

TS13003HV

High Voltage NPN Transistor

TO-92

Pin Definition:

1. Emitter
2. Collector
3. Base

PRODUCT SUMMARY

BV_{CEO}	530V
BV_{CBO}	900V
I_C	1.5A
$V_{CE(SAT)}$	0.5V @ $I_C / I_B = 0.5A / 0.1A$

Features

- High Voltage
- High Speed Switching

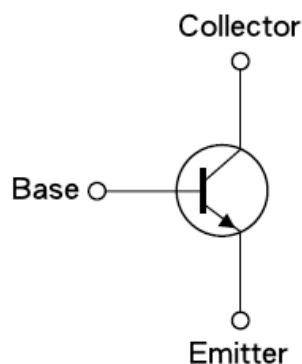
Structure

- Silicon Triple Diffused Type
- NPN Silicon Transistor

Ordering Information

Part No.	Package	Packing
TS13003HVCT B0	TO-92	1Kpcs / Bulk
TS13003HVCT B0G	TO-92	1Kpcs / Bulk
TS13003HVCT A3	TO-92	2Kpcs / Ammo
TS13003HVCT A3G	TO-92	2Kpcs / Ammo

Note: "G" denote for Green Product

Block Diagram

Absolute Maximum Rating ($T_a = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	900V	V
Collector-Emitter Voltage	V_{CEO}	530V	V
Emitter-Base Voltage	V_{EBO}	10	V
Collector Current	DC	1.5	A
	Pulse	3	
Collector Power Dissipation	P_D	1.5	W
Operating Junction Temperature	T_J	+150	$^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_{STG}	- 55 to +150	$^\circ\text{C}$

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Ambient Thermal Resistance	$R\theta_{JA}$	119.4	$^\circ\text{C/W}$

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Electrical Specifications (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Collector-Base Voltage	$I_C = 1\text{mA}, I_B = 0$	BV_{CBO}	900	--	--	V
Collector-Emitter Breakdown Voltage	$I_C = 10\text{mA}, I_E = 0$	BV_{CEO}	530	--	--	V
Emitter-Base Breakdown Voltage	$I_E = 1\text{mA}, I_C = 0$	BV_{EBO}	9	--	--	V
Collector Cutoff Current	$V_{CB} = 800\text{V}, I_E = 0$	I_{CBO}	--	--	10	uA
Emitter Cutoff Current	$V_{EB} = 10\text{V}, I_C = 0$	I_{EBO}	--	--	0.5	uA
Collector-Emitter Saturation Voltage	$I_C / I_B = 0.5\text{A} / 0.1\text{A}$	$V_{CE(SAT)1}$	--	0.3	0.5	V
	$I_C / I_B = 1.0\text{A} / 0.25\text{A}$	$V_{CE(SAT)2}$	--	0.5	1	
	$I_C / I_B = 1.5\text{A} / 0.5\text{A}$	$V_{CE(SAT)3}$	--	0.9	2	
Base-Emitter Saturation Voltage	$I_C / I_B = 0.5\text{A} / 0.1\text{A}$	$V_{BE(SAT)1}$	--	--	1	V
	$I_C / I_B = 1.0\text{A} / 0.25\text{A}$	$V_{BE(SAT)2}$	--	--	1.2	
DC Current Gain	$V_{CE} = 10\text{V}, I_C = 10\text{mA}$	h_{FE}	15	--	40	
	$V_{CE} = 10\text{V}, I_C = 400\text{mA}$		20	--	40	
	$V_{CE} = 10\text{V}, I_C = 1\text{A}$		6	--	40	
Dynamic Characteristics						
Frequency	$V_{CE} = 10\text{V}, I_C = 0.1\text{A}$	f_T	4	--	--	MHz
Output Capacitance	$V_{CB} = 10\text{V}, f = 0.1\text{MHz}$	Cob	--	21	--	pF
Resistive Load Switching Time (Ratings)						
Delay Time	$V_{CC} = 125\text{V}, I_C = 1\text{A},$ $I_{B1} = I_{B2} = 0.2\text{A},$ $t_p = 25\text{uS}$ Duty Cycle $\leq 1\%$	t_d	--	0.05	0.2	uS
Rise Time		t_r	--	1.1	--	uS
Storage Time		t_{STG}	--	2	4	uS
Fall Time		t_f	--	0.4	0.7	uS

Note: pulse test: pulse width $\leq 300\text{uS}$, duty cycle $\leq 2\%$

Electrical Characteristics Curve ($T_a = 25^\circ\text{C}$, unless otherwise noted)

