



TO-251
(IPAK)



TO-252
(DPAK)



Pin Definition:

1. Base
2. Collector
3. Emitter

PRODUCT SUMMARY

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

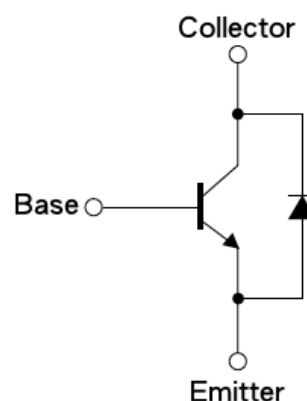
Features

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

Block Diagram



Ordering Information

Part No.	Package	Packing
TSC5302DCP RO	TO-252	2.5Kpcs / 13" Reel
TSC5302DCP ROG	TO-252	2.5Kpcs / 13" Reel
TSC5302DCH C5	TO-251	75pcs / Tube
TSC5302DCH C5G	TO-251	75pcs / Tube

Note: "G" denote for Halogen Free Product

Absolute Maximum Rating ($T_a = 25^{\circ}C$ 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	$^{\circ}C/W$

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	uA
Emitter Cutoff Current	$V_{EB} = 9\text{V}, I_C = 0$	I_{EBO}	--	--	1	uA
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	$V_{CC} = 250\text{V}, I_C = 1\text{A}, I_{B1} = I_{B2} = 0.2\text{A}, t_p = 25\text{uS}, \text{Duty Cycle} < 1\%$	t_{ON}	--	0.15	0.3	uS
Storage Time		t_{STG}	--	0.5	0.9	uS
Fall Time		t_f	--	0.2	0.4	uS
Diode						
Fall Time	$I_C = 1\text{A}$	t_f	--	--	800	uS
Forward Voltage Drop	$I_C = 1\text{A}$	V_f	--	--	1.4	V

Notes:

a. Pulsed duration = 300uS, duty cycle ≤2%

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

Figure 1. Static Characteristics

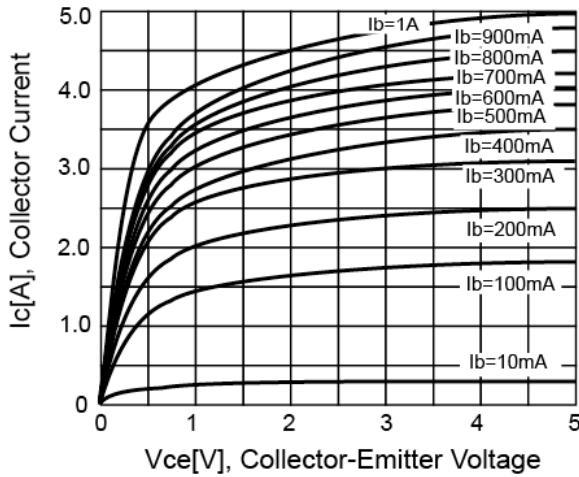


Figure 2. DC Current Gain

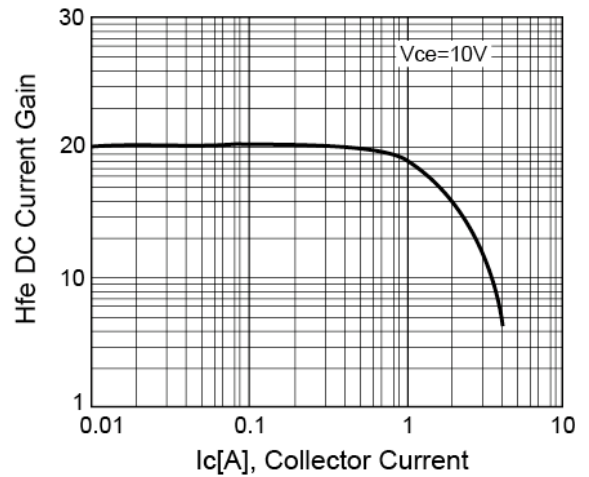


Figure 3. Vce(sat) v.s. Vbe(sat)

