

Low Vcesat NPN Epitaxial Planar Transistor

BTD1805FP

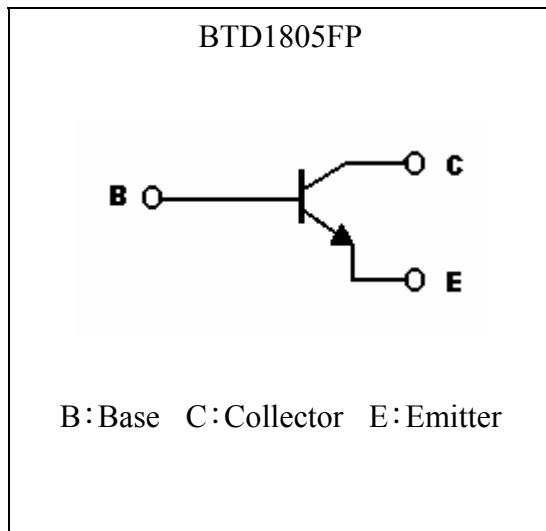
Description

The device is manufactured in NPN planar technology by using a “Base Island” layout. The resulting transistor shows exceptional high gain performance coupled with very low saturation voltage.

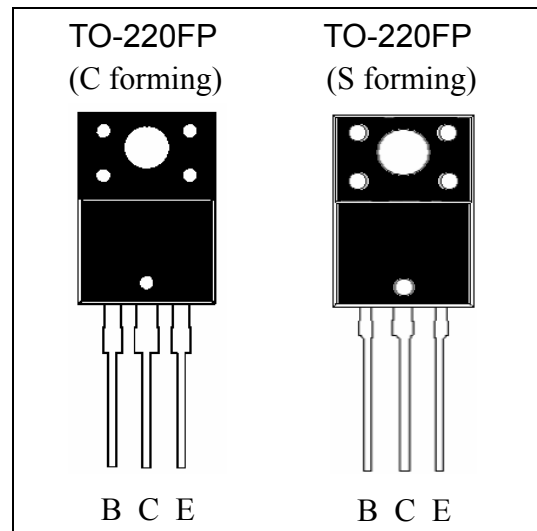
Features

- Very low collector-to-emitter saturation voltage
- Fast switching speed
- High current gain characteristic
- Large current capability
- RoHS compliant package

Symbol

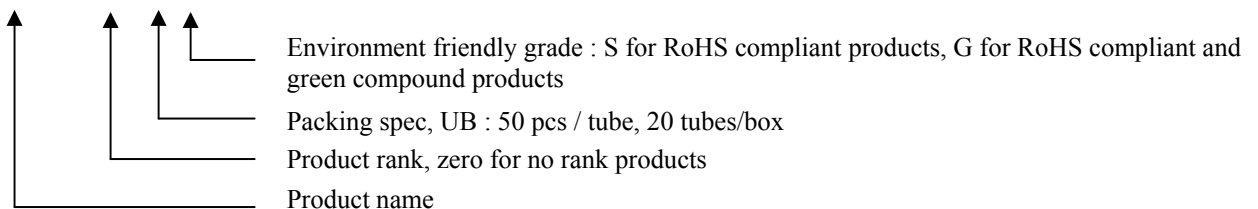


Outline



Ordering Information

Device	Package	Shipping
BTD1805FP-0-UB-S	TO-220FP (RoHS compliant package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton





Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage (IE=0)	V _{CBO}	150	V
Collector-Emitter Voltage (IB=0)	V _{CEO}	70	V
Emitter-Base Voltage (IC=0)	V _{EBO}	7	V
Collector Current (DC)	I _C	5	A
Collector Current (Pulse)	I _{CP}	10 (Note 1)	
Base Current	I _B	2	A
Power Dissipation @ TA=25°C	P _D	2	W
Power Dissipation @ TC=25°C	P _D	40	
Thermal Resistance, Junction to Ambient	R _{θJA}	62.5	°C/W
Thermal Resistance, Junction to Case	R _{θJC}	3.125	°C/W
Junction Temperature	T _j	150	°C
Storage Temperature	T _{stg}	-55~+150	°C

Note : 1. Single Pulse , Pw ≤ 380μs, Duty ≤ 2%.

