

# TO-220-3L Plastic-Encapsulate Transistors

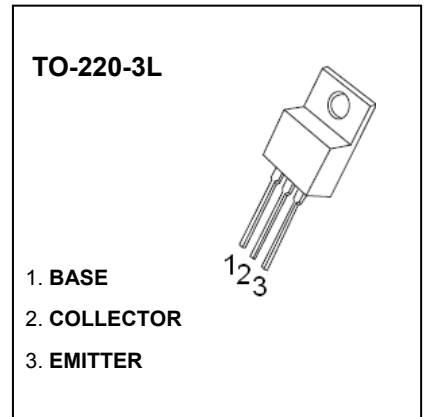
## 2SA1012 TRANSISTOR (PNP)

### FEATURES

- High Current Switching Applications
- Low Collector Saturation Voltage
- High Speed Switching Time

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

Symbol	Parameter	Value	Unit
V <sub>CB0</sub>	Collector-Base Voltage	-60	V
V <sub>CEO</sub>	Collector-Emitter Voltage	-50	V
V <sub>EBO</sub>	Emitter-Base Voltage	-5	V
I <sub>c</sub>	Collector Current -Continuous	-5	A
P <sub>c</sub>	Collector Power Dissipation	2	W
R <sub>θJA</sub>	Thermal Resistance Junction to Ambient	62.5	°C/W
T <sub>j</sub>	Junction Temperature	150	°C
T <sub>stg</sub>	Storage Temperature Range	-55~+150	°C



