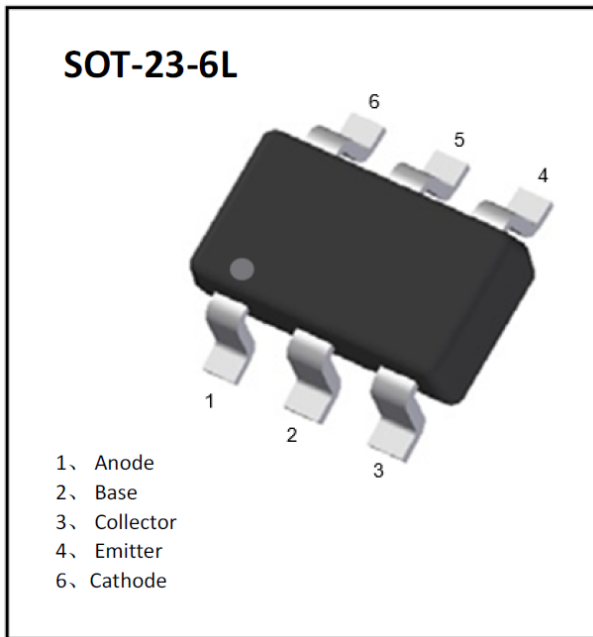


## NPN Transistor with Zener Diode



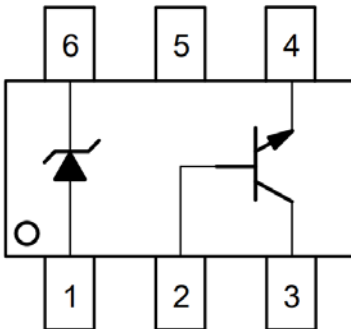
### Features

- Epoxy meets UL-94 V-0 flammability rating
- Surface mount package ideally Suited for Automatic Insertion
- NPN+Zener

### Mechanical Data

- **Package:** SOT-23-6L
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking:** 4456A

### ■Equivalent circuit



### ■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	UNIT WEIGHT(mg)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SMBT445V6A	F2	Approximate 15.6	3000	30000	120000	7" reel

### ■ Thermal Characteristics(T<sub>a</sub>=25°C Unless otherwise specified)

Item	Symbol	Unit	Conditions	Value
Total Device Dissipation(Per device)	P <sub>D</sub>	mW		500
Junction Temperature	T <sub>J</sub>	°C		-55 to +150
Storage Temperature	T <sub>STG</sub>	°C		-55 to +150



# SMBT445V6A

## ■NPN Transistor Pin2、3、4 Maximum Ratings (Ta=25°C Unless otherwise specified)

Item	Symbol	Unit	Conditions	Value
Collector-Base Voltage	$V_{CBO}$	V	$I_C=10\mu A, I_E=0$	50
Collector-Emitter Voltage	$V_{CEO}$	V	$I_C=10mA, I_B=0$	45
Emitter-Base Voltage	$V_{EBO}$	V	$I_E=1\mu A, I_C=0$	5
Collector Current -Continuous	$I_C$	mA		500

## ■NPN Transistor Pin2、3、4 Electrical Characteristics (Ta=25°C unless otherwise specified)

Item	Symbol	Unit	Conditions	Min	TYP	Max
Collector-base breakdown voltage	$V_{CBO}$	V	$I_C=10\mu A, I_E=0$	50		
Collector-emitter breakdown voltage	$V_{CEO}$	V	$I_C=10mA, I_B=0$	45		
Emitter-base breakdown voltage	$V_{EBO}$	V	$I_E=1\mu A, I_C=0$	5		
Collector-base cut-off current	$I_{CBO}$	$\mu A$	$V_{CE}=45V, I_E=0$			0.1
Emitter-base cut-off current	$I_{EBO}$	$\mu A$	$V_{BE}=4V, I_C=0$			0.1
DC current gain	$h_{FE1}$		$V_{CE}=1V, I_C=100mA$	250		600
	$h_{FE2}$		$V_{CE}=1V, I_C=500mA$	40		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	$I_C=500mA, I_B=50mA$			0.7
Base-emitter saturation voltage	$V_{BE(sat)}$	V	$I_C=500mA, I_B=50mA$			1.2
Base-emitter saturation voltage	$V_{BE}$	V	$V_{CE}=1V, I_C=500mA$			1.2
Collector-base output capacitance	$C_{ob}$	pF	$V_{CB}=10V, f=1MHz$		10	
Transition frequency	$f_T$	MHz	$V_{CE}=5V, I_C=10mA, f=100MHz$	100		



