

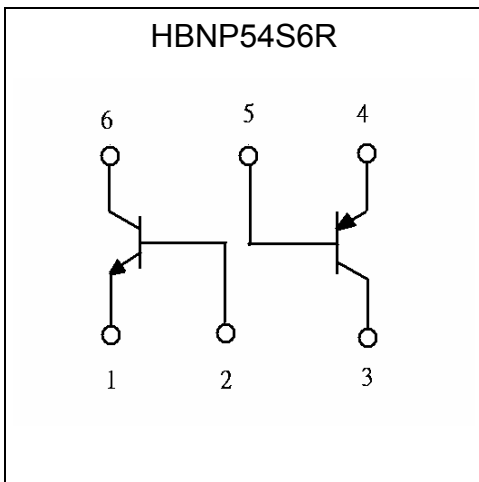
**General Purpose NPN / PNP Epitaxial Planar Transistors
 (dual transistors)**

HBNP54S6R

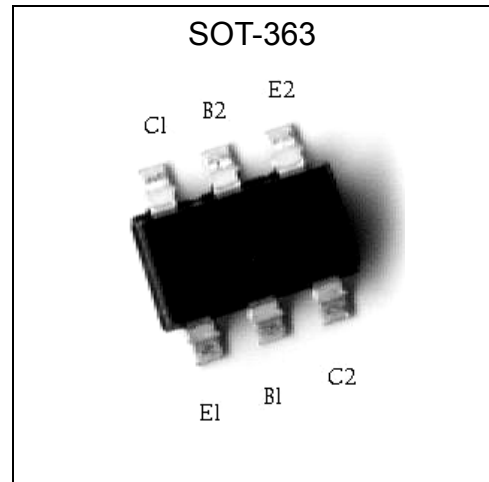
Features

- Includes a BTC3906 chip and BTA1514 chip in a SOT-363 package.
- Mounting possible with SOT-323 automatic mounting machines.
- Transistor elements are independent, eliminating interference.
- Mounting cost and area can be cut in half.
- Pb-free lead plating package.

Equivalent Circuit

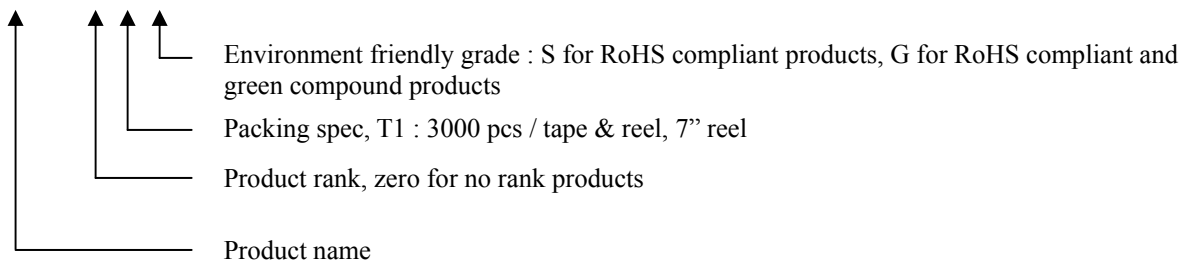


Outline



Ordering Information

Device	Package	Shipping
HBNP54S6R-0-T1-G	SOT-363 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel





Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit
		TR1 (NPN)	TR2 (PNP)	
Collector-Base Voltage	V _{CB0}	180	-160	V
Collector-Emitter Voltage	V _{CEO}	160	-160	V
Emitter-Base Voltage	V _{EBO}	6	-6	V
Collector Current	I _C	600	-600	mA
Power Dissipation	P _d	200(total) *1		mW
Junction Temperature	T _j	150		°C
Storage Temperature	T _{stg}	-55~+150		°C

Note: *1 150mW per element must not be exceeded.

Characteristics (Ta=25°C)

•Q1, TR1 (NPN)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV _{CB0}	180	-	-	V	I _C =100μA
BV _{CEO}	160	-	-	V	I _C =1mA
BV _{EBO}	6	-	-	V	I _E =10μA
I _{CB0}	-	-	50	nA	V _{CB} =180V
I _{EBO}	-	-	50	nA	V _{EB} =6V
*V _{CE(sat)1}	-	0.1	0.15	V	I _C =10mA, I _B =1mA
*V _{CE(sat)2}	-	-	0.2	V	I _C =50mA, I _B =5mA
*V _{BE(sat)1}	-	-	0.9	V	I _C =10mA, I _B =1mA
*V _{BE(sat)2}	-	-	1.0	V	I _C =50mA, I _B =5mA
*h _{FE1}	100	-	-	-	V _{CE} =5V, I _C =1mA
*h _{FE2}	120	-	270	-	V _{CE} =5V, I _C =10mA
*h _{FE3}	40	-	-	-	V _{CE} =5V, I _C =50mA
f _T	100	-	-	MHz	V _{CE} =20V, I _C =10mA, f=100MHz
C _{ob}	-	-	6	pF	V _{CB} =20V, I _E =0A, f=1MHz

