



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 @ $I_C=0.5A, I_B=0.1A$

Features

- High Voltage
- High Speed Switching

Structure

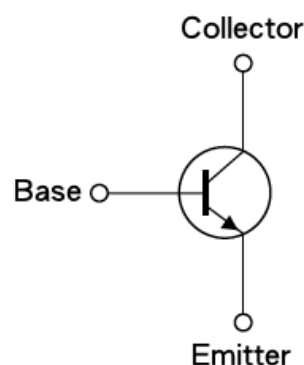
- Silicon Triple Diffused Type
- NPN Silicon Transistor

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 Halogen Free Product

Block Diagram



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

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	900	V
Collector-Emitter Voltage	V_{CEO}	530	V
Emitter-Base Voltage	V_{EBO}	10	V
Collector Current	I_C	DC	1.5
		Pulse	3
Maximum Power Dissipation	P_D	0.5	W
	P_{tot}	1.96	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 Case Thermal Resistance	$R_{\theta JC}$	64	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	248	$^\circ\text{C/W}$

Electrical Specifications ($T_a = 25^\circ\text{C}$ 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	μA
Emitter Cutoff Current	$V_{EB} = 10\text{V}, I_C = 0$	I_{EBO}	--	--	0.5	μA
Collector-Emitter Saturation Voltage	$I_C = 0.5\text{A}, I_B = 0.1\text{A}$	$V_{CE(SAT)1}$	--	0.3	0.5	V
	$I_C = 1\text{A}, I_B = 0.25\text{A}$	$V_{CE(SAT)2}$	--	0.5	1	
	$I_C = 1.5\text{A}, I_B = 0.5\text{A}$	$V_{CE(SAT)3}$	--	0.9	2	
Base-Emitter Saturation Voltage	$I_C = 0.5\text{A}, I_B = 0.1\text{A}$	$V_{BE(SAT)1}$	--	--	1	V
	$I_C = 1\text{A}, I_B = 0.25\text{A}$	$V_{BE(SAT)2}$	--	--	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	$V_{CB} = 10\text{V}, f = 0.1\text{MHz}$	C_{ob}	--	21	--	pF
Resistive Load Switching Time (Ratings)						
Delay Time	$V_{CC} = 125\text{V}, I_C = 1\text{A},$ $I_{B1} = I_{B2} = 0.2\text{A},$ $t_p = 25\mu\text{s}$ Duty Cycle $\leq 1\%$	t_d	--	0.05	0.2	μs
Rise Time		t_r	--	1.1	--	μs
Storage Time		t_{STG}	--	2	4	μs
Fall Time		t_f	--	0.4	0.7	μs

