

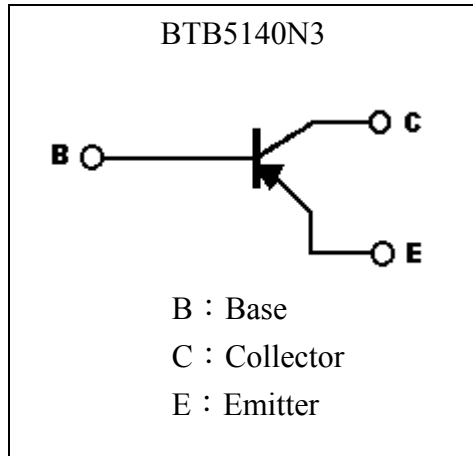
Low Vcesat PNP Epitaxial Planar Transistor
BTB5140N3

BV_{CEO}	-40V
I_C	-2A
$R_{CESAT(TYP)}$	0.22 Ω

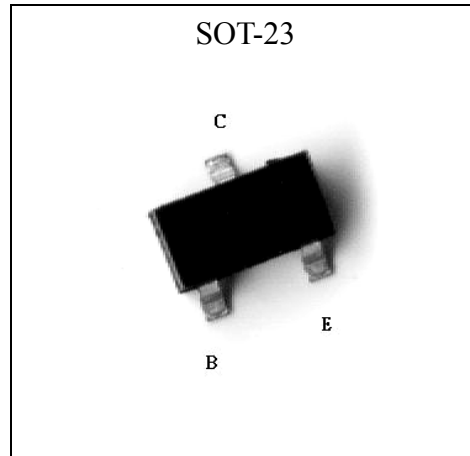
Features

- Low $V_{CE(sat)}$, $V_{CE(sat)} = -0.25V$ (max), at $I_C / I_B = -500mA / -50mA$
- Pb-free lead plating and halogen-free package

Symbol

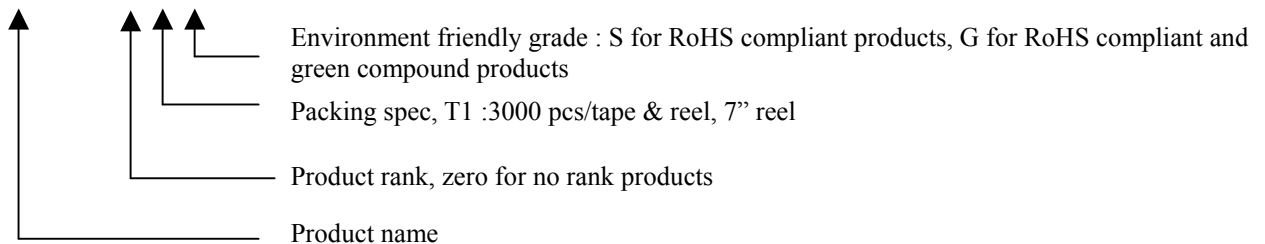


Outline



Ordering Information

Device	Package	Shipping
BTB5140N3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel





Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V _{CBO}	-40	V
Collector-Emitter Voltage	V _{CEO}	-40	
Emitter-Base Voltage	V _{EBO}	-5	
Collector Current(DC)	I _C	-2	A
Peak Collector Current	I _{CM}	-4 *1	
Peak Base Current	I _{BM}	-1	
Power Dissipation	P _D	300 *2	mW
		450 *3	
Thermal Resistance, Junction to Ambient	R _{θJA}	417 *2	°C/W
		278 *3	
Thermal Resistance, Junction to Case	R _{θJC}	39	
Operating Junction and Storage Temperature Range	T _j ;T _{stg}	-65~+150	°C

