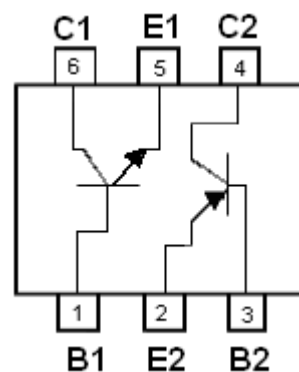
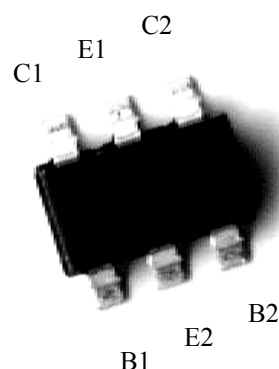


NPN AND PNP Dual Epitaxial Planar Transistors

Features :

- High BV_{CEO}
- High current
- Excellent DC current gain characteristics
- Pb-free lead plating and halogen-free package

SOT-23-6L



B : Base E : Emitter C : Collector

Ordering Information

Device	Package	Shipping
KWHBNP5213	SOT-23-6L (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit
		NPN	PNP	
Collector-Base Voltage	V _{CBO}	100	-100	V
Collector-Emitter Voltage	V _{CEO}	80	-80	V
Emitter-Base Voltage	V _{EBO}	7	-7	V
Collector Current(DC) (Note 1)	I _C	1	-1	A
Peak Collector Current (Note 2)	I _{CP}	2	-2	A
Peak Base Current (Note 2)	I _{BP}	200	-200	mA
Total Power Dissipation (Note 1)	Pd	1.14		W
Linear Derating Factor		0.01		W / °C
Operating Junction and Storage Temperature	T _j , T _{stg}	-55~+150		°C
Thermal Resistance, Junction-to-Ambient (Note 1)	R _{th,ja}	110		°C/W

Note : 1.Surface mounted on 1 in² copper pad of FR-4 board, t_≤5 sec; 180°C/W when mounted on minimum copper pad
 2.Pulse width limited by maximum junction temperature

NPN Electrical Characteristics (T_j=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV _{CBO}	100	-	-	V	I _C =50μA
BV _{CEO}	80	-	-	V	I _C =1mA
BV _{EBO}	7	-	-	V	I _E =50μA
I _{CBO}	-	-	100	nA	V _{CB} =100V, I _E =0
I _{EBO}	-	-	100	nA	V _{EB} =7V, I _C =0
*V _{CE(SAT)}	-	0.15	0.3	V	I _C =500mA, I _B =20mA
*V _{CE(SAT)}	-	-	0.5	V	I _C =1A, I _B =50mA
*V _{BE(SAT)}	-	-	1.2	V	I _C =1A, I _B =50mA
*h _{FE} 1	180	-	390	-	V _{CE} =10V, I _C =150mA
*h _{FE} 2	60	-	-	-	V _{CE} =10V, I _C =500mA
f _T	150	230	-	MHz	V _{CE} =10V, I _C =50mA, f=100MHz
Cob	-	6	15	pF	V _{CB} =10V, I _E =0A, f=1MHz

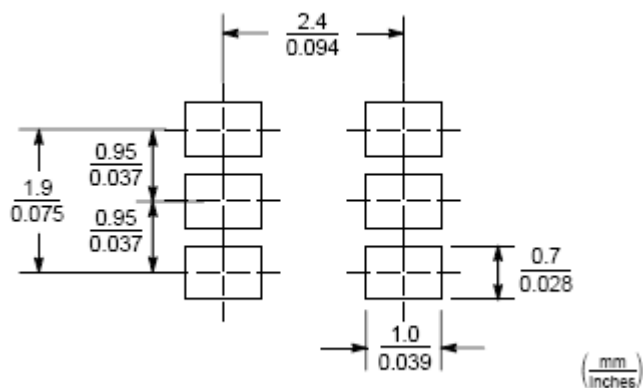
*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

PNP Electrical Characteristics (Tj=25°C, unless otherwise specified)