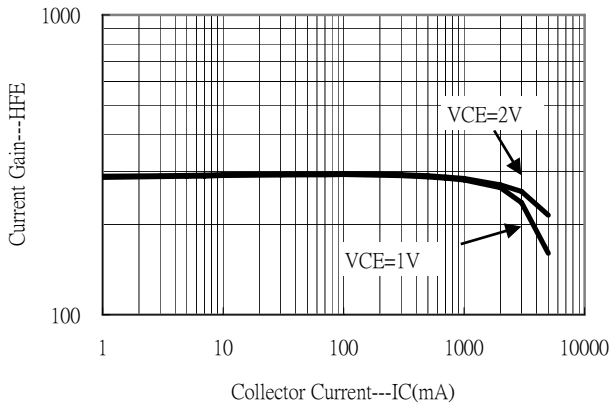
Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV _{CBO}	150	-	-	V	I _C =100μA, I _E =0
*BV _{CEO}	70	-	-	V	I _C =1mA, I _B =0
BV _{EBO}	7	-	-	V	I _C =100μA, I _C =0
I _{CBO}	-	-	0.1	μA	V _{CB} =80V, I _E =0
I _{EBO}	-	-	0.1	μA	V _{EB} =4V, I _C =0
*V _{CE(sat)} 1	-	-	50	mV	I _C =100mA, I _B =5mA
*V _{CE(sat)} 2	-	200	300	mV	I _C =2A, I _B =50mA
*V _{CE(sat)} 3	-	240	400	mV	I _C =3A, I _B =150mA
*V _{CE(sat)} 4	-	-	600	mV	I _C =5A, I _B =200mA
*V _{BE(sat)}	-	0.9	1.2	V	I _C =2A, I _B =100mA
*h _{FE} 1	200	-	400	-	V _{CE} =2V, I _C =100mA
*h _{FE} 2	85	-	-	-	V _{CE} =2V, I _C =5A
*h _{FE} 3	20	-	-	-	V _{CE} =2V, I _C =10A
f _T	-	150	-	MHz	V _{CE} =10V, I _C =50mA
C _{ob}	-	50	-	pF	V _{CB} =10V, f=1MHz
t _{on}	-	50	-	ns	V _{CC} =30V, I _C =10I _B I _B 1=-10I _B I _B 2=1A, R _L =30Ω
t _{stg}	-	1.35	-	μs	
t _f	-	120	-	ns	

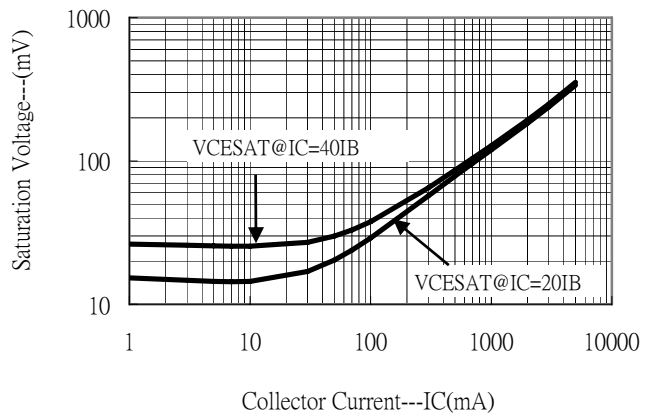
*Pulse Test : Pulse Width ≤ 380μs, Duty Cycles ≤ 2%

