

NPN Epitaxial Silicon Transistor

1 Description

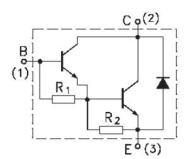
The TIP122 / MJD122 is a medium power low voltage transistor provides insulation voltage rated at 2000V RMS from all three terminals to external heatsink. TO-220F series comply with UL standards (File ref:E252906).

2 Features

- High current output up to 5A
- Low saturation voltage
- Complement to TIP127

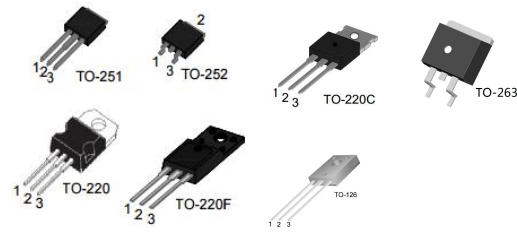
3 Applications

- voltage regulator
- medium power linear
- switching



Typ: R1=8KΩ, R2=0.12KΩ

$B_{VCB} = 100V$
 $B_{VCE} = 100V$
 $I_C = 5A$



1.Base 2.Collector 3.Emitter

4 Electrical Characteristics

4.1 Absolute Maximum Ratings (T_c=25°C, unless otherwise noted)

PARAMETER		SYMBOL	VALUE	UNIT
Collector-Base Voltage		V_{CBO}	100	V
Collector-Emitter Voltage		V_{CEO}	100	V
Emitter-Base Voltage		V_{EBO}	5	V
Collector Current (DC)		I_C	5	A
*Collector Current (Pulse)		I_{CP}	8	A
Base Current (DC)		I_B	0.1	A
Collector Dissipation (T _c =25°C)	TO-220/220C/263	P_C	50	W
	TO-252/251		35	
	TO-220F/126		25	
Collector Dissipation (T _a =25°C)			3	W
Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	- 55 ~ 150	°C

* PW≤10ms, Duty Cycle≤50%

4.2 Thermal Characteristics

PARAMETER	SYMBOL	VALUE				UNIT
		TO-220/263	TO-220F	TO-126	TO-252/251	
Thermal Resistance, Junction to Case-sink	R_{thJC}	3.0	4.0	6.5	3.5	°C/W

4.3 Electrical Characteristics (Tc=25°C, unless otherwise noted)

SYMBOL	PARAMETER	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE}=100V$	-	-	100	μA
I_{CEO}	Collector Cut-off Current ($I_B = 0$)	$V_{CE}=100V$	-	-	100	μA
I_{EBO}	Emitter Cut-off Current ($I_C = 0$)	$V_{EB}=5V$	-	-	10	mA
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage ($I_B = 0$)	$I_C=10mA$	100	-	-	V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ($I_E = 0$)	$I_C=100\mu A$	100	-	-	V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ($I_C = 0$)	$I_E=30mA$	5	-	-	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=1A, I_B=10mA$	-	-	1.2	V
		$I_C=3A, I_B=12mA$	-	-	2	
		$I_C=5A, I_B=20mA$	-	-	4	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=3A, I_B=12mA$	-	-	1.5	
h_{FE}	DC Current Gain	$I_C=10mA, V_{CE}=4V$	1K	-	9K	
		$I_C=1A, V_{CE}=4V^*$	1K	-	9K	
		$I_C=3A, V_{CE}=4V$	1K	-	9K	