# SMBT445V6A

## ■ Zener Diode Pin1、6 Maximum Ratings (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	VALUE
Maximum Forward Voltage @I <sub>F</sub> =10mA	V <sub>F</sub>	V	0.9

## ■ Zener Diode Pin1、6 Electrical Characteristics (Ta=25°C unless otherwise specified)

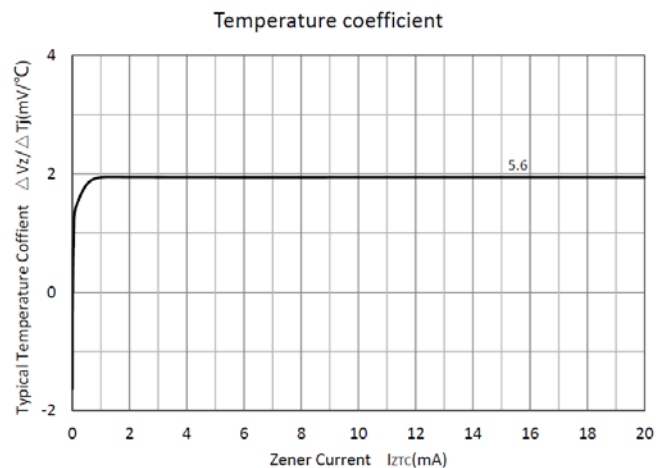
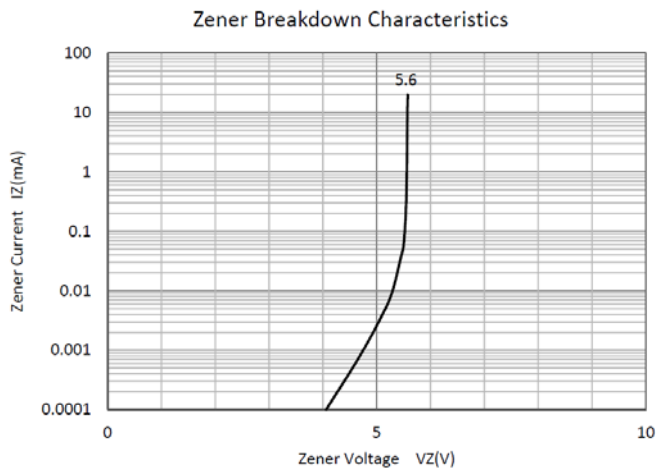
Type Number	V <sub>Z</sub> at I <sub>ZT</sub> (V)				I <sub>R</sub> (μA)@V <sub>R</sub>	
	min.	typ.	max.	I <sub>ZT</sub> (μA)	max	V <sub>R</sub> (V)
SMBT445V6A	5.32	5.6	5.88	50	10	4

## ■ Thermal Characteristics

Parameter	Symbol	Unit	Value
Thermal resistance, junction-to-ambient (Note1)	R <sub>θJ-A</sub>	°C/W	250
Thermal resistance, junction-to-case (Note1)	R <sub>θJ-C</sub>	°C/W	200

Note1: Device mounted on PCB(25.4\*25.4\*1.5mm), single-sided copper,with standard footprint.

