TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TS13002HV

High Voltage NPN Transistor

TO-92

Pin Definition:
1. Emitter
2. Collector
3. Base

PRODUCT SUMMARY

BV_{CEO}	450V
BV_{CBO}	900V
I_C	0.8A
$V_{CE(SAT)}$	0.6V @ I_C=0.2A, I_B=0.04A

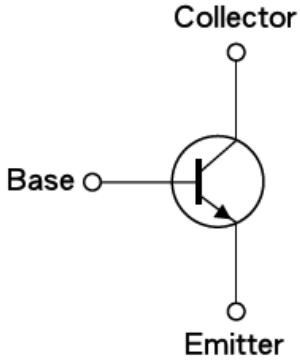
Features

- High Voltage
- High Speed Switching

Structure

- Silicon Triple Diffused Type
- NPN Silicon Transistor

Block Diagram



Ordering Information

Part No.	Package	Packing
TS13002HVCT B0G	TO-92	1kpcs / Bulk
TS13002HVCT A3G	TO-92	2kpcs / Ammo

Note: "G" denote for Halogen Free Product

Absolute Maximum Ratings (Ta = 25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Collector-Base Voltage		V_{CBO}	900	V
Collector-Emitter Voltage		V_{CEO}	450	V
Emitter-Base Voltage		V_{EBO}	9	V
Collector Current	DC	I_C	0.8	A
	Pulse		1.6	
Maximum Power Dissipation @ T_C = 25°C		P_{tot}	0.8	W
Operating Junction Temperature		T_J	+150	°C
Operating Junction and Storage Temperature Range		T_{STG}	- 55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Ambient Thermal Resistance	$R\Theta_{JA}$	125	°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 =1mA, I_B =0	BV_{CBO}	900	--	--	V
Collector-Emitter Breakdown Voltage	I_C =10mA, I_E =0	BV_{CEO}	450	--	--	V
Emitter-Base Breakdown Voltage	I_E =1mA, I_C =0	BV_{EBO}	9	--	--	V
Collector-Base Cutoff Current	V_{CB} =900V, I_E =0	I_{CBO}	--	--	100	μA
Collector-Emitter Cutoff Current	V_{CE} =450V, I_C = 0	I_{CEO}	--	--	100	μA
Emitter-Base Cutoff Current	V_{EB} =9V, I_C = 0	I_{EBO}	--	--	100	μA
Collector-Emitter Saturation Voltage	I_C=0.2A, I_B=0.04A	$V_{CE(SAT)}$	--	0.2	0.6	V
Base-Emitter Saturation Voltage	I_C=0.2A, I_B=0.04A	$V_{BE(SAT)}$		0.9	1.5	V
DC Current Gain	V_{CE} =5V, I_C =5mA	h_{FE}	15	--	--	
	V_{CE} =5V, I_C =100mA		25	--	40	
	V_{CE} =5V, I_C =300mA		20	--	40	
Dynamic Characteristics						
Frequency	V_{CE} =10V, I_C =0.1A	f_T	5	--	--	MHz
Resistive Load Switching Time (Ratings)						
Rise Time	V_{CC} =125V, I_C =0.1A	t_r	--	--	1	μs
Storage Time	I_{B1}=I_{B2}=20mA	t_{STG}	--	2	5	μs
Fall Time	t_p=25μs, D=≤1%	t_f	--	--	1	μs

Note: pulse test: pulse width ≤300μs, duty cycle ≤2%

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Electrical Characteristics Curves (Ta = 25°C, unless otherwise noted)

