

General Purpose NPN Epitaxial Planar Transistor

BTC2059N3

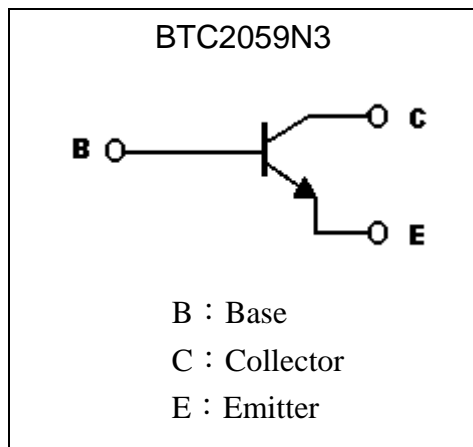
Description

The BTC2059N3 is designed for using in VHF & UHF oscillators and VHF mixer in tuner of a TV receiver.

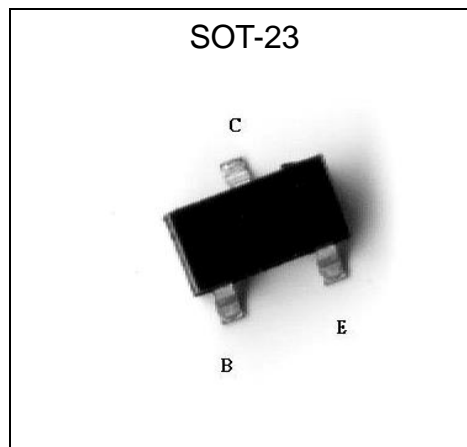
Features

- High transition frequency. ($f_T = 1.0\text{GHz}$, TYP. @ $V_{CB}=10\text{V}$, $I_c=10\text{mA}$, $f=200\text{MHz}$)
- Very low capacitance. ($C_{ob} = 1.4\text{pF}$, TYP. @ $V_{CB}=10\text{V}$, $f=1\text{MHz}$)
- Small $R_{bb'}$ - C_c and high gain. ($R_{bb'}$ - $C_c = 8\text{ps}$, TYP. @ $V_{CB}=10\text{V}$, $I_c=10\text{mA}$, $f=31.8\text{MHz}$)
- Small NF. ($NF = 5.5\text{dB}$, TYP. @ $V_{CE}=12\text{V}$, $I_c=2\text{mA}$, $f=200\text{MHz}$, $R_g=50\text{ohm}$)
- Pb-free lead plating and halogen-free package

Symbol

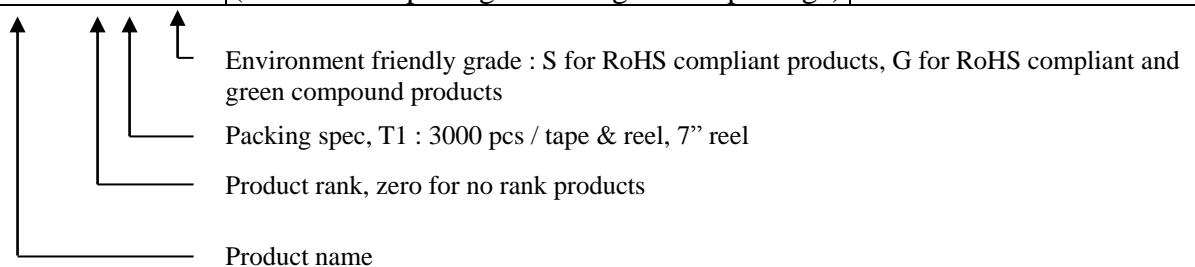


Outline



Ordering Information

Device	Package	Shipping
BTC2059N3-X-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}	25	V
Collector-Emitter Voltage	V _{CEO}	18	V
Emitter-Base Voltage	V _{EBO}	3	V
Collector Current	I _C	50	mA
Power Dissipation	P _D	225	mW
Operating Junction Temperature Range	T _j	-55~+150	°C
Storage Temperature Range	T _{stg}	-55~+150	°C