Note :1 Single pulse, Pw=10ms

2 When mounted on a FR-4 PCB, single-sided copper, tinplated and standard footprint.

3 When mounted on a FR-4 PCB, single-sided copper, tinplated and mounting pad for collector 1 cm².

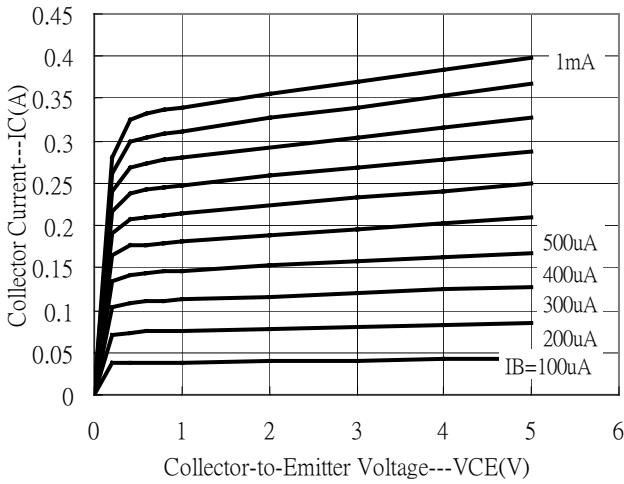
Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV _{CBO}	-40	-	-	V	I _C =-50μA, I _E =0
BV _{CEO}	-40	-	-	V	I _C =-1mA, I _B =0
BV _{EBO}	-5	-	-	V	I _E =-50μA, I _C =0
I _{CBO}	-	-	-100	nA	V _{CB} =-40V, I _E =0
I _{CEO}	-	-	-1	μA	V _{CE} =-30V, I _E =0
I _{EBO}	-	-	-100	nA	V _{EB} =-5V, I _C =0
*V _{CE(sat)}	-	-75	-200	mV	I _C =-100mA, I _B =-1mA
*V _{CE(sat)}	-	-110	-250	mV	I _C =-500mA, I _B =-50mA
*V _{CE(sat)}	-	-196	-400	mV	I _C =-1A, I _B =-100mA
*R _{CE(sat)}	-	220	500	mΩ	I _C =-500mA, I _B =-50mA
*V _{BE(sat)}	-	-860	-1	V	I _C =-1A, I _B =-50mA
*V _{BE(on)}	-	-762	-0.9	V	V _{CE} =-5V, I _C =-1A
*h _{FE 1}	300	464	-	-	V _{CE} =-5V, I _C =-1mA
*h _{FE 2}	300	427	600	-	V _{CE} =-5V, I _C =-100mA
*h _{FE 3}	250	360	-	-	V _{CE} =-5V, I _C =-500mA
*h _{FE 4}	160	300	-	-	V _{CE} =-5V, I _C =-1A
f _T	-	75	-	MHz	V _{CE} =-5V, I _C =-10mA, f=100MHz
Cob	-	20	-	pF	V _{CB} =-10V, f=1MHz

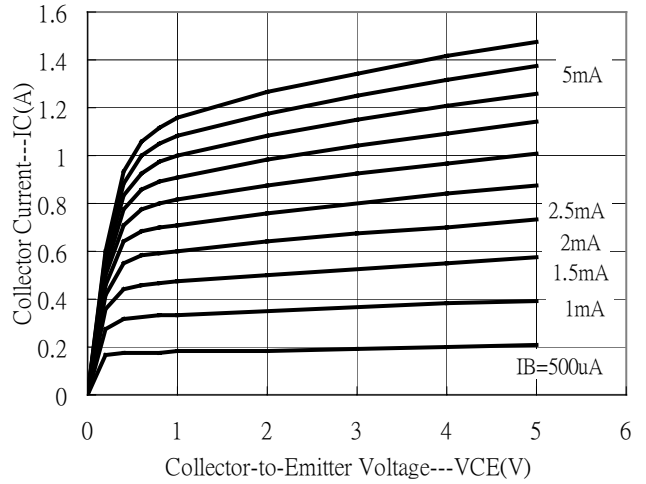
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