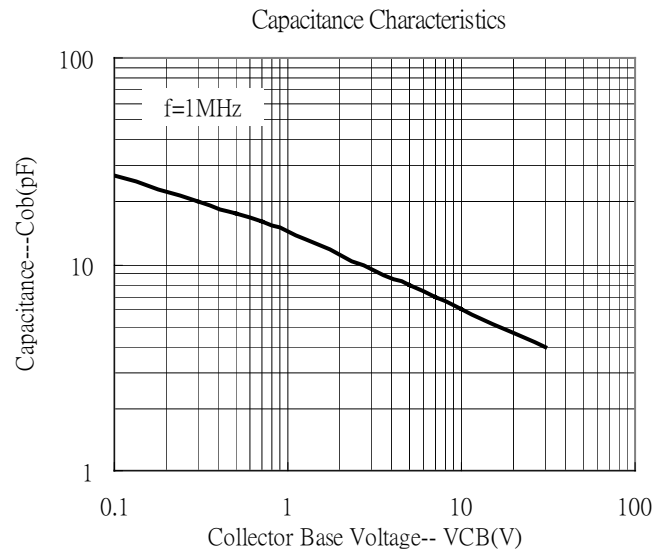
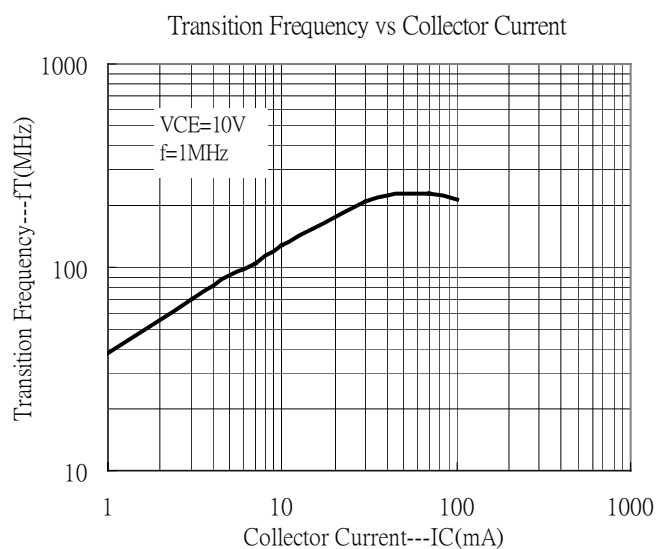
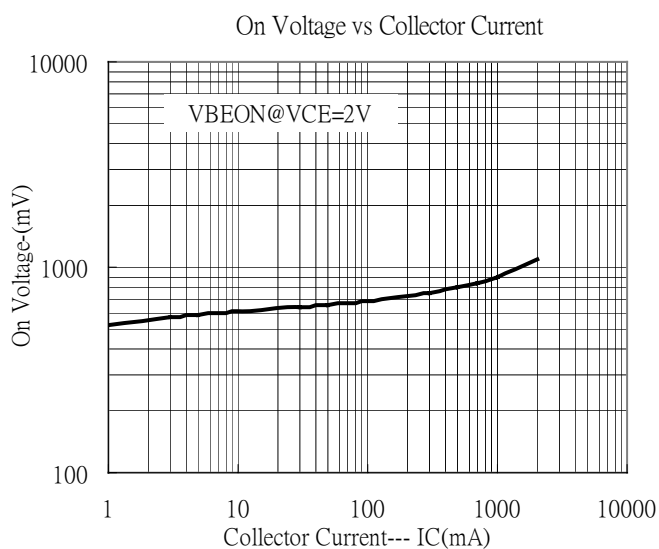
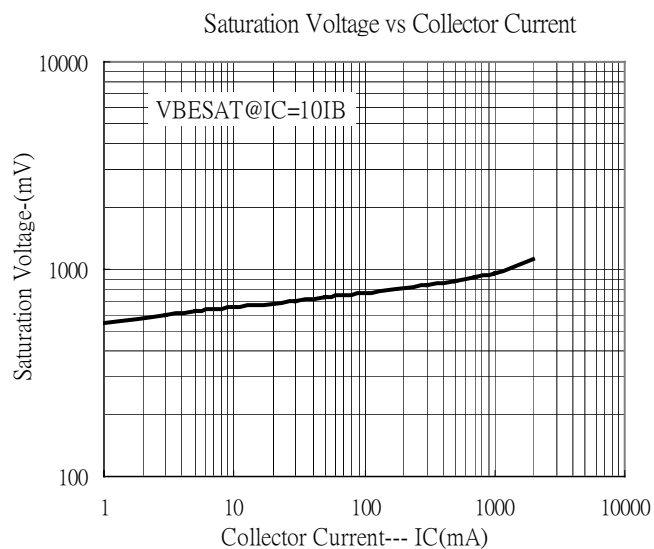
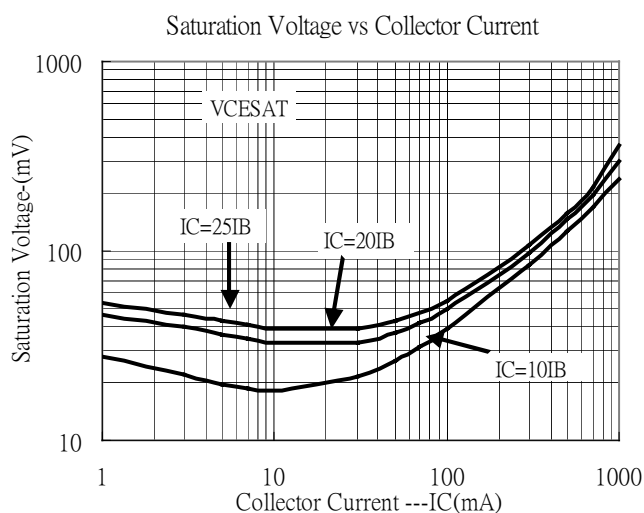
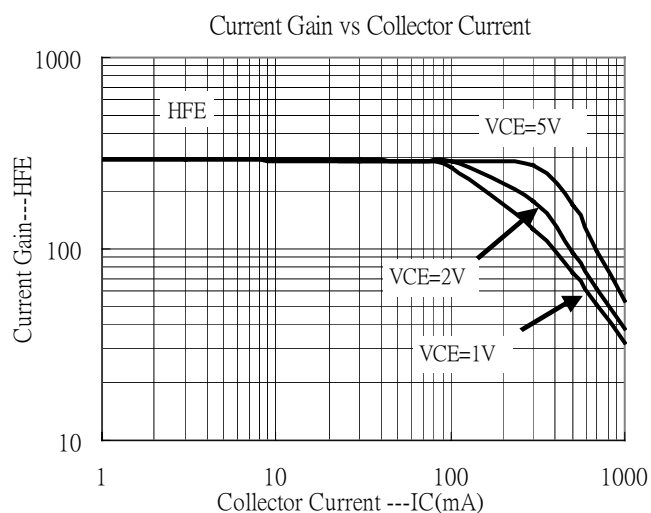
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	-100	-	-	V	$I_C = -100\mu A$
BV_{CEO}	-80	-	-	V	$I_C = -10mA$
BV_{EBO}	-7	-	-	V	$I_E = -10\mu A$
I_{CBO}	-	-	-100	nA	$V_{CB} = -100V$
I_{EBO}	-	-	-100	nA	$V_{EB} = -7V$
$*V_{CE(sat)1}$	-	-0.16	-0.3	V	$I_C = -500mA, I_B = -50mA$
$*V_{CE(sat)2}$	-	-	-0.6	V	$I_C = -700mA, I_B = -35mA$
$*V_{BE(sat)}$	-	-	-1.2	V	$I_C = -1A, I_B = -50mA$
$*h_{FE1}$	180	-	390	-	$V_{CE} = -10V, I_C = -150mA$
$*h_{FE2}$	50	-	-	-	$V_{CE} = -10V, I_C = -500mA$
f_T	150	200	-	MHz	$V_{CE} = -10V, I_C = -50mA, f = 100MHz$
C_{ob}	-	11	15	pF	$V_{CB} = -10V, I_E = 0A, f = 1MHz$

