

## Features

- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings @ 25°C Unless Otherwise Specified

- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 328°C/W Junction to Ambient

## NPN Transistor

Parameter	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	50	V
Collector-Emitter Voltage	$V_{CEO}$	45	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Continuous Collector Current	$I_C$	500	mA

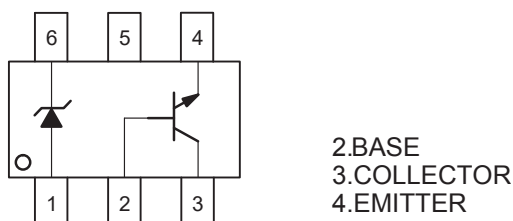
## Zener Diode

Parameter	Symbol	Rating	Unit
Maximum Forward Voltage @ $I_F=10mA$	$V_F$	0.9	V

## Total Device Dissipation

Parameter	Symbol	Rating	Unit
Total Device Dissipation	$P_D$	380	mW

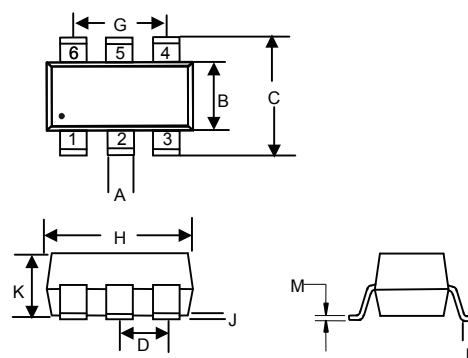
## Internal Structure



**Marking: 4456A**

# NPN Transistor with Zener Diode

## SOT23-6L



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.012	0.020	0.30	0.50	
B	0.051	0.070	1.30	1.80	
C	0.087	0.126	2.20	3.20	
D	0.037		0.95		TYP.
G	0.074		1.90		TYP.
H	0.106	0.122	2.70	3.10	
J	0.002	0.006	0.05	0.15	
K	0.030	0.051	0.75	1.30	
L	0.012	0.024	0.30	0.60	
M	0.003	0.008	0.08	0.22	

### NPN Transistor---Electrical Characteristics @ $T_A=25^{\circ}\text{C}$ Unless Otherwise Specified

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	50			V	$I_C=10\mu\text{A}$ , $I_E=0$
Collector-Emitter Breakdown Voltage(*)	$V_{(BR)CEO}$	45			V	$I_C=10\text{mA}$ , $I_B=0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	$I_E=1\mu\text{A}$ , $I_C=0$
Collector Cutoff Current	$I_{CBO}$			0.1	$\mu\text{A}$	$V_{CB}=45\text{V}$ , $I_E=0$
Emitter-Base Cutoff Current	$I_{EBO}$			0.1	$\mu\text{A}$	$V_{EB}=4\text{V}$ , $I_C=0$
DC Current Gain(*)	$h_{FE1}$	250		600		$V_{CE}=1\text{V}$ , $I_C=100\text{mA}$
	$h_{FE2}$	40				$V_{CE}=1\text{V}$ , $I_C=500\text{mA}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.7	V	$I_C=500\text{mA}$ , $I_B=50\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			1.2	V	$I_C=500\text{mA}$ , $I_B=50\text{mA}$
Base-Emitter Voltage	$V_{BE}$			1.2	V	$V_{CE}=1\text{V}$ , $I_C=500\text{mA}$
Collector capacitance	$C_{ob}$		10		pF	$V_{CB}=10\text{V}$ , $f=1\text{MHz}$ ,
Transition Frequency	$f_T$	100			MHz	$V_{CE}=5\text{V}$ , $I_C=10\text{mA}$ , $f=100\text{MHz}$

\*.Pulse test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycle $\leq 2.0\%$ .

### Zener Diode---Electrical Characteristics @ $25^{\circ}\text{C}$ Unless Otherwise Specified

MCC Part Number	Zener Voltage				Leakage Current $I_R @ V_R$	
		$V_Z @ I_{ZT}$		$I_{ZT}$	$I_R$	$V_R$
	Min.(V)	Nom(V)	Max.(V)	$\mu\text{A}$	$\mu\text{A}$	V
SMBT445V6	5.32	5.6	5.88	50	10	4.0