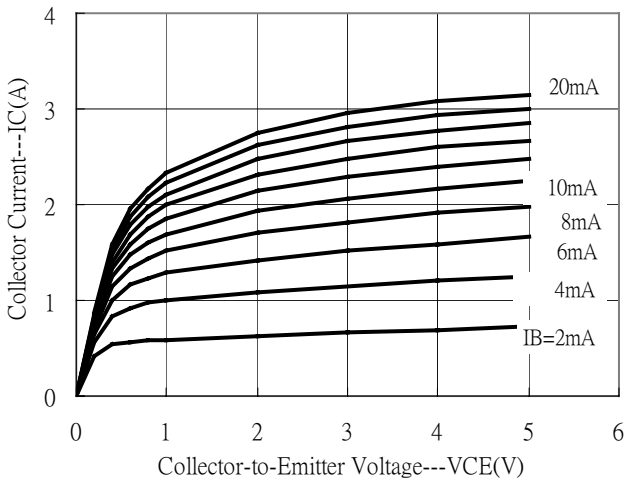
Emitter Grounded Output Characteristics



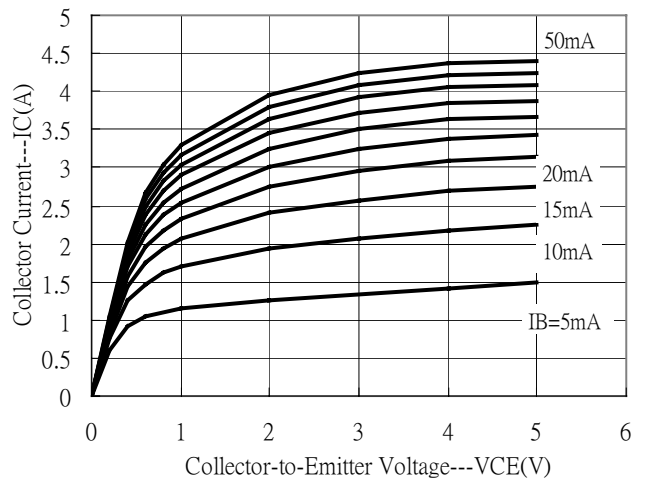
Emitter Grounded Output Characteristics



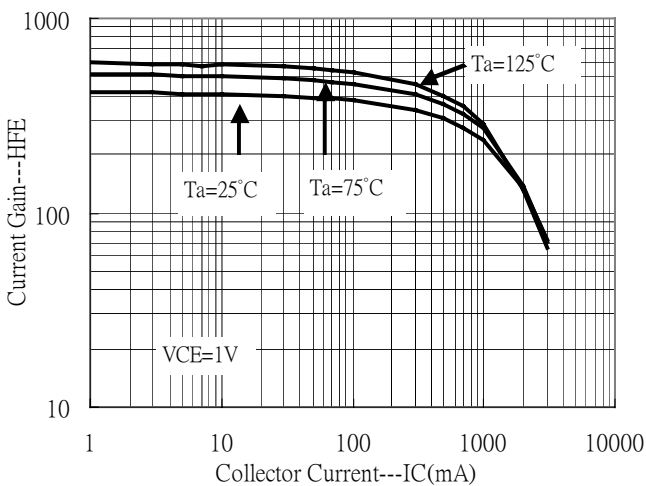
Emitter Grounded Output Characteristics



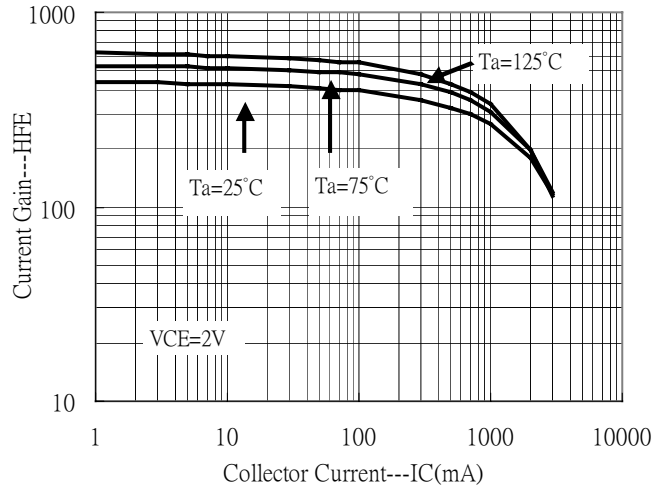
Emitter Grounded Output Characteristics



Current Gain vs Collector Current

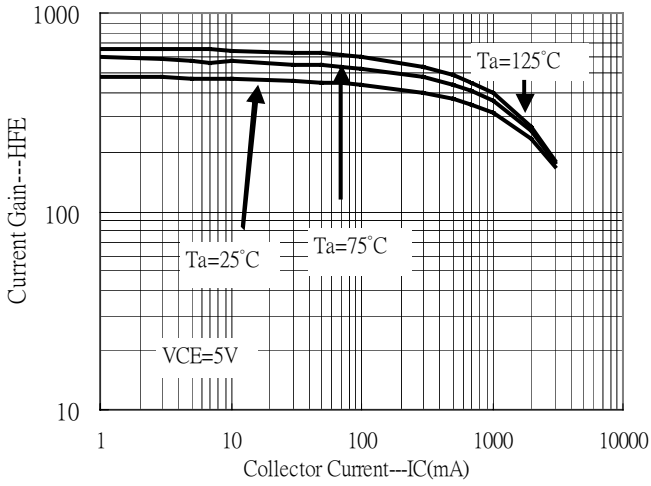


Current Gain vs Collector Current

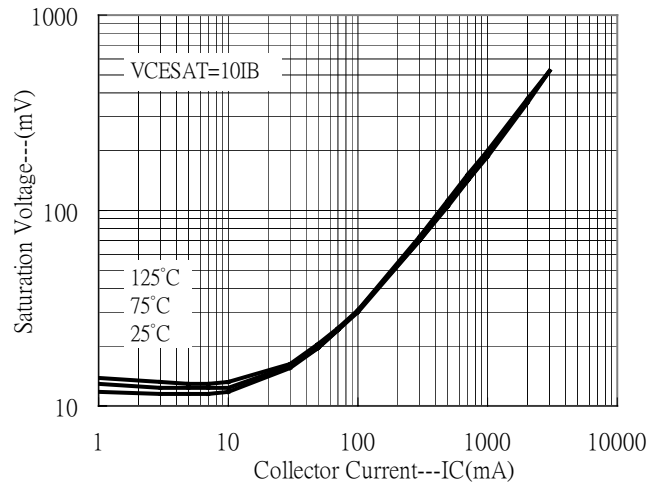


Typical Characteristics(Cont.)