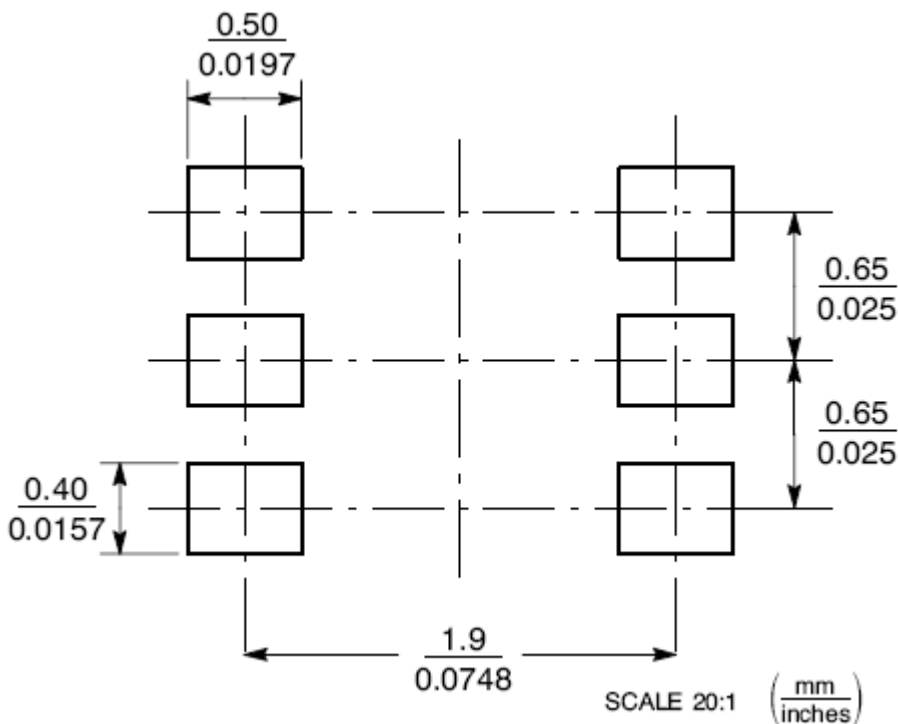
*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

• Q2, TR2 (PNP)

