TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TSC128D

High Voltage Fast-Switching NPN Power Transistor

TO-220

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 = 2.5A / 0.5A

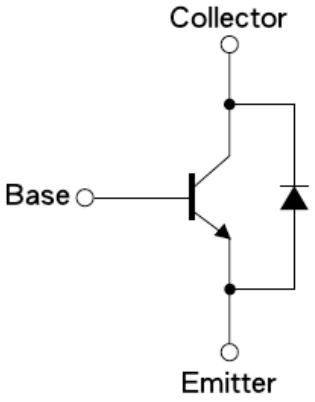
Features

- High Voltage
- High Speed Switching

Structure

- Silicon Triple Diffused Type
- NPN Silicon Transistor
- Integrated Antiparallel Collector-Emitter Diode

Block Diagram



Ordering Information

Part No.	Package	Packing
TSC128DCZ C0	TO-220	50pcs / Tube

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

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	700V	V
Collector-Emitter Voltage	V_{CEO}	400V	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
Total Dissipation	P_{tot}	70	W
Maximum Operating Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Case Thermal Resistance	$R\Theta_{JC}$	1.78	°C/W
Junction to Ambient Thermal Resistance	$R\Theta_{JA}$	62.5	°C/W

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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	$V_{CE(SAT)1}$	--	--	0.7	V
	I_C =1A, I_B =0.2A	$V_{CE(SAT)2}$	--	--	1	
	I_C =2.5A, I_B =0.5A	$V_{CE(SAT)3}$	--	--	1.5	
	I_C =4A, I_B =1A	$V_{CE(SAT)4}$	--	0.9	--	
Base-Emitter Saturation Voltage	I_C =0.5A, I_B =0.1A	$V_{BE(SAT)1}$	--	--	1.1	V
	I_C =1A, I_B =0.2A	$V_{BE(SAT)2}$	--	--	1.2	
	I_C =2.5A, I_B =0.5A	$V_{BE(SAT)3}$	--	--	1.3	
DC Current Gain	V_{CE} =5V, I_C =10mA	Hfe	10	--	--	
	V_{CE} =5V, I_C =2A		12	--	32	
	V_{CE} =5V, I_C =2.5A		8	--	--	
Forward Voltage Drop	I_f =2A	Vf	--	--	2	V
Turn On Time	V_{CC} =250V, I_C =2A,	t_{ON}	--	--	0.6	uS
Storage Time	I_{B1}=I_{B2}=0.4A, t_p=25uS	t_{STG}	2.5	3.0	3.5	uS
Fall Time	Duty Cycle<1%	t_f	--	0.2	0.3	uS

