

TO-251 (IPAK)



TO-252 (DPAK)



Pin Definition:

1. Base
2. Collector
3. Emitter

PRODUCT SUMMARY

V_{CEO}	400V
V_{CBO}	700V
I_C	2A
$V_{CE(SAT)}$	1.1V @ $I_C=1A, I_B=0.25A$

Features

- Build-in Free-wheeling Diode Makes Efficient Anti-saturation Operation
- No Need to Interest 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

Structure

- Silicon Triple Diffused Type
- NPN Silicon Transistor with Diode

Ordering Information

Part No.	Package	Packing
TSC5302DCP ROG	TO-252	2.5kpcs / 13" Reel
TSC5302DCH C5G	TO-251	75pcs / Tube

Note: "G" denote for Halogen Free Product

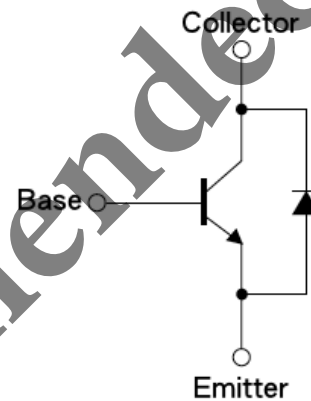
Absolute Maximum Ratings ($T_a = 25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	700	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	10	V
Collector Current	I_C	2	A
Collector Peak Current ($t_p < 5ms$)	I_{CM}	4	A
Base Current	I_B	1	A
Base Peak Current ($t_p < 5ms$)	I_{BM}	2	A
Total Dissipation @ $T_c \leq 25^{\circ}C$	TO-251	1.5	W
	TO-252	25	
Maximum Operating Junction Temperature	T_J	+150	$^{\circ}C$
Storage Temperature Range	T_{STG}	-65 to +150	$^{\circ}C$

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Case Thermal Resistance	$R_{\theta_{JC}}$	6.25	$^{\circ}C/W$
Junction to Ambient Thermal Resistance	$R_{\theta_{JA}}$	100	$^{\circ}C/W$

Block Diagram



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 ^a	$I_C = 10\text{mA}, I_E = 0$	BV_{CEO}	400	--	--	V
Emitter-Base Breakdown Voltage	$I_E = 1\text{mA}, I_C = 0$	BV_{EBO}	10	--	--	V
Collector Cutoff Current	$V_{CB} = 700\text{V}, I_E = 0$	I_{CBO}	--	--	1	μA
Emitter Cutoff Current	$V_{EB} = 9\text{V}, I_C = 0$	I_{EBO}	--	--	1	μA
Collector-Emitter Saturation Voltage ^a	$I_C = 0.5\text{A}, I_B = 0.1\text{A}$	$V_{CE(SAT)1}$	--	--	0.5	V
	$I_C = 1\text{A}, I_B = 0.25\text{A}$	$V_{CE(SAT)2}$	--	1.1	1.5	
Base-Emitter Saturation Voltage ^a	$I_C = 0.5\text{A}, I_B = 0.1\text{A}$	$V_{BE(SAT)1}$	--	--	1.1	V
	$I_C = 1\text{A}, I_B = 0.25\text{A}$	$V_{BE(SAT)2}$	--	--	1.2	
DC Current Gain	$V_{CE} = 5\text{V}, I_C = 10\text{mA}$	$h_{FE 1}$	10	--	--	
	$V_{CE} = 5\text{V}, I_C = 400\text{mA}$	$h_{FE 2}$	10	--	30	
	$V_{CE} = 5\text{V}, I_C = 1\text{A}$	$h_{FE 3}$	5	--	--	
Turn On Time	$V_{CC} = 250\text{V}, I_C = 1\text{A},$	t_{ON}	--	0.15	0.3	μs
Storage Time	$I_{B1} = I_{B2} = 0.2\text{A}, t_p = 25\mu\text{s}$	t_{STG}	--	0.5	0.9	μs
Fall Time	Duty Cycle < 1%	t_f	--	0.2	0.4	μs
Diode						
Fall Time	$I_C = 1\text{A}$	t_f	--	--	800	μs
Forward Voltage Drop	$I_C = 1\text{A}$	Vf	--	--	1.4	V