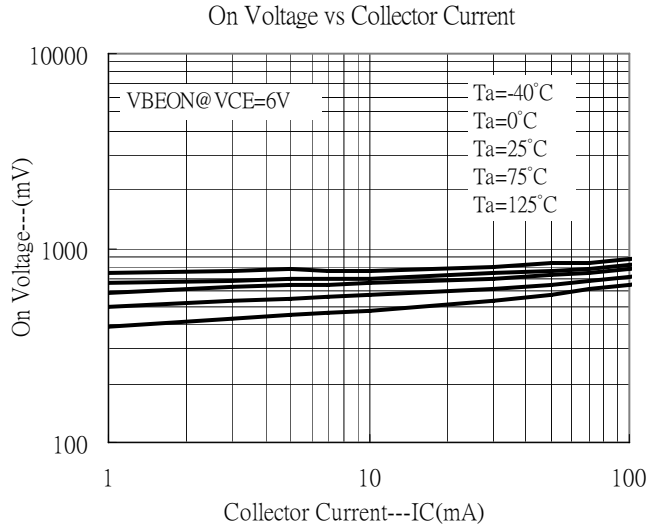
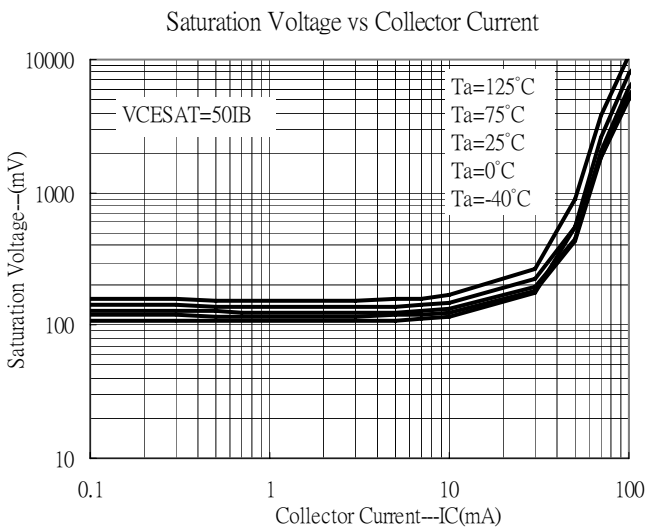
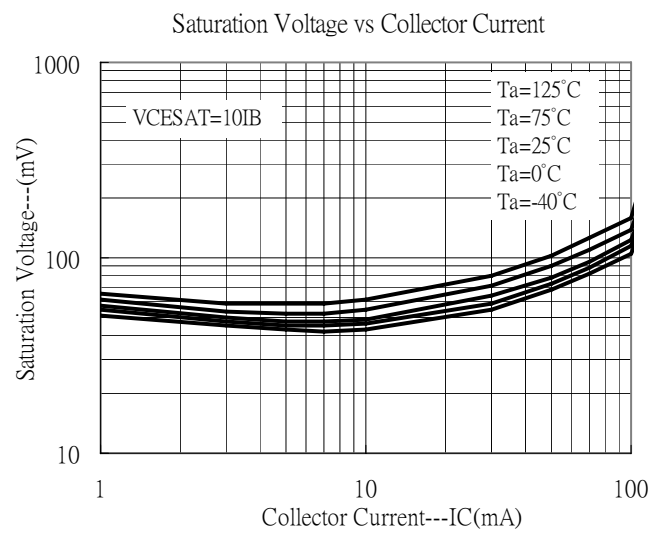
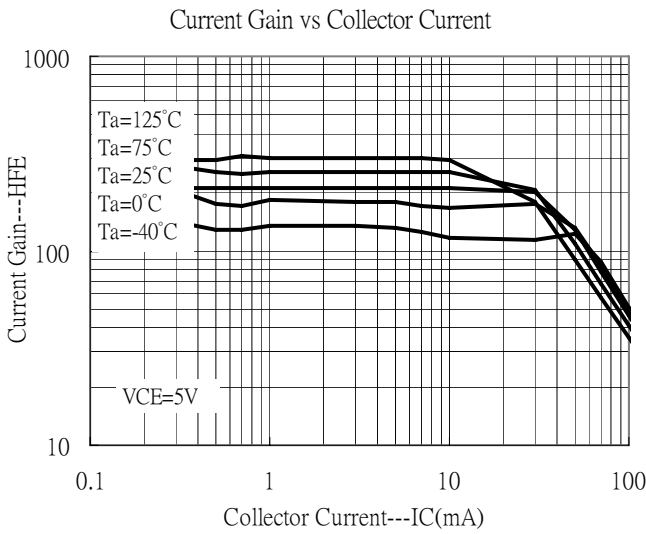
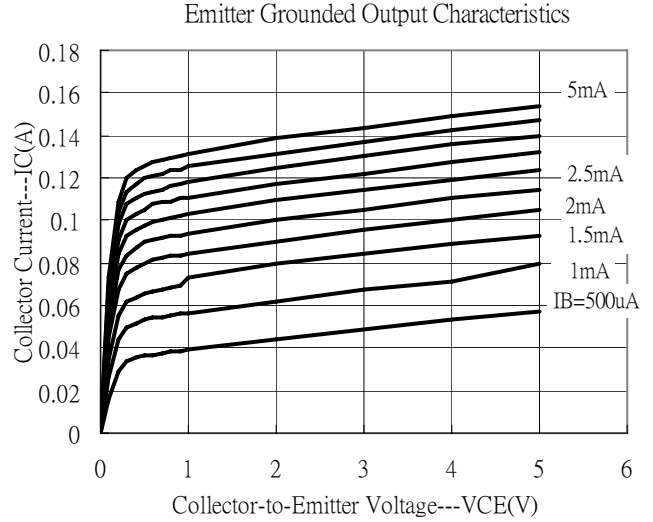
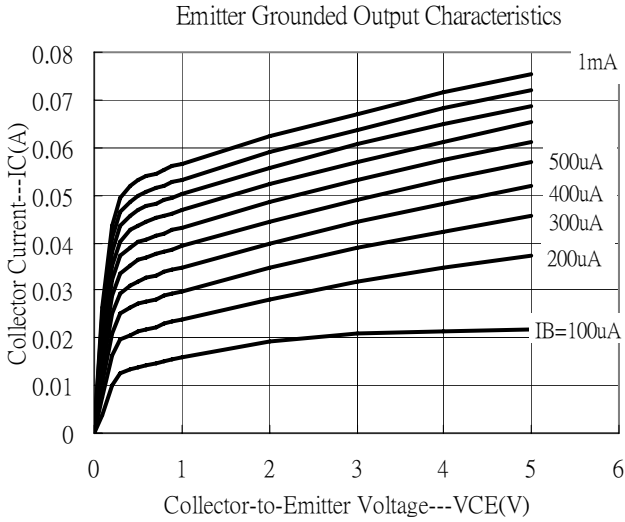
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	-160	-	-	V	$I_C = -50\mu A$
BV_{CEO}	-160	-	-	V	$I_C = -1mA$
BV_{EBO}	-6	-	-	V	$I_E = -50\mu A$
I_{CBO}	-	-	-50	nA	$V_{CB} = -160V$
I_{EBO}	-	-	-50	nA	$V_{EB} = -6V$
* $V_{CE(sat)1}$	-	-	-0.2	V	$I_C = -10mA, I_B = -1mA$
* $V_{CE(sat)2}$	-	-	-0.3	V	$I_C = -50mA, I_B = -5mA$
* $V_{BE(sat)1}$	-	-	-0.9	V	$I_C = -10mA, I_B = -1mA$
* $V_{BE(sat)2}$	-	-	-1.0	V	$I_C = -50mA, I_B = -5mA$
* h_{FE1}	90	-	-	-	$V_{CE} = -5V, I_C = -1mA$
* h_{FE2}	120	-	270	-	$V_{CE} = -5V, I_C = -10mA$
* h_{FE3}	40	-	-	-	$V_{CE} = -5V, I_C = -50mA$
f_T	100	-	-	MHz	$V_{CE} = -30V, I_C = -10mA, f = 100MHz$
Cob	-	-	6	pF	$V_{CB} = -30V, I_E = 0A, f = 1MHz$