Typical Characteristics

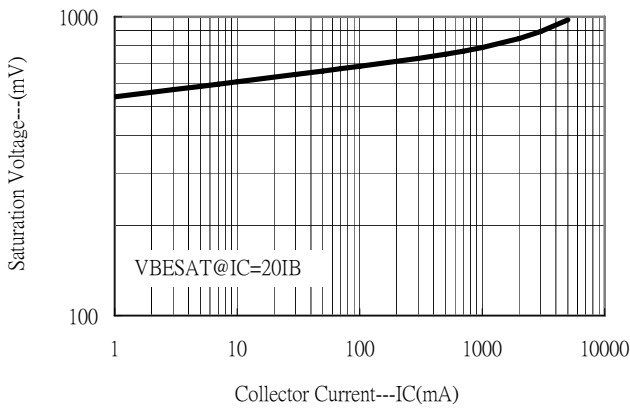
Current Gain vs Collector Current



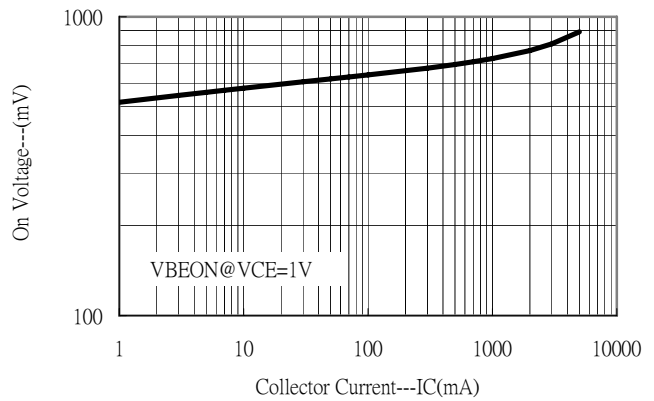
Saturation Voltage vs Collector Current



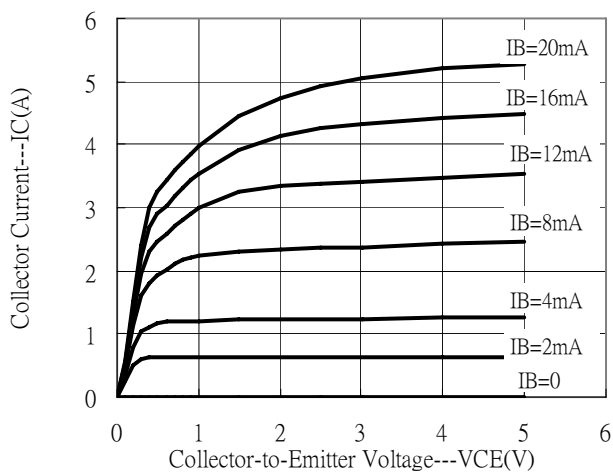
Saturation Voltage vs Collector Current



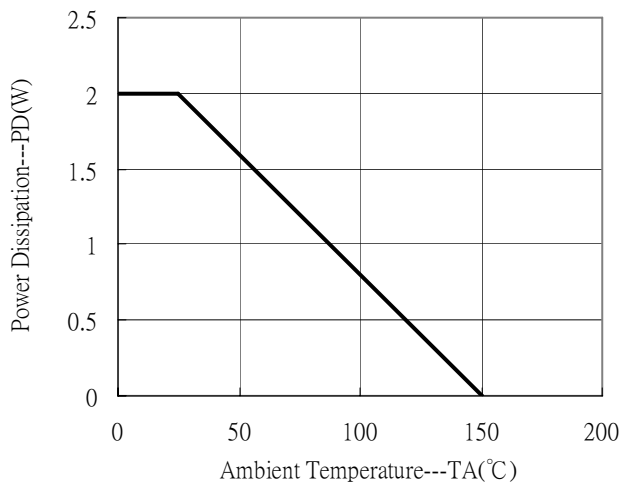
On Voltage vs Collector Current



Output Characteristics



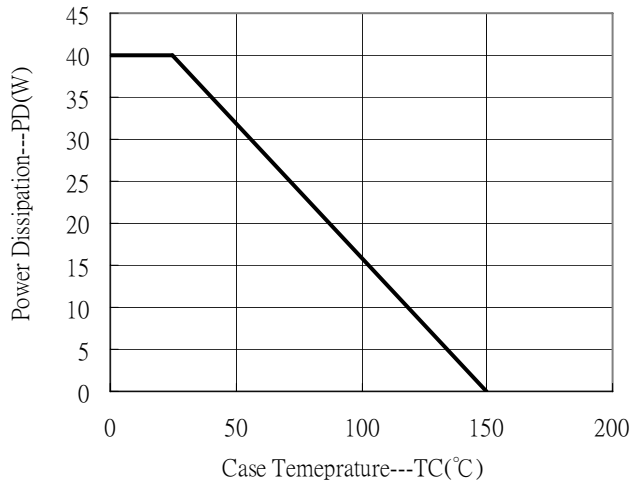
Power Derating Curve





Typical Characteristics(Cont.)

