TSC5304D

High Voltage NPN Transistor with Diode

TO-251 (IPAK)

TO-252 (DPAK)

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

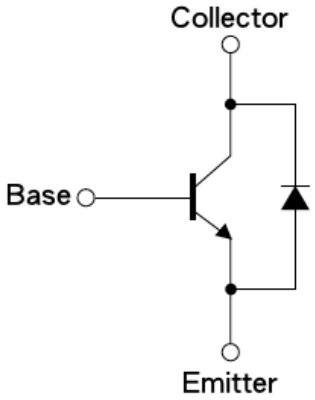
PRODUCT SUMMARY

BV_{CEO}	400V
BV_{CBO}	700V
I_C	4A
$V_{CE(SAT)}$	1.5V @ I_C / I_B = 4A / 1A

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

Block Diagram



Structure

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

Ordering Information

Part No.	Package	Packing
TSC5304DCP RO	TO-252	2.5Kpcs / 13” Reel
TSC5304DCH C5	TO-251	75pcs / Tube

Absolute Maximum Rating (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	4	A
Collector Peak Current (tp <5ms)	I_{CM}	8	A
Base Current	I_B	2	A
Base Peak Current (tp <5ms)	I_{BM}	4	A
Power Total Dissipation @ Tc=25ºC	P_{DTOT}	35	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	$R\Theta_{JC}$	3.57	$^{o}C/W$
Thermal Resistance - Junction to Ambient	$R\Theta_{JA}$	68	$^{o}C/W$

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}	--	--	100	uA
Collector Cutoff Current	V_{CE} =400V, I_B =0	I_{CEO}	--	--	250	uA
Emitter Cutoff Current	V_{EB} =7V, I_C =0	I_{EBO}	--	--	10	uA
Collector-Emitter Saturation Voltage	I_C =0.5A, I_B =0.1A	$V_{CE(SAT)1}$	--	0.25	0.7	V
	I_C =1A, I_B =0.2A	$V_{CE(SAT)2}$	--	0.5	1	
	I_C =2.5A, I_B =0.5A	$V_{CE(SAT)3}$	--	1.2	1.5	
	I_C =4A, I_B =1A	$V_{CE(SAT)4}$	--	0.5	--	
Base-Emitter Saturation Voltage	I_C =1A, I_B =0.2A	$V_{BE(SAT)1}$	--	--	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	Hfe	10	--	--	
	V_{CE} =5V, I_C =1A		17	--	37	
	V_{CE} =5V, I_C =2A		12	--	32	
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=25uS Duty Cycle<1%	t_{ON}	--	0.2	0.6	uS
Storage Time		t_{STG}	--	3.0	4.5	uS
Fall Time		t_f	--	0.2	0.3	uS

Notes: Pulsed duration =380uS, duty cycle ≤2%

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

Figure 1. Static Characteristics

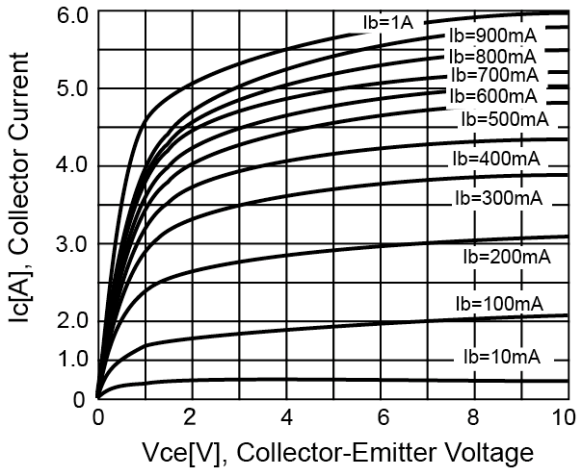


Figure 2. DC Current Gain

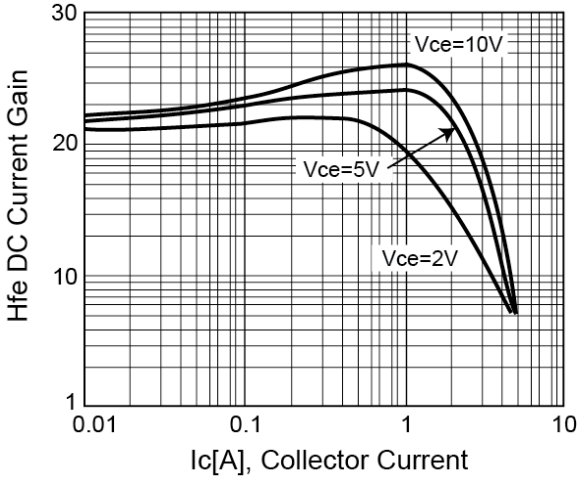


Figure 3. Vce(sat) v.s. Vbe(sat)