*Pulse Test: Pulse Width $\leq 380\mu s$, Duty Cycle $\leq 2\%$

Recommended Soldering Footprint

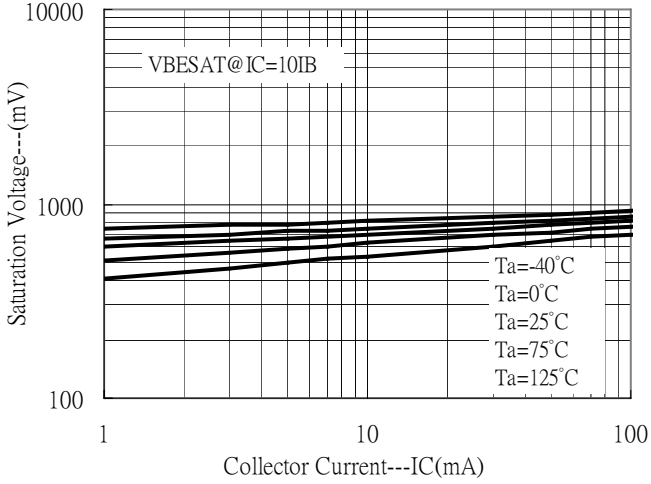


Q1, Typical Characteristics

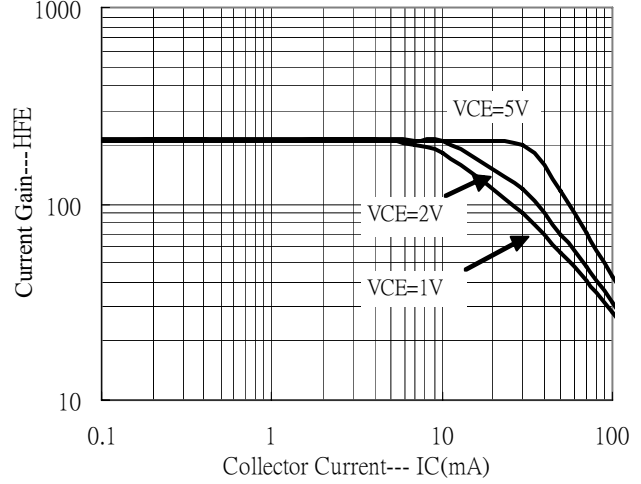


Q1, Typical Characteristics(Cont.)

