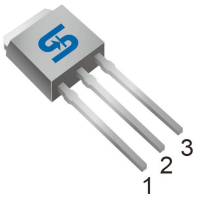
TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

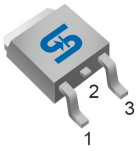
TSC5303D

High Voltage NPN Transistor with Diode

TO-251 (IPAK)



TO-252 (DPAK)



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

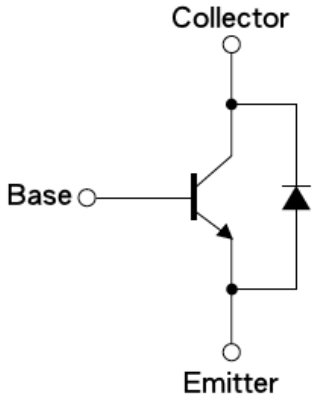
PRODUCT SUMMARY

BV_{CEO}	400V
BV_{CBO}	700V
I_C	3A
$V_{CE(SAT)}$	0.17V @ I_C=1A, I_B=0.25A

Features

- Build-in Free-wheeling Diode Makes Efficient Anti-saturation Operation
- No Need to Interest an h_{FE} Value Because of Low Variable Storage-time Spread Even Though Comer Spirit Product.
- Low Base Drive Requirement
- Suitable for Half Bridge Light Ballast Application

Block Diagram



Structure

- Silicon Triple Diffused Type
- NPN Silicon Transistor
- Integrated Anti-parallel Collector-Emitter Diode

Ordering Information

Part No.	Package	Packing
TSC5303DCP ROG	TO-252	2.5kpcs / 13” Reel
TSC5303DCH C5G	TO-251	75pcs / Tube

Note: “G” denotes Halogen Free Products

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

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	700	V
Collector-Emitter Voltage @ V_{BE}=0V	V_{CES}	700	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	9	V
Collector Current	I_C	3	A
Collector Peak Current (tp <5ms)	I_{CM}	6	A
Base Current	I_B	1.5	A
Base Peak Current (tp <5ms)	I_{BM}	3	A
Power Total Dissipation @ T_C=25ºC	P_{DTOT}	30	W
Maximum Operating Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

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Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	$R\Theta_{JC}$	4.15	°C/W
Thermal Resistance - Junction to Ambient	$R\Theta_{JA}$	75	°C/W

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}	700	--	--	V
Collector-Emitter Breakdown Voltage	I_C =10mA, I_E =0	BV_{CEO}	400	--	--	V
Emitter-Base Breakdown Voltage	I_E =1mA, I_C =0	BV_{EBO}	9	--	--	V
Collector Cutoff Current	V_{CB} =700V, I_E =0	I_{CBO}	--	--	10	μA
Collector Cutoff Current	V_{CE} =400V, I_B =0	I_{CEO}	--	--	10	μA
Emitter Cutoff Current	V_{EB} =7V, I_C =0	I_{EBO}	--	--	10	μA
Collector-Emitter Saturation Voltage	I_C =0.4A, I_B =0.1A	$V_{CE(SAT)1}$	--	0.10	0.7	V
	I_C =1A, I_B =0.25A	$V_{CE(SAT)2}$	--	0.17	1	
	I_C =2A, I_B =0.5A	$V_{CE(SAT)3}$	--	0.55	--	
Base-Emitter Saturation Voltage	I_C =1A, I_B =0.25A	$V_{BE(SAT)1}$	--	--	1.1	V
	I_C =2A, I_B =0.5A	$V_{BE(SAT)2}$	--	--	1.2	
DC Current Gain	V_{CE} =5V, I_C =10mA	h_{FE}	10	--	--	
	V_{CE} =5V, I_C =1A		15	--	30	
	V_{CE} =5V, I_C =2A		5	--	--	
Forward Voltage Drop	I_F =2A	Vf	--	--	2	V
Turn On Time	V_{CC} =250V, I_C =1A, I_{B1}=I_{B2}=0.2A, t_p=25μs Duty Cycle<1%	t_{ON}	--	0.2	0.6	μs
Storage Time		t_{STG}	--	2.7	4.5	μs
Fall Time		t_f	--	0.16	0.3	μs