 h_{FE}^* Classification

Classification	1	2	3	4	5	6
h_{FE}^*	1K-3K	3K-4K	4K-5K	5K-6K	6K-7K	7K-9K

5 Typical characteristics diagrams

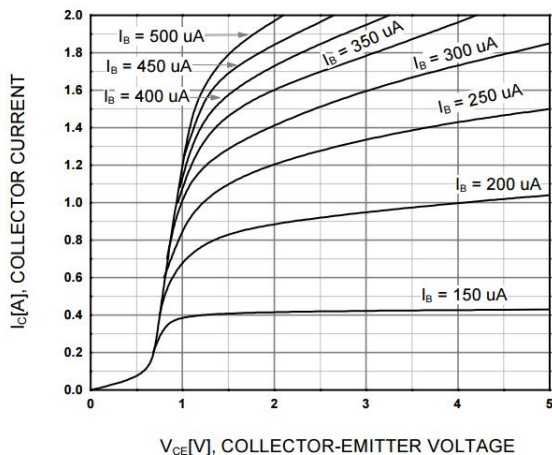


Figure 1. Static Characteristic

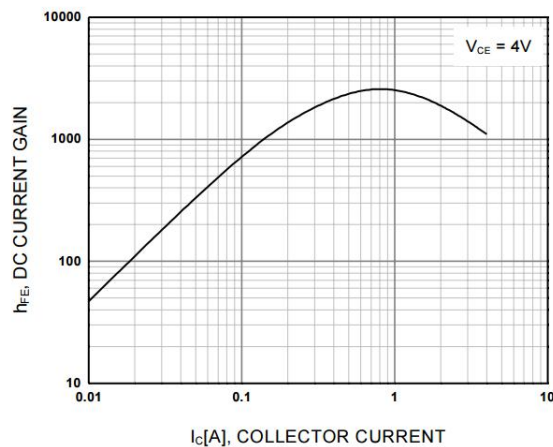
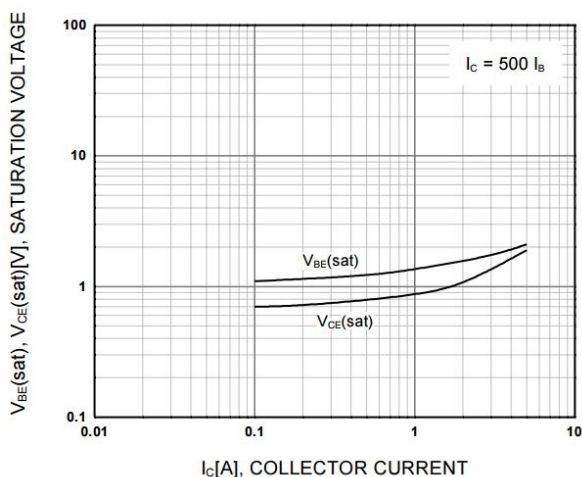