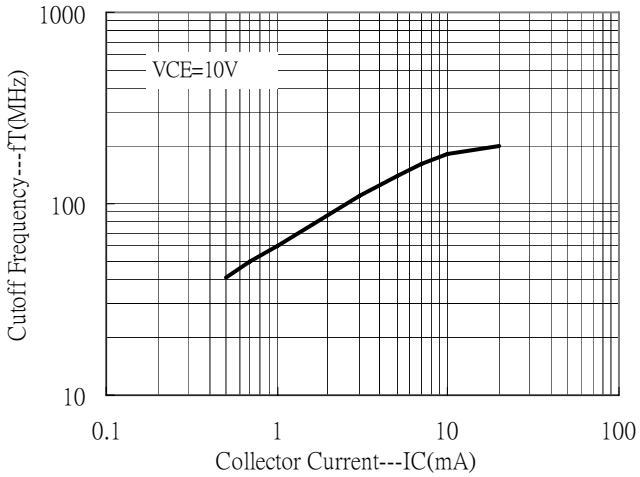
Saturation Voltage vs Collector Current



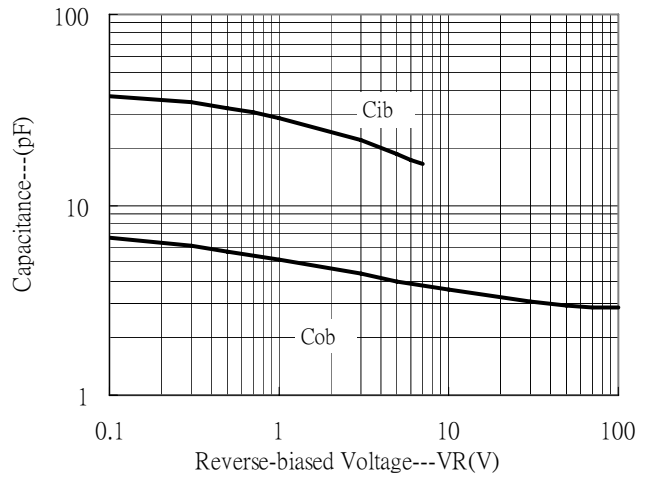
Current Gain vs Collector Current



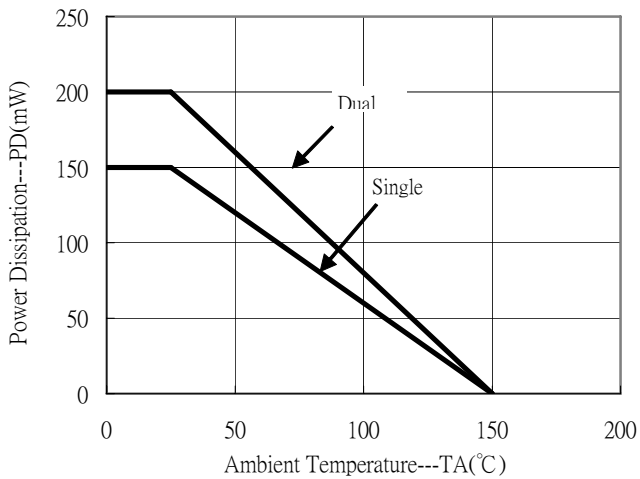
Cutoff Frequency vs Collector Current



Capacitance vs Reverse-biased Voltage

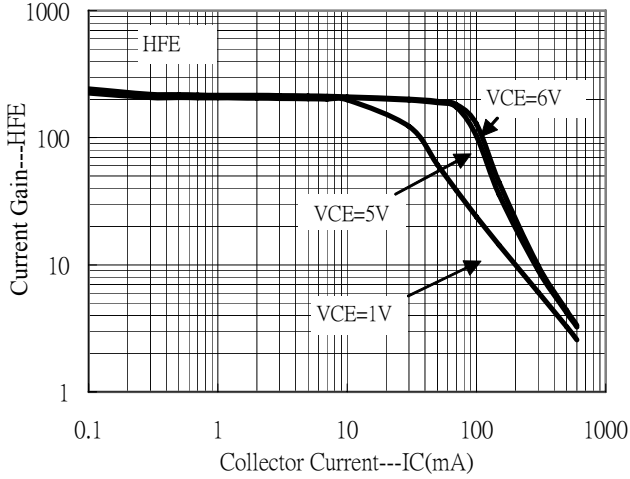


Power Derating Curves

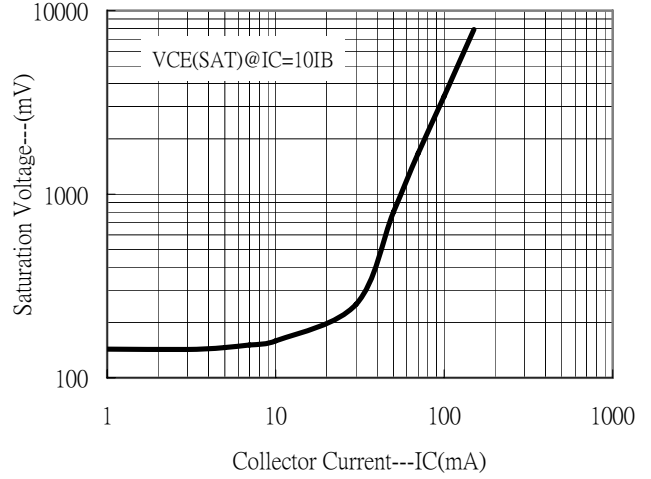