## NPN Transistor---Curve Characteristics

Fig. 1 - Static Characteristics

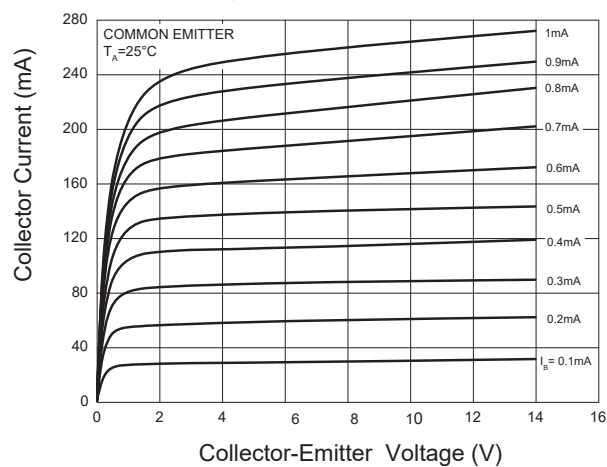


Fig. 2 - DC Current Gain Characteristics

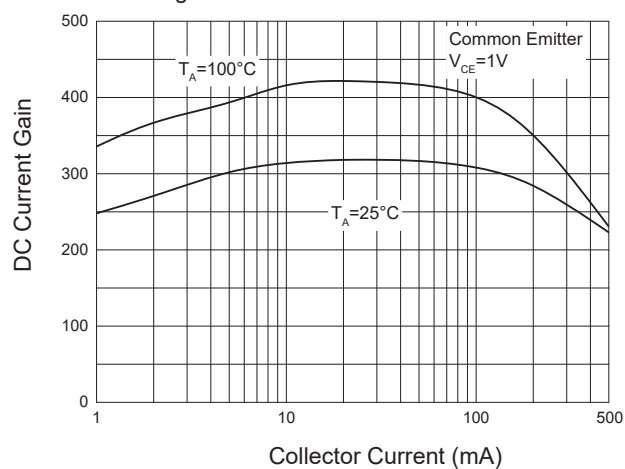


Fig. 3 - Collector-Emitter Saturation Voltage Characteristics

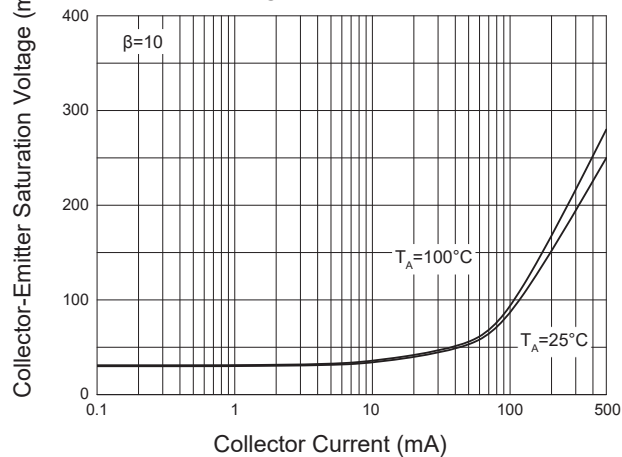
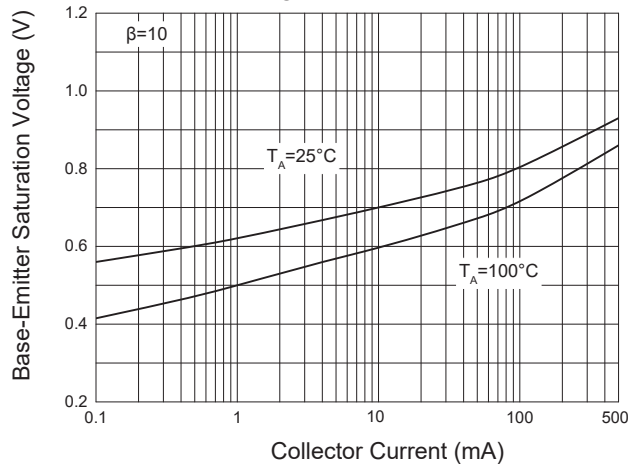
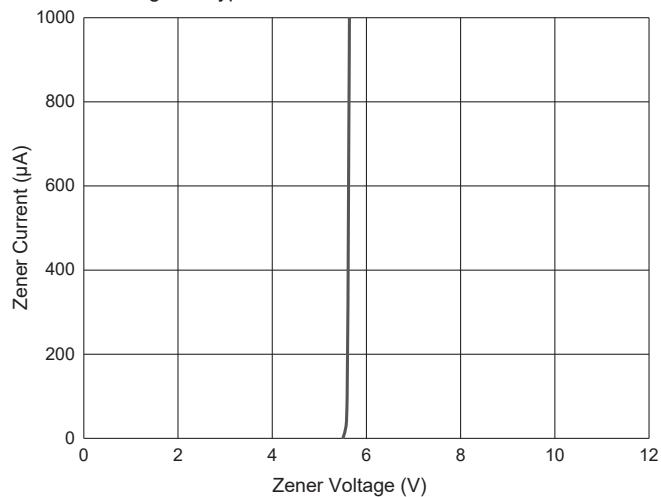


Fig. 4 - Base-Emitter Saturation Voltage Characteristics



## Zener Diode---Curve Characteristics

Fig. 5 - Typical Zener Breakdown Characteristics



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel

Note : Adding "-HF" Suffix for Halogen Free, eg. Part Number-TP-HF

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