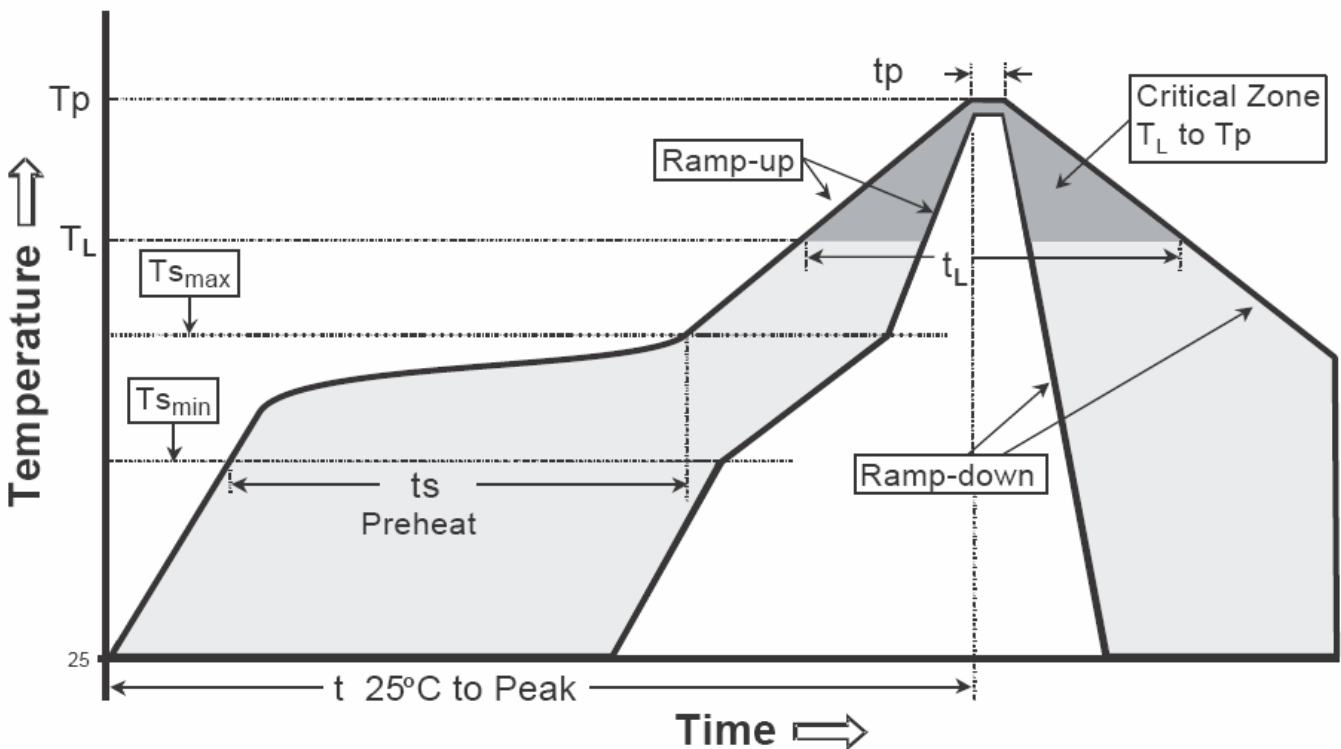
Power Derating Curve



Recommended wave soldering condition

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

