TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TS13003A

High Voltage NPN Transistor

TO-126

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

PRODUCT SUMMARY

BV_{CEO}	450V
BV_{CBO}	700V
I_C	2A
$V_{CE(SAT)}$	0.5V @ I_C=1A, I_B=0.25A

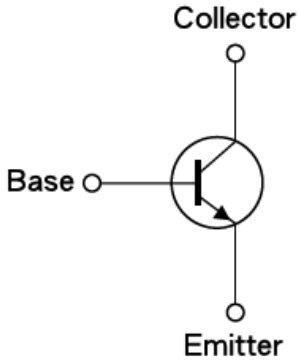
Features

- High Voltage
- High Speed Switching

Structure

- Silicon Triple Diffused Type
- NPN Silicon Transistor

Block Diagram



Ordering Information

Part No.	Package	Packing
TS13003ACK B0G	TO-126	1kpcs / Bulk
TS13003ACK C0G	TO-126	50pcs / Tube

Note: "G" denote for Halogen free

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

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	700	V
Collector-Emitter Voltage	V_{CEO}	450	V
Emitter-Base Voltage	V_{EBO}	9	V
Collector Current	I_C	2	A
Total Power Dissipation @ T_C=25°C	P_{TOT}	50	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 Case Thermal Resistance	$R\Theta_{JC}$	2.5	°C/W
Junction to Ambient Thermal Resistance	$R\Theta_{JA}$	96.2	°C/W

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

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Collector-Base Voltage	I_C = 1mA, I_B = 0	BV_{CBO}	700	--	--	V
Collector-Emitter Breakdown Voltage	I_C = 1mA, V_{BE} = 0V	BV_{CES}	700	--	--	V
Collector-Emitter Breakdown Voltage	I_C = 10mA, I_E = 0	BV_{CEO}	450	--	--	V
Emitter-Base Breakdown Voltage	I_E = 10mA, I_C = 0	BV_{EBO}	9	--	--	V
Collector-Base Cutoff Current	V_{CB} = 700V, 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=1A, I_B=0.25A	$V_{CE(SAT)}$ 1	--	0.25	0.5	V
	I_C=1.5A, I_B=0.5A	$V_{CE(SAT)}$ 2		0.3	0.6	V
Base-Emitter Saturation Voltage*	I_C=1A, I_B=0.25A	$V_{BE(SAT)}$		0.9	1.2	V
DC Current Gain*	V_{CE} = 5V, I_C = 500mA	h_{FE} 1	15	--	35	
	V_{CE} = 5V, I_C = 2A	h_{FE} 2	5	--	--	
Dynamic Characteristics						
Frequency	V_{CE} = 10V, I_C = 0.1A	f_T	5	--	--	MHz
Output Capacitance	V_{CB} = 10V, f = 0.1MHz	Cob	--	21	--	pF
Resistive Load Switching Time (Ratings)						
Storage Time	V_{CC} = 125V, I_C = 0.25A, Duty Cycle ≤1%	t_{STG}	2	--	5	μs
Fall Time		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

