

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

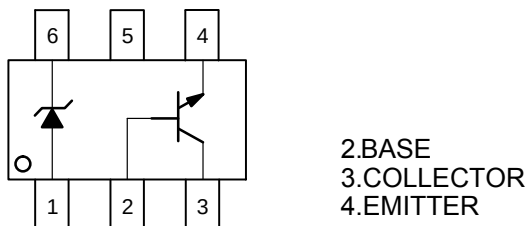
Zener Diode

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

Total Device Dissipation

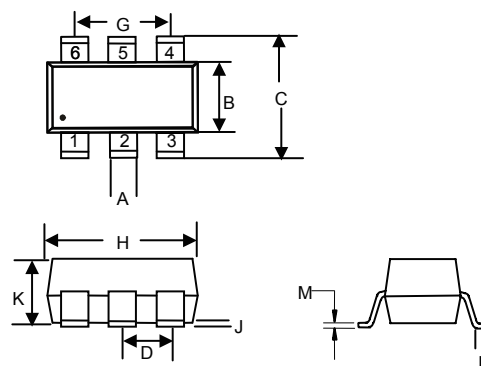
Parameter	Symbol	Rating	Unit
Total Device Dissipation	P_D	380	mW

Internal Structure



NPN Transistor with Zener Diode

SOT23-6L



DIMENSIONS					NOTE
DIM	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 @ $T_A=25^{\circ}\text{C}$ Unless Otherwise Specified

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60			V	$I_C=100\mu\text{A}$, $I_E=0$
Collector-Emitter Breakdown Voltage*	$V_{(BR)CEO}$	40			V	$I_C=1\text{mA}$, $I_B=0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6			V	$I_E=100\mu\text{A}$, $I_C=0$
Base Cutoff Current	I_{BL}			0.1	μA	$V_{CE}=35\text{V}$, $V_{BE}=0.4\text{V}$
Collector Cutoff Current	I_{CEX}			0.1	μA	$V_{CE}=35\text{V}$, $V_{BE}=0.4\text{V}$
DC Current Gain*	$h_{FE(1)}$	20				$V_{CE}=1\text{V}$, $I_C=0.1\text{mA}$
	$h_{FE(2)}$	40				$V_{CE}=1\text{V}$, $I_C=1\text{mA}$
	$h_{FE(3)}$	80				$V_{CE}=1\text{V}$, $I_C=10\text{mA}$
	$h_{FE(4)}$	100		300		$V_{CE}=1\text{V}$, $I_C=150\text{mA}$
	$h_{FE(5)}$	40				$V_{CE}=2\text{V}$, $I_C=500\text{mA}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.4	V	$I_C=150\text{mA}$, $I_B=15\text{mA}$
				0.75	V	$I_C=500\text{mA}$, $I_B=50\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		0.75	0.95	V	$I_C=150\text{mA}$, $I_B=15\text{mA}$
				1.2	V	$I_C=500\text{mA}$, $I_B=50\text{mA}$
Transition Frequency	f_T	250			MHz	$V_{CE}=10\text{V}$, $I_C=20\text{mA}$, $f=100\text{MHz}$
Delay Time	t_d			15	ns	$V_{CC}=30\text{V}$, $V_{BE}=0.2\text{V}$, $I_C=150\text{mA}$, $I_{B1}=15\text{mA}$
Rise Time	t_r			20	ns	
Storage Time	t_s			225	ns	$V_{CC}=30\text{V}$, $I_C=150\text{mA}$, $I_{B1}=I_{B2}=15\text{mA}$
Fall Time	t_f			30	ns	
Collector-Base Capacitance	C_{cb}			6.5	pF	$V_{CB}=5\text{V}$, $I_E=0$, $f=1\text{MHz}$
Emitter-Base Capacitance	C_{eb}			30	pF	$V_{EB}=0.5\text{V}$, $I_C=0$, $f=1\text{MHz}$

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

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

MCC Part Number	Zener Voltage			Maximum Zener Impedance				Reverse Current	
	$V_Z @ I_{ZT}$			Z_{ZT}	I_{ZT}	Z_{ZK}	I_{ZK}	$I_R(\text{Max})$	V_R
	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

