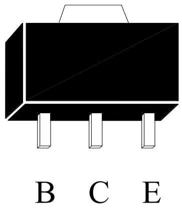
Low VCE(sat) PNP Epitaxial Planar Transistor

Features

- Excellent DC current gain characteristics
- Low Saturation Voltage, $V_{CE(sat)}$=-0.12V(typ) @I_C=-1A, I_B=-50mA.
- Complementary to KMD2150A
- Pb-free lead plating and halogen-free package

Outline

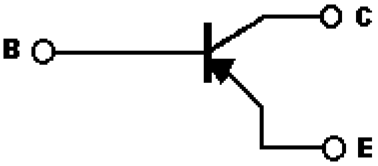
SOT-89



Symbol

KMB1424A

BV_{CEO}	-50V
I_C	-3A
$V_{CESAT(typ)}$	-0.12V
$R_{CESAT(typ)}$	0.12Ω



B：Base
C：Collector
E：Emitter

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	-50	V
Collector-Emitter Voltage	V_{CEO}	-50	V
Emitter-Base Voltage	V_{EBO}	-6	V
Collector Current(DC)	I_C	-3	A
Collector Current(Pulsed)	I_{CP}	-5	
Power Dissipation	P_D	1.5 (Note 1)	W
		2.1 (Note 2)	
ESD susceptibility		8000 (Note 3)	V
Operating Temperature Range	Tj	-55~+150	°C
Storage Temperature Range	Tstg	-55~+150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient, max	$R_{\theta JA}$	83.3 (Note 1)	°C/W
		59.5 (Note 2)	
Thermal Resistance, Junction-to-Case, max	$R_{\theta JC}$	30	

Note 1: When mounted on 25mm×25mm×1.6 mm FR-4 PCB with high coverage of single sided 1 oz copper, in still air condition
2: When mounted on 50mm×50mm×1.6 mm FR-4 PCB with high coverage of single sided 1 oz copper, in still air condition
3 : Human body model, 1.5kΩ in series with 100pF

Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	-50	-	-	V	I_C=-50μA
BV_{CEO}	-50	-	-	V	I_C=-1mA
BV_{EBO}	-6	-	-	V	I_E=-50μA
I_{CBO}	-	-	-0.1	μA	V_{CB}=-20V
I_{EBO}	-	-	-0.1	μA	V_{EB}=-5V
*$V_{CE(sat)}$ 1	-	-0.12	-0.35	V	I_C=-1A, I_B=-50mA
*$V_{CE(sat)}$ 2	-	-0.2	-0.35	V	I_C=-2A, I_B=-100mA
*$R_{CE(sat)}$	-	0.12	0.35	Ω	I_C=-1A, I_B=-50mA
*$V_{BE(sat)}$	-0.5	-0.68	-0.85	V	I_C=-30mA, I_B=-3mA
*$V_{BE(sat)}$	-0.5	-1.0	-1.2	V	I_C=-2A, I_B=-200mA
*h_{FE}	180	-	390	-	V_{CE}=-2V, I_C=-500mA
f_T	-	240	-	MHz	V_{CE}=-2V, I_C=-500mA, f=100MHz
Cob	-	35	-	pF	V_{CB}=-10V, f=1MHz

