



TO-220



Pin Definition:

1. Base
2. Collector
3. Emitter

PRODUCT SUMMARY

BV_{CEO}	400V
BV_{CBO}	700V
I_C	3A
$V_{CE(SAT)}$	2V @ $I_C / I_B = 2A / 0.5A$

Features

- High Voltage
- High Speed Switching

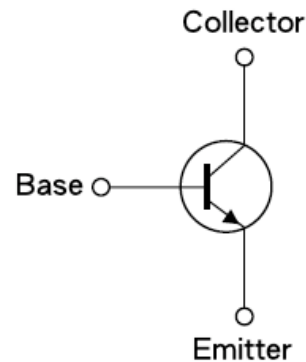
Structure

- Silicon Triple Diffused Type
- NPN Silicon Transistor

Ordering Information

Part No.	Package	Packing
TSC136CZ C0	TO-220	50pcs / Tube

Block Diagram



Absolute Maximum Rating (Ta = 25°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}	9	V
Total Dissipation @ $T_c \leq 25^\circ\text{C}$	P_{tot}	60	W
Collector Peak Current (tp < 5ms)	I_{CM}	6	A
Collector Current	I_C	3	A
Base Peak Current (tp < 5ms)	I_{BM}	3	A
Base Current	I_B	1.5	A
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	$R\theta_{JC}$	2.08	°C/W

Electrical Specifications

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Collector-Base Voltage	$I_C = 10\text{mA}, I_B = 0$	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}	9	--	--	V
Collector Cutoff Current	$V_{CB} = 700\text{V}, I_E = 0$	I_{CBO}	--	--	100	uA
Emitter Cutoff Current	$V_{EB} = 9\text{V}, I_C = 0$	I_{EBO}	--	--	10	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
	$I_C = 0.6\text{A}, I_B = 60\text{mA}$	$V_{CE(SAT)2}$	--	--	0.7	
	$I_C = 2\text{A}, I_B = 0.5\text{A}$	$V_{CE(SAT)3}$	--	1.5	2	
DC Current Gain	$V_{CE} = 5\text{V}, I_C = 10\text{mA}$	$h_{FE 1}$	10	27	--	
	$V_{CE} = 5\text{V}, I_C = 1\text{A}$	$h_{FE 2}$	10	--	30	
	$V_{CE} = 5\text{V}, I_C = 2\text{A}$	$h_{FE 3}$	4	--	24	
Frequency	$V_{CE} = 10\text{V}, I_C = 0.1\text{A}$	f_T	4	--	--	MHz
Output Capacitance	$V_{CB} = 10\text{V}, f = 0.1\text{MHz}$	C_{ob}	--	21	--	pF
Turn On Time	$V_{CC} = 125\text{V}, I_C = 1\text{A},$ $I_{B1} = 0.2\text{A}, I_{B2} = 0.2\text{A},$ $R_L = 125\text{ohm}$	t_{ON}	--	0.4	--	uS
Storage Time		t_{STG}	--	2.0	--	uS
Fall Time		t_f	--	0.16	--	uS

Notes:

a. Pulsed duration = 300uS, duty cycle $\leq 1.5\%$

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

Figure 1. Static Characteristics

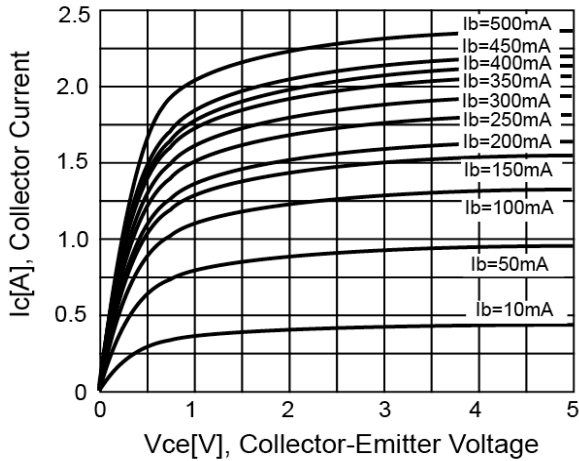


Figure 2. DC Current Gain

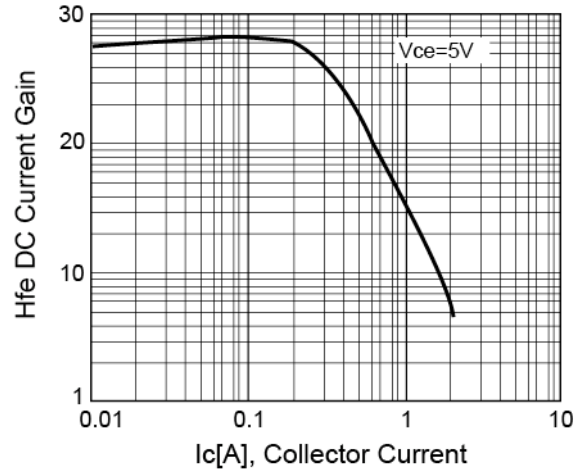


Figure 3. Vce(sat) v.s. Vbe(sat)