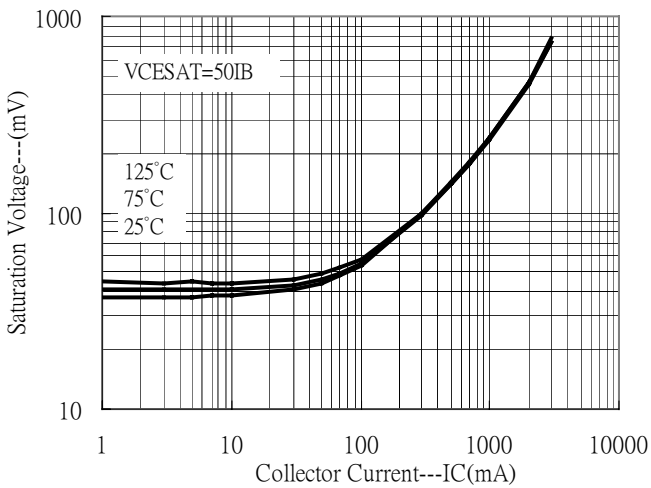
Current Gain vs Collector Current



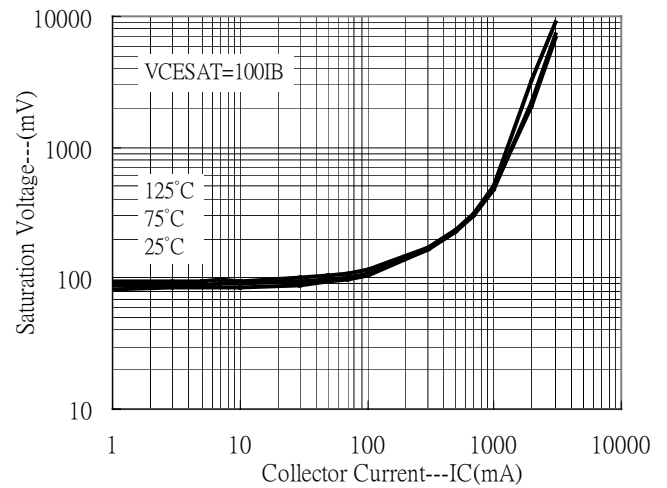
Saturation Voltage vs Collector Current



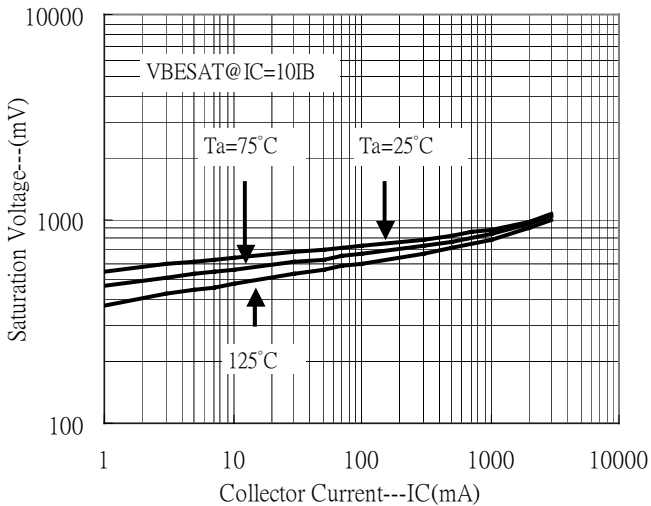
Saturation Voltage vs Collector Current