Notes: Pulsed duration = 300 μs , duty cycle $\leq 2\%$

Not Recommended

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

Figure 1. Static Characteristics

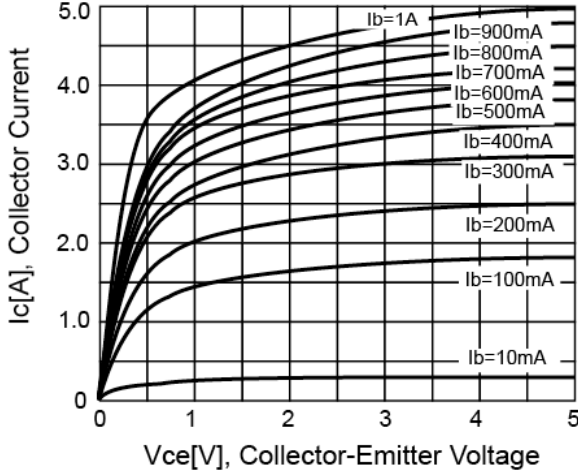


Figure 2. DC Current Gain

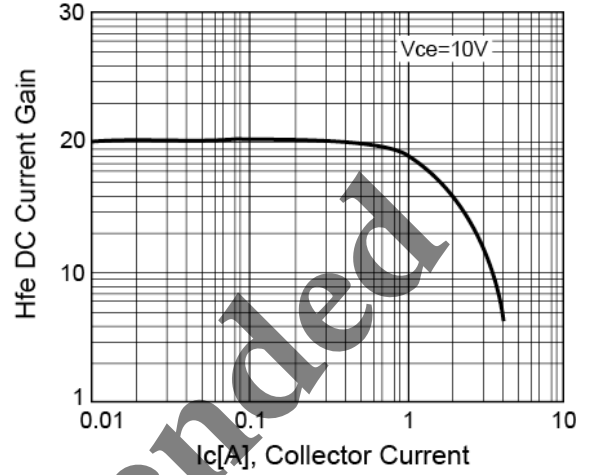


Figure 3. Vce(sat) vs. Vbe(sat)