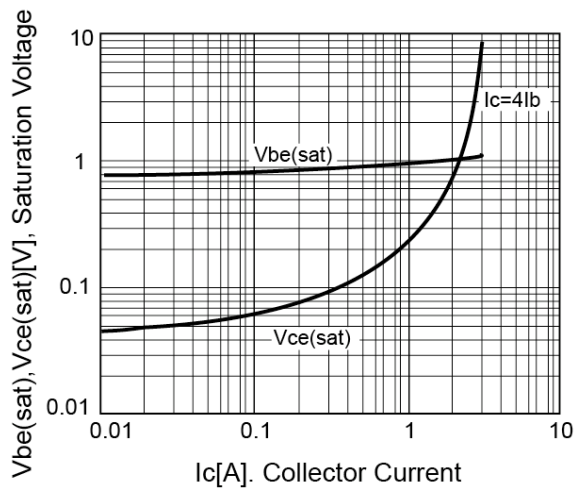


Figure 4. Power Derating

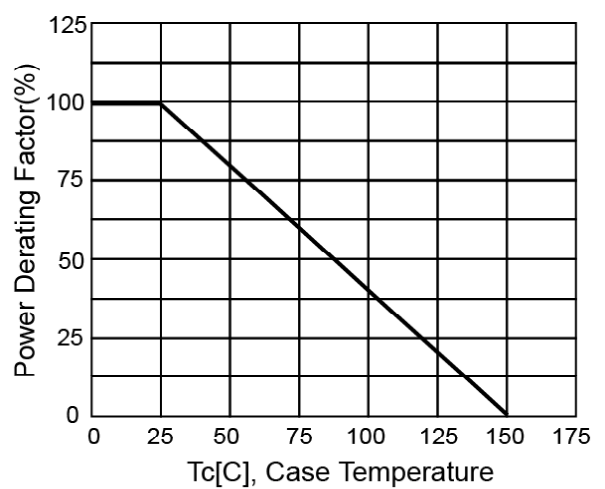


Figure 5. Reverse Bias SOA

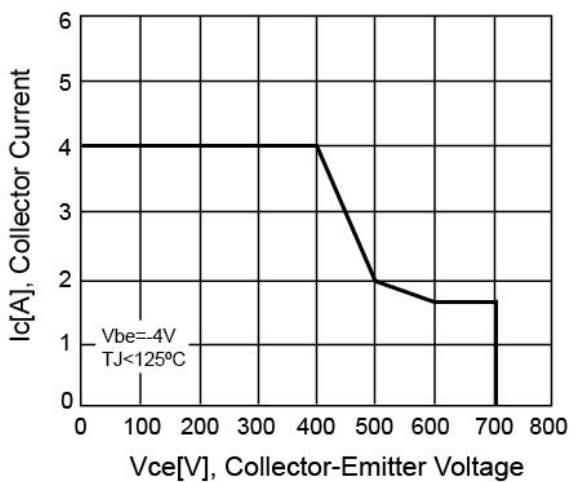
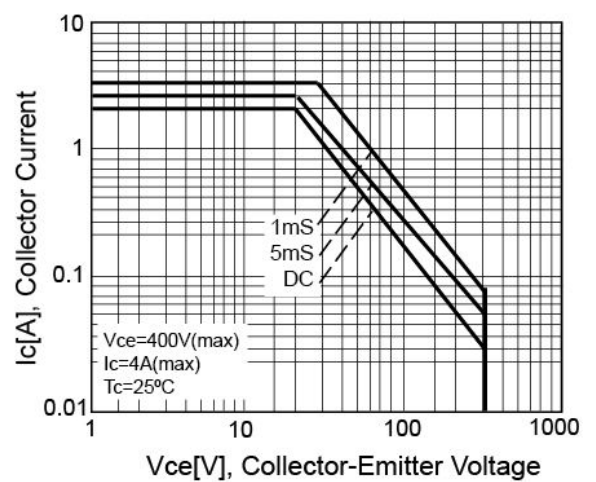
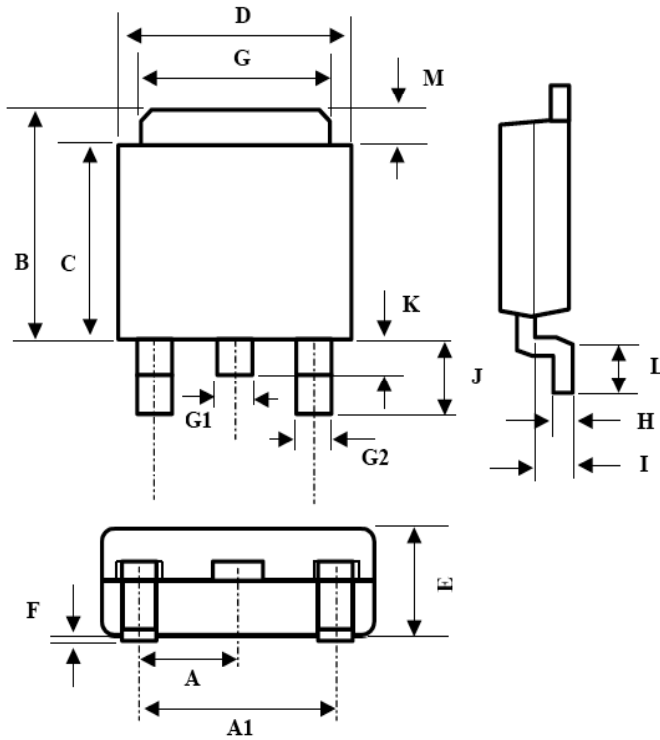