Figure 2. DC current Gain



**Figure 3. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage**

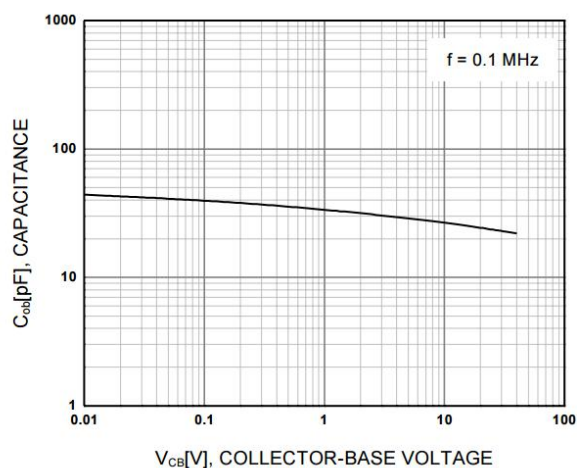


Figure 4. Collector Output Capacitance

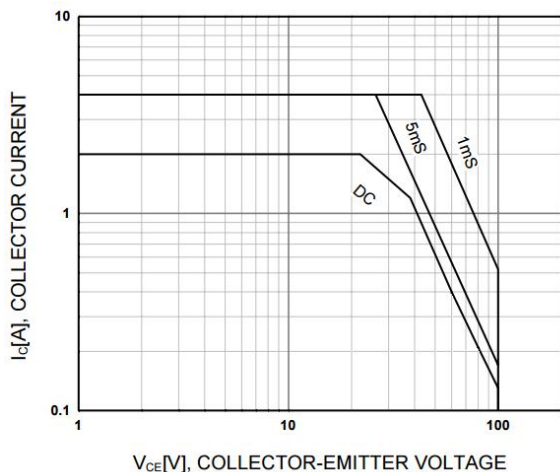


Figure 5. Safe Operating Area

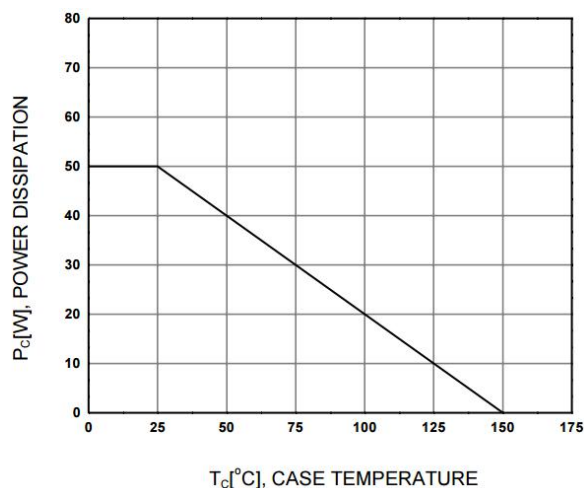


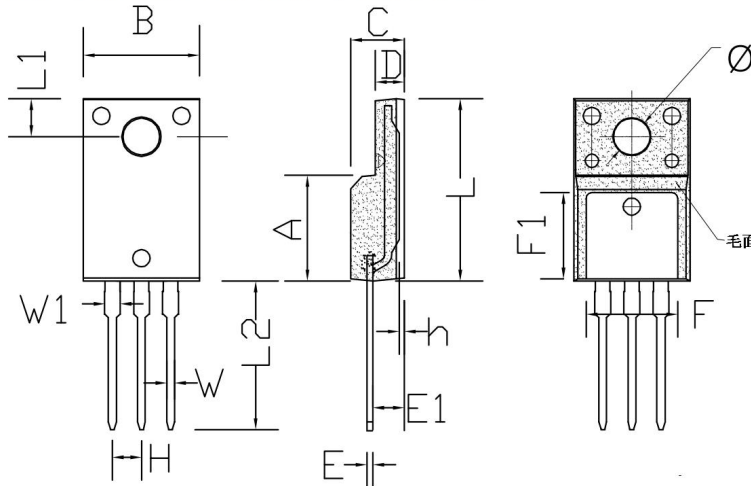
Figure 6. Power Derating

6 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
TIP122	TO-220	TIP122	Pb-free	Tube	1000//box
TIP122	TO-252	MJD122	Pb-free	Braid	3000/disc

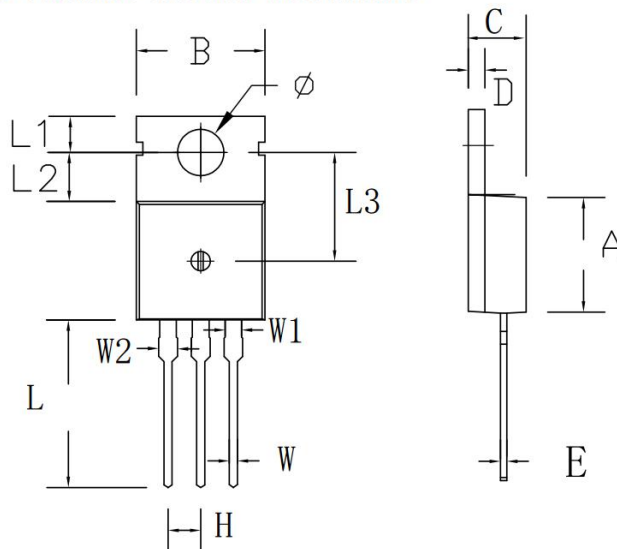
7 Dimensions

TO-220F PACKAGE OUTLINE DIMENSIONS



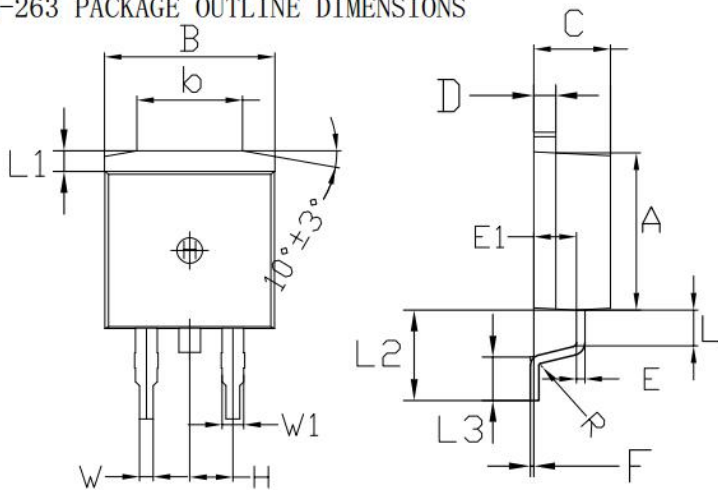
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	10.00	10.50	0.394	0.413
C	4.30	4.90	0.169	0.193
D	2.30	2.70	0.091	0.106
L	15.55	16.15	0.612	0.636
h	0.40	0.60	0.016	0.024
L1	3.15	3.55	0.124	0.140
L2	12.65	13.35	0.498	0.526
W	0.70	0.90	0.028	0.035
W1	1.15	1.55	0.045	0.061
H	2.54 TYP		0.100 TYP	
E	0.48	0.53	0.019	0.021
Φ	2.90	3.40	0.114	0.134
E1	2.40	2.90	0.094	0.114
F	7.75	8.25	0.305	0.325
F1	7.35	7.85	0.289	0.309