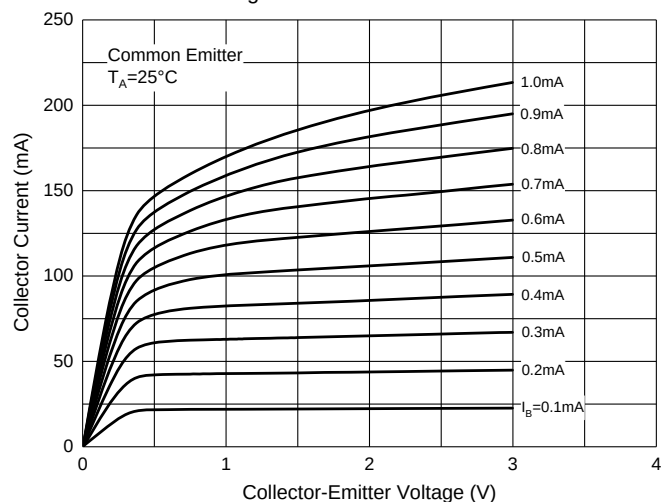


Fig. 2 - DC Current Gain Characteristics

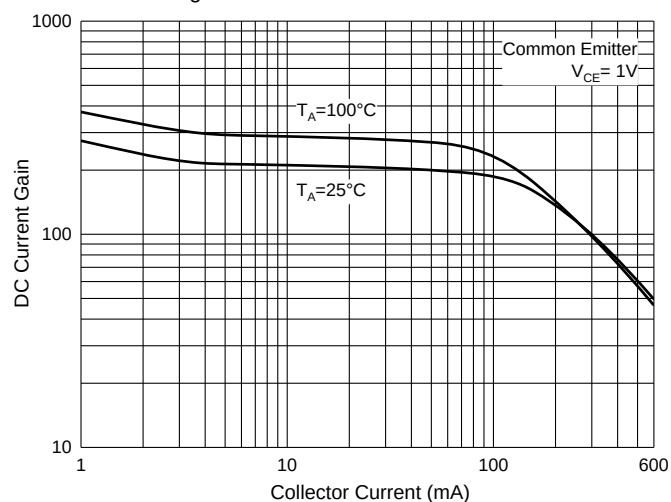


Fig. 3 - Base-Emitter Saturation Voltage Characteristics

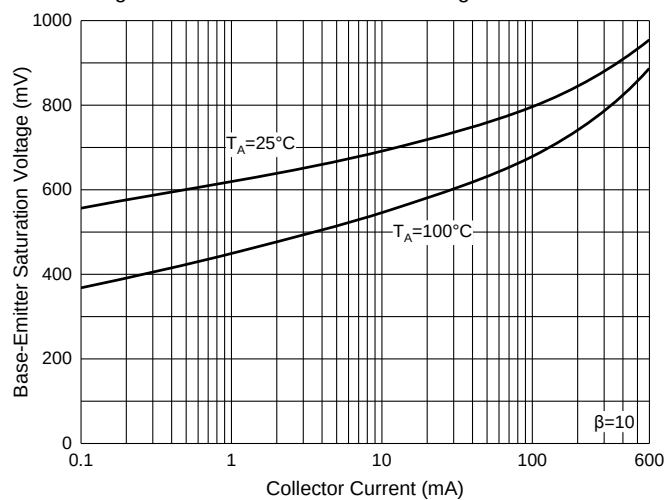
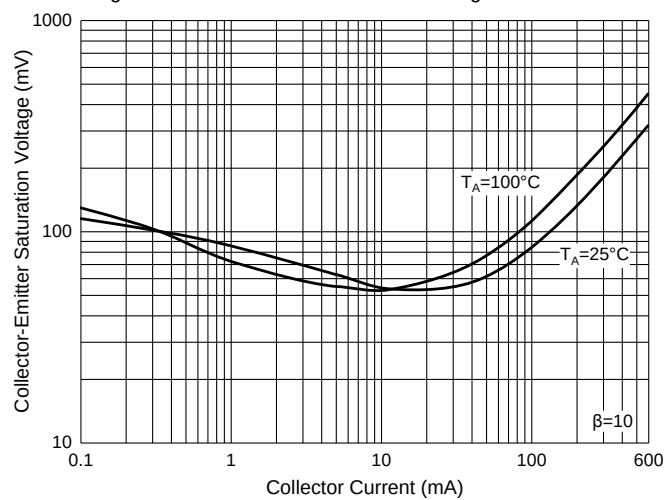


Fig. 4 - Collector-Emitter Saturation Voltage Characteristics



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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