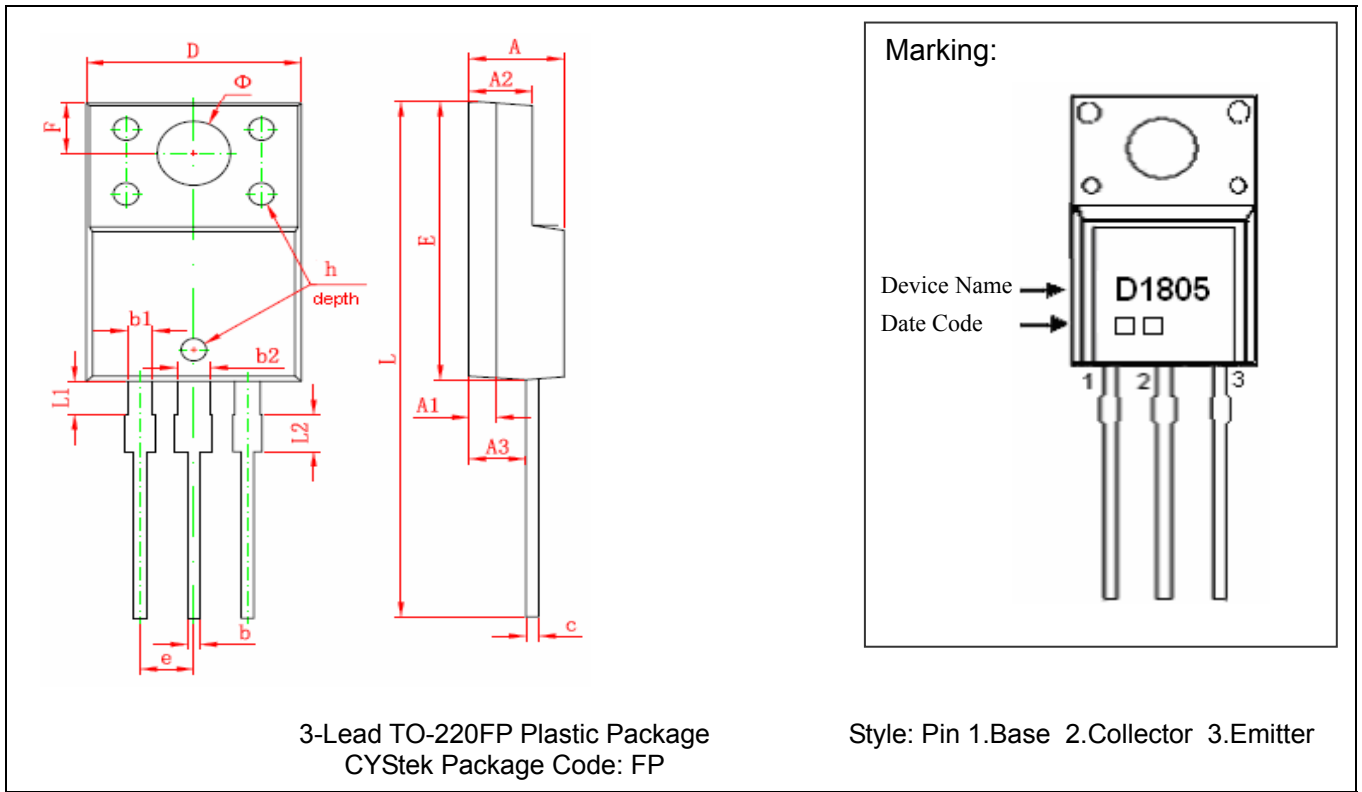
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmmax 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.

