Preliminary

TSC5302D

High Voltage NPN Transistor with Diode

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

BV_{CEO} = 400V
BV_{CBO} = 800V
Ic = 2A
$V_{CE\ (SAT)}$, = 1.0V @ Ic / Ib = 1A / 0.2A

Features

- ✧ Built-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 applications.

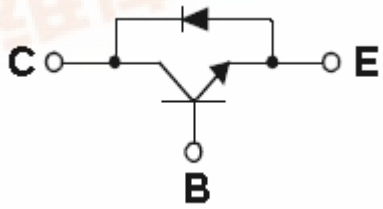
Structure

- ✧ Silicon triple diffused type.
- ✧ NPN silicon transistor with Diode

Ordering Information

Part No.	Packing	Package
TSC5302DCH	Tube	TO-251
TSC5302DCP	T&R	TO-252

Block Diagram



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

Parameter		Symbol	Limit	Unit
Collector-Base Voltage		V_{CBO}	800V	V
Collector-Emitter Voltage		V_{CEO}	400V	V
Emitter-Base Voltage		V_{EBO}	10	V
Collector Current	DC	I_C	2	A
	Pulse		4	
Base Current	DC	I_B	1	A
	Pulse		2	
Collector Power Dissipation (Tc=25 °C)	TO-251	P_D	75	W
	TO-252		1.5	
Operating Junction Temperature		T_J	+150	°C
Operating Junction and Storage Temperature Range		T_{STG}	- 65 to +150	°C
Thermal Resistance Junction to Case		RΘjc	6.25	°C/W
Thermal Resistance Junction to Ambient		RΘja	100	°C/W

Note: 1. Single pulse, Pw = 300uS, Duty <= 2%

Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Collector-Base Voltage	I_C = 1mA, I_B = 0	BV_{CBO}	800	--	--	V
Collector-Emitter Breakdown Voltage	I_C = 5mA, I_E = 0	BV_{CEO}	400	--	--	V
Emitter-Base Breakdown Voltage	I_E = 1mA, I_C = 0	BV_{EBO}	10	--	--	V
Collector Cutoff Current	V_{CB} = 500V, I_E = 0	I_{CBO}	--	--	10	uA
Emitter Cutoff Current	V_{EB} = 9V, I_C = 0	I_{EBO}	--	--	10	uA
Collector-Emitter Saturation Voltage	I_C / I_B = 0.5A / 0.1A I_C / I_B = 1.0A / 0.25A	$V_{CE(SAT)}1$ $V_{CE(SAT)}2$	-- --	-- --	0.4 0.6	V
Base-Emitter Saturation Voltage	I_C / I_B = 0.5A / 0.1A I_C / I_B = 1.0A / 0.25A	$V_{CB(SAT)}1$ $V_{CB(SAT)}2$	-- --	-- --	0.9 1.0	V
DC Current Gain	V_{CE} = 5V, I_C = 0.4A V_{CE} = 5V, I_C = 1A	h_{FE} 1 h_{FE} 2	20 6	-- --	-- --	
Turn On Time	V_{CC} = 250V, I_C = 1A,	t_{ON}	--	--	0.5	uS
Storage Time	I_{B1} = I_{B2} = 0.2A, tp= 25uS	t_{STG}	--	2.0	2.75	uS
Fall Time	Duty cycle < 1%	t_F	--	--	0.2	uS
Doide						
Fall Time	I_C = 1A	t_F	--	--	700	nS
Forward Voltage	I_C = 1A	Vf	--	--	1.4	V

Note : pulse test: pulse width <=300uS, duty cycle <=2%

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Electrical Characteristics Curve

Figure 1. Static Characteric

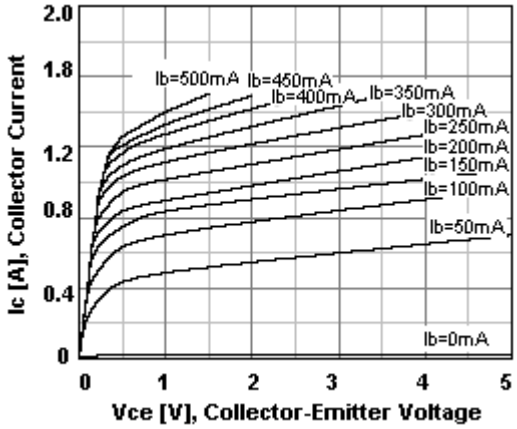


Figure 2. DC Current Gain

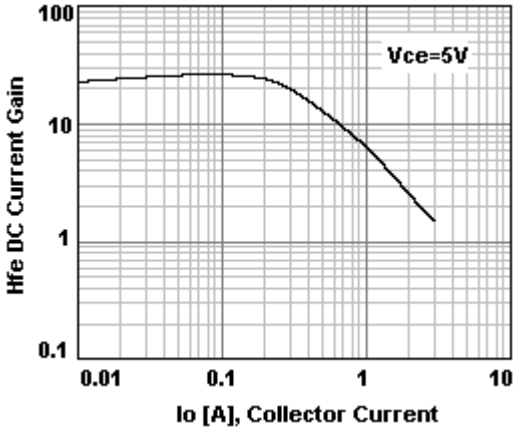


Figure 3. Vce(sat) v.s. Vbe(sat)

