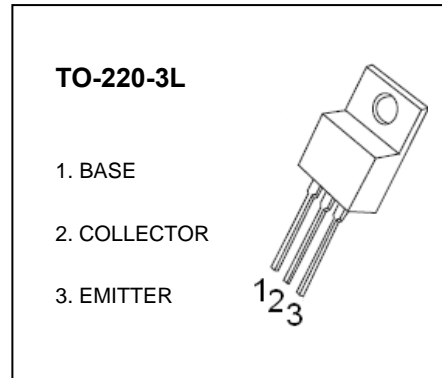


# TO-220-3L Plastic-Encapsulate Transistors

## 2SD1138 TRANSISTOR (NPN)

### FEATURES

- Low Frequency Power Amplifier Color TV Vertical Deflection Output



### MAXIMUM RATINGS (T<sub>a</sub>=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V <sub>CB0</sub>	Collector-Base Voltage	200	V
V <sub>CEO</sub>	Collector-Emitter Voltage	150	V
V <sub>EBO</sub>	Emitter-Base Voltage	6	V
I <sub>C</sub>	Collector Current	2	A
P <sub>C</sub>	Collector Power Dissipation	1.8	W
R <sub>θJA</sub>	Thermal Resistance from Junction to Ambient	69	°C/W
T <sub>J</sub> , T <sub>stg</sub>	Operation Junction and Storage Temperature Range	-55~+150	°C

### ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)

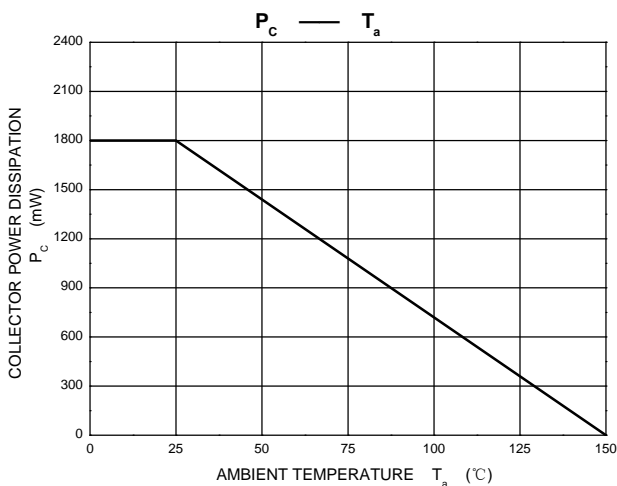
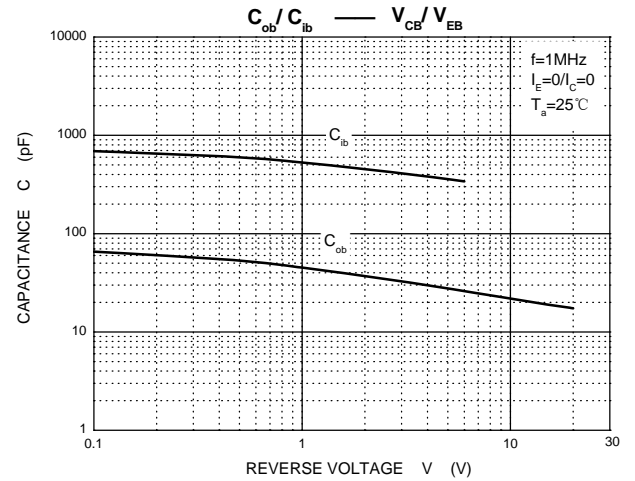
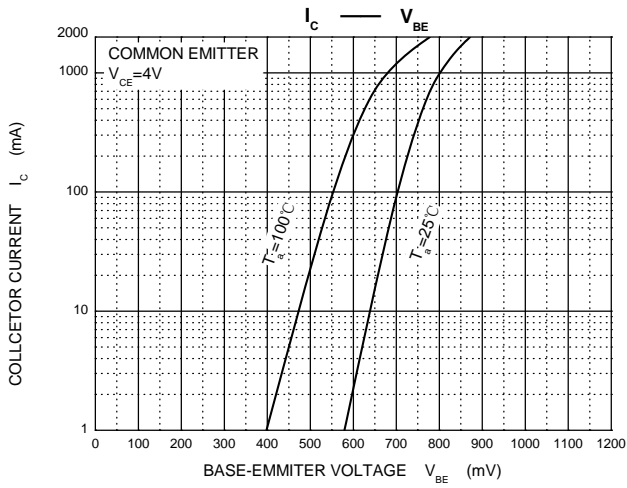
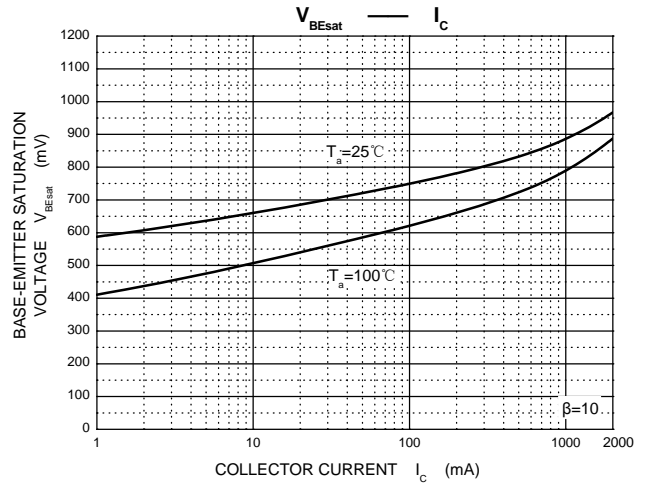
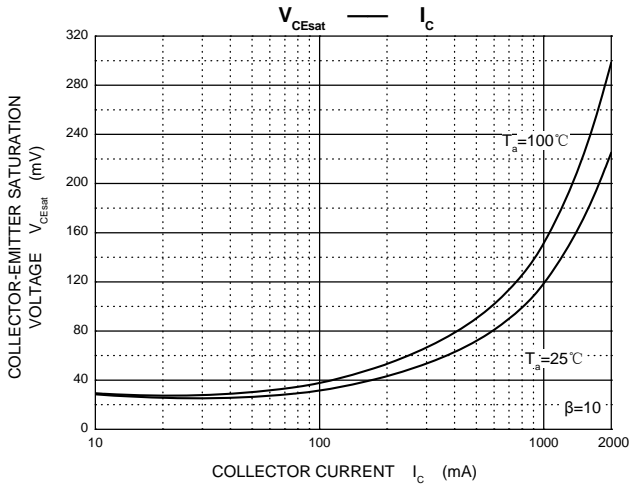
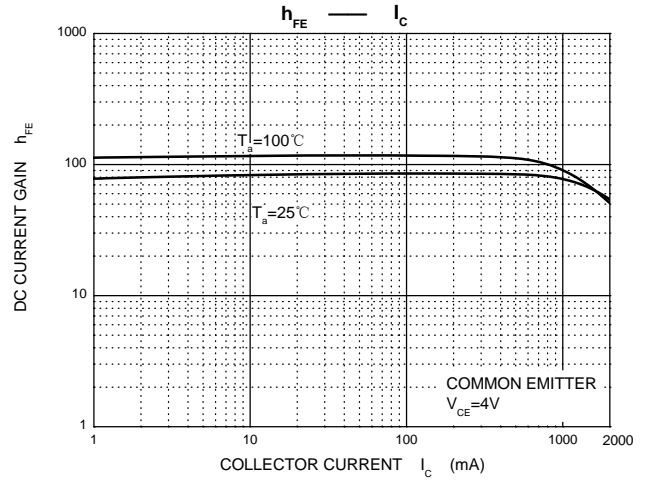
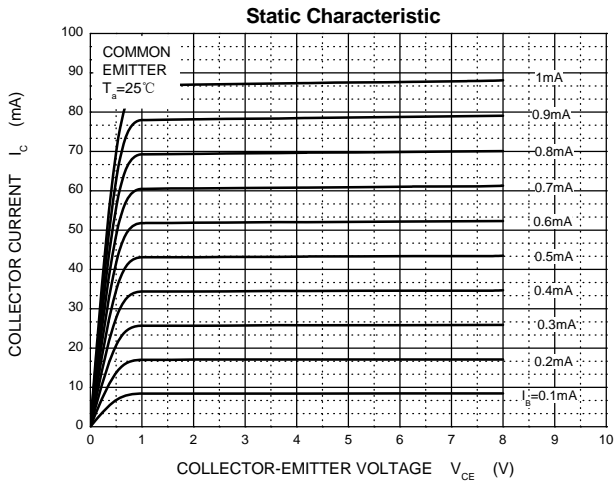
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =5mA, I <sub>E</sub> =0	200			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =50mA, I <sub>B</sub> =0	150			V
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =5mA, I <sub>C</sub> =0	6			V
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> =120V, I <sub>E</sub> =0			1	μA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> =5V, I <sub>C</sub> =0			1	μA
DC current gain	h <sub>FE</sub> (1)	V <sub>CE</sub> =4V, I <sub>C</sub> =50mA	60		200	
	h <sub>FE</sub> (2)	V <sub>CE</sub> =10V, I <sub>C</sub> =500mA	60			
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =500mA, I <sub>B</sub> =50mA			3	V
Base-emitter voltage	V <sub>BE</sub>	V <sub>CE</sub> =4V, I <sub>C</sub> =50mA			1	V
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> =10V, I <sub>E</sub> =0, f=1MHz		30		pF

