

TO-92



Pin Definition:

1. Emitter
2. Collector
3. Base

PRODUCT SUMMARY

BV_{CEO}	400V
BV_{CBO}	700V
I_C	1.5A
$V_{CE(SAT)}$	1V @ $I_C = 0.5A$, $I_B = 0.1A$

Features

- High Voltage
- High Speed Switching

Structure

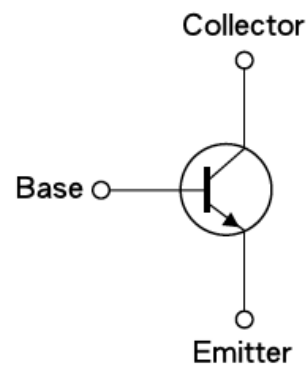
- Silicon Triple Diffused Type
- NPN Silicon Transistor

Ordering Information

Part No.	Package	Packing
TS13003CT B0	TO-92	1Kpcs / Bulk
TS13003CT B0G	TO-92	1Kpcs / Bulk
TS13003CT A3	TO-92	2Kpcs / Ammo
TS13003CT A3G	TO-92	2Kpcs / Ammo

Note: "G" denote for Halogen free

Block Diagram



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

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	700	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	9	V
Collector Current	DC	1.5	A
	Pulse	3	
Total Power Dissipation @ Tc= 25°C	P_{TOT}	1.5	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	$R\theta_{JA}$	122	°C/W

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}	700	--	--	V
Collector-Emitter Breakdown Voltage	$I_C = 10\text{mA}$, $I_E = 0$	BV_{CEO}	400	--	--	V
Emitter-Base Breakdown Voltage	$I_E = 1\text{mA}$, $I_C = 0$	BV_{EBO}	9	--	--	V
Collector Cutoff Current	$V_{CB} = 700\text{V}$, $I_E = 0$	I_{CBO}	--	--	1	uA
Emitter Cutoff Current	$V_{EB} = 9\text{V}$, $I_C = 0$	I_{EBO}	--	--	1	uA
Collector-Emitter Saturation Voltage*	$I_C / I_B = 0.5\text{A} / 0.1\text{A}$	$V_{CE(SAT)1}$	--	0.25	0.5	V
	$I_C / I_B = 1.0\text{A} / 0.25\text{A}$	$V_{CE(SAT)2}$	--	0.5	1	
	$I_C / I_B = 1.5\text{A} / 0.5\text{A}$	$V_{CE(SAT)3}$	--	1.2	3	
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*	$V_{CE} = 5\text{V}$, $I_C = 10\text{mA}$	h_{FE}	6	--	40	
	$V_{CE} = 10\text{V}$, $I_C = 400\text{mA}$		20	--	40	
	$V_{CE} = 2\text{V}$, $I_C = 1\text{A}$		6	--	35	
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	--	0.5	1	uS
Storage Time		t_{STG}	--	2	4	uS
Fall Time		t_f	--	0.4	0.7	uS