*Pulse Test: Pulse Width $\leq 380\mu s$, Duty Cycle $\leq 2\%$

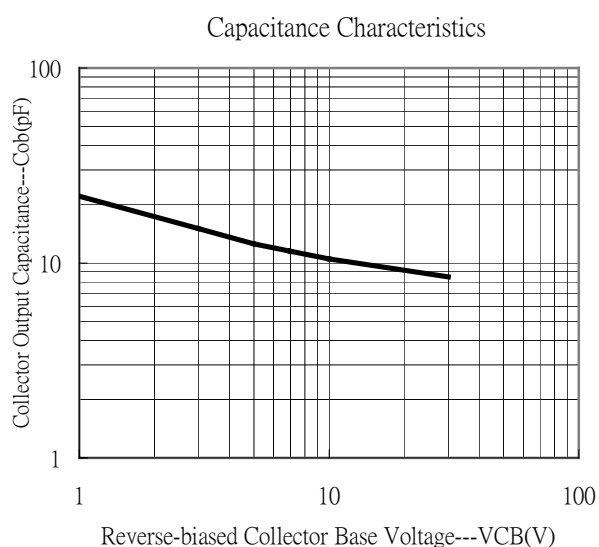
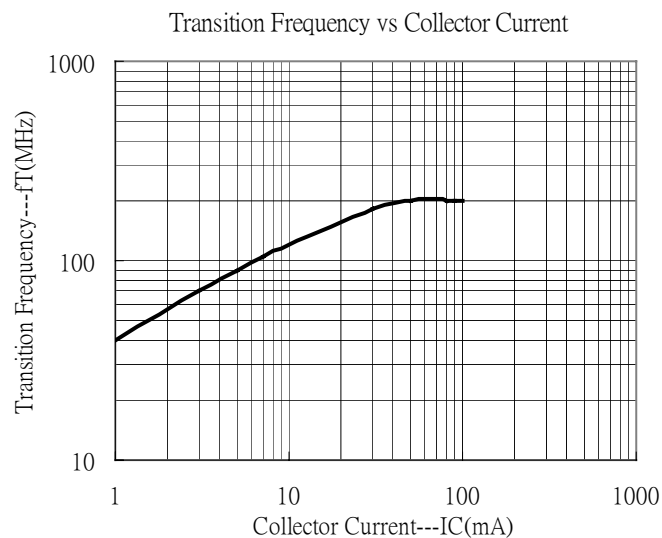
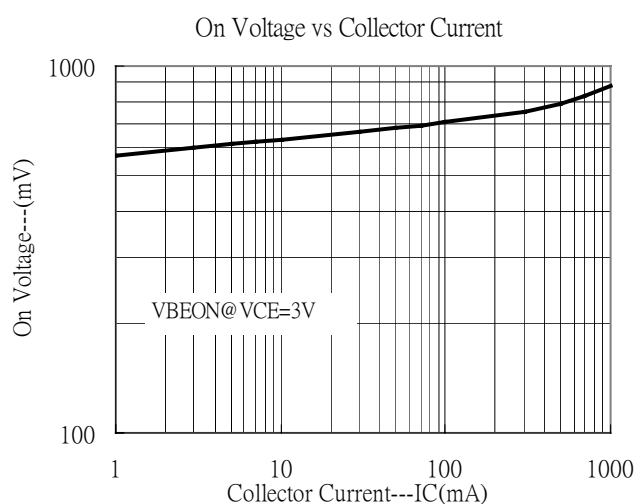
