

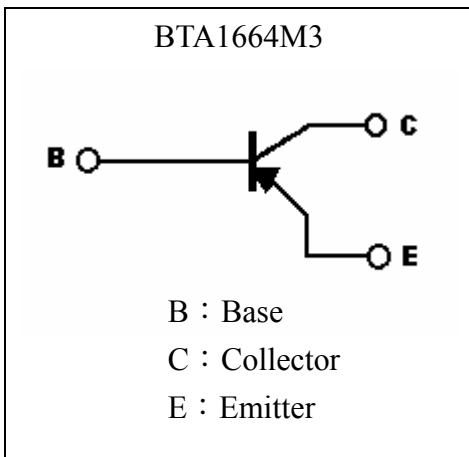
**Low Vcesat PNP Epitaxial Planar Transistor**

# BTA1664M3

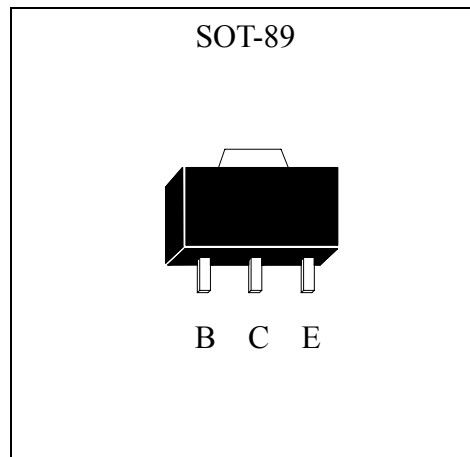
**Features**

- Low  $V_{CE(sat)}$ ,  $V_{CE(sat)} = -0.24V$  (typical), at  $I_C / I_B = -500mA / -20mA$
- Pb-free lead plating and halogen-free package

**Symbol**

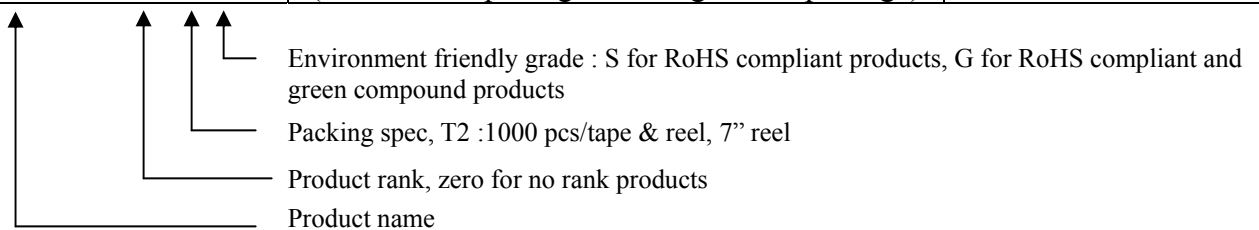


**Outline**



**Ordering Information**

Device	Package	Shipping
BTA1664M3-X-T2-G	SOT-89 (Pb-free lead plating and halogen-free package)	1000 pcs / Tape & Reel





**Absolute Maximum Ratings** (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-35	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Collector Current(DC)	I <sub>C</sub>	-2	A
Peak Collector Current	I <sub>CM</sub>	-4 *1	A
Peak Base Current	I <sub>BM</sub>	-200	mA
Power Dissipation	P <sub>D</sub>	0.6	W
		1.5 *2	
		2.1 *3	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	208	°C/W
		83.3 *2	
		59.5 *3	
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	39	
Operating Junction and Storage Temperature Range	T <sub>j</sub> ;T <sub>stg</sub>	-55~+150	°C

Note :1 Single pulse, Pw=10ms

- 2 When mounted on 25mm×25mm×1.6 mm FR-4 PCB with high coverage of single sided 1 oz copper, in still air condition
- 3 When mounted on 50mm×50mm×1.6 mm FR-4 PCB with high coverage of single sided 1 oz copper, in still air condition