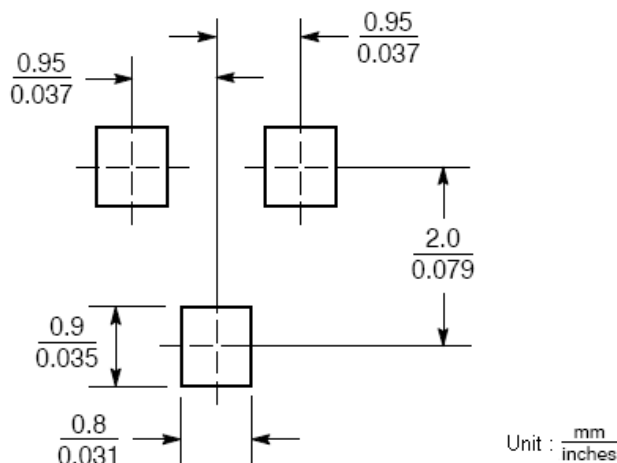
Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV _{CBO}	25	-	-	V	I _C =10μA
BV _{CEO}	18	-	-	V	I _C =1mA
BV _{EBO}	3	-	-	V	I _C =10μA
I _{CBO}	-	-	0.5	μA	V _{CB} =10V
I _{EBO}	-	-	0.5	μA	V _{EB} =2V
*V _{CE(sat)}	-	0.1	0.5	V	I _C =20mA, I _B =4mA
*h _{FE}	52	-	270	-	V _{CE} =10V, I _C =10mA
f _T	600	1000	-	MHz	V _{CE} =10V, I _C =10mA, f=200MHz
C _{ob}	-	1.4	2.0	pF	V _{CB} =10V, I _E =0A, f=1MHz
R _{bb} '-C _c	-	8	15	ps	V _{CB} =10V, I _C =10mA, f=31.8MHz
NF	-	5.5	-	dB	V _{CE} =12V, I _C =2mA, f=200MHz, R _g =50ohm