Figure 1. Safe Operation Area

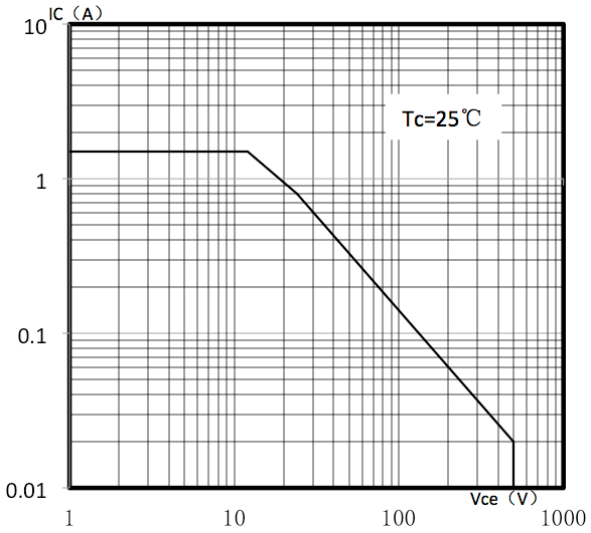


Figure 2. DC Current Gain

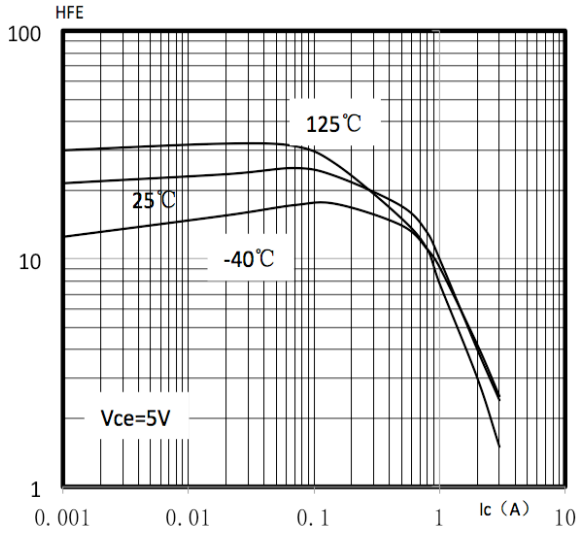


Figure 3. Vce(sat) vs. IC

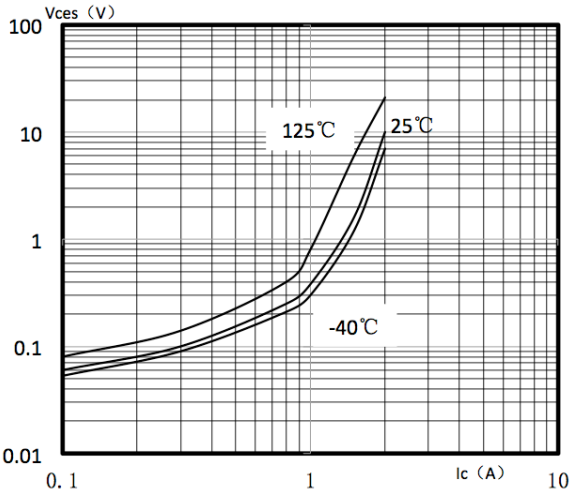


Figure 4. Vbe(sat) vs. IC

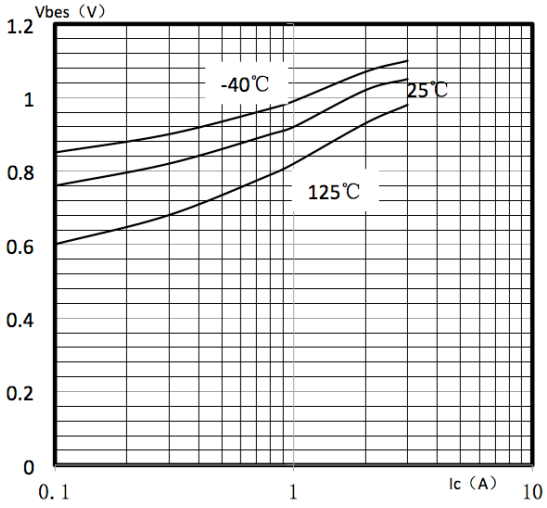
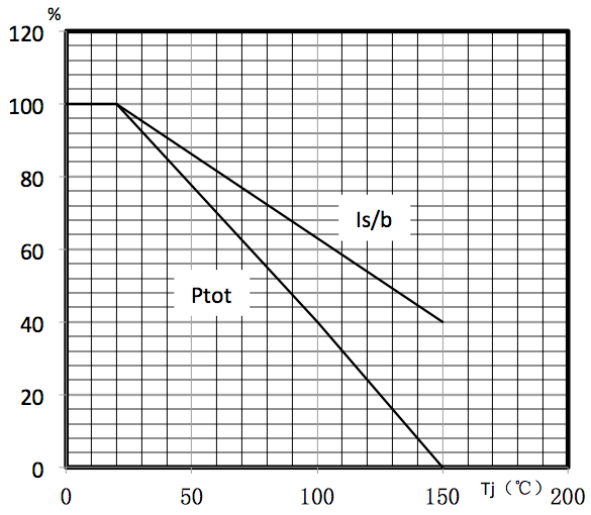
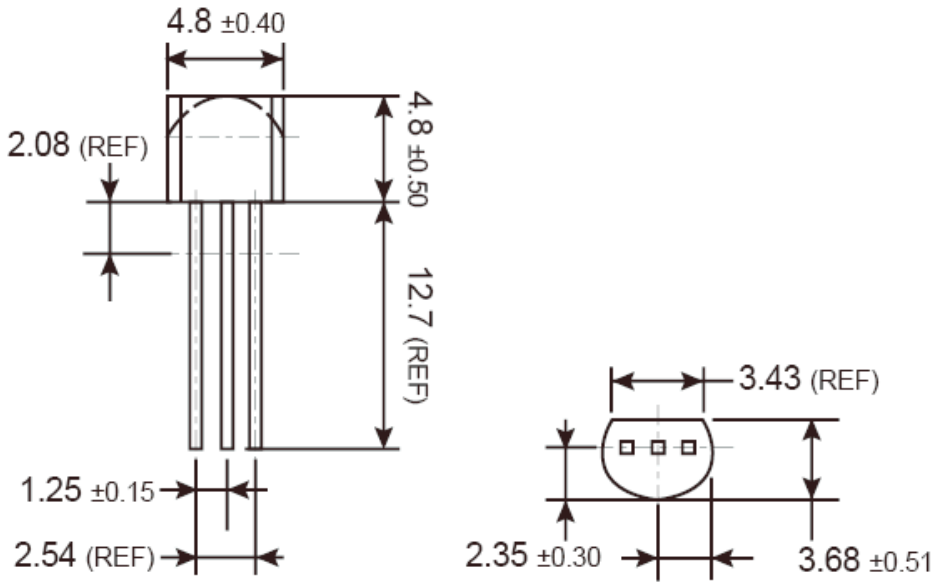