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

Classification of hFE

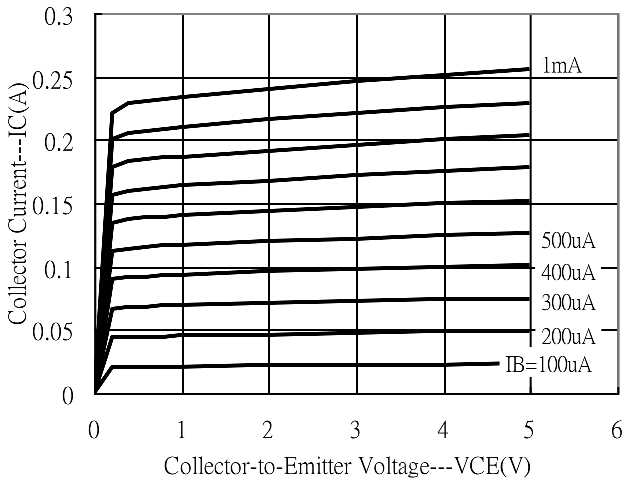
Rank	R
Range	180 ~ 390

Ordering Information

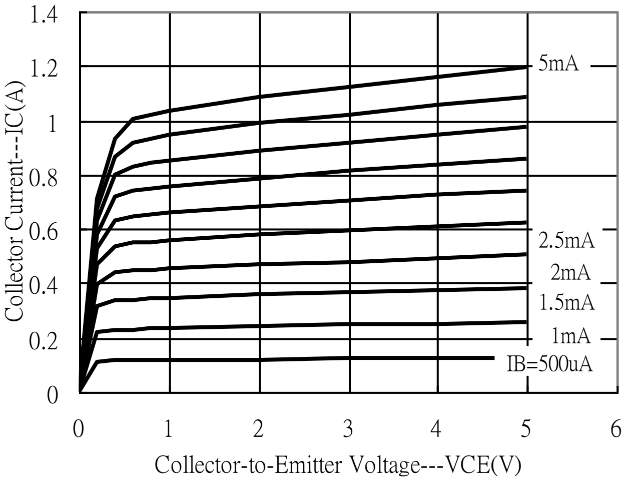
Device	HFE Rank	Package	Shipping
KMB1424A	R	SOT-89 (Pb-free lead plating and halogen-free package)	1000 pcs / Tape & Reel