## ■ Zener Diode Pin1、6 Characteristics (Typical)





# SMBT445V6A

## ■ NPN Transistor Pin2、3、4 Characteristics (Typical)

Fig 1: Static Characteristics

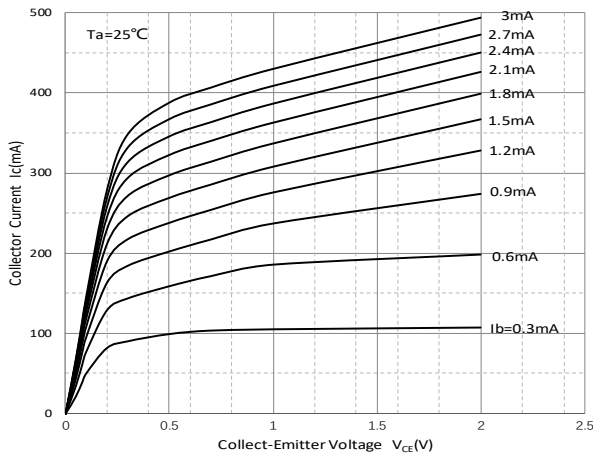


Fig 2: DC Current Gain

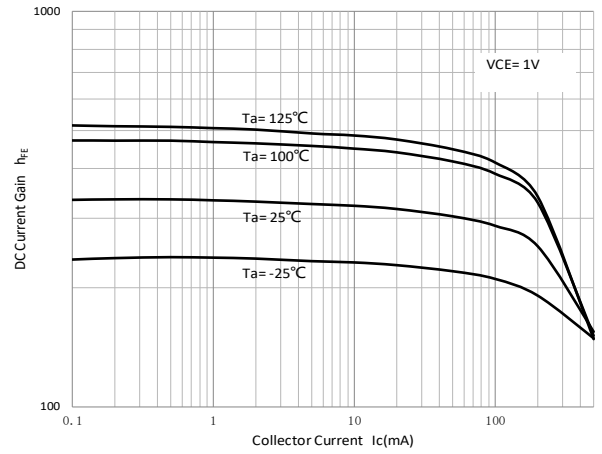


Fig 3: Collector-Emittor Saturation Voltage

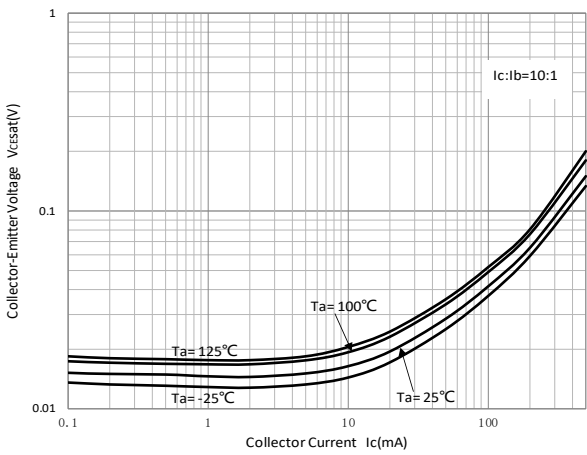


Fig 4: Base-Emittor Saturation Voltage

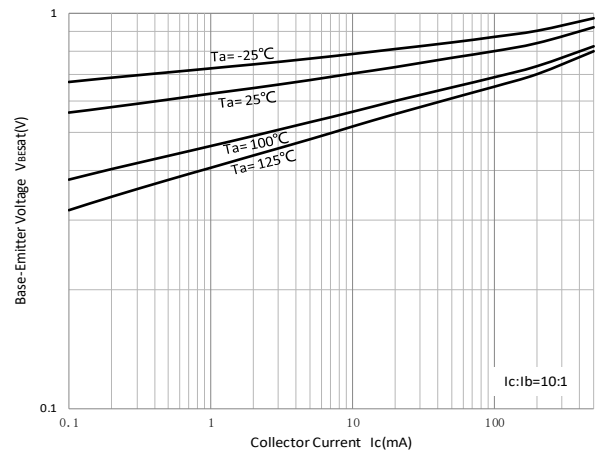


Fig 5: Base-Emittor On Voltage

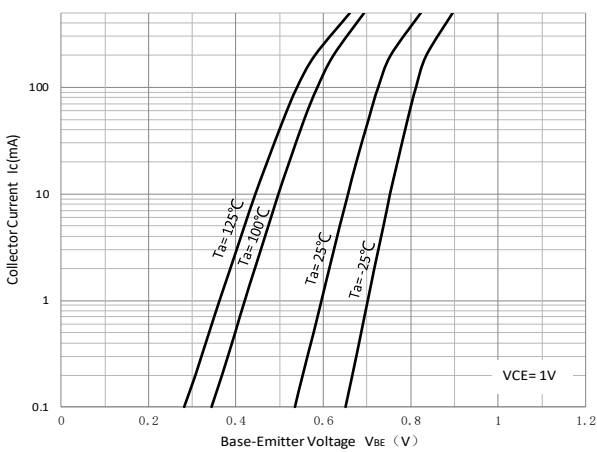
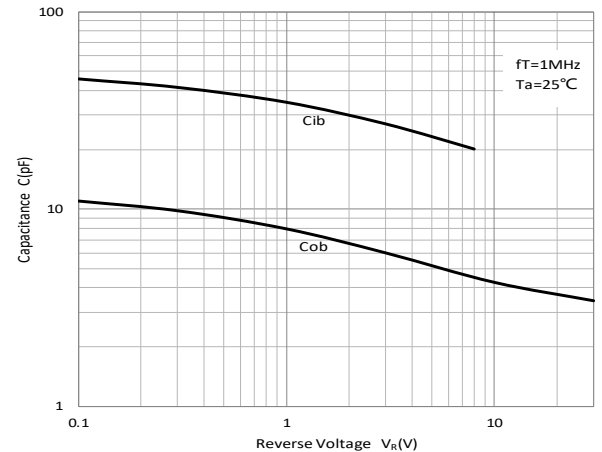
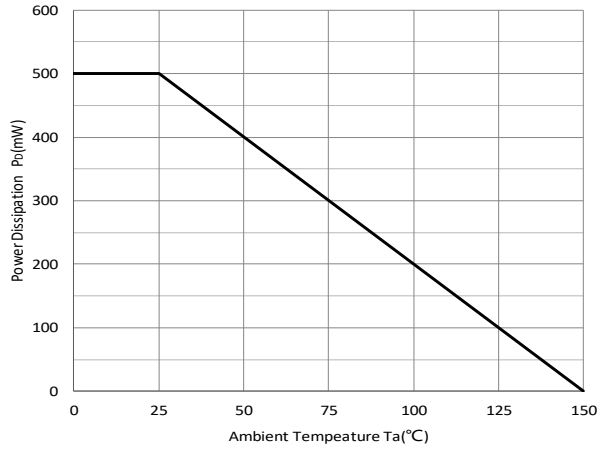


Fig 6: Cob/Cib-Vcb/Veb





