

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

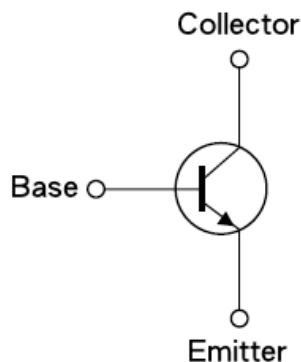
Structure

- 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 ≤1.5%

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

Figure 1. Static Characteristics

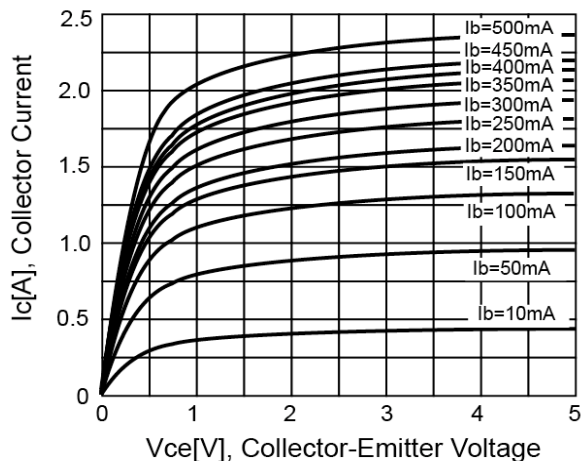


Figure 2. DC Current Gain

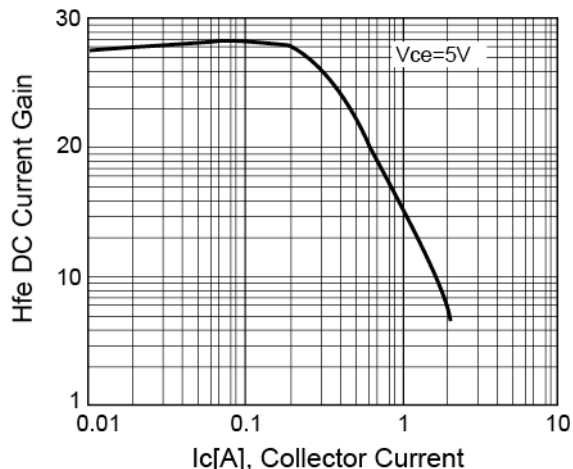


Figure 3. $V_{ce(sat)}$ v.s. $V_{be(sat)}$

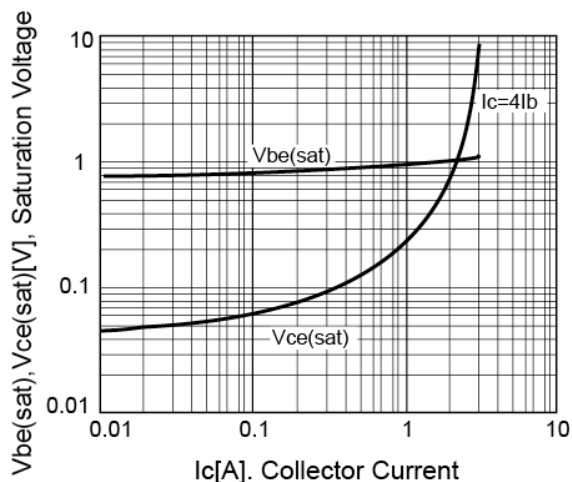


Figure 4. Power Derating