Typical Characteristics

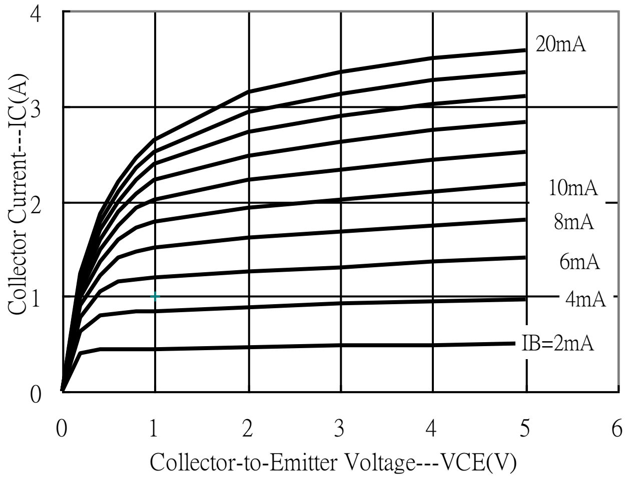
Emitter Grounded Output Characteristics



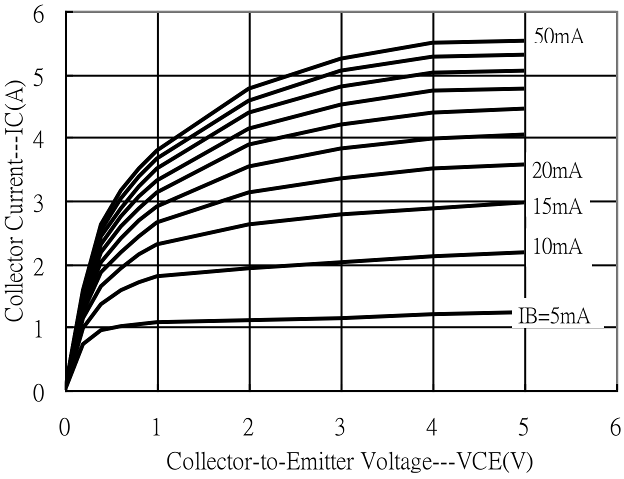
Emitter Grounded Output Characteristics



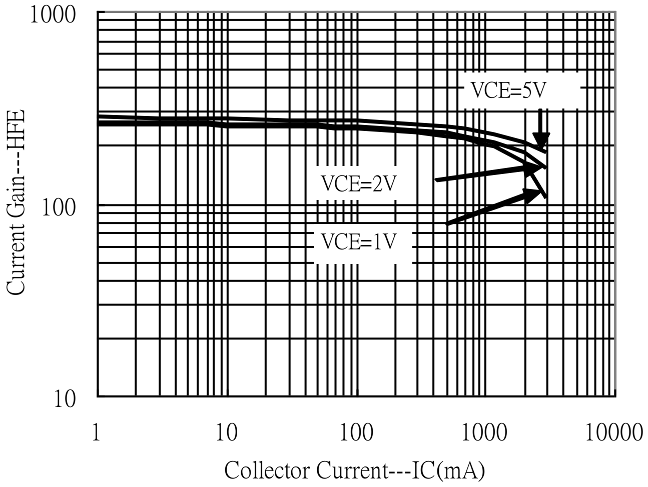
Emitter Grounded Output Characteristics



