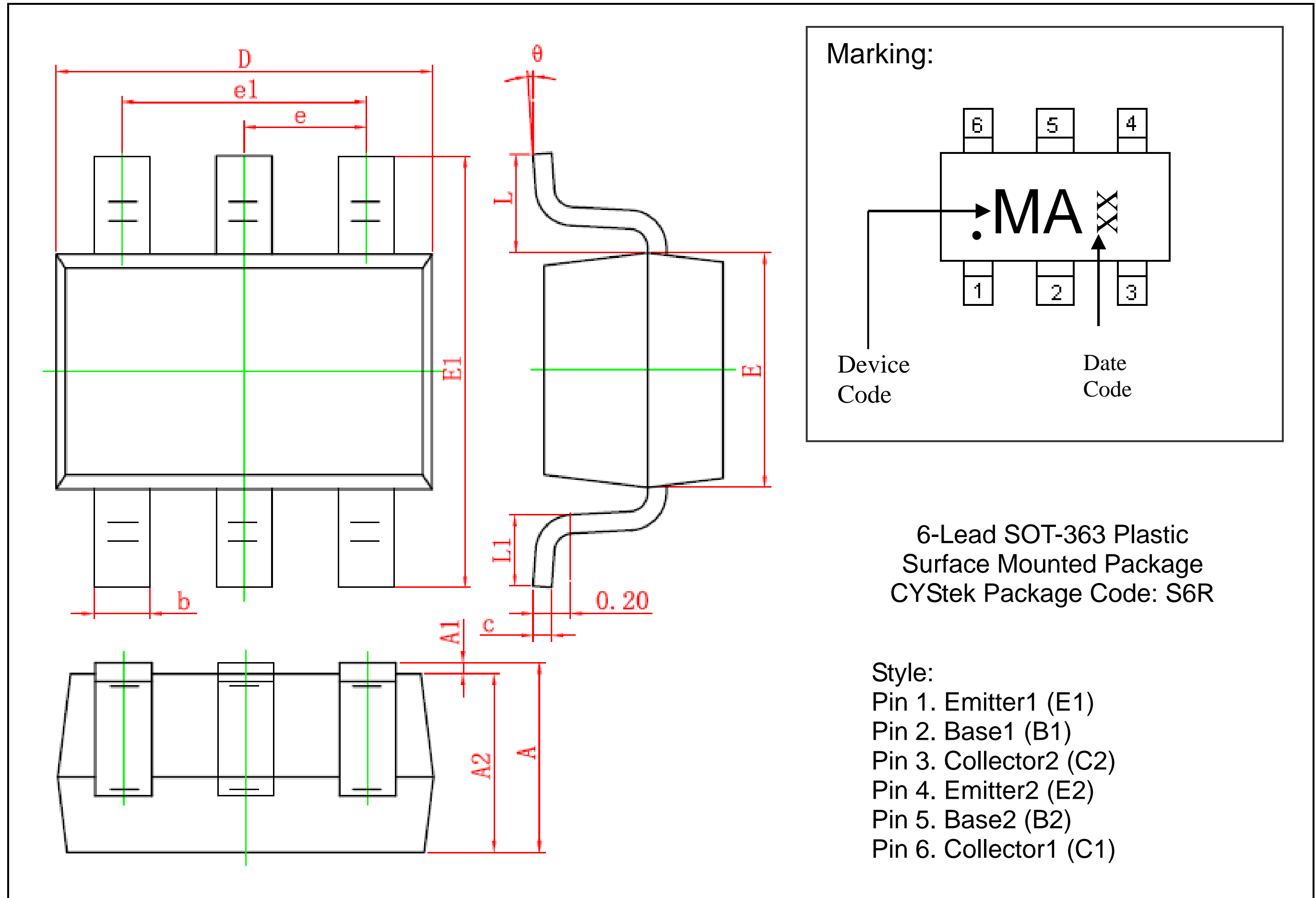
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(T_P)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

SOT-363 Dimension



6-Lead SOT-363 Plastic
Surface Mounted Package
CYStek Package Code: S6R

Style:
Pin 1. Emitter1 (E1)
Pin 2. Base1 (B1)
Pin 3. Collector2 (C2)
Pin 4. Emitter2 (E2)
Pin 5. Base2 (B2)
Pin 6. Collector1 (C1)

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043	E1	2.150	2.450	0.085	0.096
A1	0.000	0.100	0.000	0.004	e	0.650	TYP	0.026	TYP
A2	0.900	1.000	0.035	0.039	e1	1.200	1.400	0.047	0.055
b	0.150	0.350	0.006	0.014	L	0.525	REF	0.021	REF
c	0.080	0.150	0.003	0.006	L1	0.260	0.460	0.010	0.018
D	2.000	2.200	0.079	0.087	θ	0°	8°	0°	8°
E	1.150	1.350	0.045	0.053					

Notes : 1.Controlling dimension : millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material :

- Lead : Pure tin plated.
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0.

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