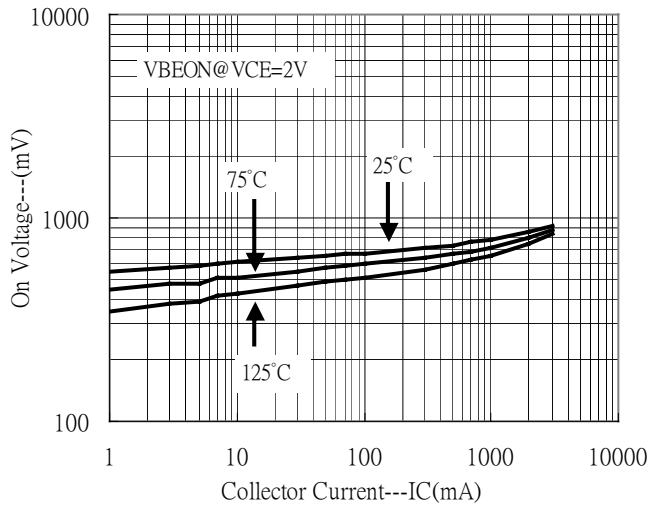
Saturation Voltage vs Collector Current



Saturation Voltage vs Collector Current

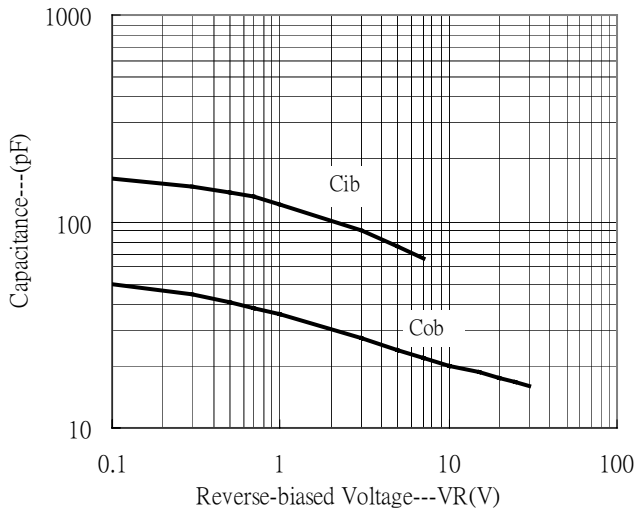


On Voltage vs Collector Current

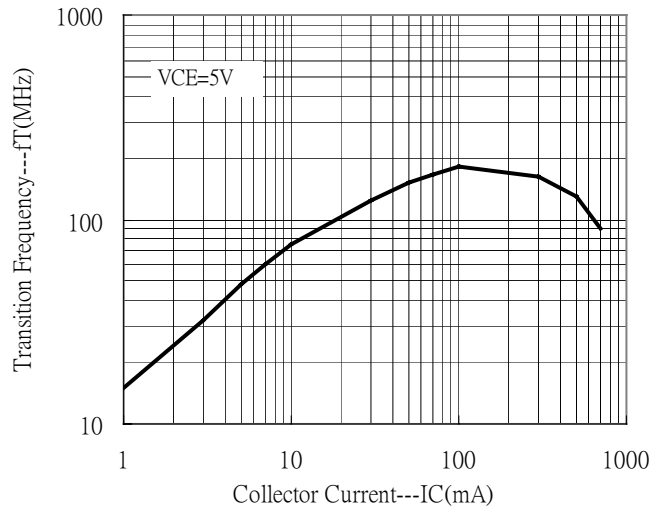


Typical Characteristics(Cont.)