**Characteristics** (Ta=25°C)

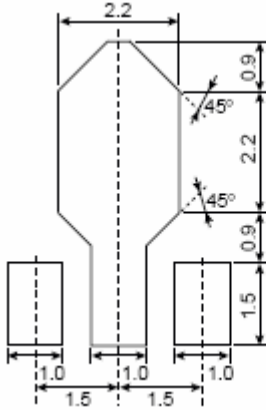
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>CBO</sub>	-50	-	-	V	I <sub>C</sub> =-50μA, I <sub>E</sub> =0
BV <sub>CEO</sub>	-35	-	-	V	I <sub>C</sub> =-1mA, I <sub>B</sub> =0
BV <sub>EBO</sub>	-7	-	-	V	I <sub>E</sub> =-50μA, I <sub>C</sub> =0
I <sub>CBO</sub>	-	-	-100	nA	V <sub>CB</sub> =-50V, I <sub>E</sub> =0
I <sub>EBO</sub>	-	-	-100	nA	V <sub>EB</sub> =-7V, I <sub>C</sub> =0
*V <sub>CE(sat)</sub>	-	-0.24	-0.4	V	I <sub>C</sub> =-500mA, I <sub>B</sub> =-20mA
*V <sub>CE(sat)</sub>	-	-	-0.5	V	I <sub>C</sub> =-800mA, I <sub>B</sub> =-80mA
*V <sub>BE(on)</sub>	-0.5	-	-0.8	V	V <sub>CE</sub> =-1V, I <sub>C</sub> =-10mA
*h <sub>FE 1</sub>	120	-	390	-	V <sub>CE</sub> =-1V, I <sub>C</sub> =-100mA
*h <sub>FE 2</sub>	40	-	-	-	V <sub>CE</sub> =-1V, I <sub>C</sub> =-800mA
f <sub>T</sub>	-	120	-	MHz	V <sub>CE</sub> =-5V, I <sub>C</sub> =-10mA, f=100MHz
Cob	-	19	-	pF	V <sub>CB</sub> =-10V, f=1MHz