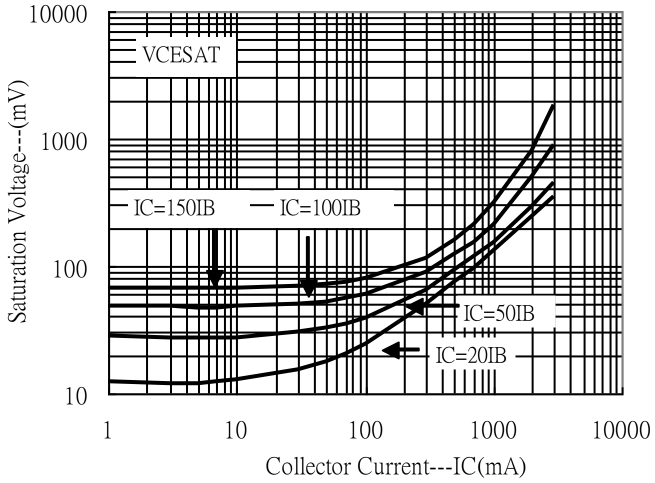
Emitter Grounded Output Characteristics



Current Gain vs Collector Current

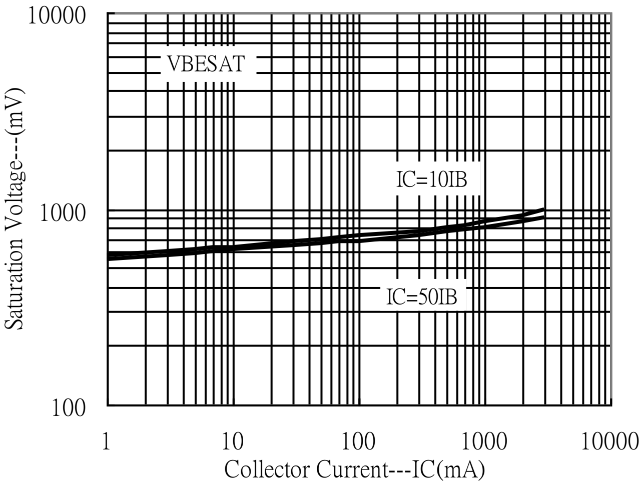


Saturation Voltage vs Collector Current

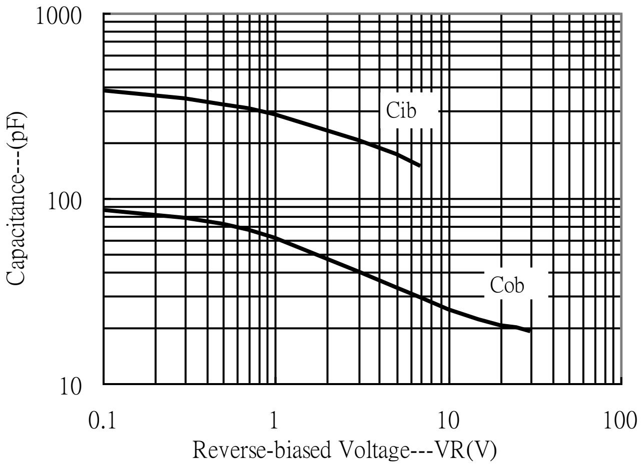


Typical Characteristics(Cont.)