TO-220FP (C Forming) Dimension



*Typical

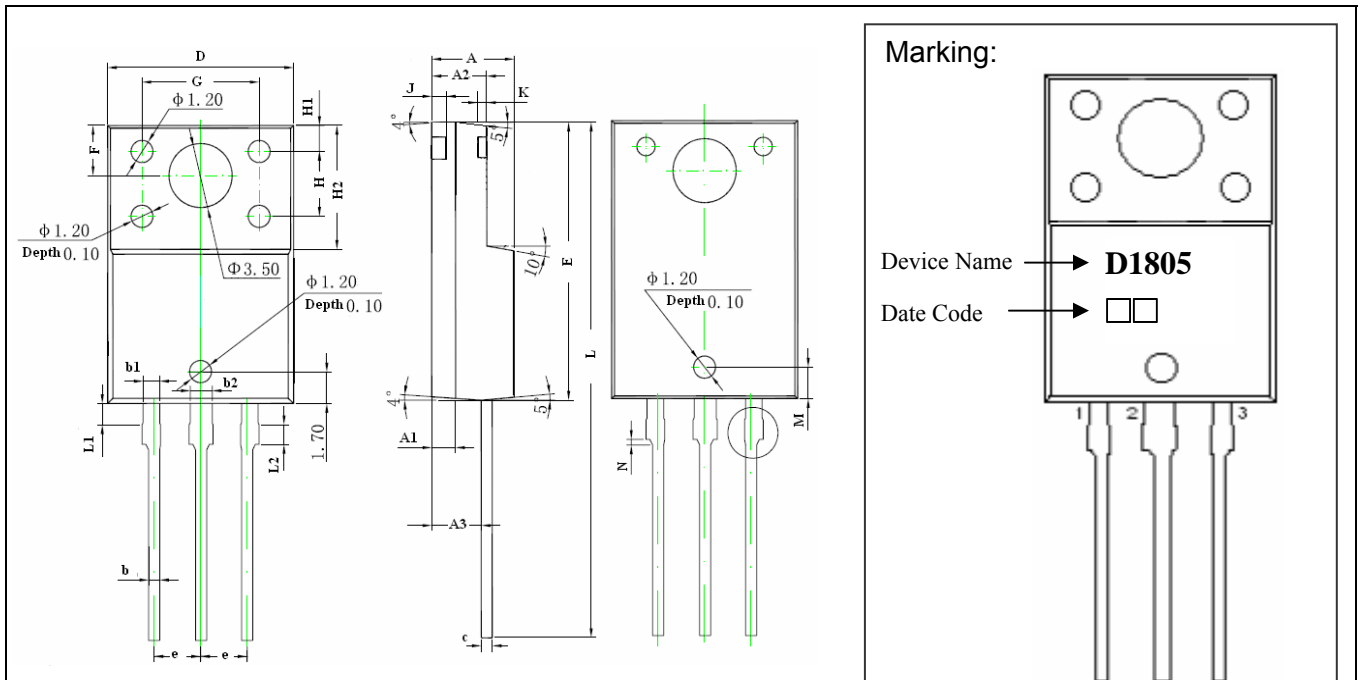
DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.169	0.185	4.300	4.700	E	0.583	0.598	14.800	15.200
A1	0.051 REF		1.300 REF		e	0.100*		2.540*	
A2	0.110	0.126	2.800	3.200	F	0.106 REF		2.700 REF	
A3	0.098	0.114	2.500	2.900	Φ	0.138 REF		3.500 REF	
b	0.020	0.030	0.500	0.750	h	0.000	0.012	0.000	0.300
b1	0.043	0.053	1.100	1.350	L	1.102	1.118	28.000	28.400
b2	0.059	0.069	1.500	1.750	L1	0.067	0.075	1.700	1.900
c	0.020	0.030	0.500	0.750	L2	0.075	0.083	1.900	2.100
D	0.392	0.408	9.960	10.360					

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.

TO-220FP Dimension (S Forming)



3-Lead TO-220FP Plastic Package
 CYStek Package Code: FP

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

*Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.171	0.183	4.35	4.65	G	0.246	0.258	6.25	6.55
A1	0.051 REF		1.300 REF		H	0.138 REF		3.50 REF	
A2	0.112	0.124	2.85	3.15	H1	0.055 REF		1.40 REF	
A3	0.102	0.110	2.60	2.80	H2	0.256	0.272	6.50	6.90
b	0.020	0.030	0.50	0.75	J	0.031 REF		0.80 REF	
b1	0.031	0.041	0.80	1.05	K	0.020		0.50 REF	
b2	0.047 REF		1.20 REF		L	1.102	1.118	28.00	28.40
c	0.020	0.030	0.500	0.750	L1	0.043	0.051	1.10	1.30
D	0.396	0.404	10.06	10.26	L2	0.036	0.043	0.92	1.08
E	0.583	0.598	14.80	15.20	M	0.067 REF		1.70 REF	
e	0.100 *		2.54*		N	0.012 REF		0.30 REF	
F	0.106 REF		2.70 REF						

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.