Q2, Typical Characteristics

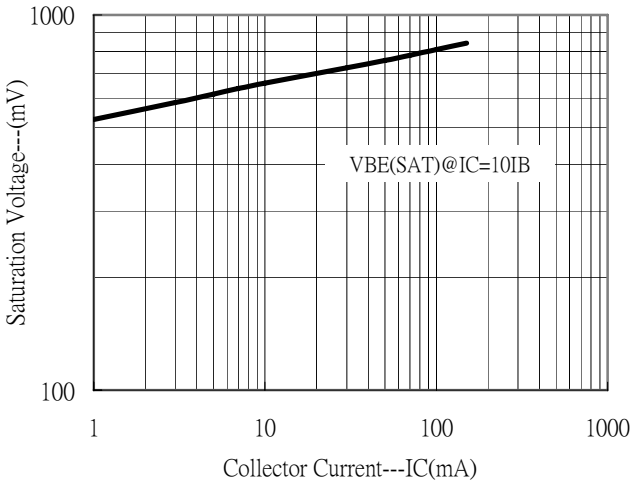
Current Gain vs Collector Current



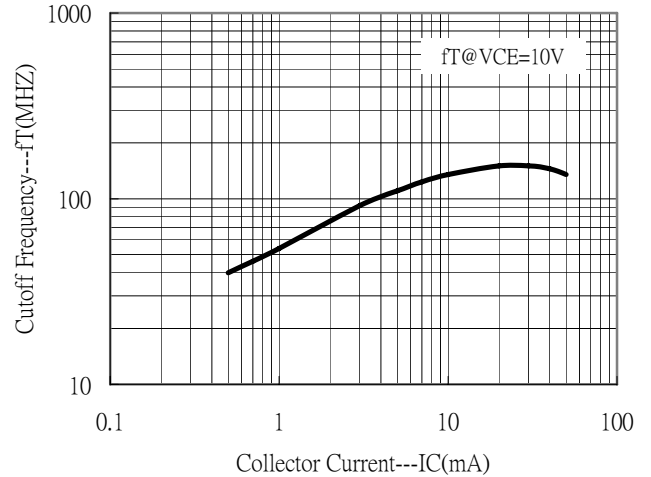
Saturation Voltage vs Collector Current



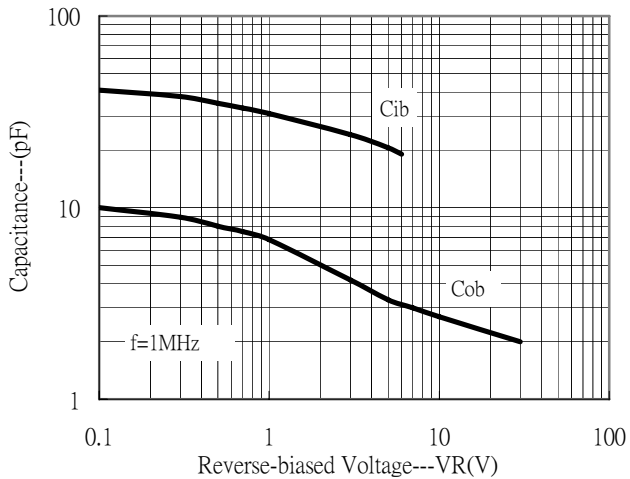
Saturation Voltage vs Collector Current



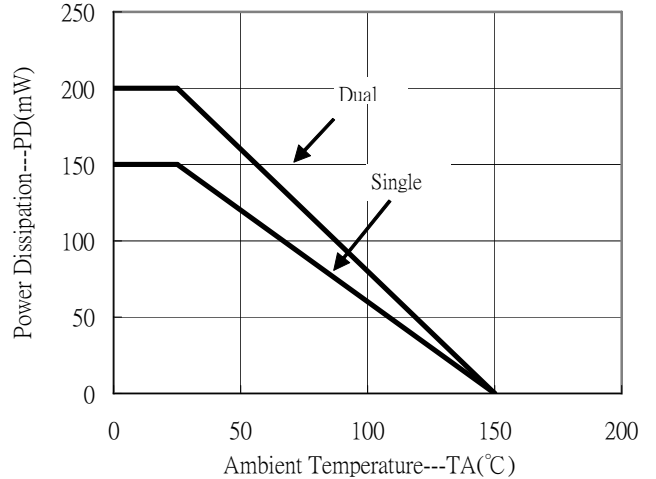
Cutoff Frequency vs Collector Current