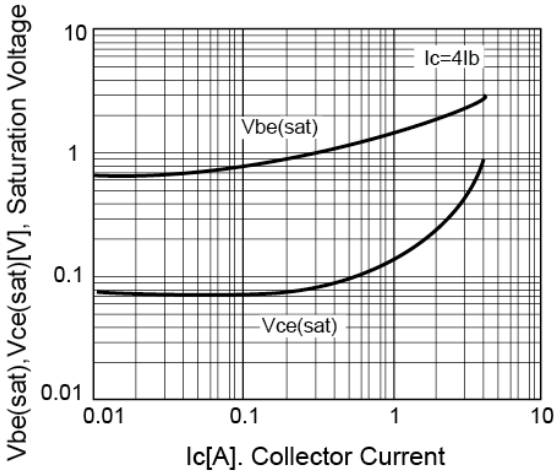


Figure 4. Power Derating

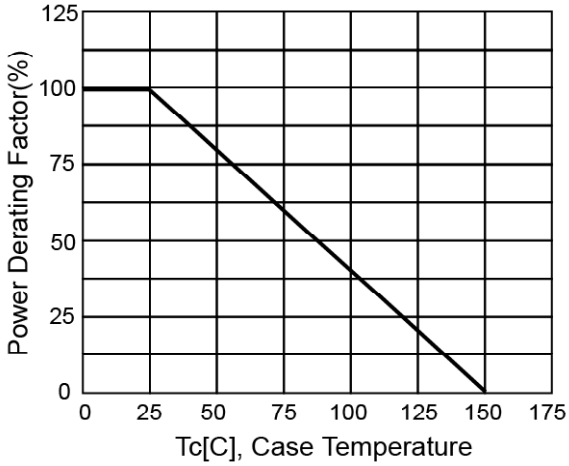


Figure 5. Reverse Bias SOA

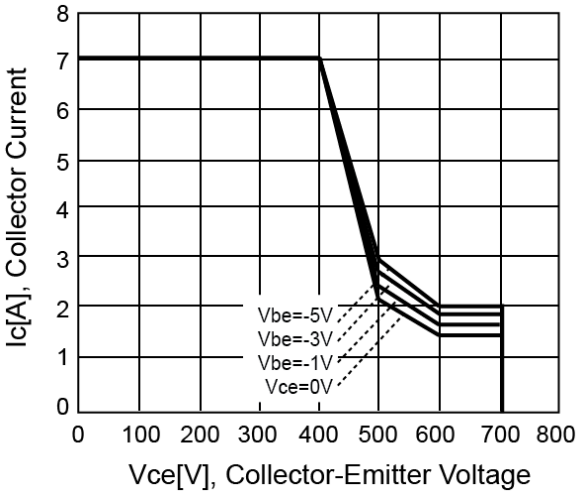
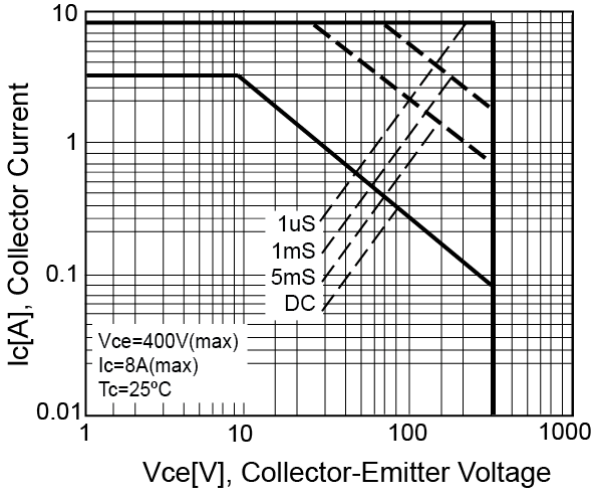