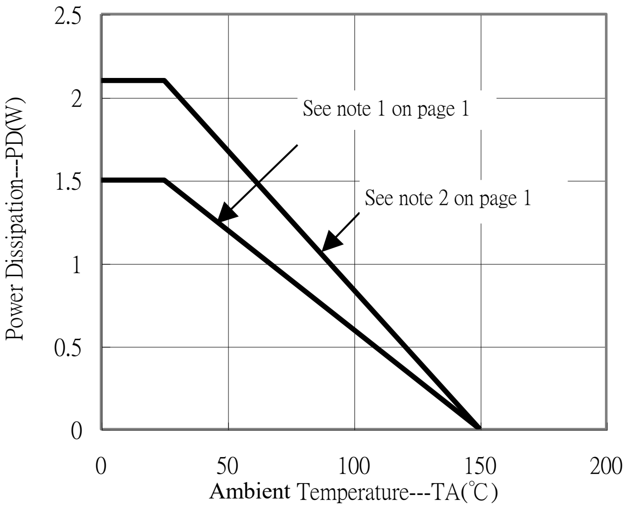
Saturation Voltage vs Collector Current



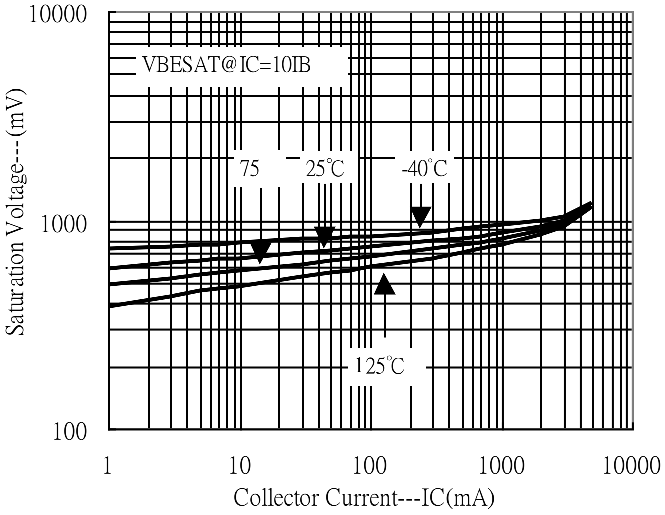
Capacitance vs Reverse-biased Voltage



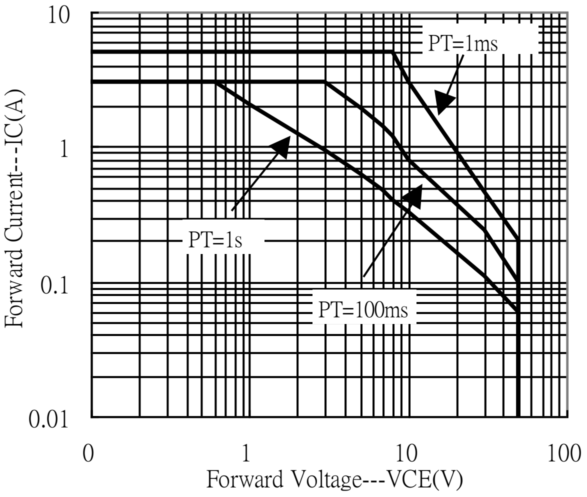
Power Derating Curve



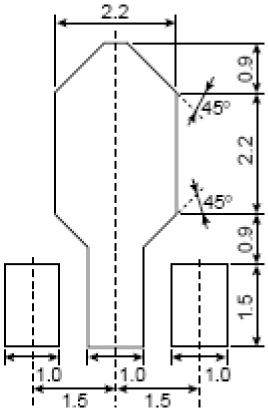