TO-220C PACKAGE OUTLINE DIMENSIONS



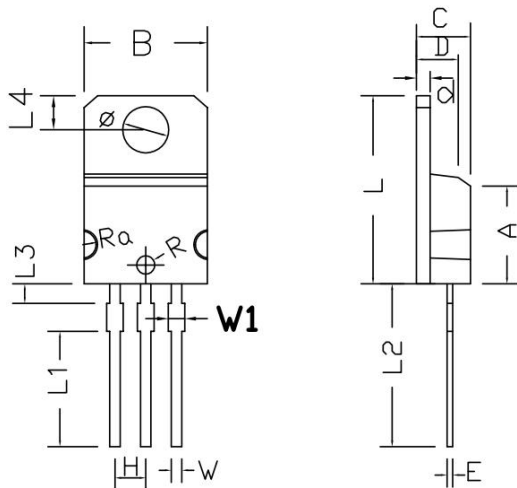
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
H	2.54 TYP		0.100 TYP	
W	0.60	0.95	0.024	0.037
W1	1.05	1.45	0.041	0.057
W2	1.20	1.60	0.047	0.063
L	12.60	13.40	0.496	0.528
L1	2.45	2.95	0.096	0.116
L2	3.45	3.95	0.136	0.156
L3	8.15	8.65	0.321	0.341
Φ	3.50	3.90	0.138	0.154

TO-263 PACKAGE OUTLINE DIMENSIONS



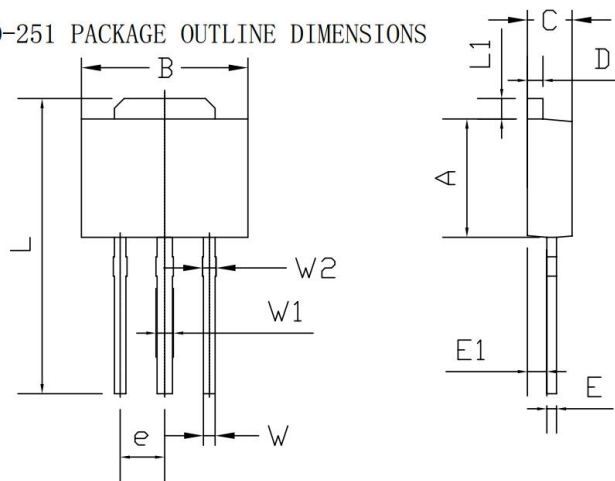
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
L	12.25	13.75	0.482	0.541
L1	1.15	1.45	0.045	0.057
R	0.24	0.26	0.0095	0.0102
W	0.80	0.82	0.0315	0.0323
W1	1.20	1.30	0.047	0.051
H	2.54 TYP		0.200 TYP	
b	5.50	6.50	0.216	0.256
E1	2.4	2.6	0.0946	0.1024
L2	5.20	5.80	0.205	0.228
L3	2.20	3.20	0.087	0.126
F	0.03	0.23	0.0012	0.0091