Note: Pulsed duration =380μs, duty cycle ≤2%

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

Figure 1. Static Characteristics

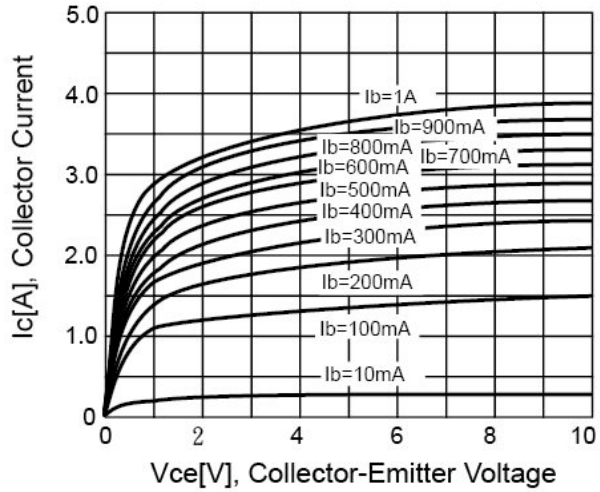


Figure 2. DC Current Gain

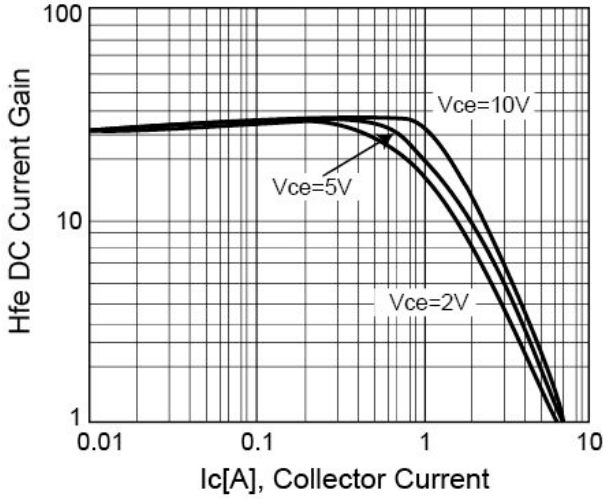


Figure 3. Vce(sat) v.s. Vbe(sat)

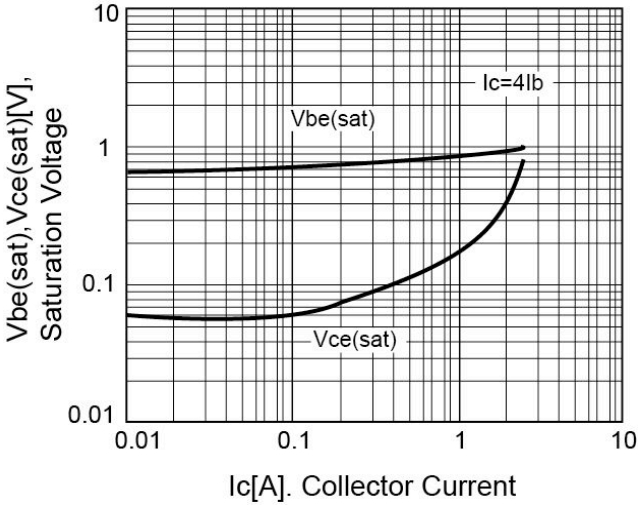


Figure 4. Power Derating

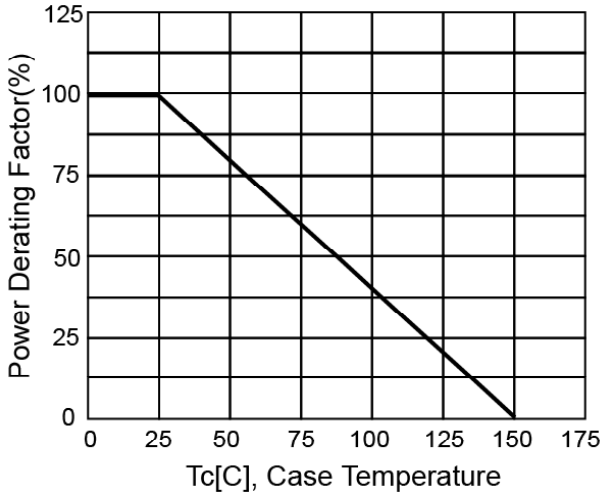


Figure 5. Reverse Bias SOA

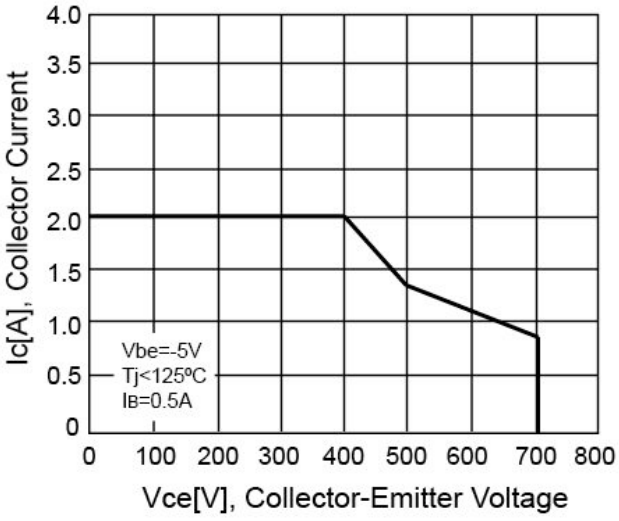
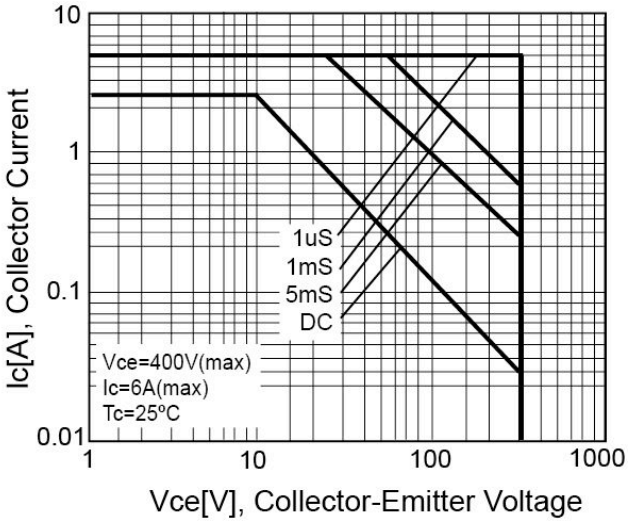