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



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

Figure 1. Static Characteristics

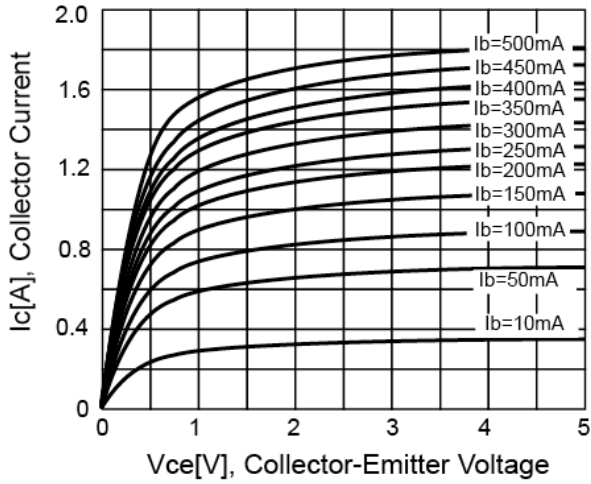


Figure 2. DC Current Gain

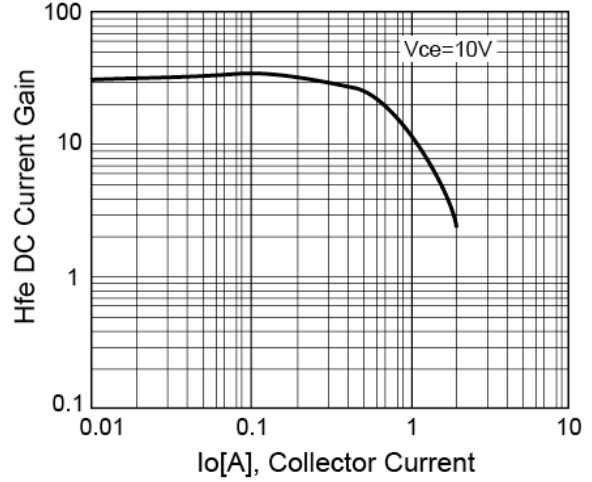


Figure 3. $V_{CE(SAT)}$ V.S. $V_{BE(SAT)}$

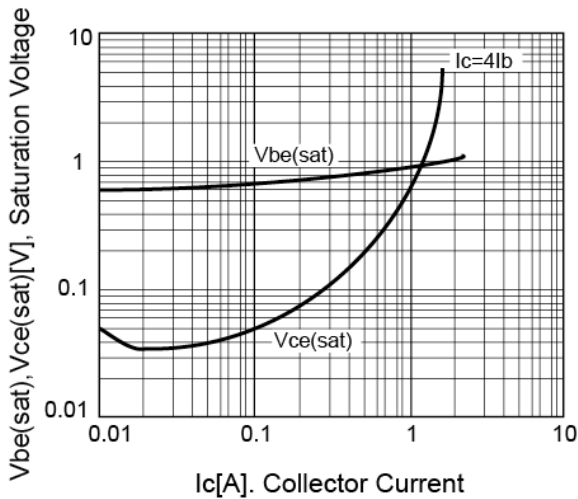


Figure 4. Power Derating

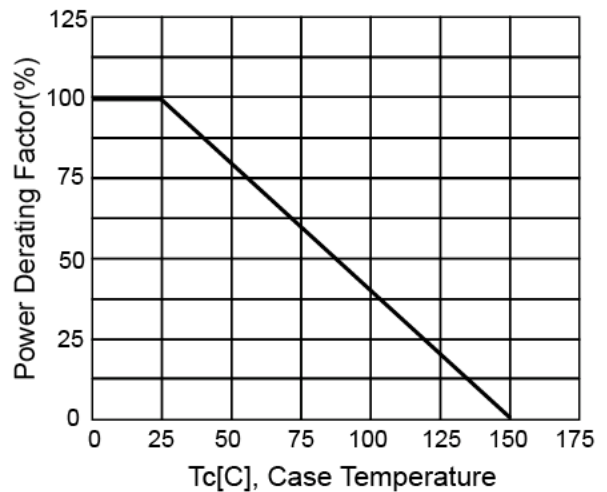


Figure 5. Reverse Bias SOA

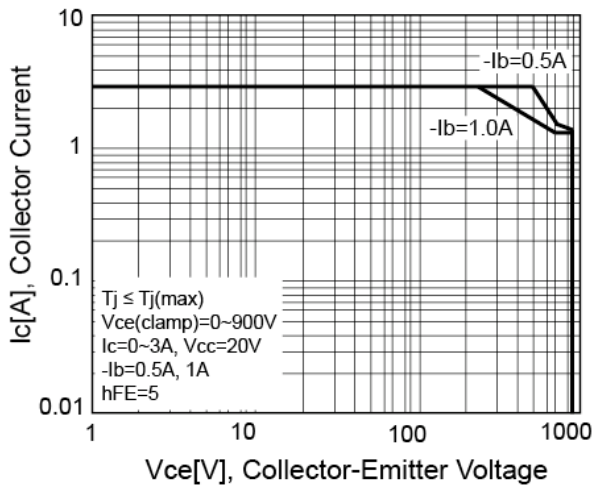
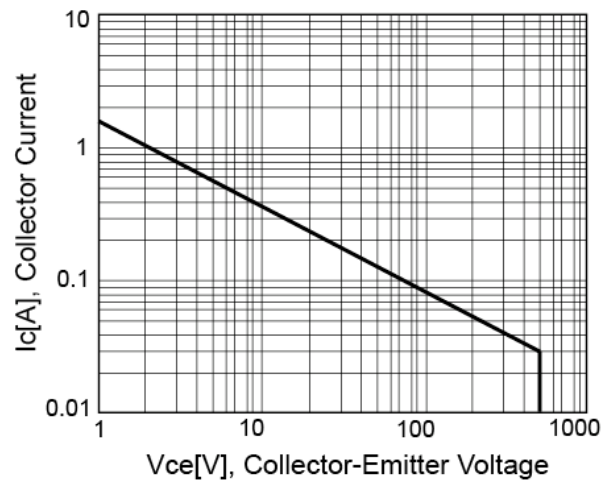
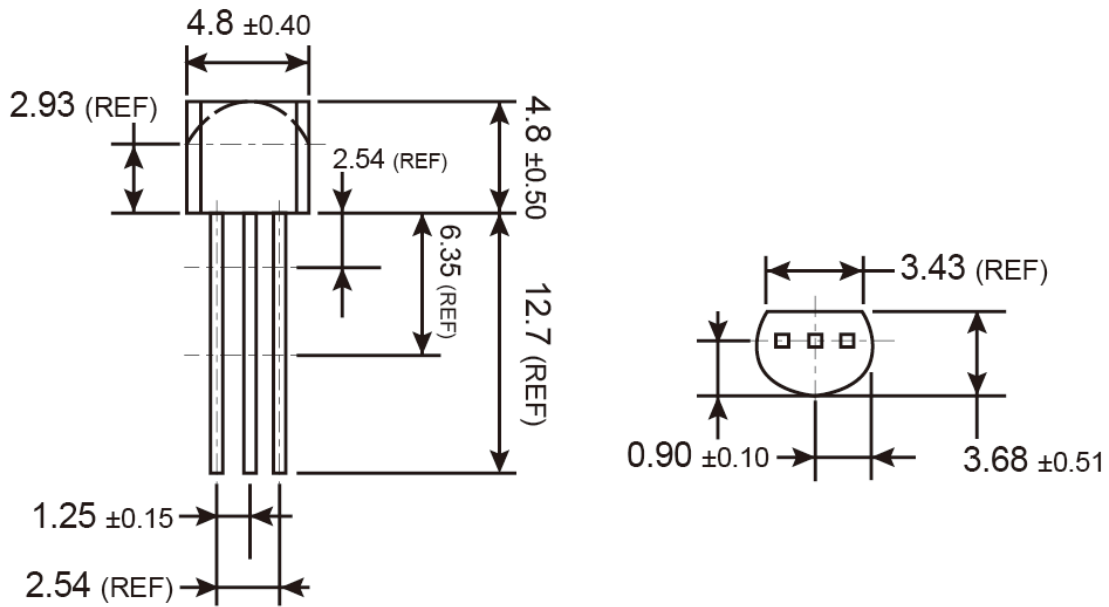