TO-220M PACKAGE OUTLINE DIMENSIONS



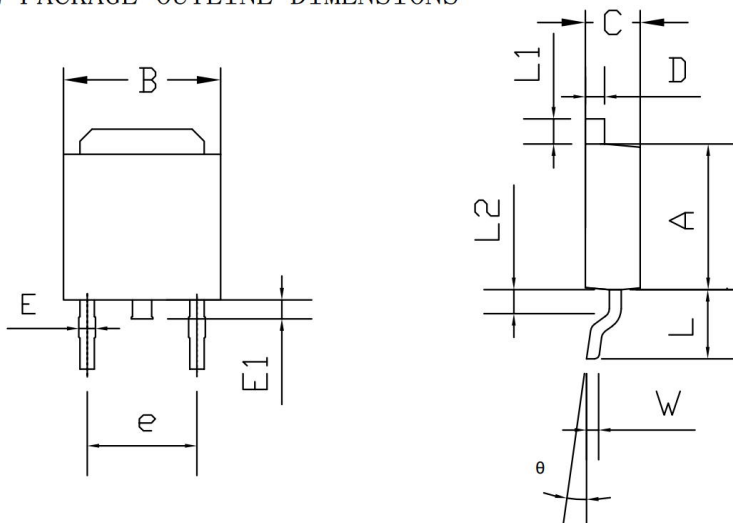
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
	MIN	MAX	MIN	MAX
A	7.55	8.05	0.297	0.317
B	9.85	10.25	0.388	0.404
C	4.20	4.80	0.165	0.189
D	3.20	3.60	0.126	0.142
E	0.42	0.47	0.017	0.019
L	15.20	15.60	0.598	0.614
H	2.52	2.56	0.099	0.101
W	0.78	0.88	0.031	0.035
Φ	3.60	3.90	0.142	0.154
R	0.72	0.78	0.028	0.031
Ra	9.00	10.5	0.354	0.413
d	1.10	1.40	0.043	0.055
L1	9.3	9.7	0.366	0.382
L2	13.00	13.60	0.512	0.535
L3	1.20	1.70	0.047	0.067
L4	2.60	3.0	0.102	0.118
W1	1.10	1.50	0.043	0.059

TO-251 PACKAGE OUTLINE DIMENSIONS

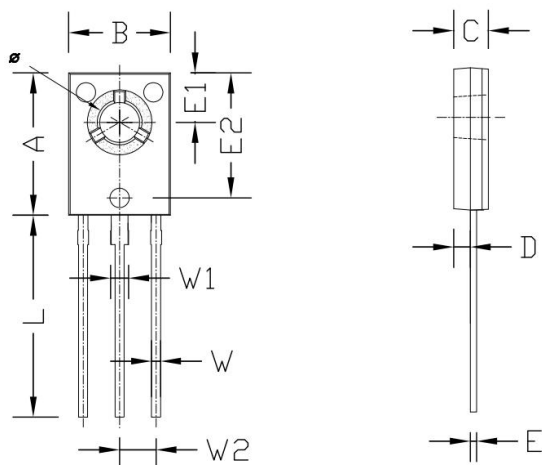


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	6.00	6.20	0.236	0.244
B	2.25	2.35	0.089	0.093
C	2.45	2.65	0.097	0.104
D	0.75	0.85	0.030	0.033
E	8.48	8.52	0.3341	0.3357
E1	5.10	5.46	0.201	0.215
e	2.29	2.31	0.0902	0.0910
L	15.00	15.40	0.5910	0.6068
L1	1.00	1.10	0.0394	0.0433
W	0.55	0.65	0.0217	0.0256
W1	0.85	0.95	0.0335	0.0374
W2	0.65	0.75	0.0256	0.0296

TO-252 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	6.00	6.20	0.236	0.244
B	6.49	6.69	0.256	0.263
C	2.20	2.40	0.087	0.094
D	0.75	0.85	0.030	0.033
E	0.65	0.75	0.0256	0.0296
E1	0.70	0.90	0.028	0.035
e	4.58	4.62	0.1805	0.1820
L	2.85	2.95	0.112	0.116
L1	1.00	1.10	0.0394	0.0433
L2	0.70	0.90	0.0276	0.0355
W	0.48	0.52	0.019	0.020
θ	0	8	0	8

TO-126 PACKAGE OUTLINE DIMENSIONS


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	10.50	11.10	0.413	0.437
B	7.65	7.95	0.301	0.313
C	2.50	2.80	0.098	0.110
D	1.45	1.75	0.057	0.069
E	0.40	0.60	0.016	0.024
E1	3.65	3.85	0.144	0.152
E2	9.40	9.60	0.370	0.378
L	15.4	15.9	0.606	0.626
W	0.60	0.80	0.024	0.031
W1	1.20	1.30	0.047	0.051
W2	2.32 TYP		0.091 TYP	
Φ	3.05	3.35	0.120	0.132

8 Attentions

- Jiangsu Donghai Semiconductor Technology Co., Ltd. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of WXDH products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

9 Appendix

Revision history:

Date	REV.	Description	Page
2017.08.11	1.0	Original	