Figure 6. Safety Operating Area



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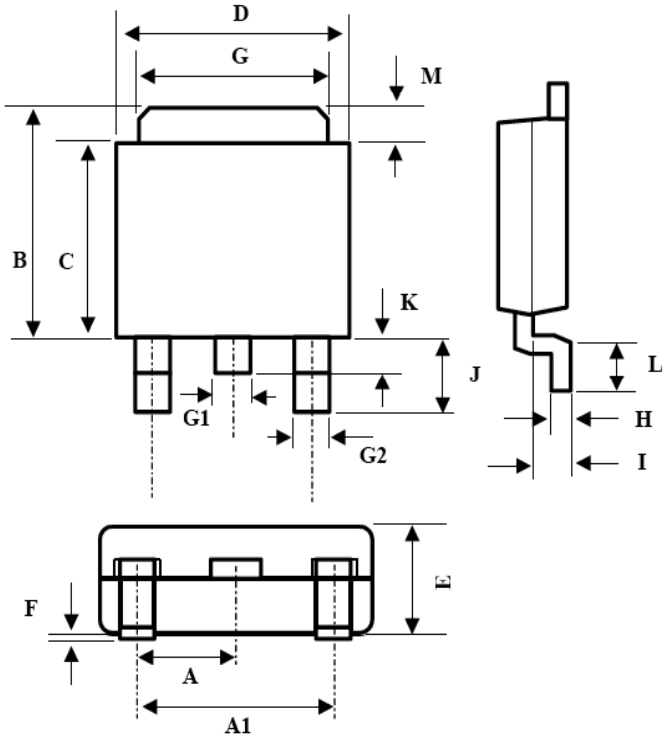
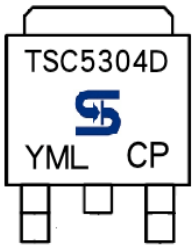
TO-252 Mechanical Drawing



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)
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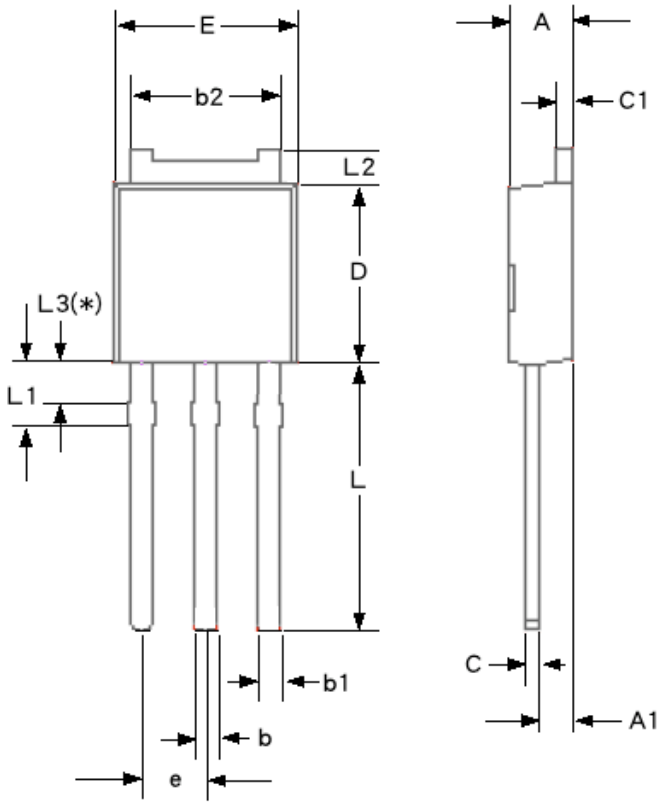
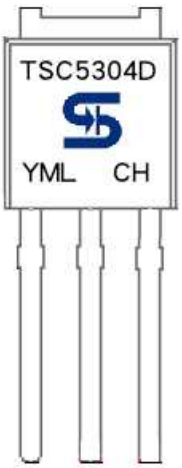
SOT-251 Mechanical Drawing



TO-251 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.190	2.380	0.0862	0.0937
A1	0.890	1.140	0.0350	0.0449
b	0.640	0.890	0.0252	0.0350
b1	0.760	1.140	0.0299	0.0449
b2	5.210	5.460	0.2051	0.2150
C	0.460	0.580	0.0181	0.0228
C1	0.460	0.580	0.0181	0.0228
D	5.970	6.100	0.2350	0.2402
E	6.350	6.730	0.2500	0.2650
e	2.280 BSC		0.0898 BSC	
L	8.890	9.650	0.3500	0.3799
L1	1.910	2.280	0.0752	0.0898
L2	0.890	1.270	0.0350	0.0500
L3	1.150	1.520	0.0453	0.0598

Marking Diagram



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