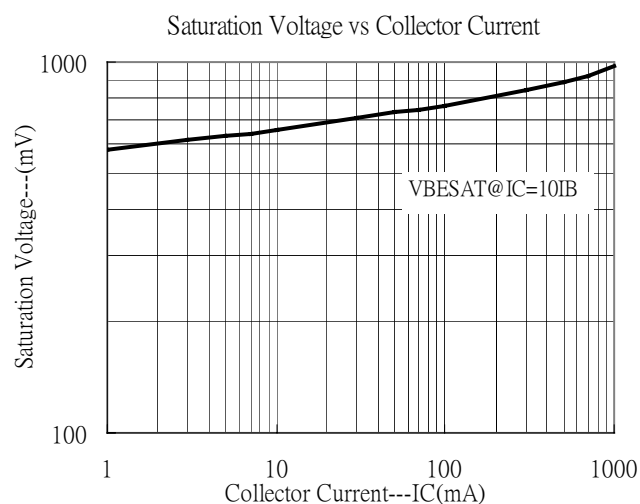
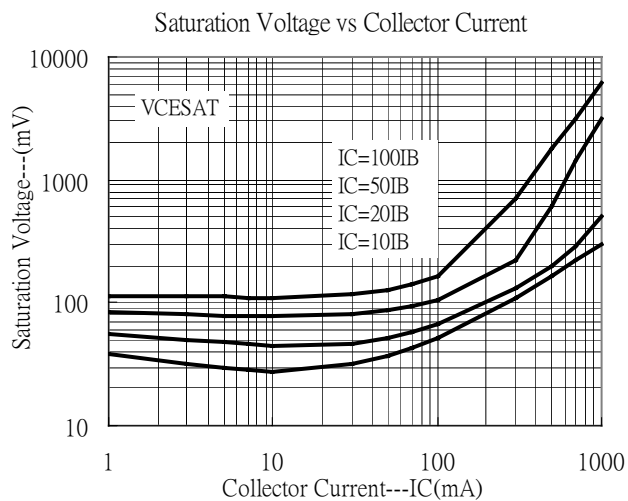
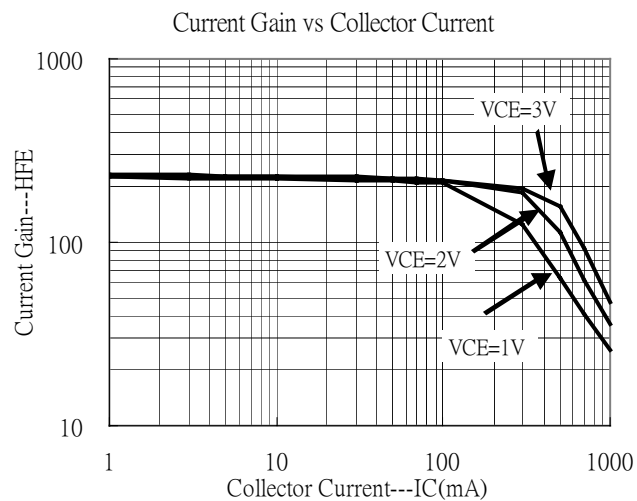
Recommended Soldering Footprint



