

### 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	$V_{CBO}$	60	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Continuous Collector Current	$I_C$	600	mA

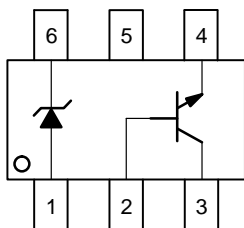
### Zener Diode

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

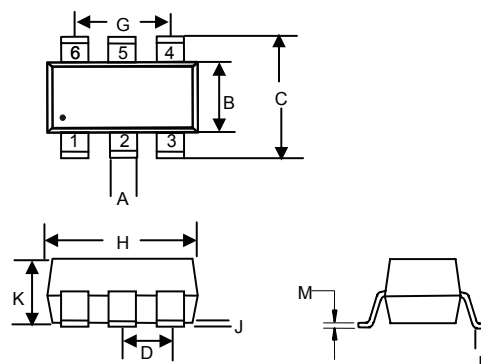
### Internal Structure



2.BASE  
3.COLLECTOR  
4.EMITTER

## NPN Transistor with Zener Diode

### SOT23-6L



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	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<sub>A</sub>=25°C Unless Otherwise Specified**

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	60			V	I <sub>C</sub> =100μA, I <sub>E</sub> =0
Collector-Emitter Breakdown Voltage*	V <sub>(BR)CEO</sub>	40			V	I <sub>C</sub> =1mA, I <sub>B</sub> =0
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	6			V	I <sub>E</sub> =100μA, I <sub>C</sub> =0
Base Cutoff Current	I <sub>BL</sub>			0.1	μA	V <sub>CE</sub> =35V, V <sub>BE</sub> =0.4V
Collector Cutoff Current	I <sub>CEX</sub>			0.1	μA	V <sub>CE</sub> =35V, V <sub>BE</sub> =0.4V
DC Current Gain*	h <sub>FE(1)</sub>	20				V <sub>CE</sub> =1V, I <sub>C</sub> =0.1mA
	h <sub>FE(2)</sub>	40				V <sub>CE</sub> =1V, I <sub>C</sub> =1mA
	h <sub>FE(3)</sub>	80				V <sub>CE</sub> =1V, I <sub>C</sub> =10mA
	h <sub>FE(4)</sub>	100		300		V <sub>CE</sub> =1V, I <sub>C</sub> =150mA
	h <sub>FE(5)</sub>	40				V <sub>CE</sub> =2V, I <sub>C</sub> =500mA
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>			0.4	V	I <sub>C</sub> =150mA, I <sub>B</sub> =15mA
				0.75	V	I <sub>C</sub> =500mA, I <sub>B</sub> =50mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>		0.75	0.95	V	I <sub>C</sub> =150mA, I <sub>B</sub> =15mA
				1.2	V	I <sub>C</sub> =500mA, I <sub>B</sub> =50mA
Transition Frequency	f <sub>T</sub>	250			MHz	V <sub>CE</sub> =10V, I <sub>C</sub> =20mA, f=100MHz
Delay Time	t <sub>d</sub>			15	ns	V <sub>CC</sub> =30V, V <sub>BE</sub> =0.2V, I <sub>C</sub> =150mA, I <sub>B1</sub> =15mA
Rise Time	t <sub>r</sub>			20	ns	
Storage Time	t <sub>s</sub>			225	ns	V <sub>CC</sub> =30V, I <sub>C</sub> =150mA, I <sub>B1</sub> =I <sub>B2</sub> =15mA
Fall Time	t <sub>f</sub>			30	ns	
Collector-Base Capacitance	C <sub>cb</sub>			6.5	pF	V <sub>CB</sub> =5V, I <sub>E</sub> =0, f=1MHz
Emitter-Base Capacitance	C <sub>eb</sub>			30	pF	V <sub>EB</sub> =0.5V, I <sub>C</sub> =0, f=1MHz

\*.Pulse test: Pulse Width≤300μs,Duty Cycle≤2.0%.

**Zener Diode---Electrical Characteristics @ 25°C Unless Otherwise Specified**

MCC Part Number	Zener Voltage			Maximum Zener Impedance				Reverse Current	
	V <sub>Z</sub> @ I <sub>ZT</sub>			Z <sub>ZT</sub>	I <sub>ZT</sub>	Z <sub>ZK</sub>	I <sub>ZK</sub>	I <sub>R</sub> (Max)	V <sub>R</sub>
	Min.(V)	Nom(V)	Max.(V)	Ω	mA	Ω	mA	μA	V
SMBT445V6	5.49	5.6	5.71	40	5	400	1	0.1	2.0