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

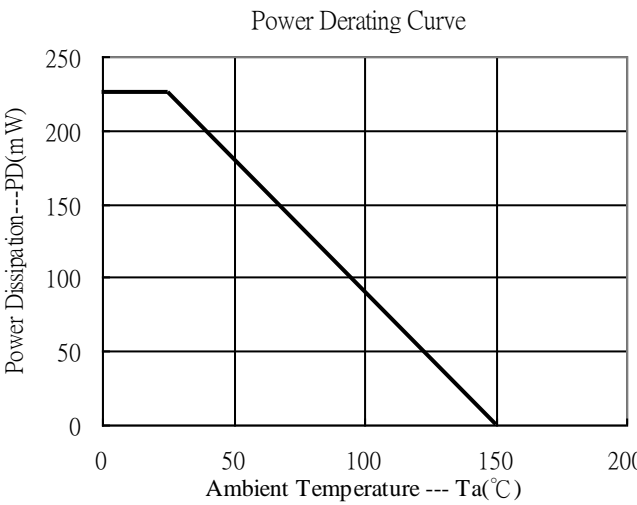
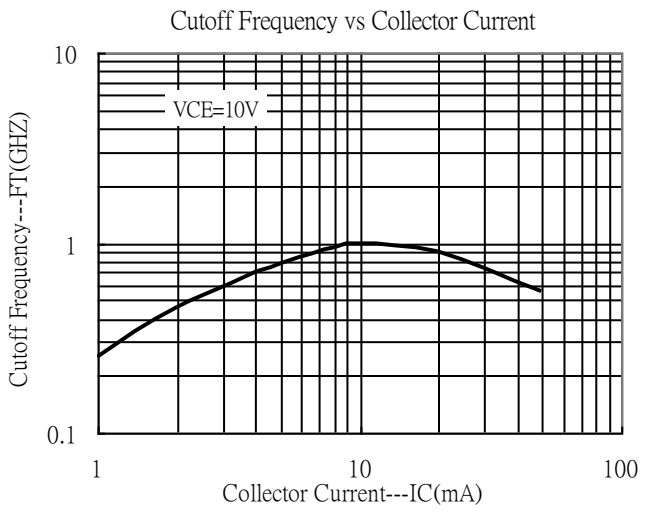
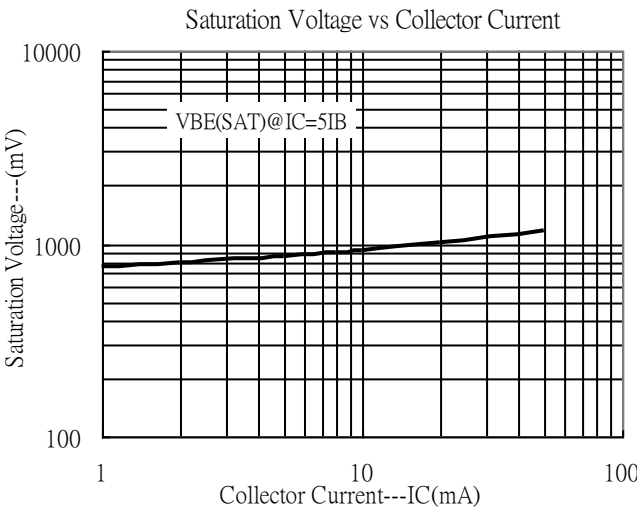
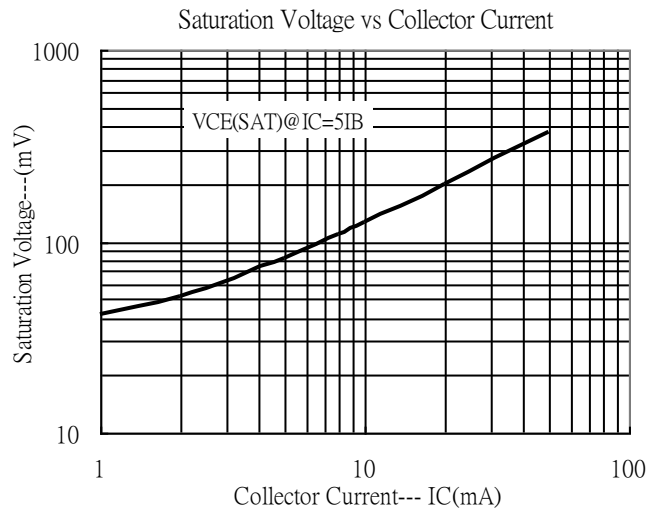
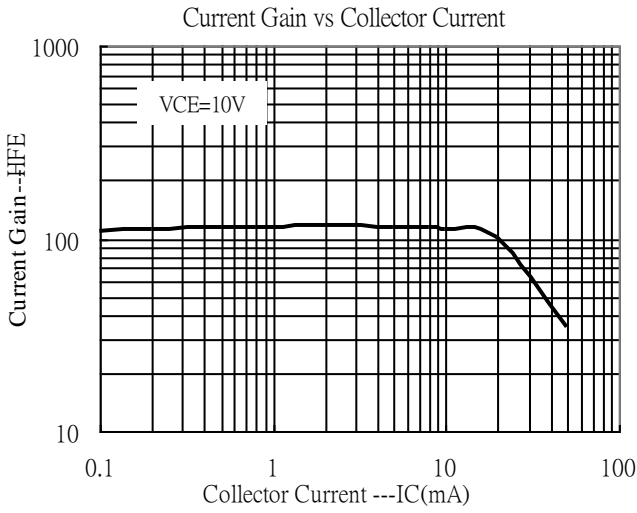
 Classification of h_{FE}