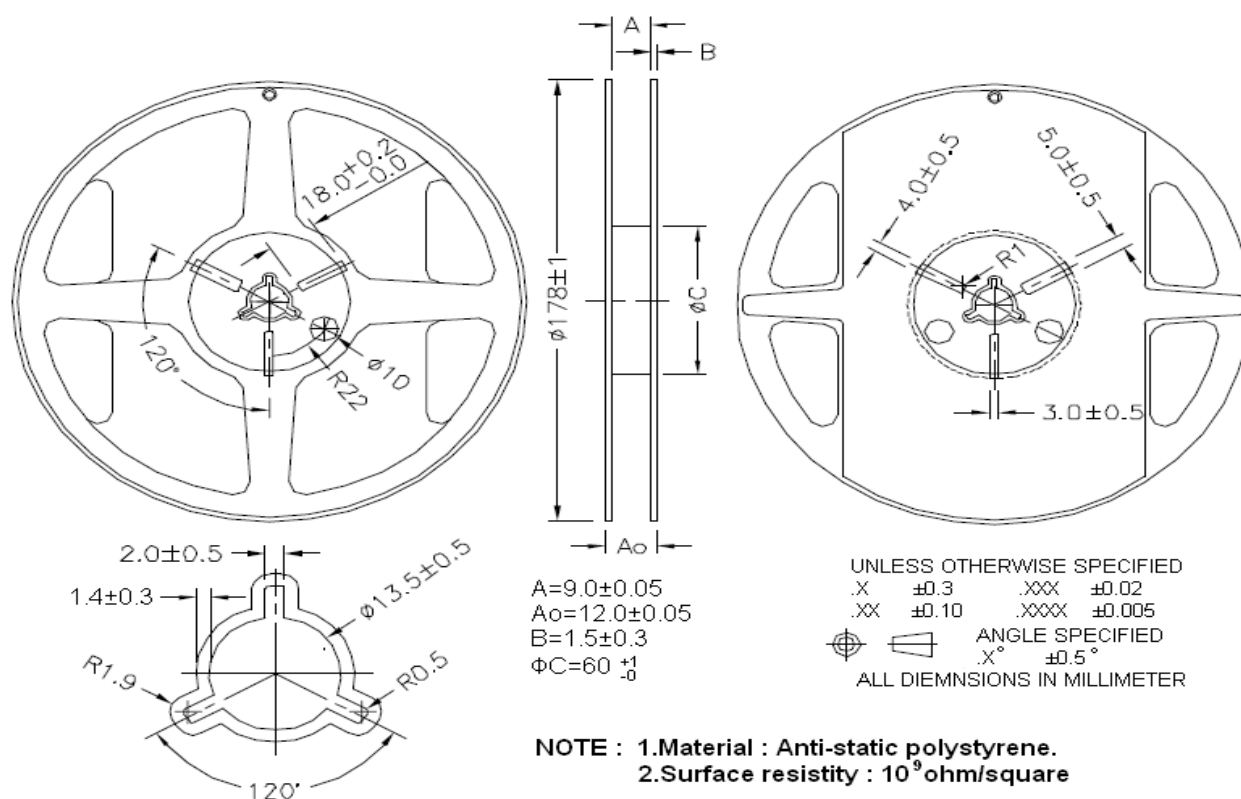
Q1, NPN Typical Characteristics



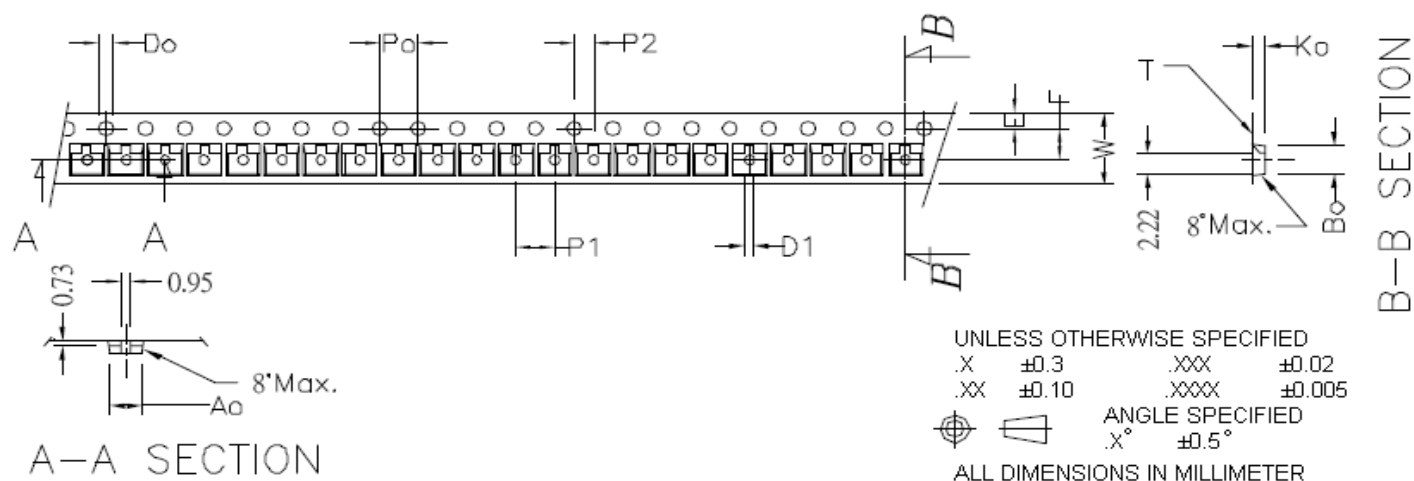
Q2, PNP Typical Characteristics



Reel Dimension

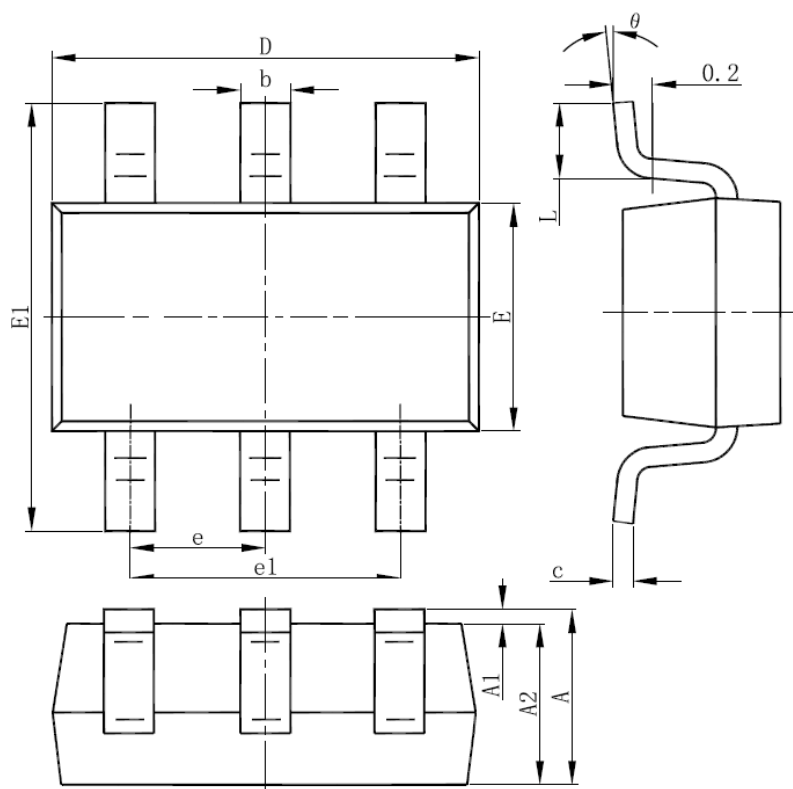


Carrier Tape Dimension

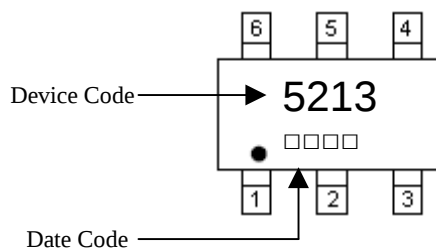


symbol	A_o	B_o	K_o	P_o	P_1	P_2	T
Spec	3.20 ± 0.1	3.00 ± 0.1	1.33 ± 0.1	4.0 ± 0.1	4.0 ± 0.10	2.0 ± 0.05	0.20 ± 0.02
symbol	E	F	D_o	D_1	W	$10P_o$	
Spec	1.75 ± 0.1	3.5 ± 0.05	1.50 ± 0.10	1.0 ± 0.25	$8.0^{+0.3}_{-0.1}$	40.0 ± 0.2	

SOT-23-6L Dimension



Marking:



6Lead SOT-23-6L Plastic
Surface Mounted Package

Style:

Pin 1. Base 1 (B1)
 Pin 2. Emitter 2 (E2)
 Pin 3. Base 2 (B2)
 Pin 4. Collector 2 (C2)
 Pin 5. Emitter 1 (E1)
 Pin 6. Base 1 (B1)

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049	E	1.500	1.700	0.059	0.067
A1	0.000	0.100	0.000	0.004	E1	2.650	2.950	0.104	0.116
A2	1.050	1.150	0.041	0.045	e	0.950 (BSC)		0.037 (BSC)	
b	0.300	0.500	0.012	0.020	e1	1.800	2.000	0.071	0.079
c	0.100	0.200	0.004	0.008	L	0.300	0.600	0.012	0.024
D	2.820	3.020	0.111	0.119	θ	0°	8°	0°	8°