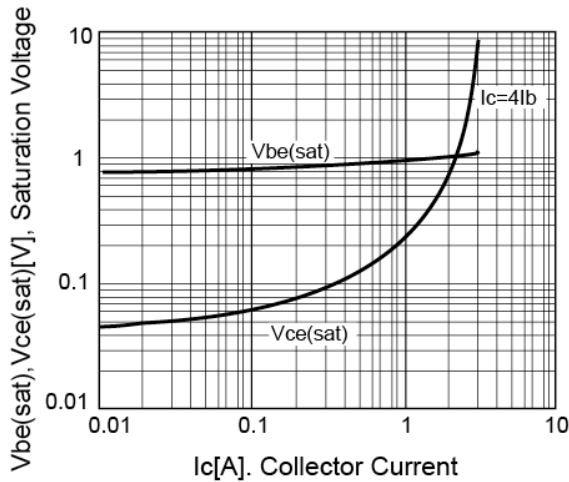


Figure 4. Power Derating

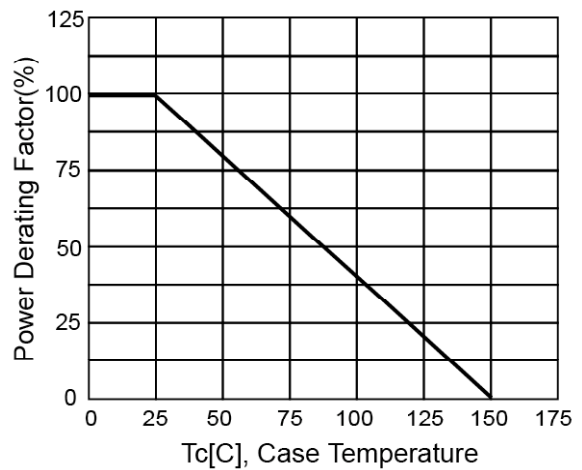


Figure 5. Reverse Bias SOA

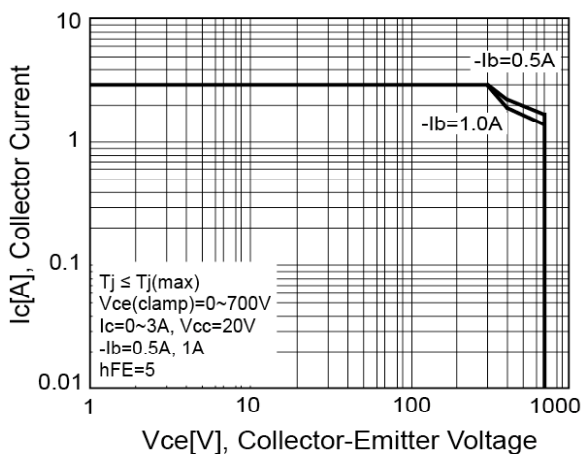
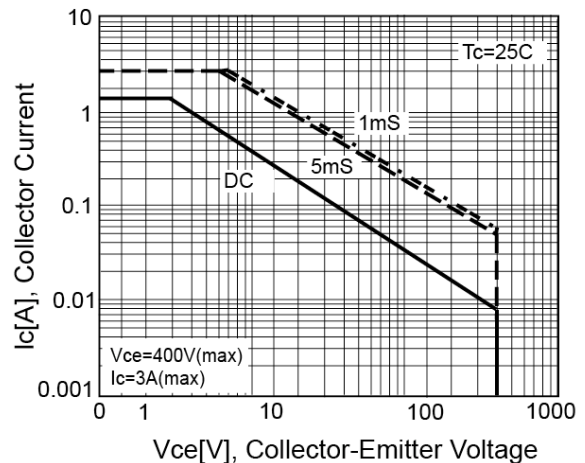
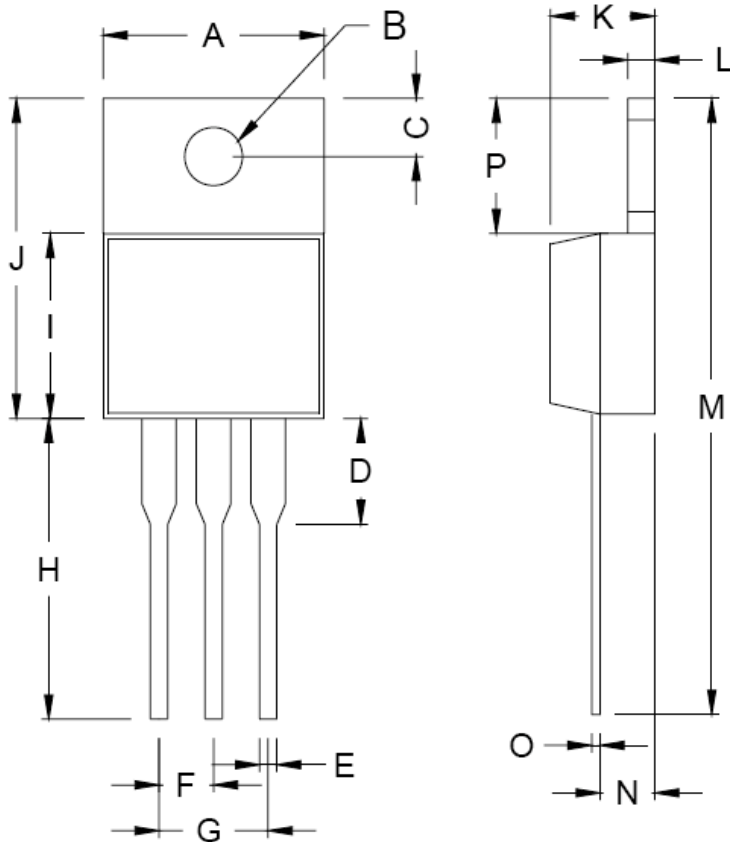


Figure 6. Safety Operating Area

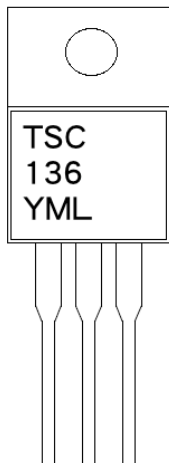


TO-220 Mechanical Drawing



TO-220 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.000	10.500	0.394	0.413
B	3.740	3.910	0.147	0.154
C	2.440	2.940	0.096	0.116
D	-	6.350	-	0.250
E	0.75	0.85	0.029	0.033
F	2.345	2.715	0.092	0.058
G	4.690	5.430	0.092	0.107
H	12.700	14.732	0.500	0.581
J	14.224	16.510	0.560	0.650
K	3.556	4.826	0.140	0.190
L	1.285	1.315	0.050	0.051
M	27.700	29.620	1.060	1.230
N	2.032	2.921	0.080	0.115
O	0.255	0.610	0.010	0.024
P	5.842	6.858	0.230	0.270

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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