\*Pulse test: pulse width ≤300μs, duty cycles ≤ 2.0%.

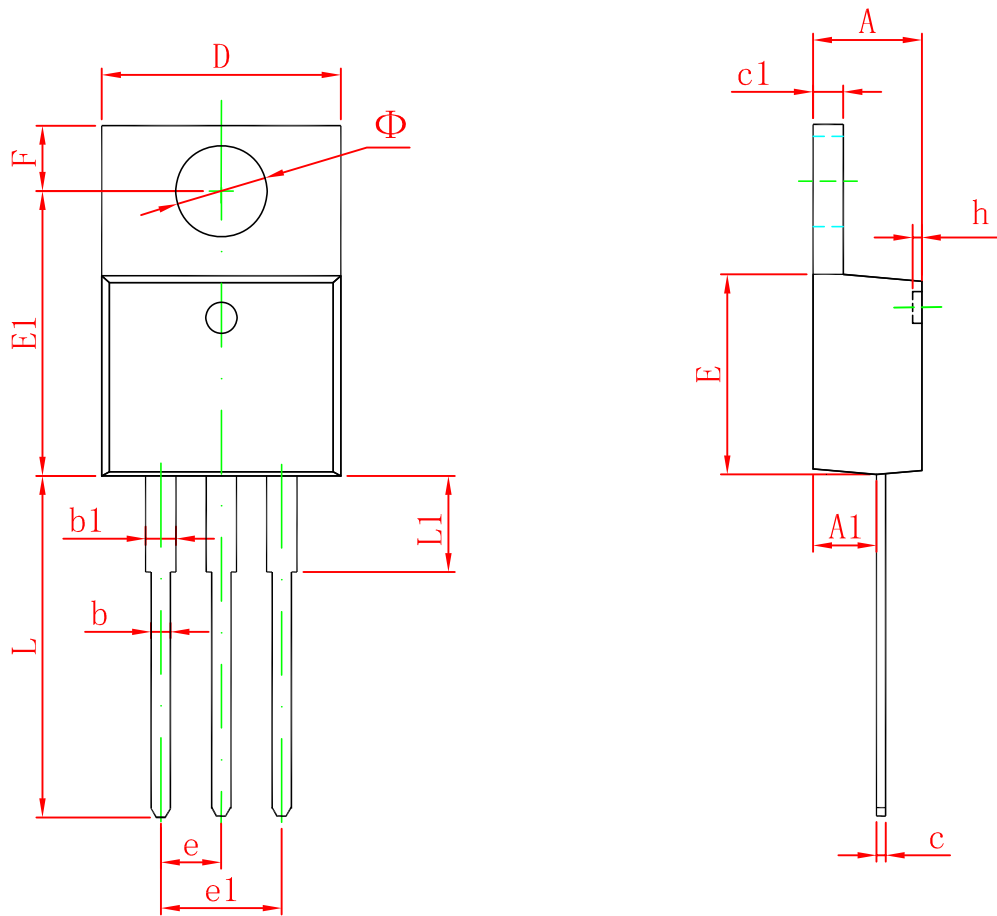
### CLASSIFICATION OF h<sub>FE(1)</sub>

RANK	B	C
RANGE	60-120	100-200

# Typical Characteristics



# TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
$\Phi$	3.735	3.935	0.147	0.155