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

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

Figure 1. Static Characteristics

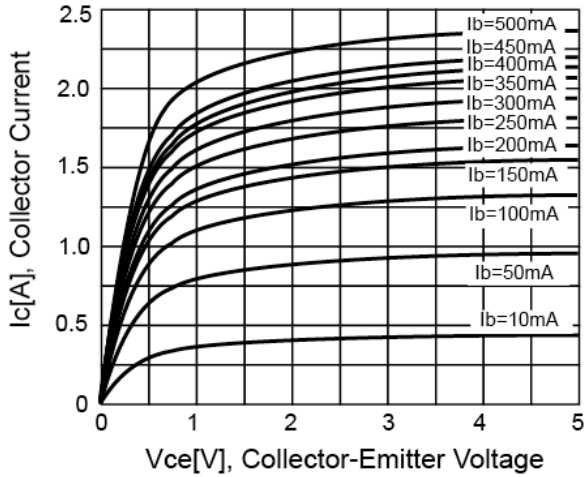


Figure 2. DC Current Gain

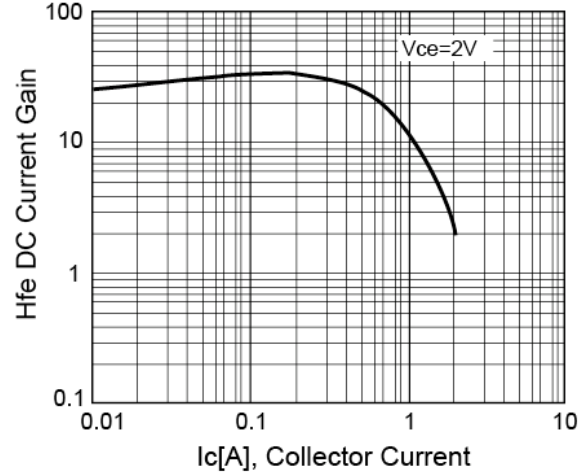


Figure 3. $V_{ce(sat)}$ V.S. $V_{be(sat)}$

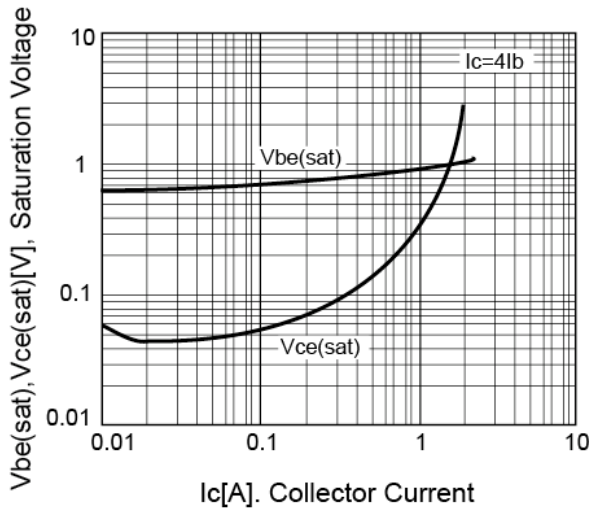


Figure 4. Power Derating

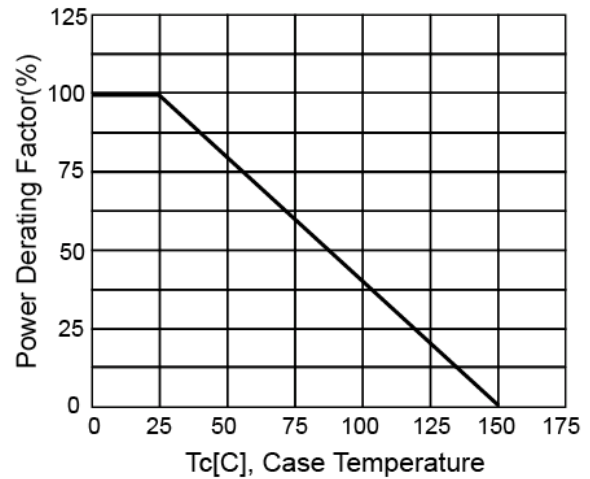


Figure 5. Reverse Bias SOA

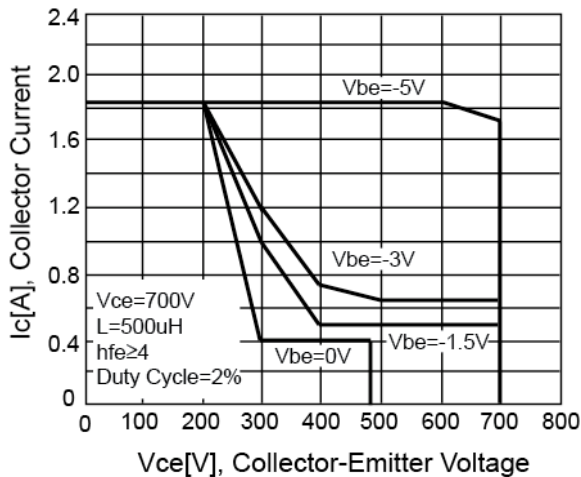
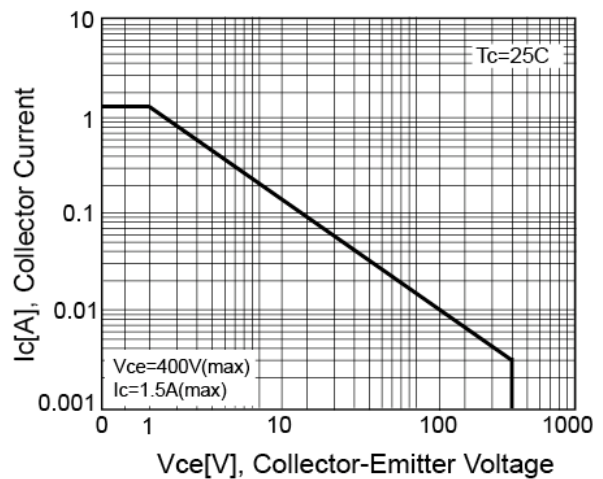
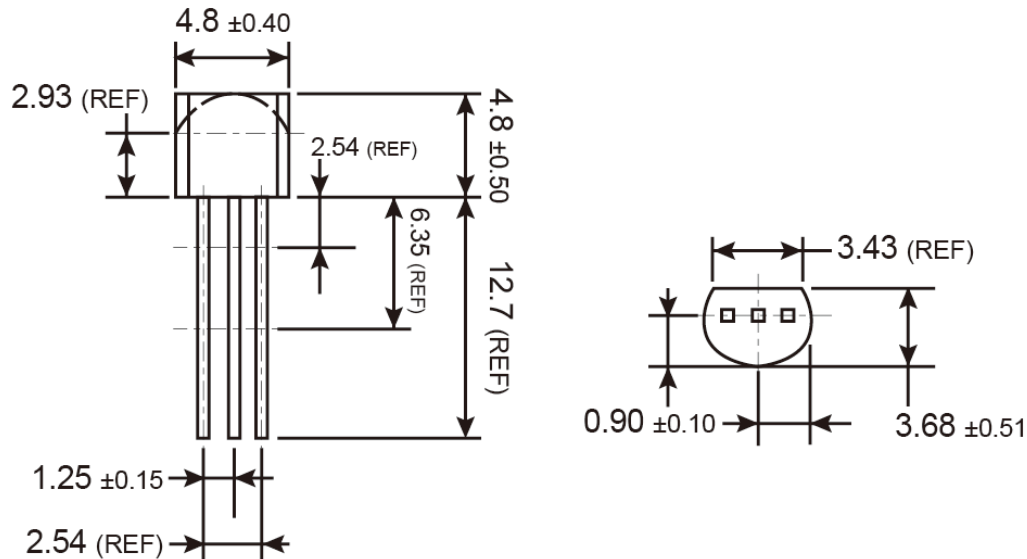


Figure 6. Safety Operating Area

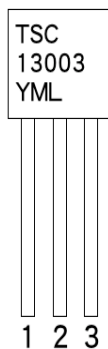


TO-92 Mechanical Drawing



Unit: Millimeters

Marking Diagram



Y = Year Code

M = Month Code

(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apr, **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**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)

L = Lot Code

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