Figure 6. Safety Operating Area

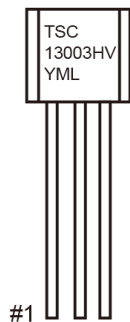


TO-92 Mechanical Drawing



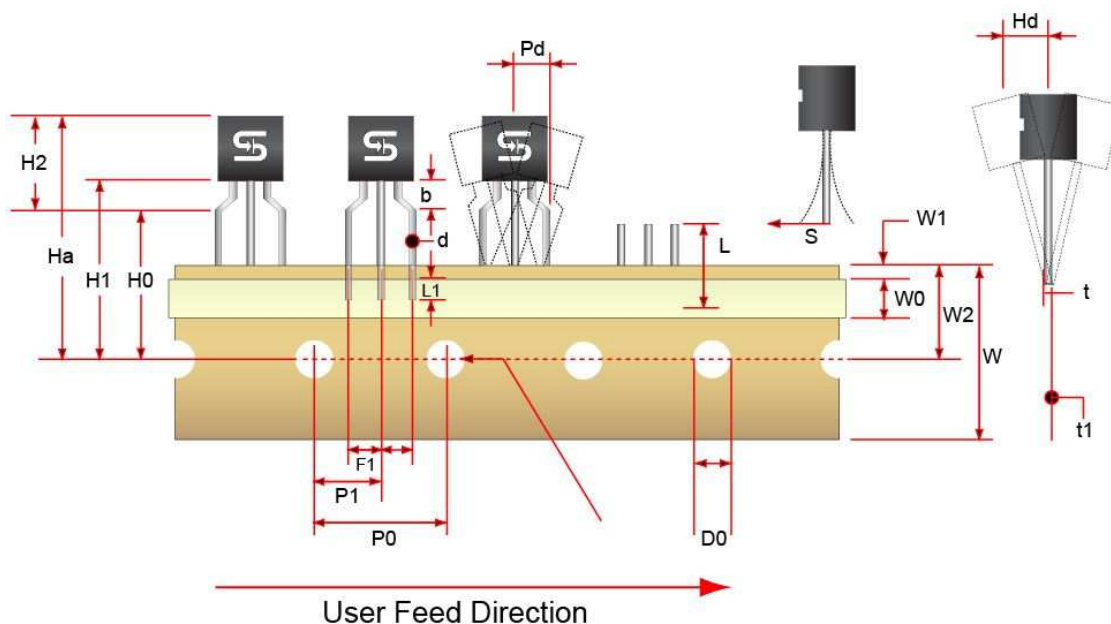
Unit: Millimeters

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)
- = Month Code for Halogen Free Product
 (O=Jan, P=Feb, Q=Mar, R=Apl, S=May, T=Jun, U=Jul, V=Aug, W=Sep, X=Oct, Y=Nov, Z=Dec)
- L** = Lot Code

TO-92 Ammo Pack Mechanical Drawing



Tape Dimension

Item Description	Symbol	Dimension
Base of Package to Lead Bend	b	3.0 (typ.)
Component Height	H_a	23.57 (typ.)
Lead Clinch Height	H_0	16.0 ±0.5
Component Base Height	H_1	19.0 ±0.5
Component Top to Lead Bend	H_2	8.0 (max)
Component Alignment (side / side)	P_d	1.02 (max)
Component Alignment (front / back)	H_d	0.79 (max)
Feed Hole Pitch	P_0	12.7 ±0.3
Hole Center to Component Center	P_1	6.25 ±0.4
Lead Spread	F_1	2.5 ±0.3
Lead Thickness	d	0.46 (typ.)
Cut Lead Length	L	10.9 (max)
Taped Lead Length	L_1	5.31 (typ.)
Taped Lead Thickness	t	0.81 ±0.2
Carrier Tape Thickness	t_1	0.5 ±0.2
Carrier Tape Width	W	18.0 ±0.5
Hold – down Tape Width	W_0	0.5 ±0.2
Hold – down Tape position	W_1	9.0 ±0.7
Feed Hole Position	W_2	6.0 ±0.2
Sprocket Hole Diameter	D_0	4.0 ±0.2
Lead Spring Out	S	0.1 (max)

Note: All dimensions are in millimeter.

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