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

**Classification of hFE 1**

Rank	Q	R
Range	120~270	180~390

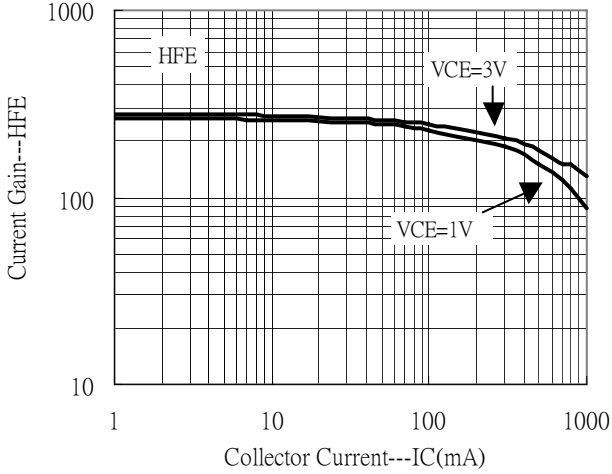
### Recommended soldering footprint



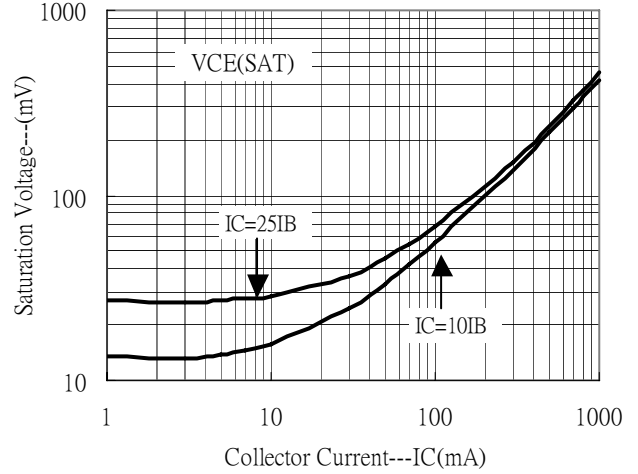
unit : mm

**Characteristic Curves**

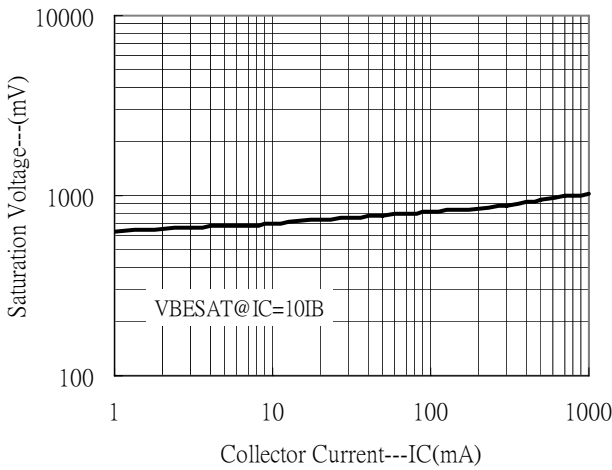
Current Gain vs Collector Current



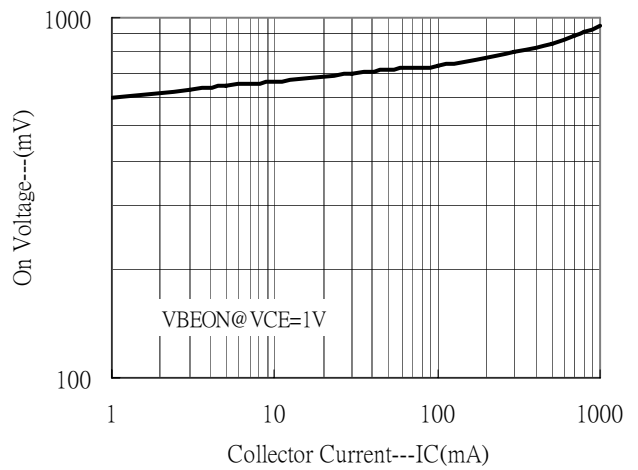
Saturation Voltage vs Collector Current



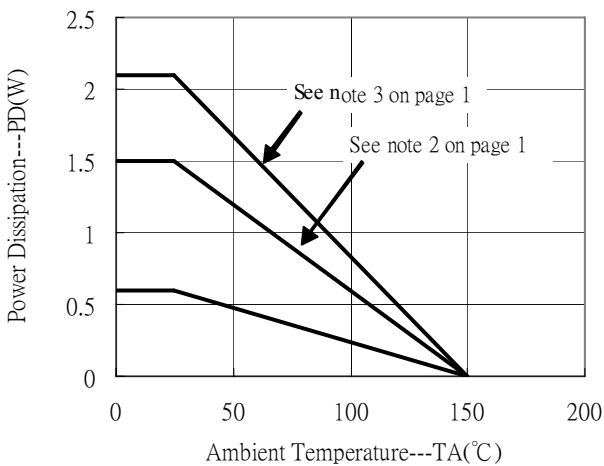
Saturation Voltage vs Collector Current