Figure 1. Static Characteristics

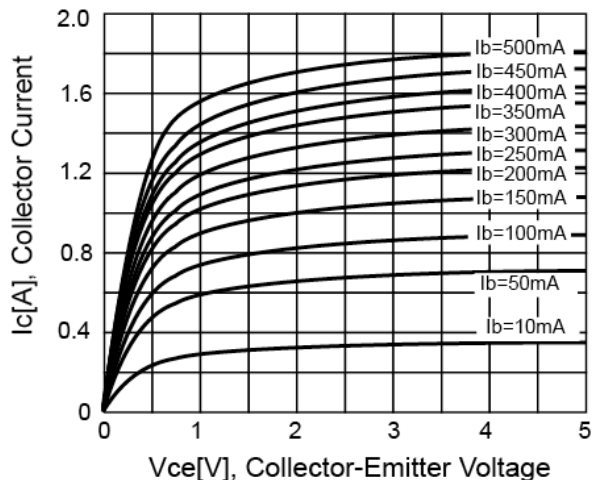


Figure 2. DC Current Gain

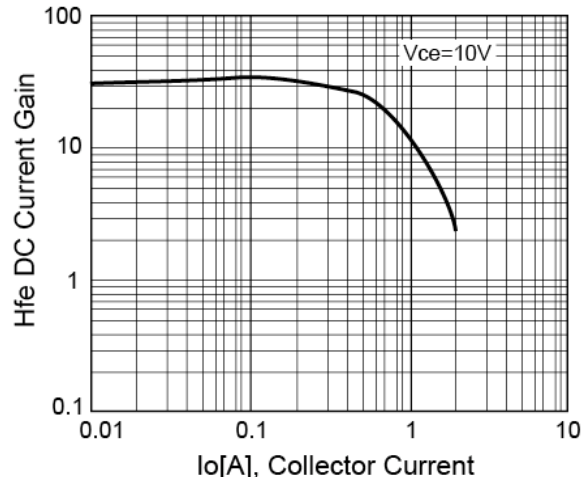


Figure 3. $V_{ce(sat)}$ v.s. $V_{be(sat)}$

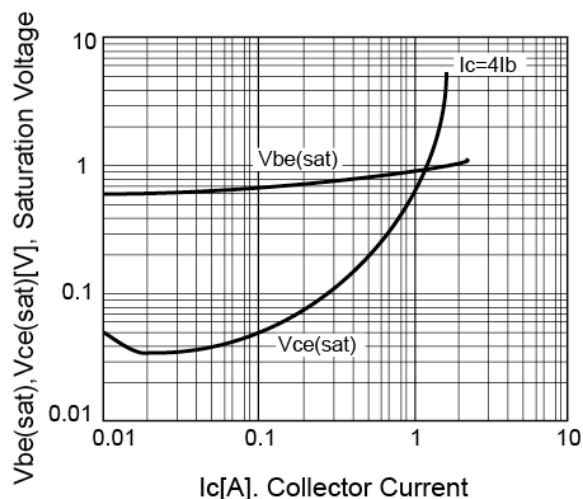


Figure 4. Power Derating

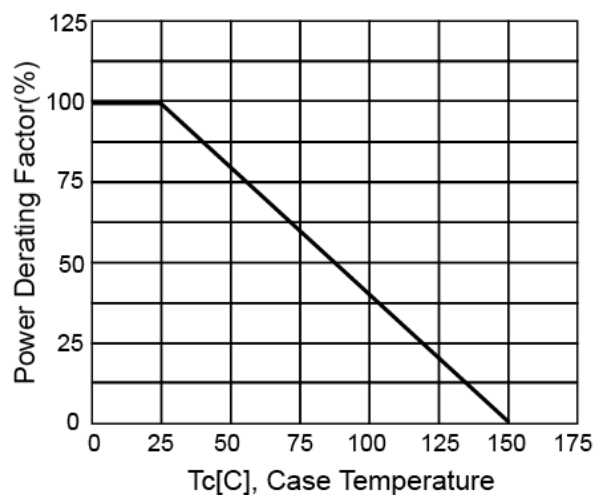


Figure 5. Reverse Bias SOA

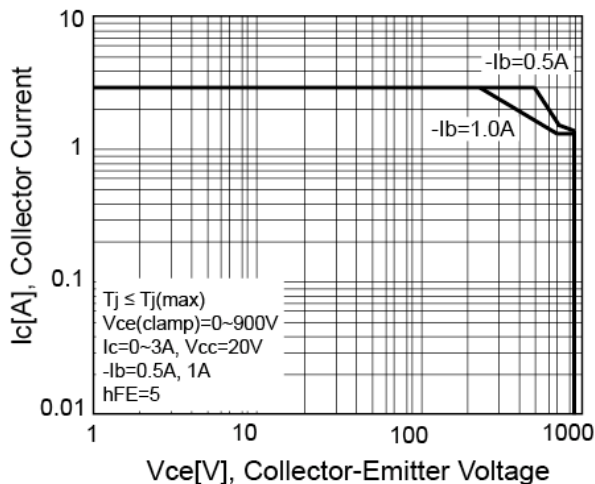
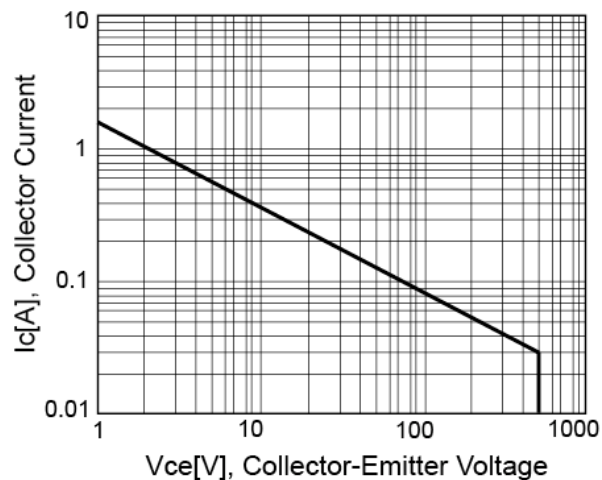
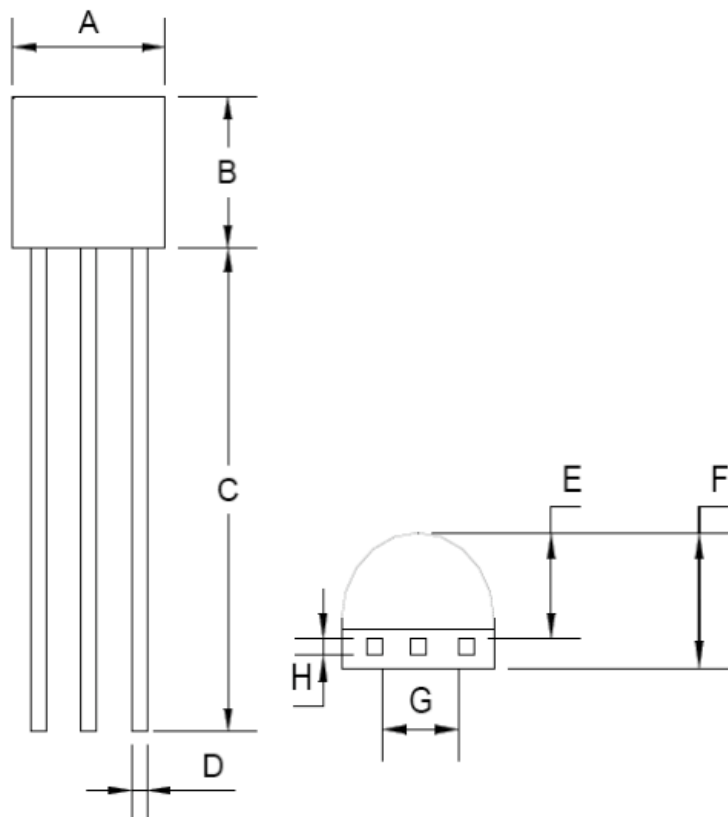


Figure 6. Safety Operating Area

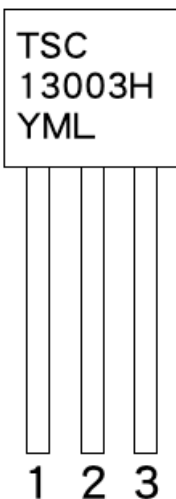


TO-92 Mechanical Drawing



TO-92 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
B	4.30	4.70	0.169	0.185
C	14.30(typ)		0.563(typ)	
D	0.43	0.49	0.017	0.019
E	2.19	2.81	0.086	0.111
F	3.30	3.70	0.130	0.146
G	2.42	2.66	0.095	0.105
H	0.37	0.43	0.015	0.017

Marking Diagram



Y = Year Code
M = Month Code
 (A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
L = Lot Code

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