Saturation Voltage vs Collector Current



Safe Operating Area

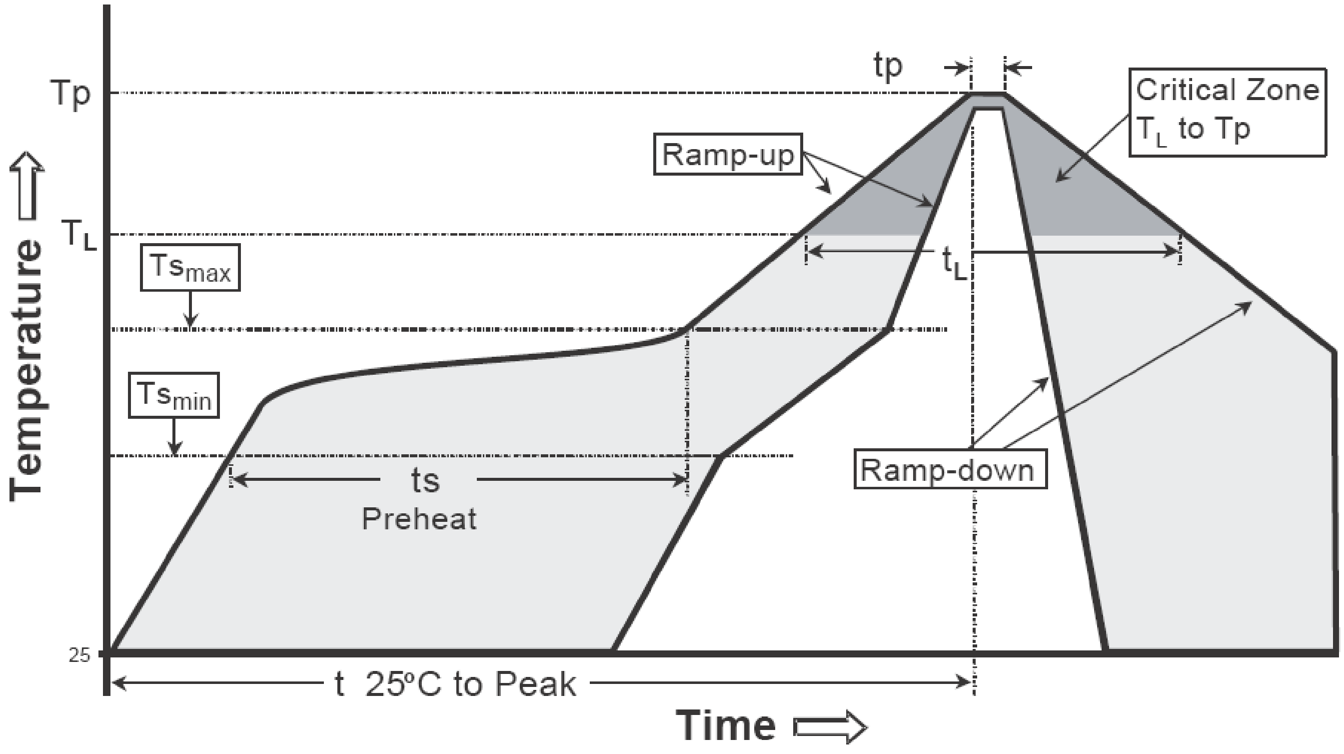


Recommended soldering footprint



unit : mm

Recommended temperature profile for IR reflow



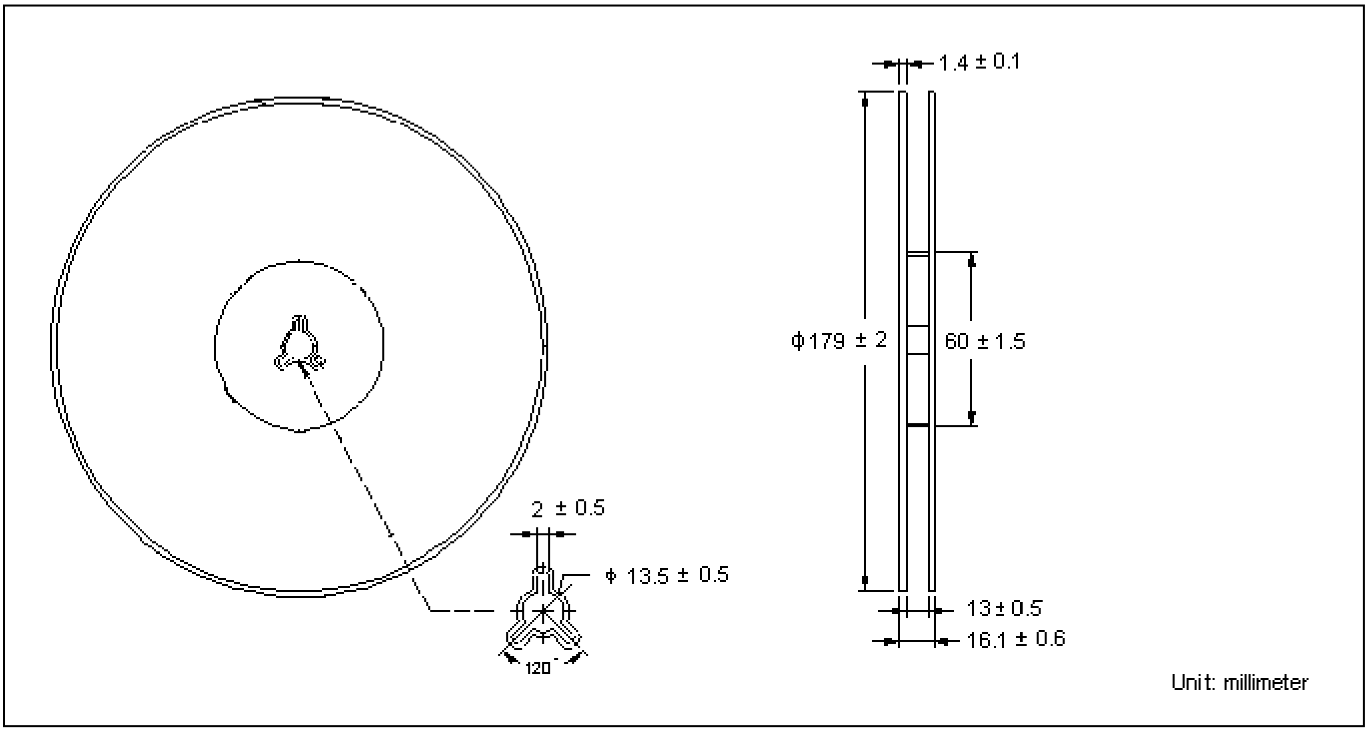
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