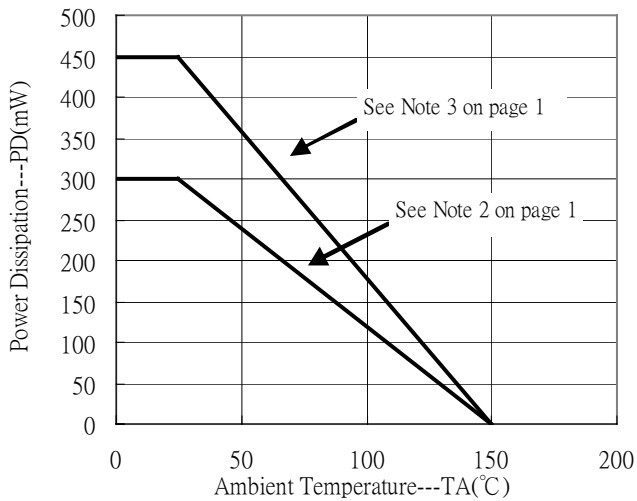
Capacitance vs Reverse-biased Voltage



Transition Frequency vs Collector Current

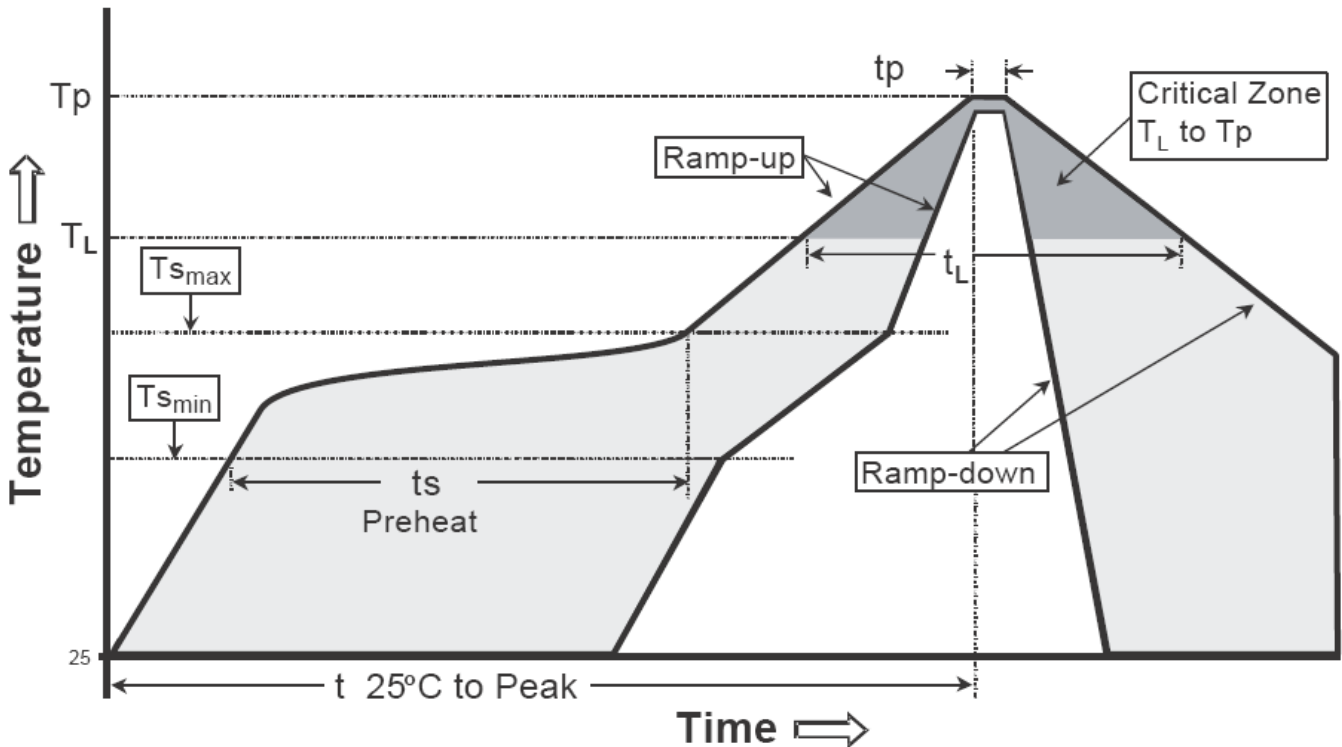


Power Derating Curves



Recommended wave soldering condition

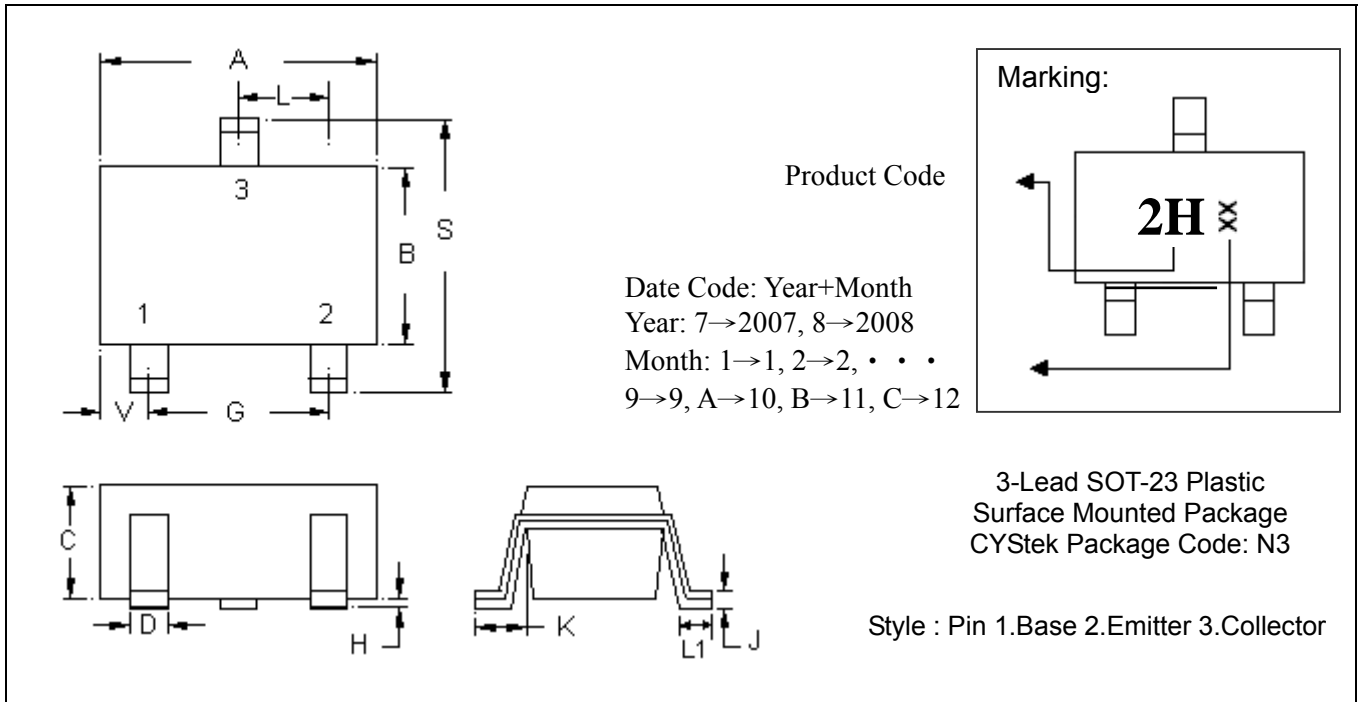
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

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-23 Dimension



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0669	1.20	1.70	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1161	2.10	2.95
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	0.50

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.

Important Notice:

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of CYStek.
- CYStek reserves the right to make changes to its products without notice.
- CYStek **semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.**
- CYStek assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.