Figure 6. Safety Operating Area

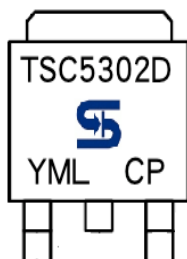


TO-252 Mechanical Drawing



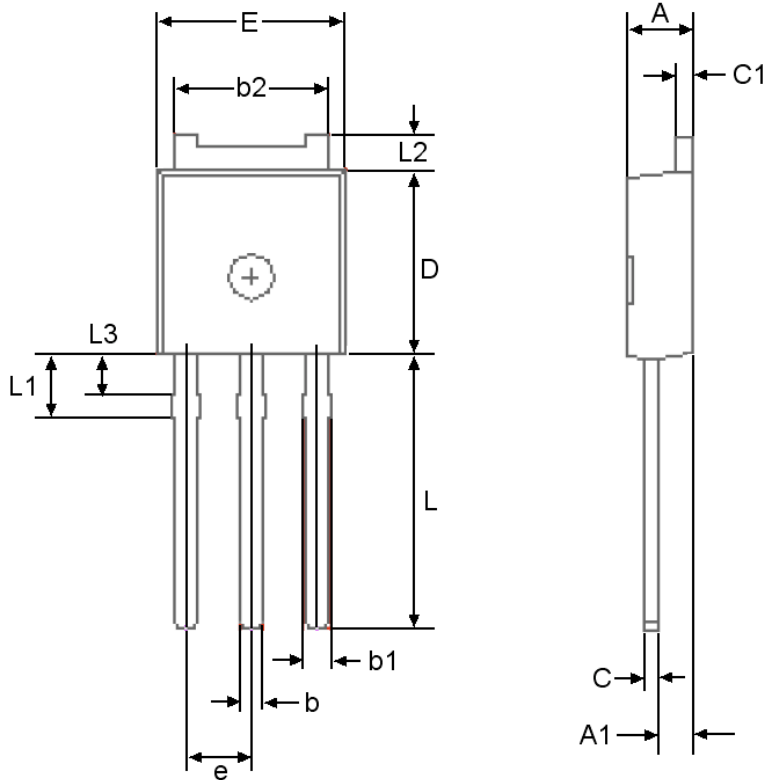
TO-252 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.290 BSC		0.090 BSC	
A1	4.600 BSC		0.180 BSC	
B	7.000	7.200	0.275	0.283
C	6.000	6.200	0.236	0.244
D	6.400	6.604	0.252	0.260
E	2.210	2.387	0.087	0.094
F	0.010	0.127	0.000	0.005
G	5.232	5.436	0.206	0.214
G1	0.666	0.889	0.026	0.035
G2	0.633	0.889	0.025	0.035
H	0.508 REF		0.020 REF	
I	0.900	1.500	0.035	0.059
J	2.743 REF		0.108 REF	
K	0.660	0.940	0.026	0.037
L	1.397	1.651	0.055	0.065
M	1.100 REF		0.043 REF	

Marking Diagram



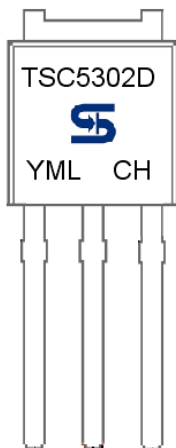
- Y** = Year Code
- M** = Month Code
(A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- = Month Code for Halogen Free Product
(O=Jan, P=Feb, Q=Mar, R=Apl, S=May, T=Jun, U=Jul, V=Aug, W=Sep, X=Oct, Y=Nov, Z=Dec)
- L** = Lot Code

TO-251 Mechanical Drawing



TO-251 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.19	2.38	0.086	0.094
A1	0.89	1.14	0.035	0.045
b	0.64	0.89	0.025	0.035
b1	0.76	1.14	0.030	0.045
b2	5.21	5.46	0.205	0.215
C	0.46	0.58	0.018	0.023
C1	0.46	0.58	0.018	0.023
D	5.97	6.10	0.235	0.240
E	6.35	6.73	0.250	0.265
e	2.28 BSC.		0.90 BSC.	
L	8.89	9.65	0.350	0.380
L1	1.91	2.28	0.075	0.090
L2	0.89	1.27	0.035	0.050
L3	1.15	1.52	0.045	0.060

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)
- YML** = 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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