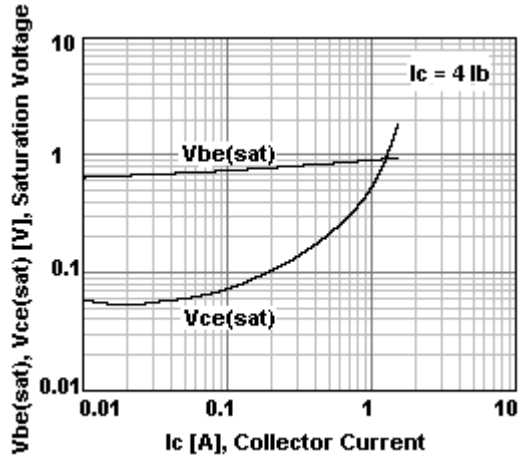


Figure 4. Switching Time

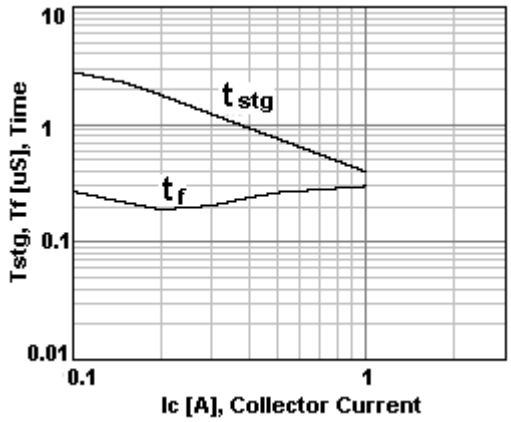


Figure 5. Safe Operating Area

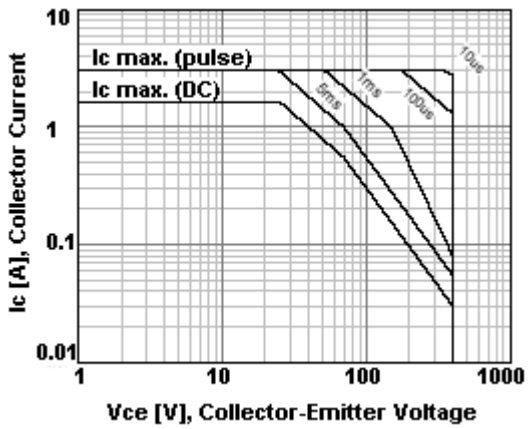
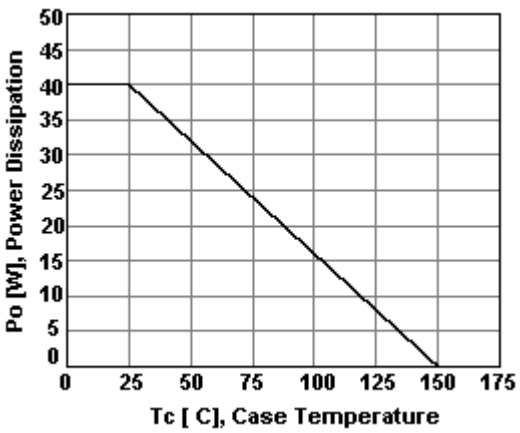


Figure 6. Power Derating



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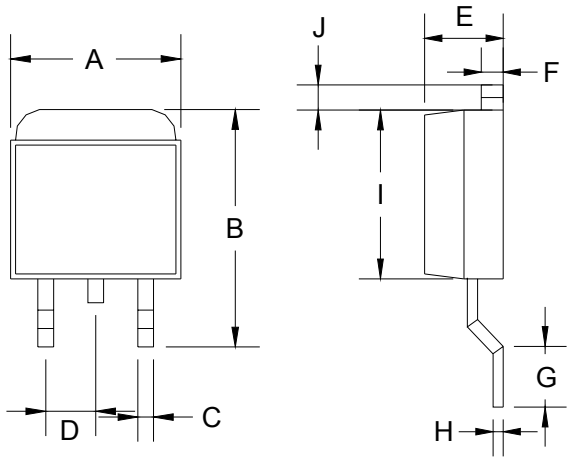
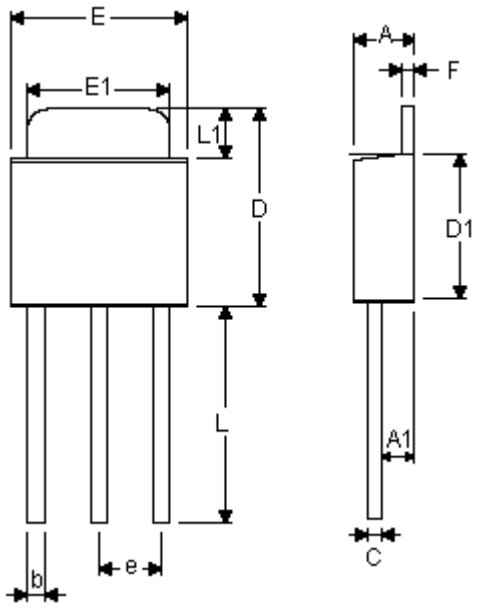
TO-252 Mechanical Drawing



TO-252 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.570	6.840	0.259	0.269
B	9.250	10.400	0.364	0.409
C	0.550	0.700	0.022	0.028
D	2.560	2.670	0.101	0.105
E	2.300	2.390	0.090	0.094
F	0.490	0.570	0.019	0.022
G	1.460	1.580	0.057	0.062
H	0.520	0.570	0.020	0.022
I	5.340	5.550	0.210	0.219
J	1.460	1.640	0.057	0.065

TO-251 Mechanical Drawing



TO-251 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.20	2.4	0.087	0.095
A1	1.10	1.30	0.043	0.051
b	0.40	0.80	0.016	0.032
C	0.40	0.60	0.016	0.024
D	6.70	7.30	0.264	0.287
D1	5.40	5.65	0.213	0.222
E	6.40	6.65	0.252	0.262
e	2.10	2.50	0.083	0.098
F	0.40	0.60	0.016	0.024
L	7.00	8.00	0.276	0.315
L1	1.60	1.86	0.063	0.073