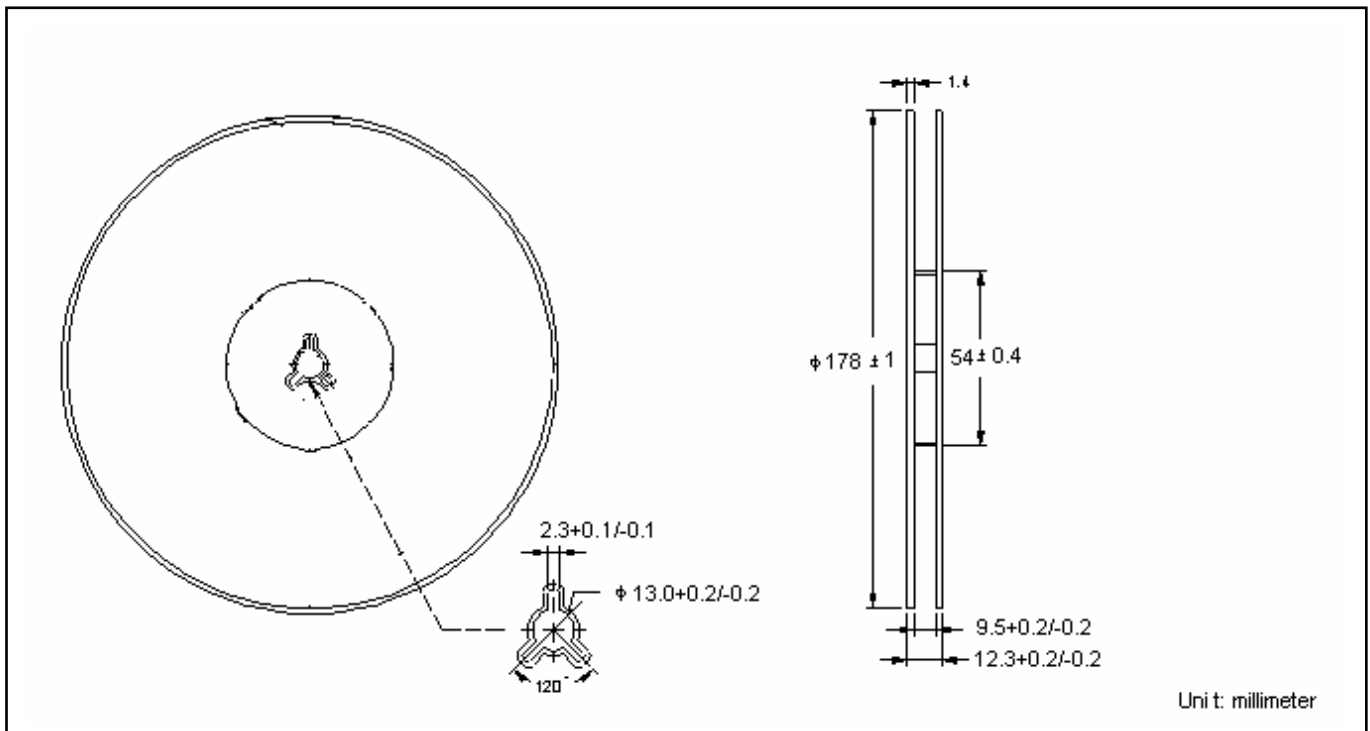
Capacitance Characteristics



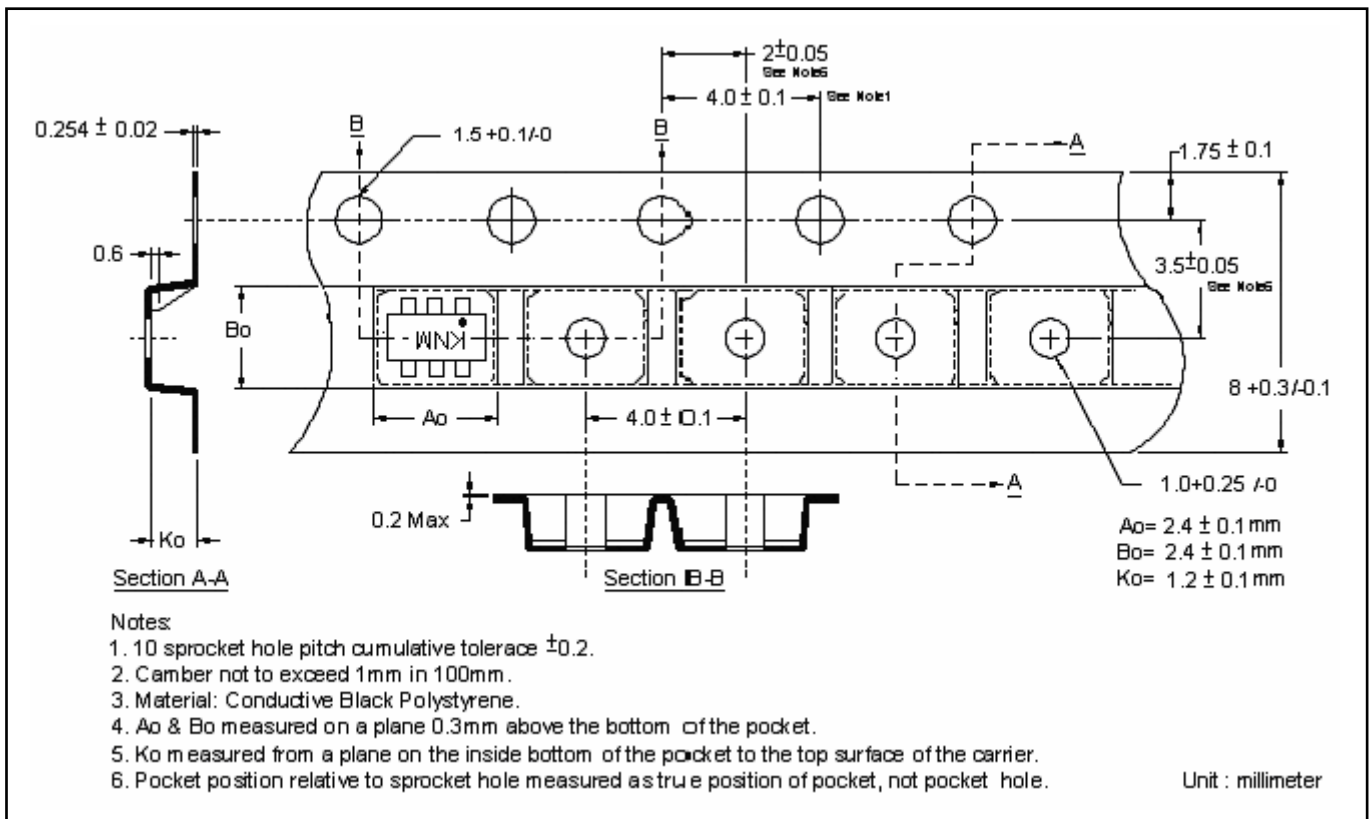
Power Derating Curves



Reel Dimension



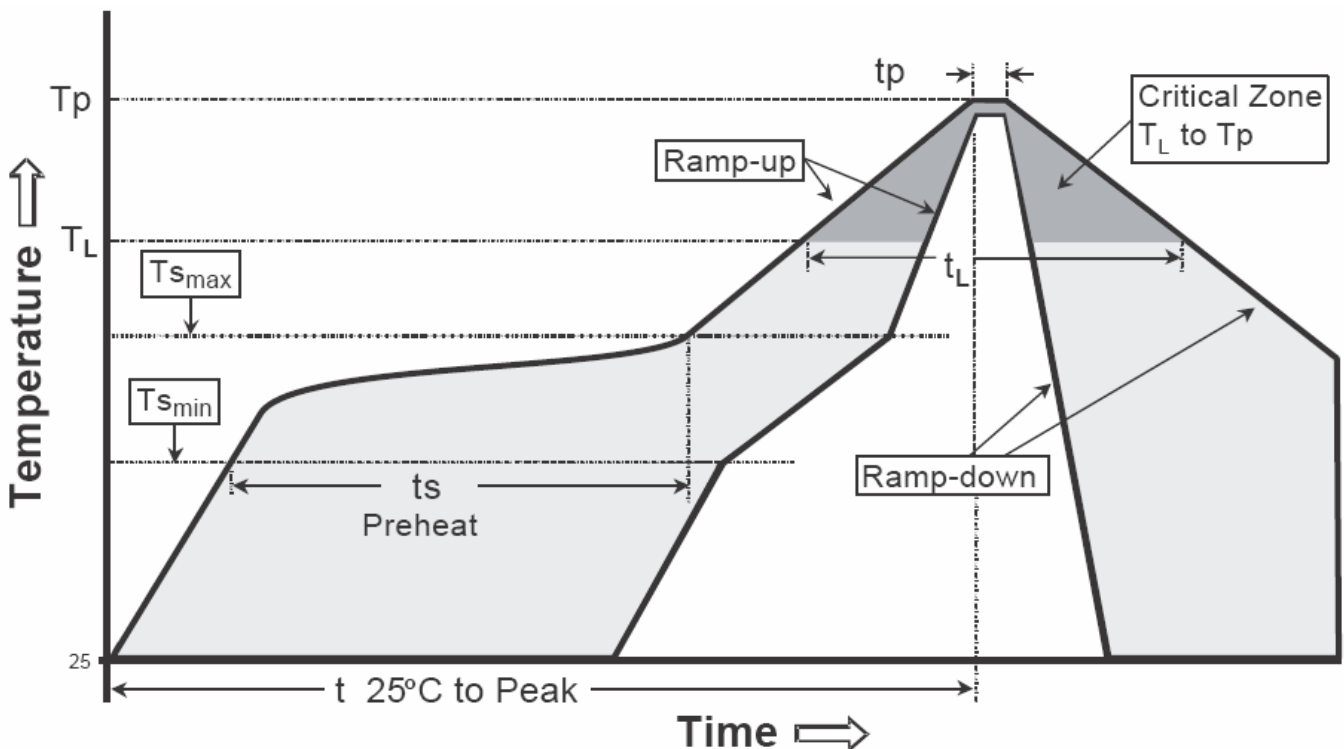
Carrier Tape Dimension



Recommended wave soldering condition

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

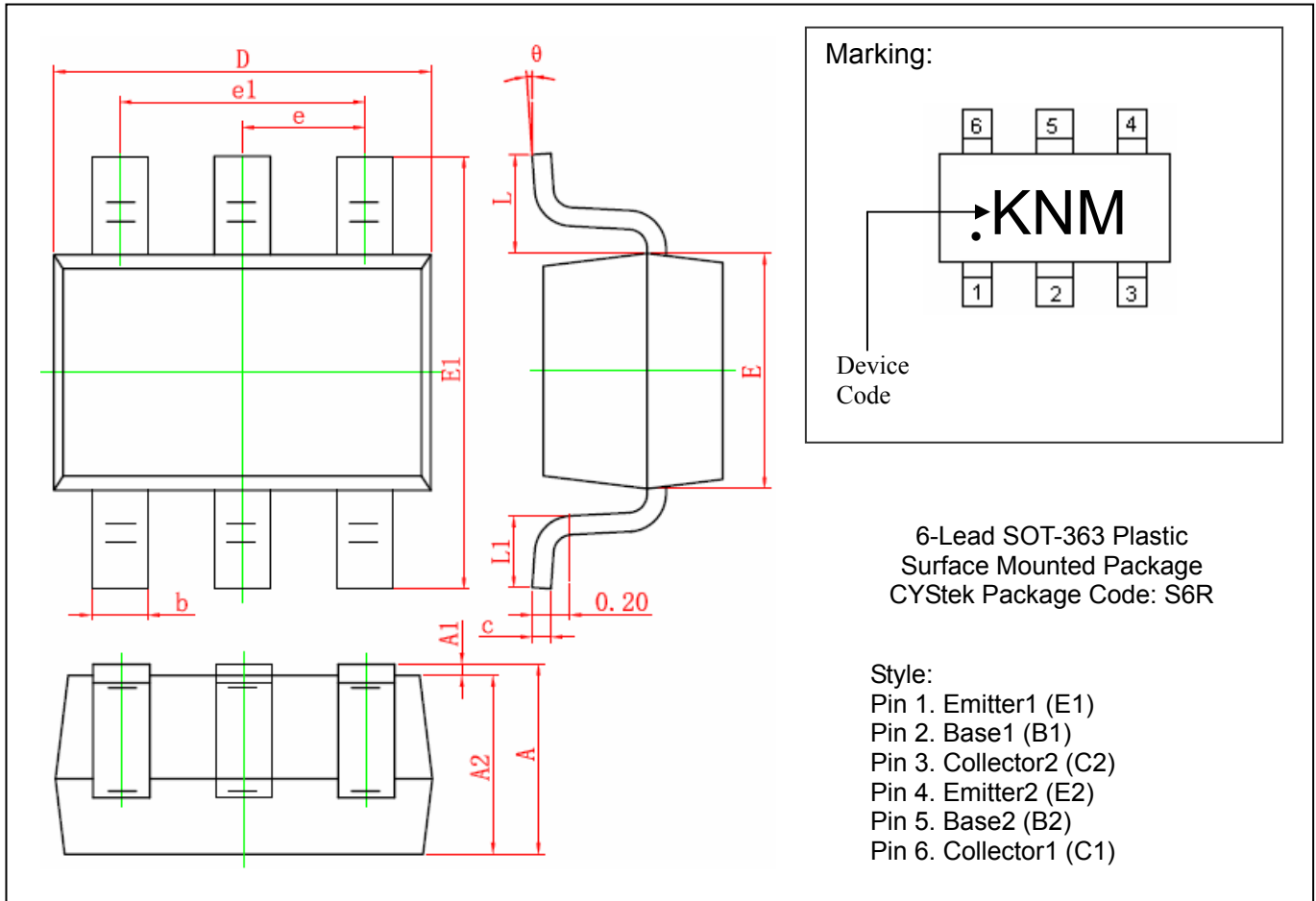
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T _{s min})	100°C	150°C
-Temperature Max(T _{s max})	150°C	200°C
-Time(t _{s min} to t _{s max})	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T _L)	183°C	217°C
- Time (t _L)	60-150 seconds	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



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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