Figure 5. Power Derating

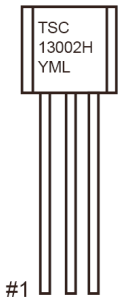


TO-92 Mechanical Drawing



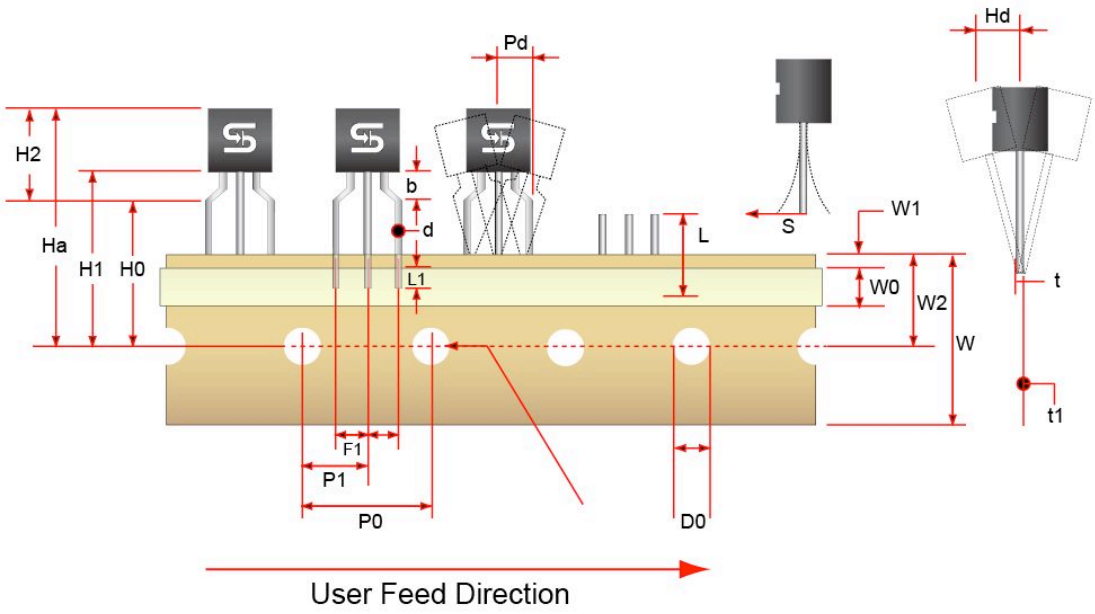
Unit: Millimeters

Marking Diagram



Y = Year Code
M = 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	Ha	23.57 (typ.)
Lead Clinch Height	H0	16.0 ±0.5
Component Base Height	H1	19.0 ±0.5
Component Top to Lead Bend	H2	8.0 (max)
Component Alignment (side / side)	Pd	1.02 (max)
Component Alignment (front / back)	Hd	0.79 (max)
Feed Hole Pitch	P0	12.7 ±0.3
Hole Center to Component Center	P1	6.25 ±0.4
Lead Spread	F1	2.5 ±0.3
Lead Thickness	d	0.46 (typ.)
Cut Lead Length	L	10.9 (max)
Taped Lead Length	L1	5.31 (typ.)
Taped Lead Thickness	t	0.81 ±0.2
Carrier Tape Thickness	t1	0.5 ±0.2
Carrier Tape Width	W	18.0 ±0.5
Hold – down Tape Width	W0	0.5 ±0.2
Hold – down Tape position	W1	9.0 ±0.7
Feed Hole Position	W2	6.0 ±0.2
Sprocket Hole Diameter	D0	4.0 ±0.2
Lead Spring Out	S	0.1 (max)

Note: All dimensions are in millimeter.

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