Notes: Pulsed duration =300uS, duty cycle ≤2%

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

Figure 1. Static Characteristics

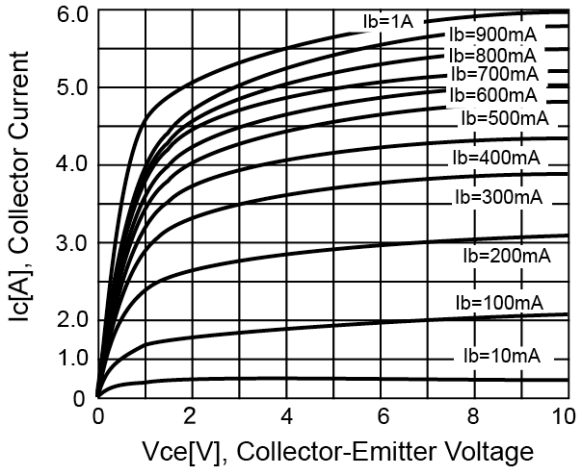


Figure 2. DC Current Gain

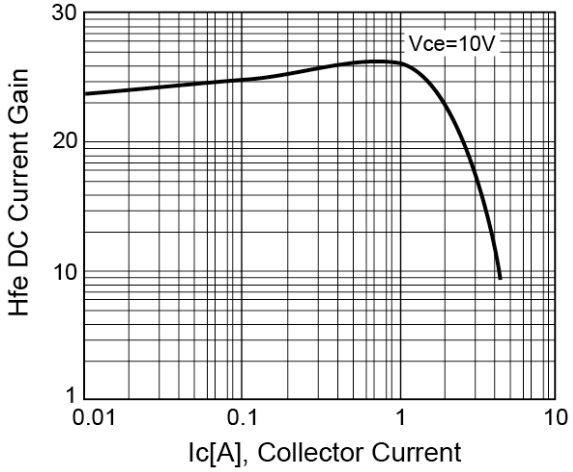


Figure 3. Vce(sat) v.s. Vbe(sat)

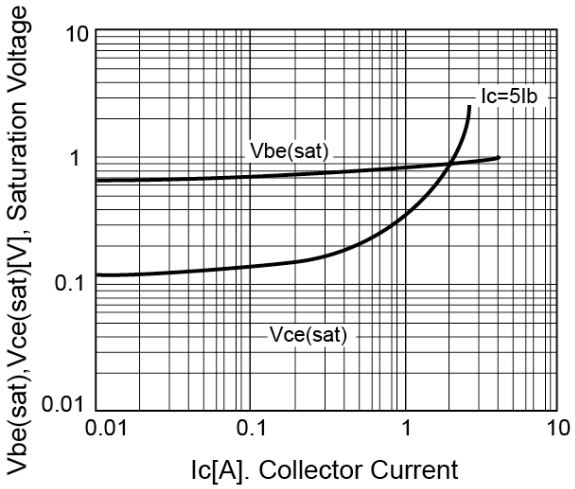


Figure 4. Power Derating

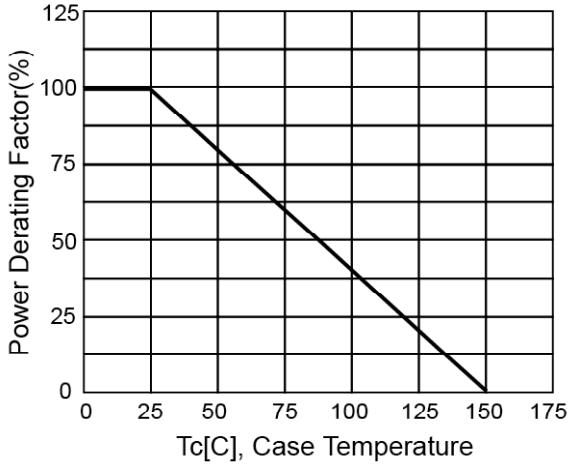


Figure 5. Reverse Bias SOA

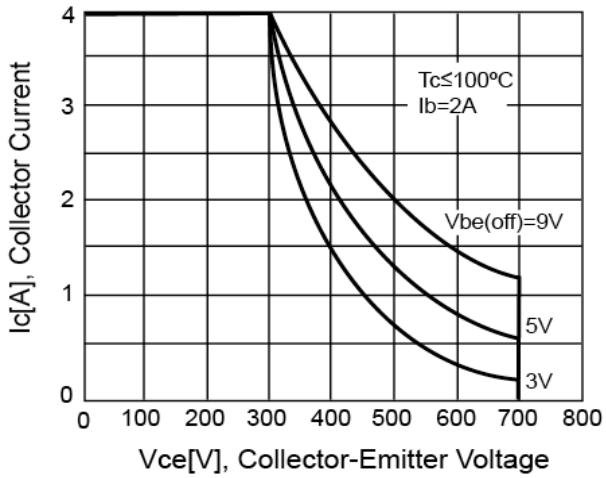
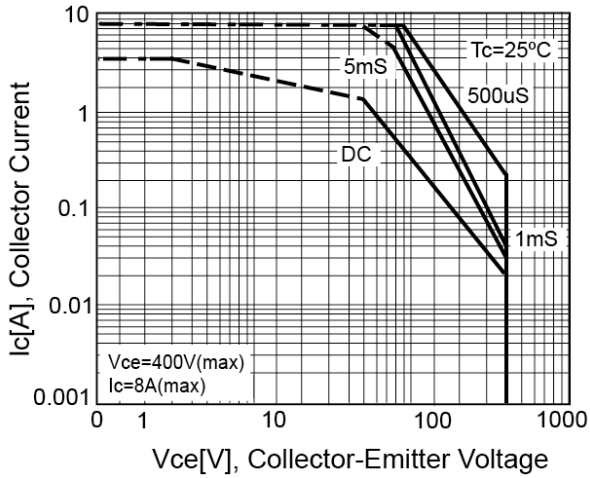