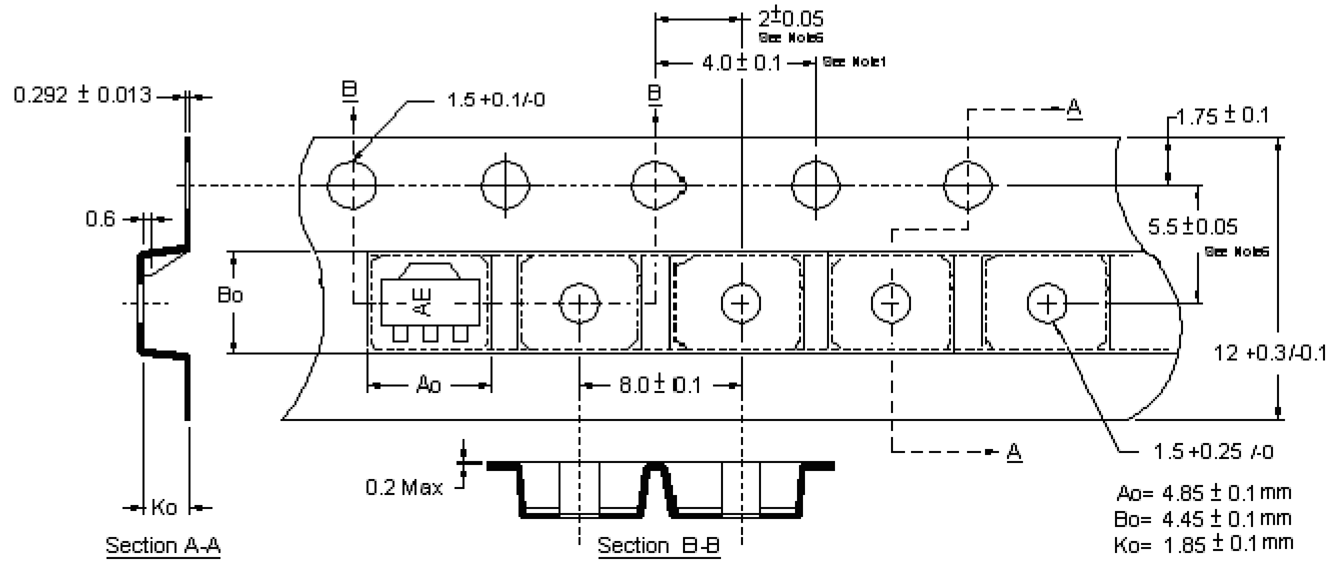
Recommended wave soldering condition

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

Reel Dimension



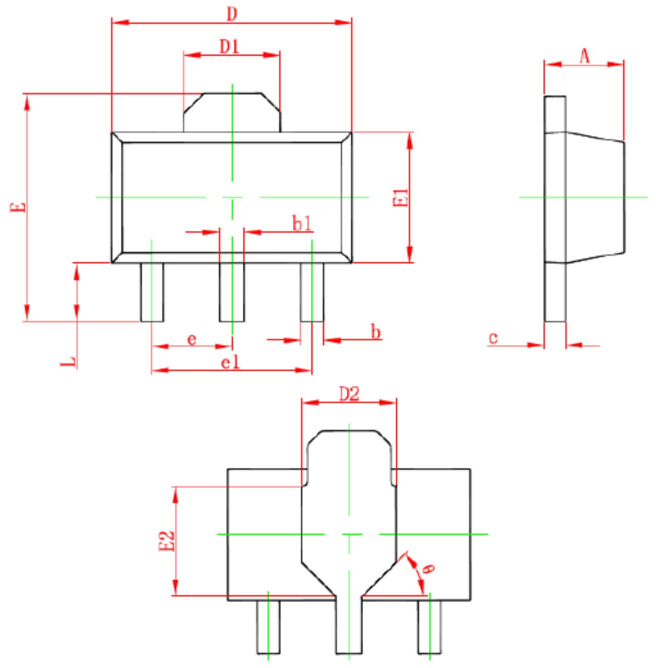
Carrier Tape Dimension



Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

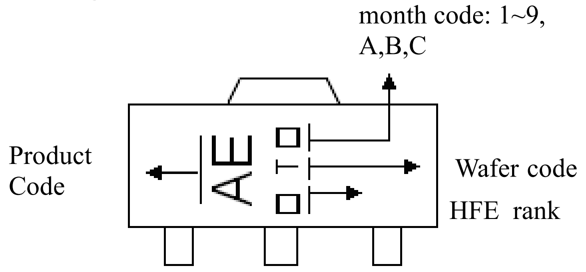
Unit : millimeter

SOT-89 Dimension



3-Lead SOT-89 Plastic
Surface Mounted Package

Marking:



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

Date Code:
Month: 1→1, 2→2, • • •
9→9, A→10, B→11, C→12

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.055	0.063	1.40	1.60	E	0.155	0.167	3.94	4.25
b	0.013	0.020	0.32	0.52	E1	0.091	0.102	2.30	2.60
b1	0.016	0.023	0.40	0.58	E2	0.075 REF.		1.90 REF.	
c	0.014	0.017	0.35	0.44	e	0.060 TYP.		1.50 TYP.	
D	0.173	0.181	4.40	4.60	e1	0.118 TYP.		3.00 TYP.	
D1	0.061 REF.		1.55 REF.		L	0.035	0.047	0.90	1.20
D2	0.069 REF.		1.75 REF.		θ	45°		45°	

Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.

Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.