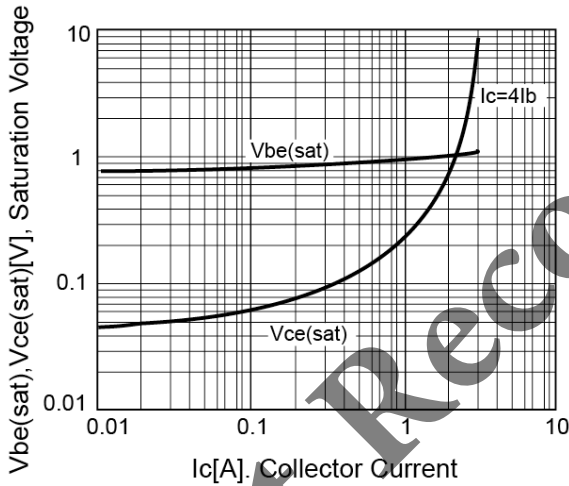


Figure 4. Power Derating

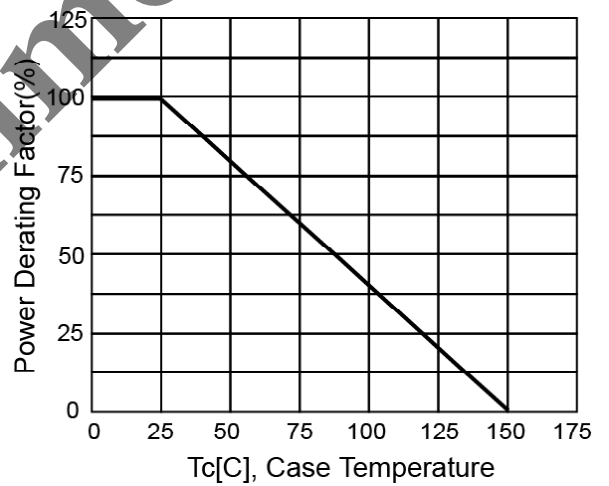


Figure 5. Reverse Bias SOA

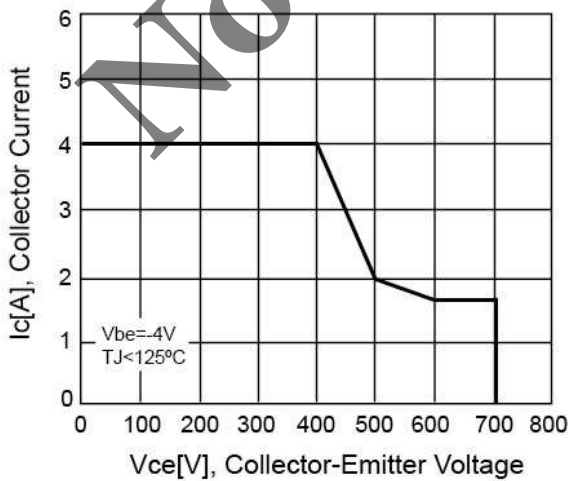
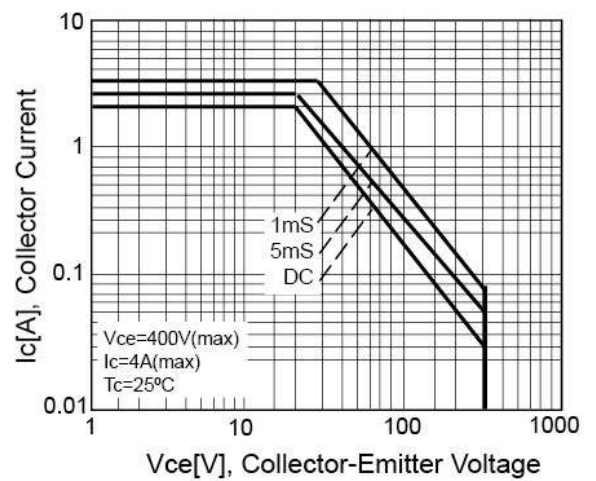
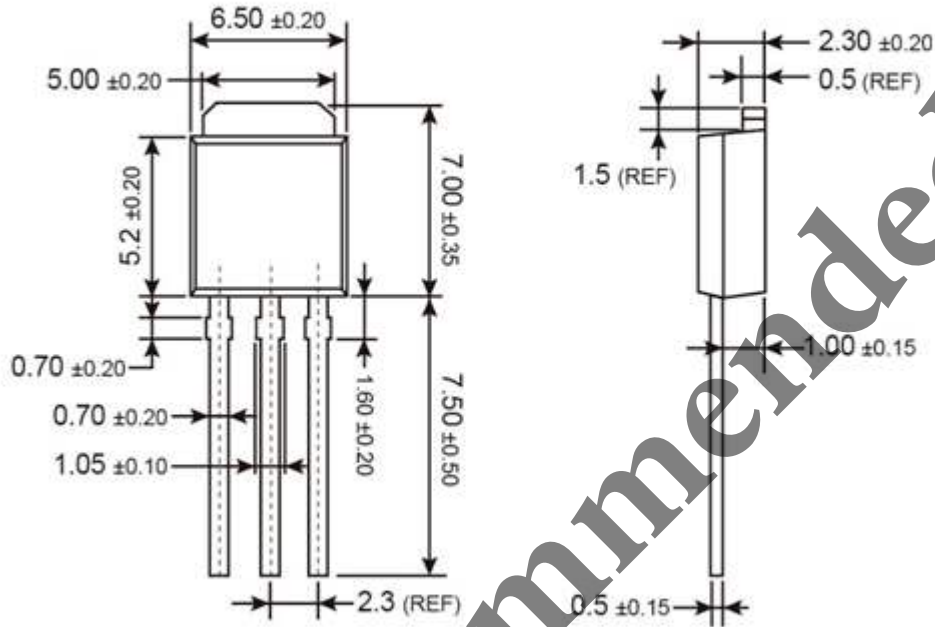


Figure 6. Safe Operating Area

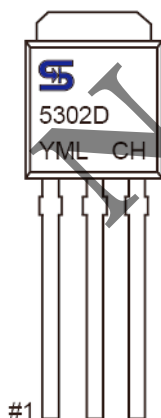


TO-251 Mechanical Drawing



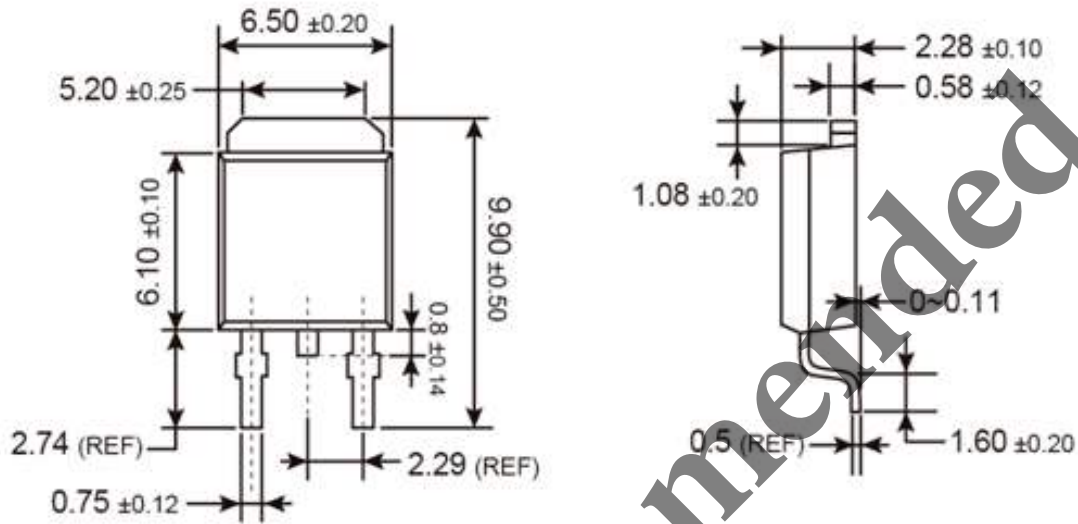
Unit: Millimeters

Marking Diagram



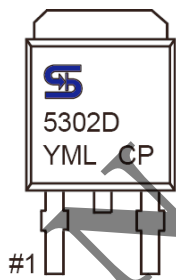
- Y** = Year Code
- M** = Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
- L** = Lot Code

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Unit: Millimeters

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Not Recommended

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