Figure 6. Safety Operating Area



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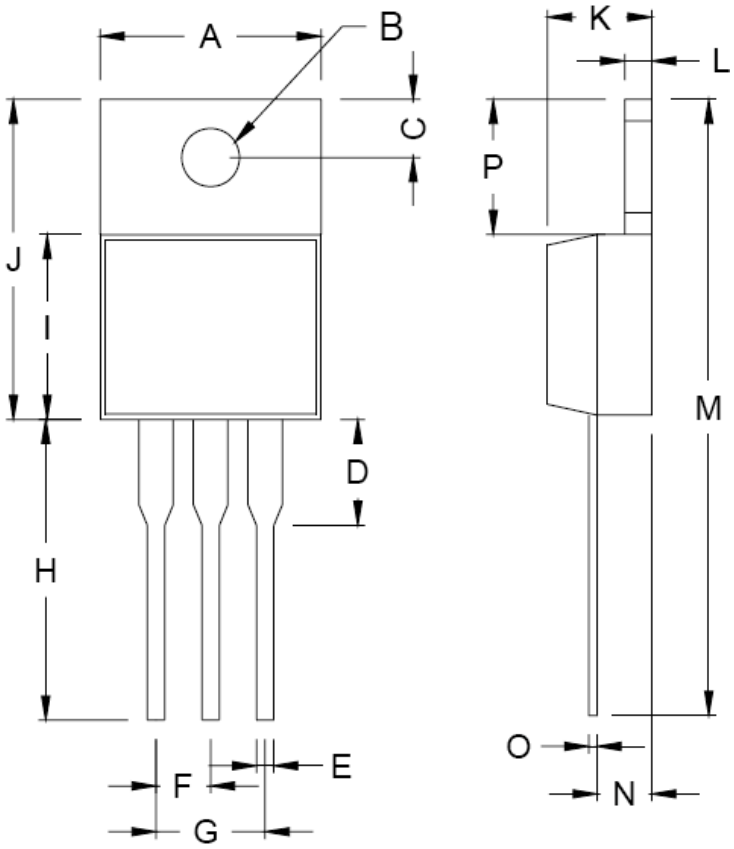
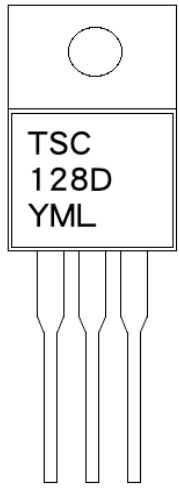
TO-220 Mechanical Drawing



TO-220 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.31	10.550	0.366	0.415
B	3.740	3.910	0.147	0.154
C	2.440	2.940	0.096	0.116
D	2.22	3.22	0.087	0.127
E	0.78	0.98	0.030	0.038
F	2.34	2.65	0.092	0.104
G	4.69	5.31	0.184	0.209
H	12.32	13.88	0.485	0.546
I	8.74	9.26	0.344	0.364
J	15.07	16.07	0.593	0.632
K	4.35	4.65	0.171	0.183
L	1.16	1.40	0.045	0.055
M	27.39	30.35	1.078	1.194
N	1.785	2.675	0.070	0.105
O	1.50	1.75	0.059	0.068
P	5.75	7.65	0.226	0.301

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)
L = Lot Code

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