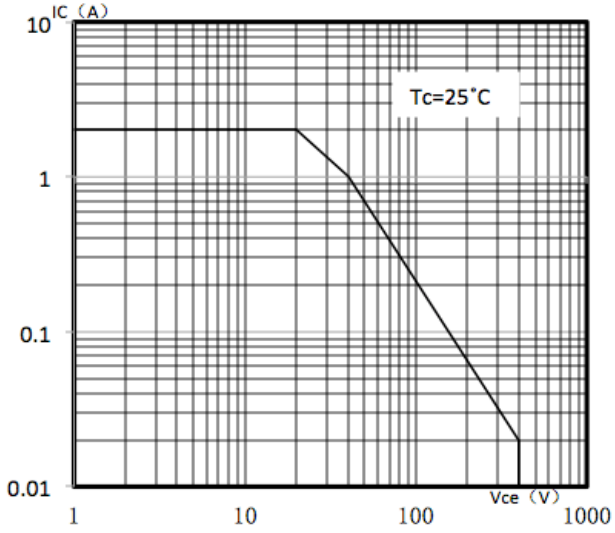


Figure 2. DC Current Gain

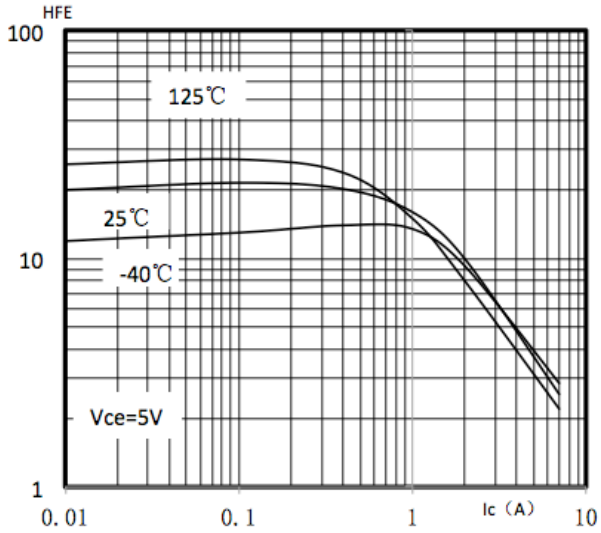


Figure 3. Vce(sat) vs. IC

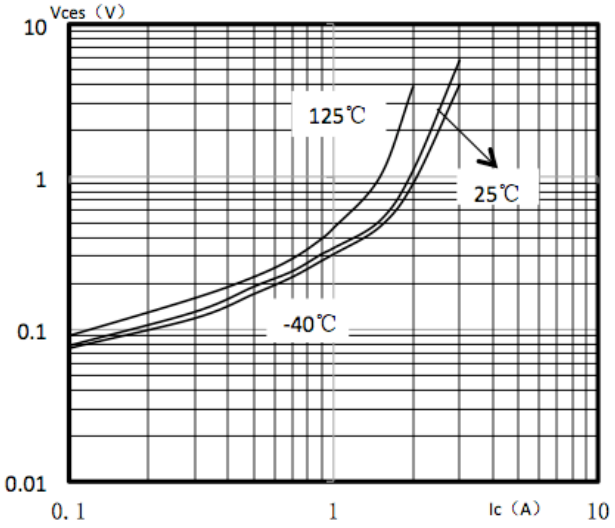


Figure 4. Vbe(sat) vs. IC

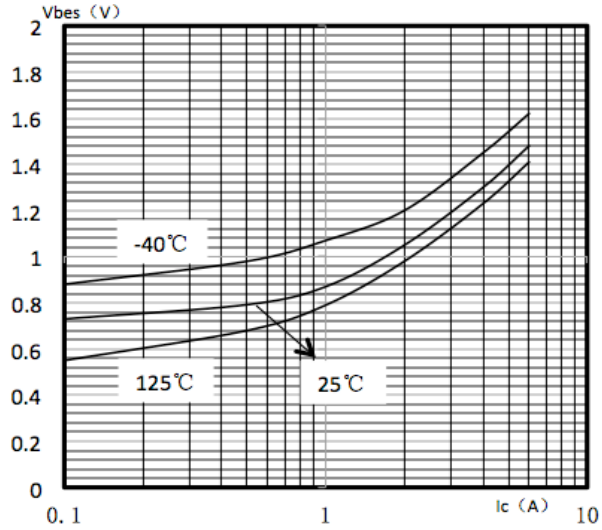
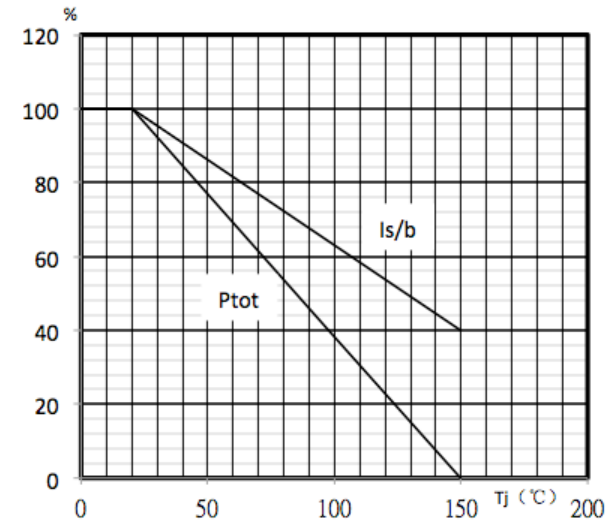
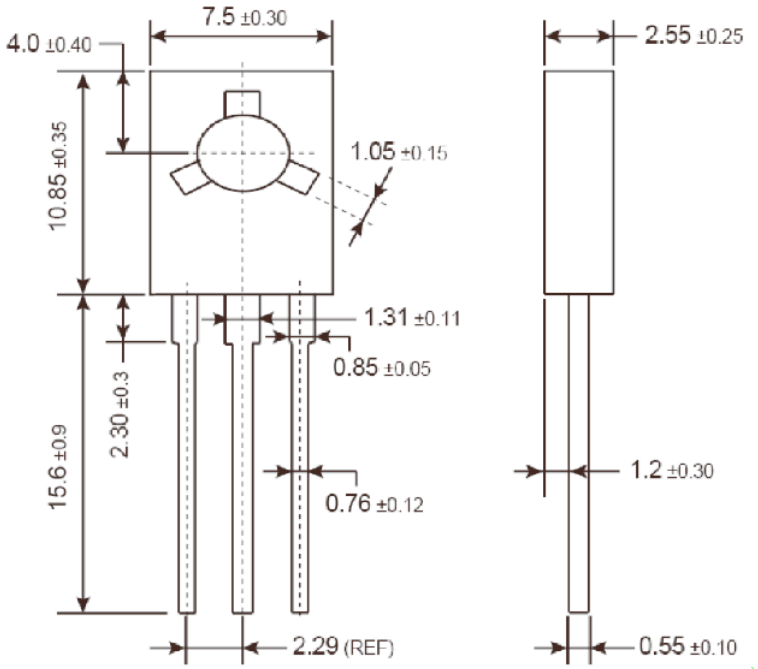


Figure 5. Power Derating

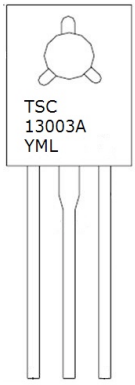


TO-126 Mechanical Drawing



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

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