Figure 6. Safety Operating Area



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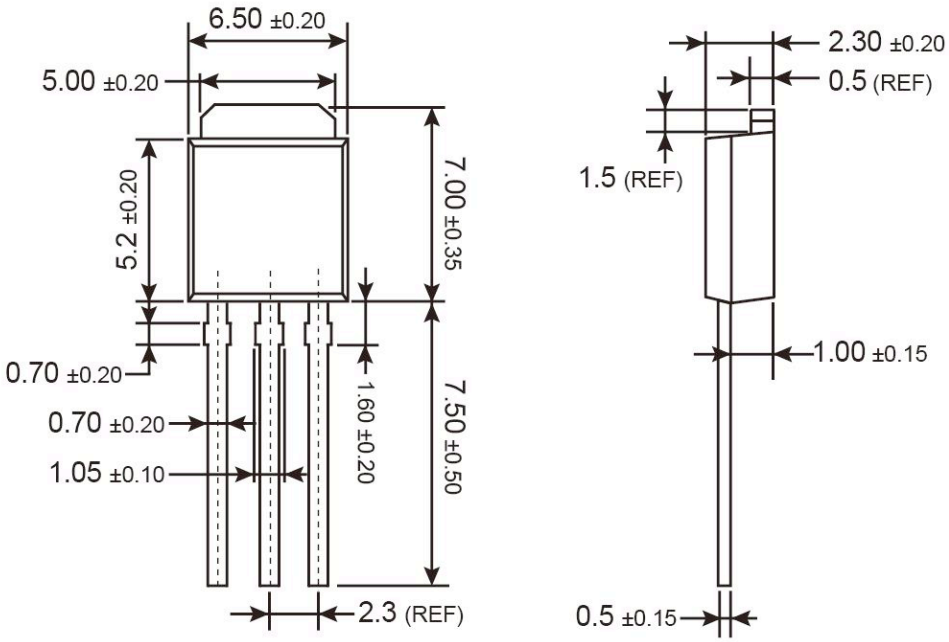
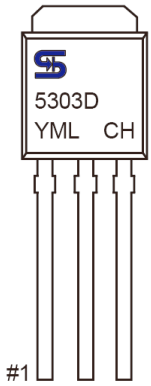
TO-251 Mechanical Drawing



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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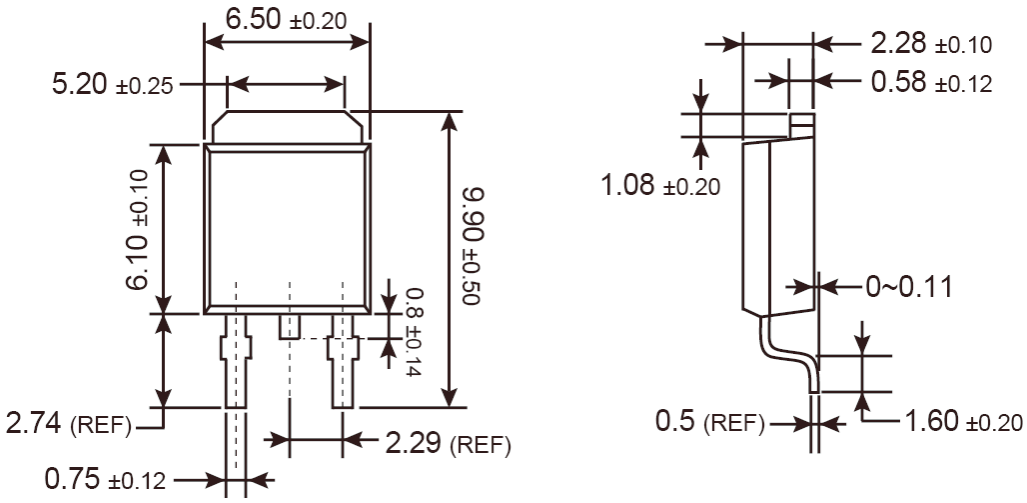
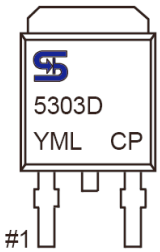


Unit: Millimeters

Marking Diagram



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