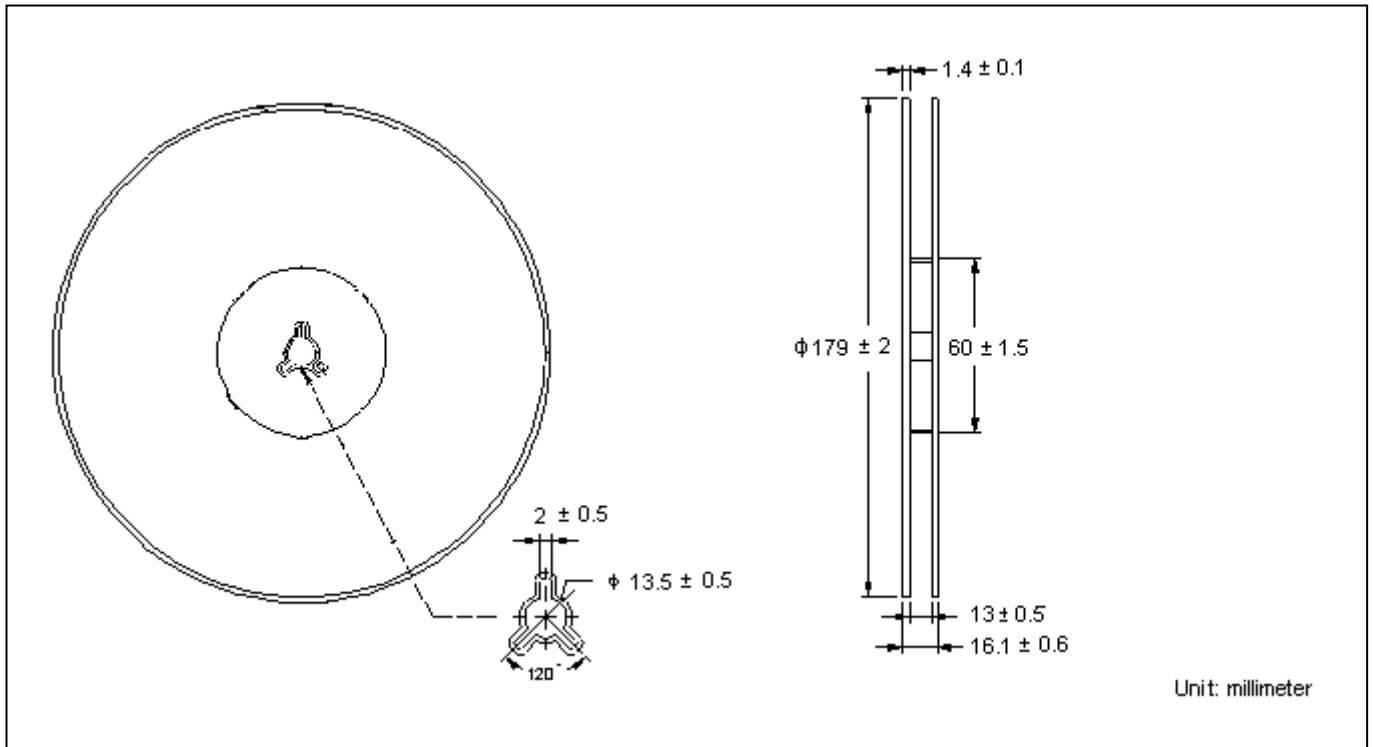
On Voltage vs Collector Current



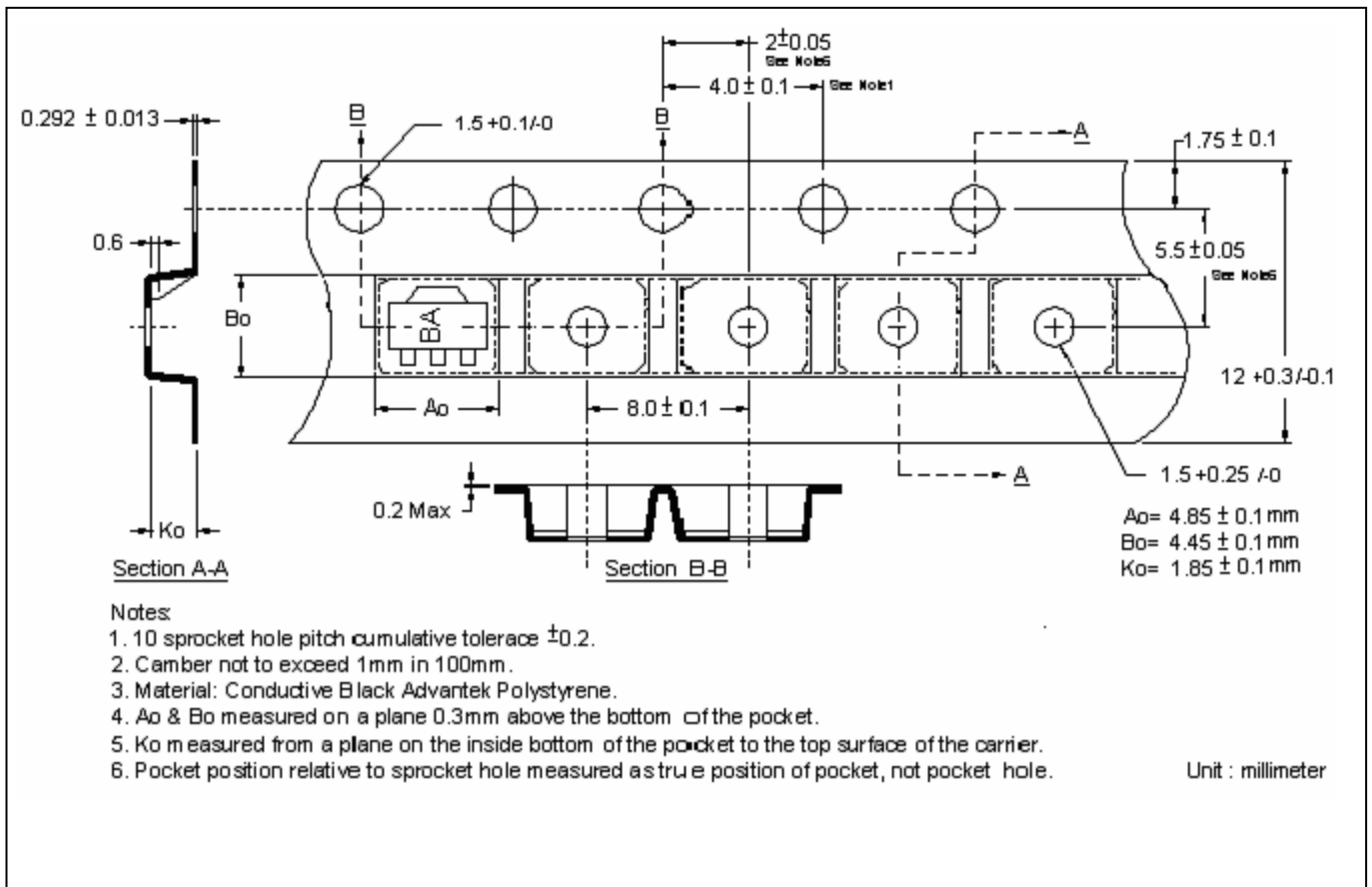
Power Derating Curves



**Reel Dimension**

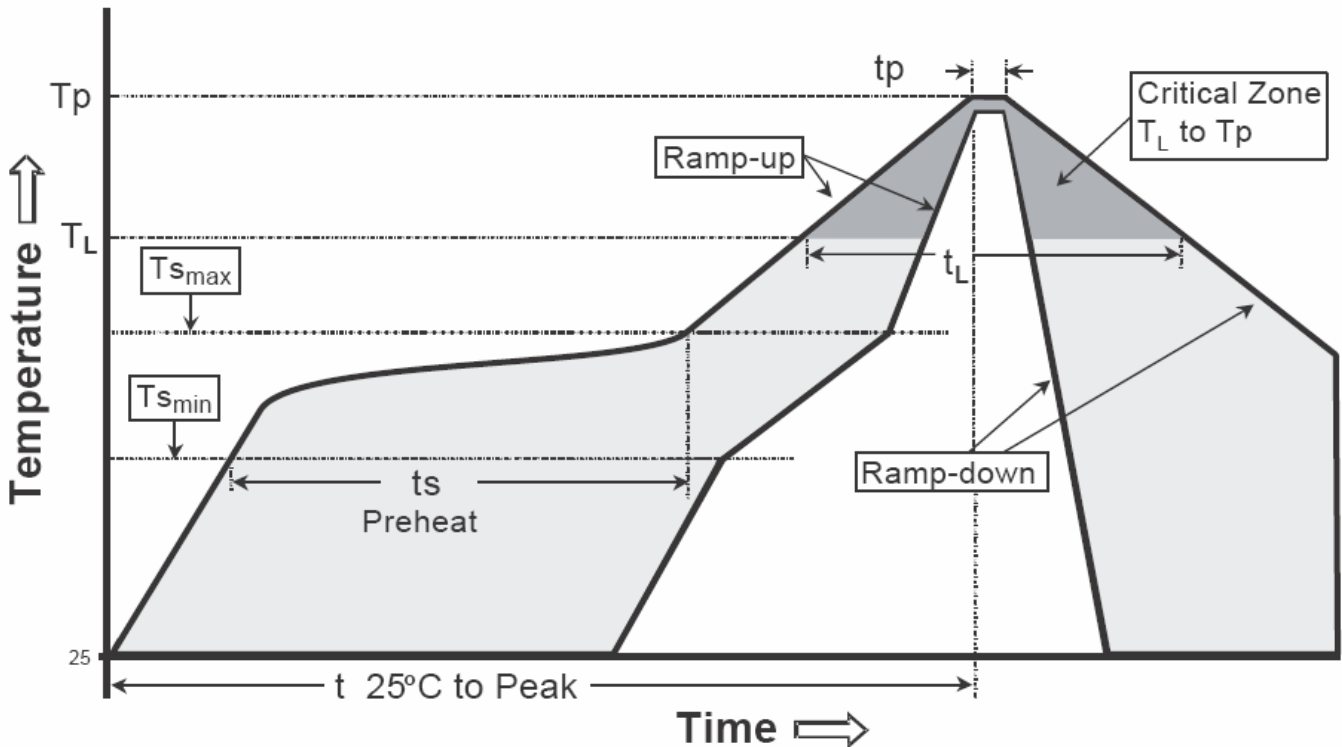


**Carrier Tape Dimension**



**Recommended wave soldering condition**

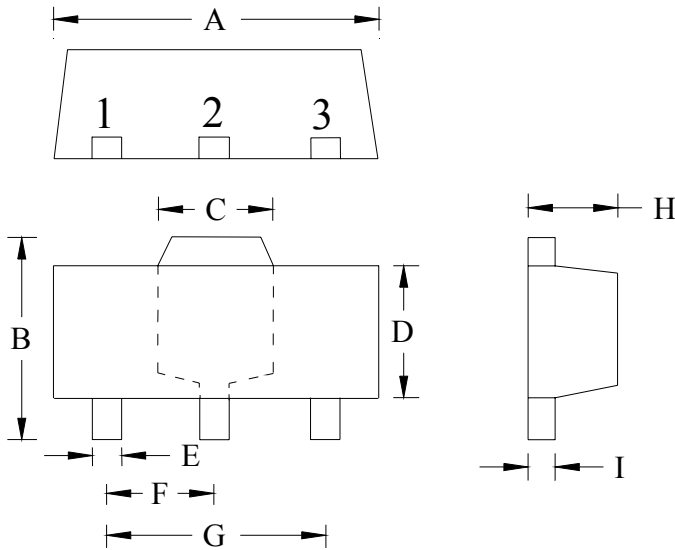
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

**Recommended temperature profile for IR reflow**


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>P</sub> )	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.