Rank	K	P	Q
Range	52~120	82~180	120~270

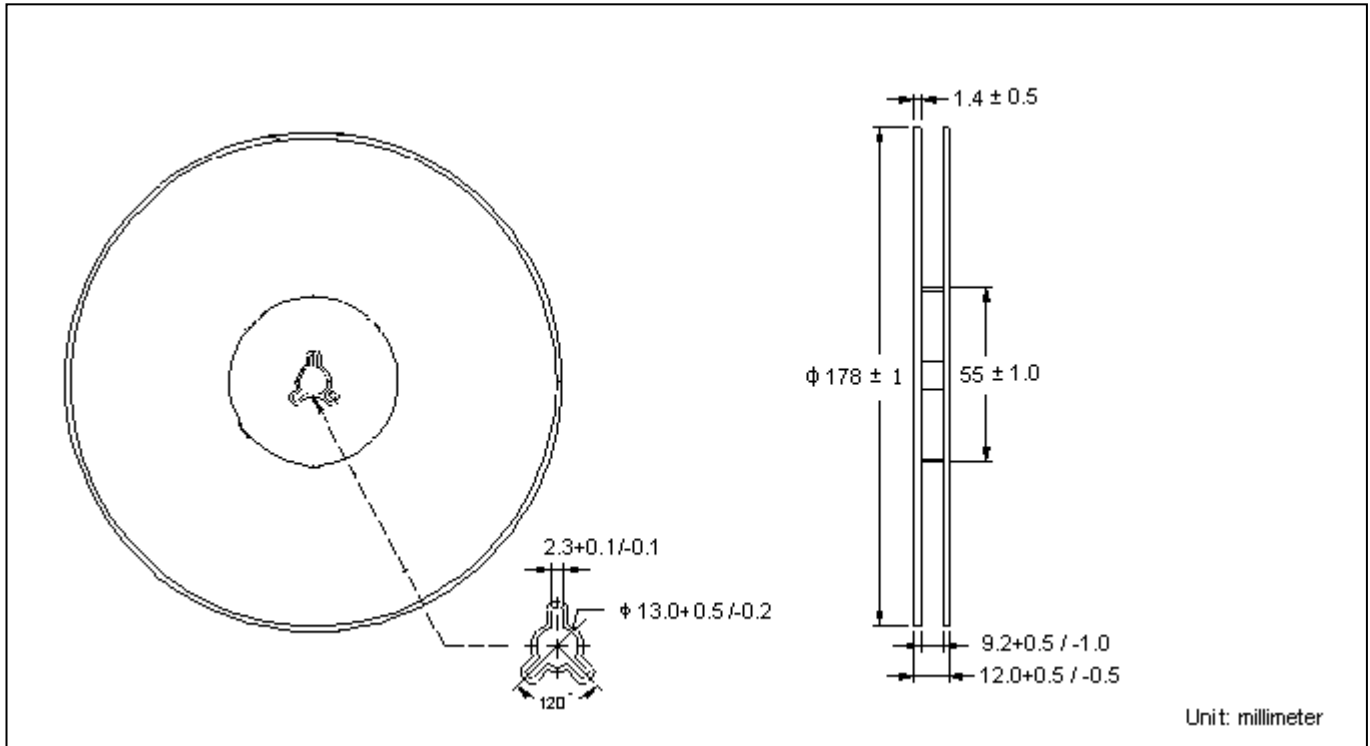
Recommended Soldering Footprint




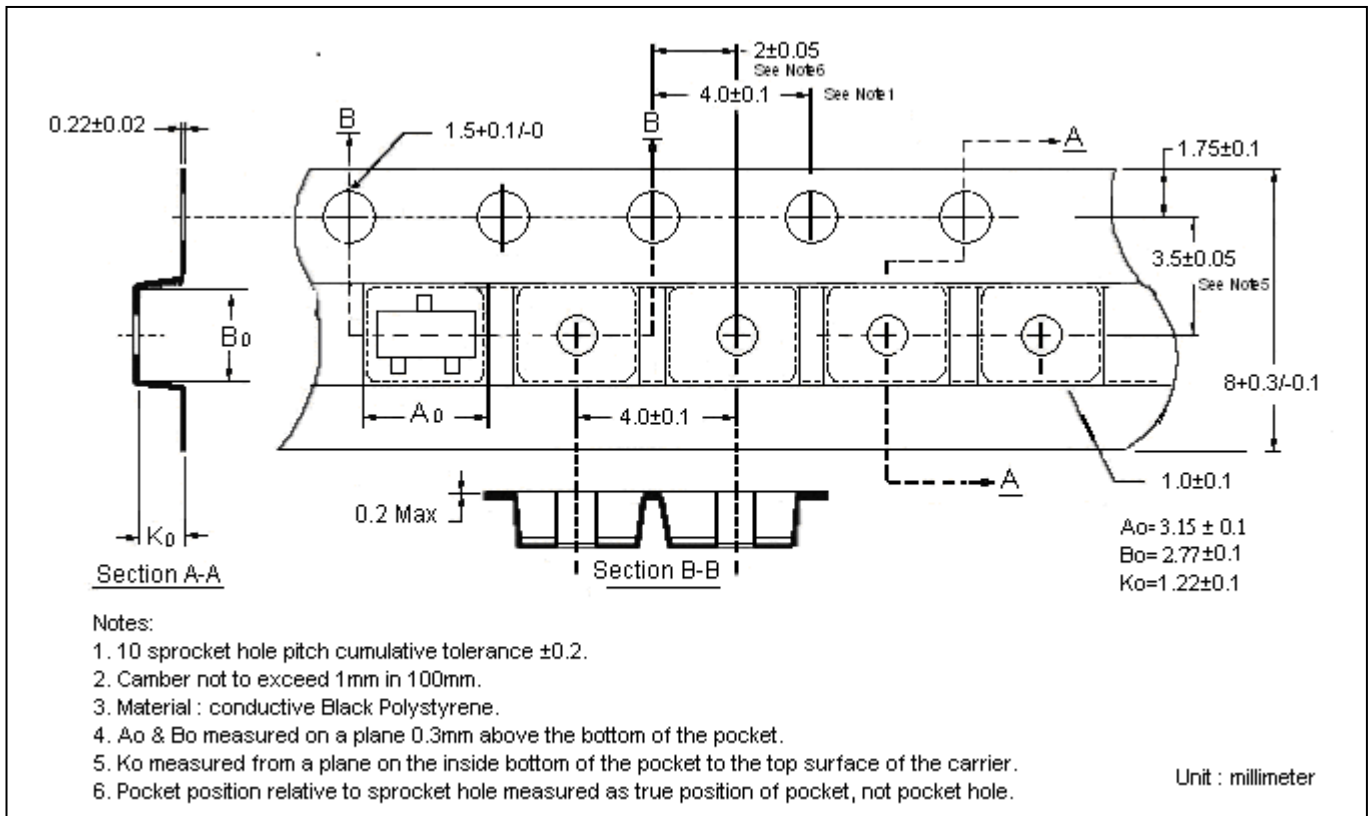
Typical Characteristics



Reel Dimension



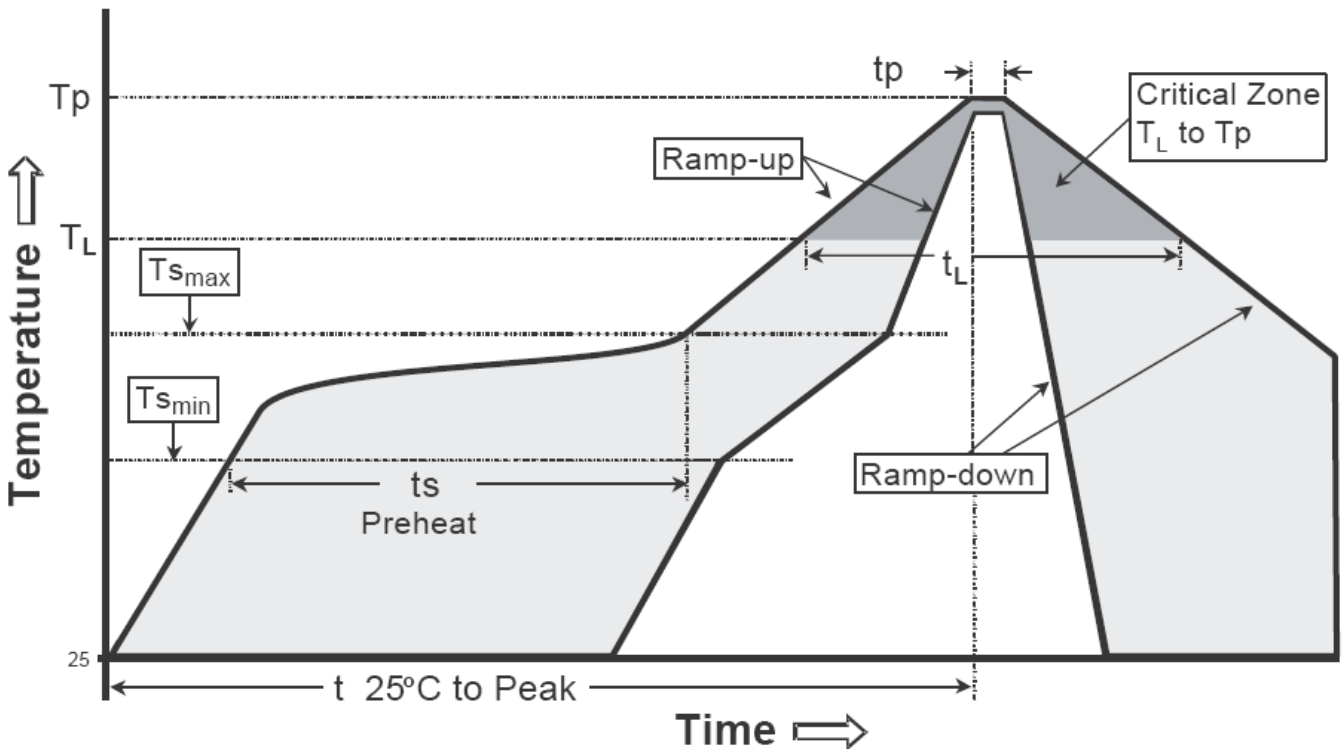
Carrier Tape Dimension



Recommended wave soldering condition

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

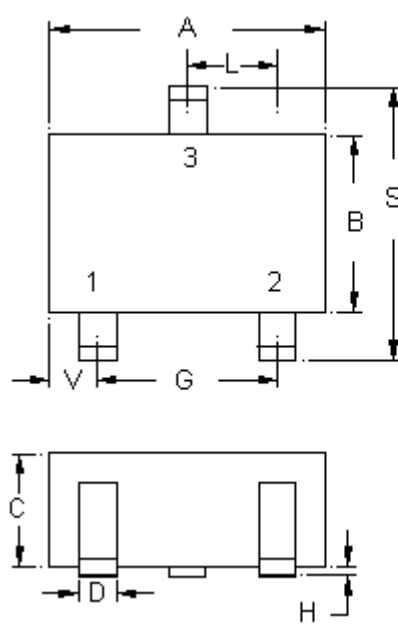
Recommended temperature profile for IR reflow



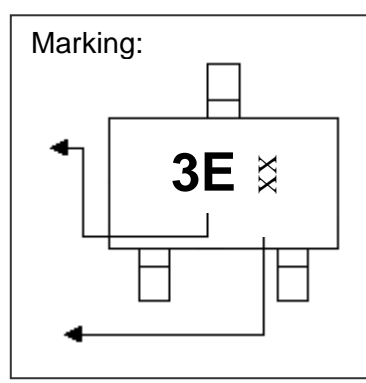
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(Ts min)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (TL)	183°C	217°C
- Time (tL)	60-150 seconds	60-150 seconds
Peak Temperature(TP)	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



Marking:



Product Code

Date Code: Year+Month
 Year: 6→2016, 7→2017,
 8→2018, . . . , etc
 Month: 1→1, 2→2, . . .
 9→9, A→10, B→11, C→12

3-Lead SOT-23 Plastic Surface Mounted Package
 CYStek Package Code: N3

Style : Pin 1.Base 2.Emitter 3.Collector

*:Typical

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	0.0551	1.20	1.40	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	0.1004	2.10	2.55
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.