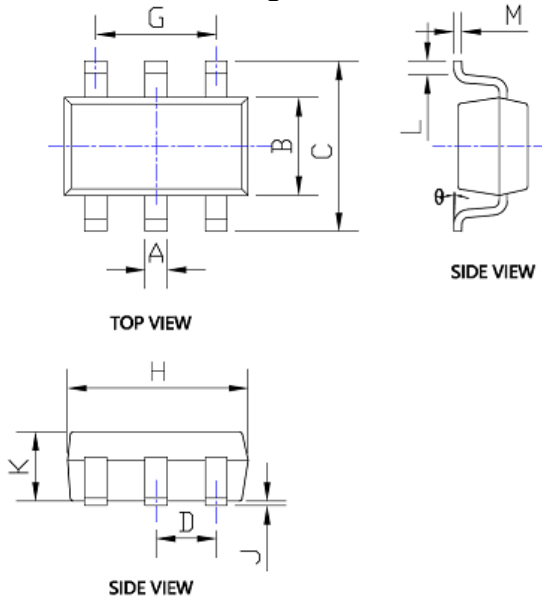
**Fig 7: P<sub>D</sub>-T<sub>a</sub> Curve**





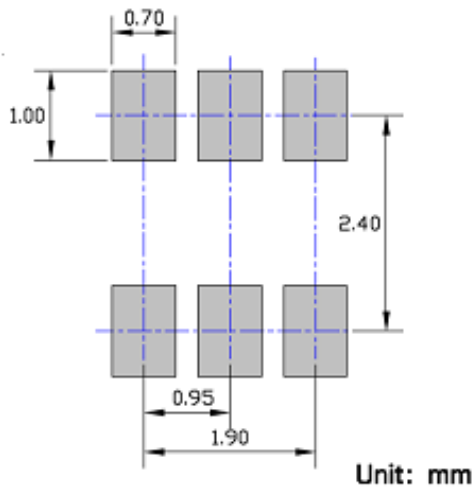
# SMBT445V6A

## ■ SOT-23-6L Package information



SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.012	0.020	0.300	0.500
B	0.059	0.067	1.500	1.700
C	0.104	0.116	2.650	2.950
D	0.037BSC		0.950BSC	
G	0.075BSC		1.900BSC	
H	0.111	0.119	2.820	3.020
J	0.000	0.004	0.000	0.100
K	0.041	0.045	1.050	1.150
L	0.012	0.024	0.300	0.600
M	0.004	0.008	0.100	0.200
$\theta$	0°	8°	0°	8°

## ■ Suggested Pad Layout





## SMBT445V6A

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