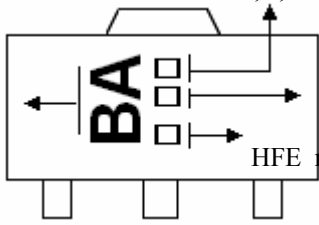
Note : All temperatures refer to topside of the package, measured on the package body surface.

**SOT-89 Dimension**



The diagram shows three views of the SOT-89 package: a top view with dimensions A, C, and lead positions 1, 2, 3; a front view with dimensions B, D, E, F, G; and a side view with dimensions H and I.

**Marking:**



month code: 1~9, A,B,C  
 Year code : 6→2006, 7→2007,...  
 Product Code BA  
 HFE rank

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

3-Lead SOT-89 Plastic  
 Surface Mounted Package  
 CYStek Package Code: M3

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1732	0.1811	4.40	4.60	F	0.0591	TYP	1.50	TYP
B	0.1551	0.1673	3.94	4.25	G	0.1181	TYP	3.00	TYP
C	0.0610	REF	1.55	REF	H	0.0551	0.0630	1.40	1.60
D	0.0906	0.1024	2.30	2.60	I	0.0138	0.0173	0.35	0.44
E	0.0126	0.0205	0.32	0.52					

- Notes:**
- Controlling dimension: millimeters.
  - Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
  - 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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