## NPN Transistor---Curve Characteristics

Fig. 1 - Static Characteristics

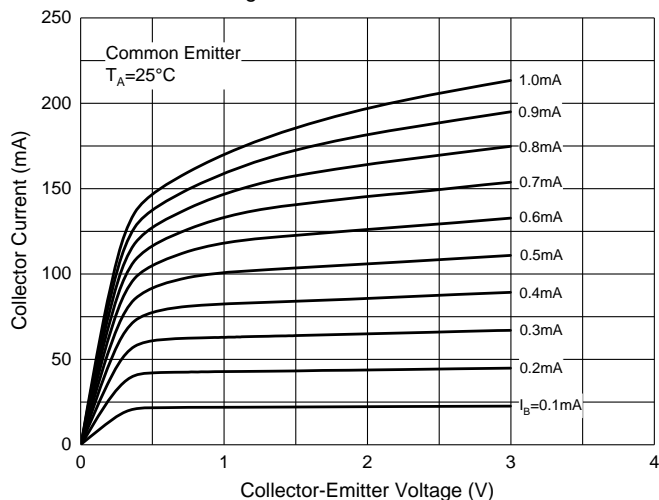


Fig. 2 - DC Current Gain Characteristics

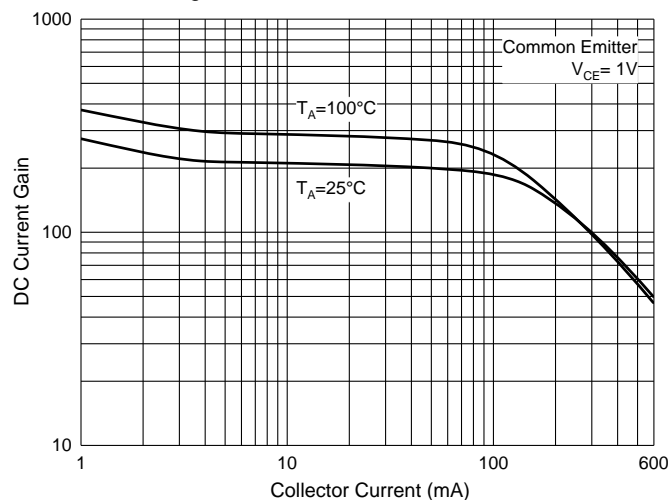


Fig. 3 - Base-Emitter Saturation Voltage Characteristics

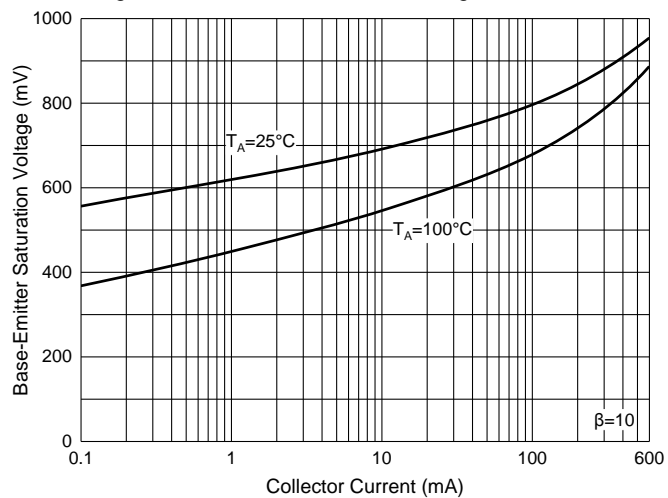
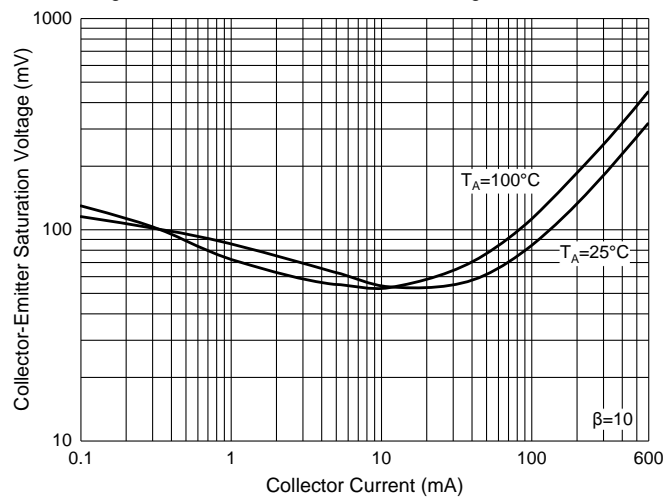
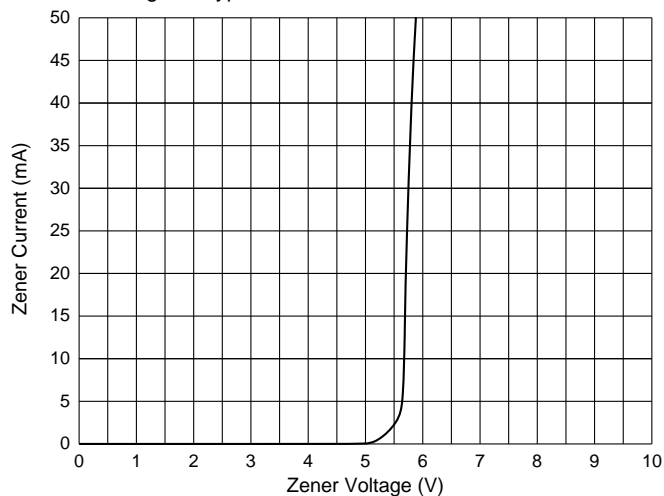


Fig. 4 - Collector-Emitter Saturation Voltage Characteristics



## 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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