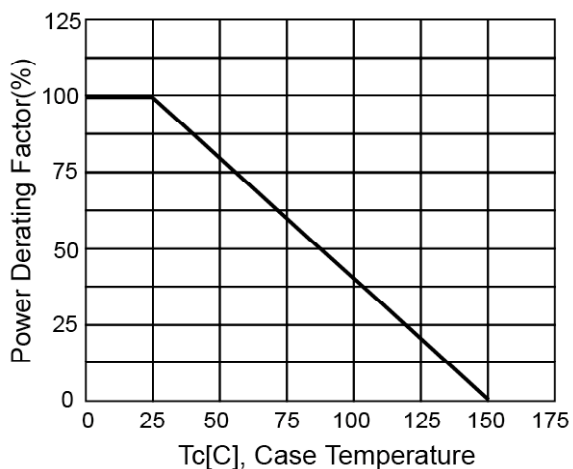


Figure 5. Reverse Bias SOA

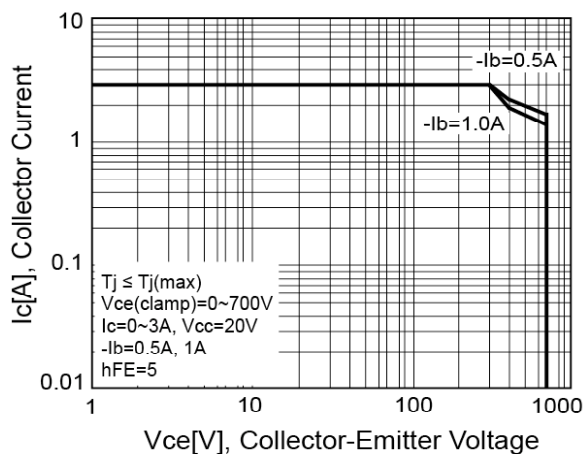
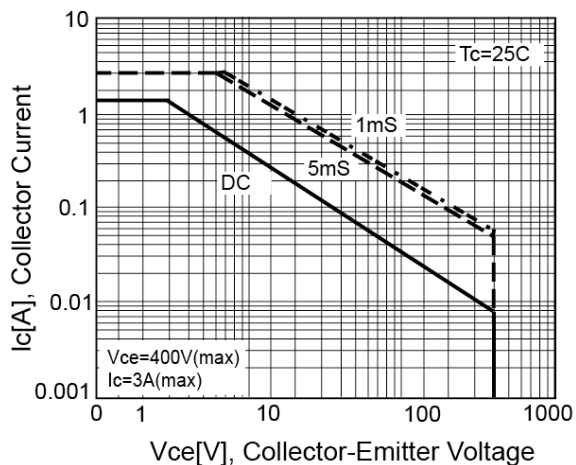
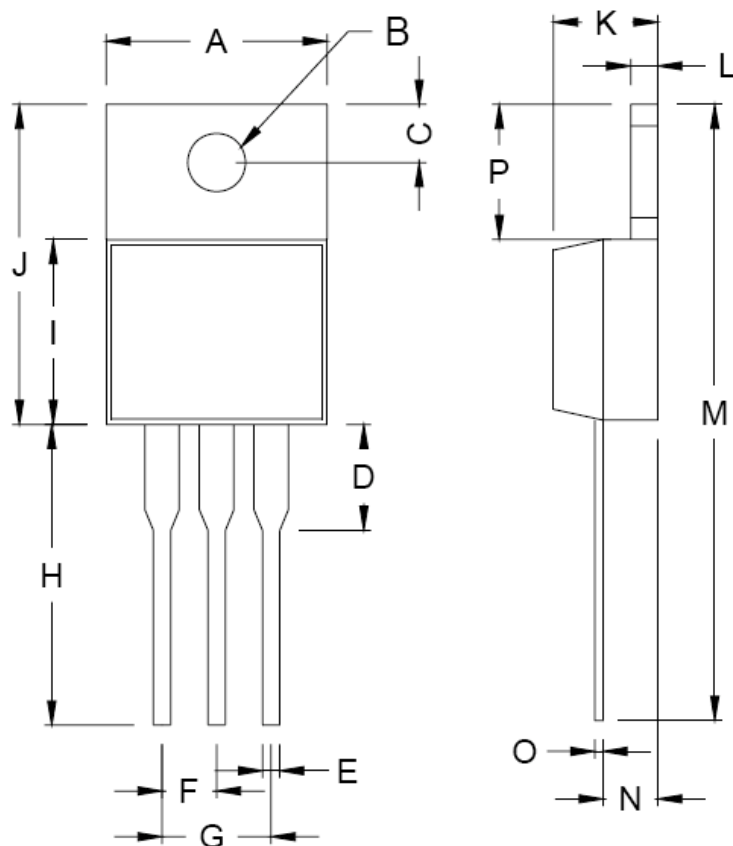


Figure 6. Safety Operating Area

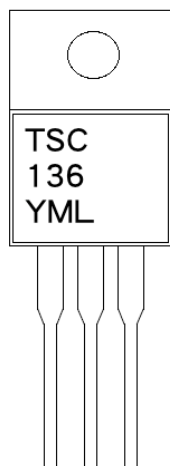


TO-220 Mechanical Drawing



DIM	TO-220 DIMENSION			
	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

TSC136

High Voltage NPN Transistor

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