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

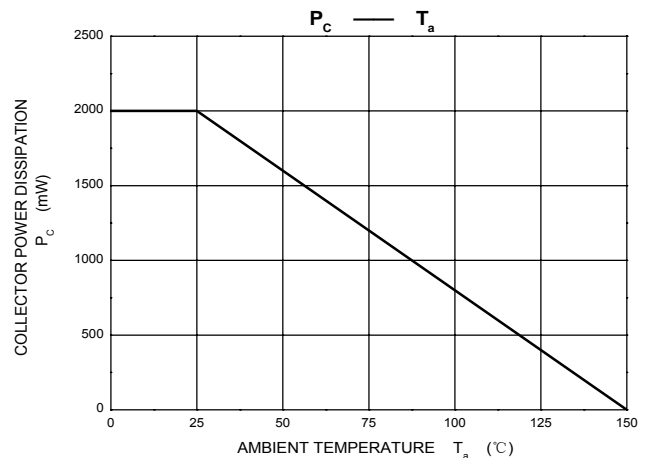
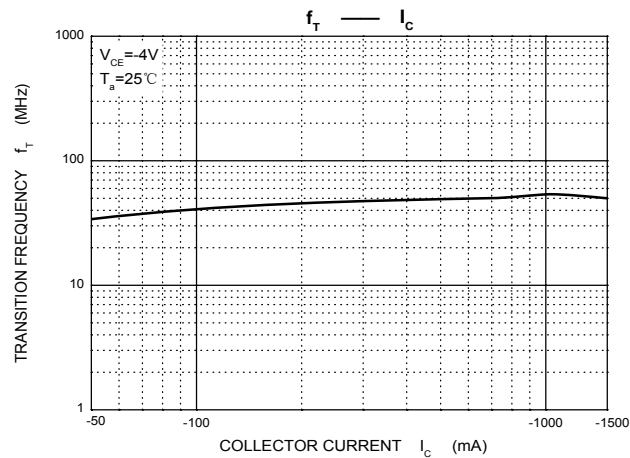
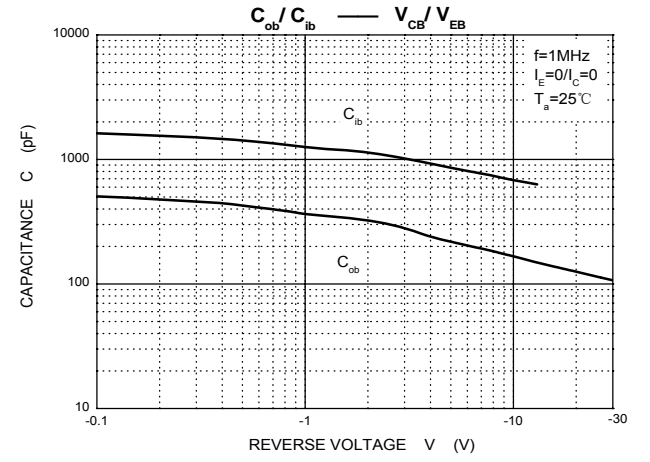
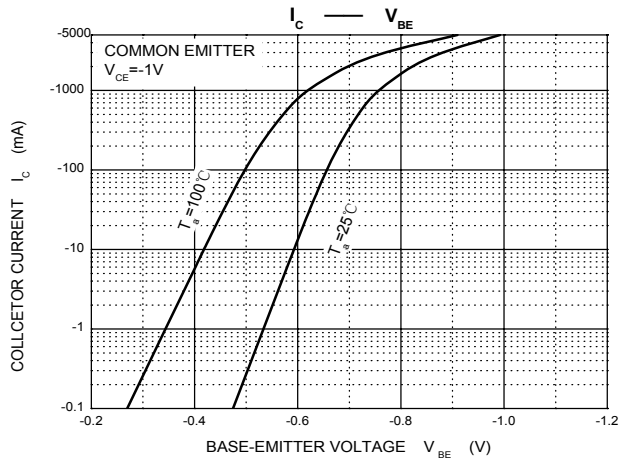
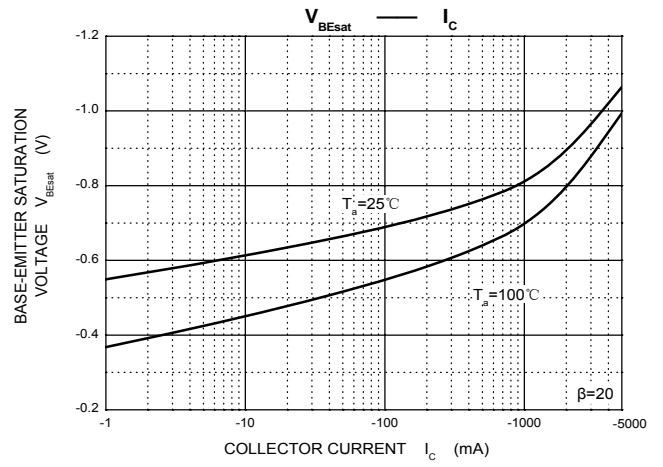
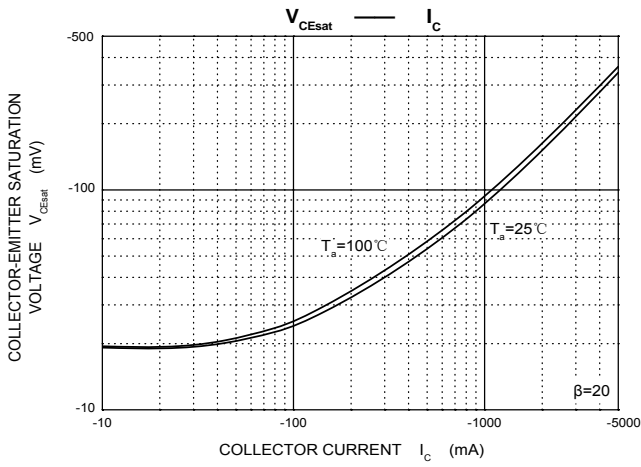
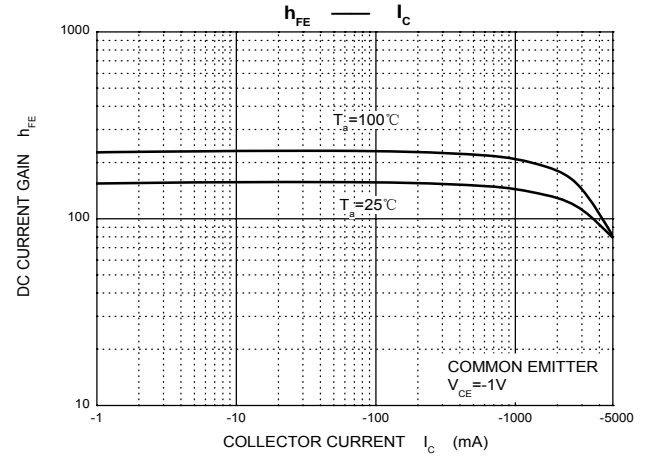
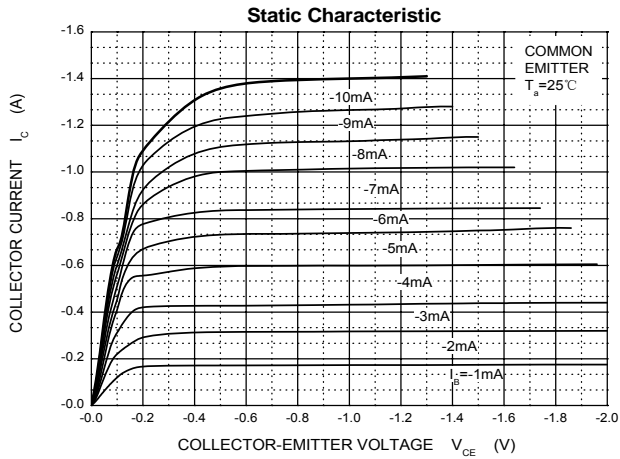
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> = -0.1mA, I <sub>E</sub> = 0	-60			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub> *	I <sub>C</sub> = -10mA, I <sub>B</sub> = 0	-50			V
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> = -100μA, I <sub>C</sub> = 0	-5			V
Collector cut-off current	I <sub>CB0</sub>	V <sub>CB</sub> = -50V, 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(1)</sub>	V <sub>CE</sub> = -1V, I <sub>C</sub> = -1A	70		240	
	h <sub>FE(2)</sub> *	V <sub>CE</sub> = -1V, I <sub>C</sub> = -3A	30			
Collector-emitter saturation voltage	V <sub>CE(sat)</sub> *	I <sub>C</sub> = -3A, I <sub>B</sub> = -150mA			-0.4	V
Base-emitter saturation voltage	V <sub>BE(sat)</sub> *	I <sub>C</sub> = -3A, I <sub>B</sub> = -150mA			-1.2	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = -4V, I <sub>C</sub> = -1A		60		MHz
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = -10V, I <sub>E</sub> = 0, f = 1MHz		170		pF
Turn-on Time	t <sub>on</sub>	V <sub>CC</sub> = -30V, I <sub>C</sub> = -3A, I <sub>B1</sub> = -I <sub>B2</sub> = -0.15A		0.1		μs
Storage Time	t <sub>s</sub>			1.0		
Fall Time	t <sub>f</sub>			0.1		

\*Pulse test: t<sub>p</sub> ≤ 300μs, δ ≤ 0.02.

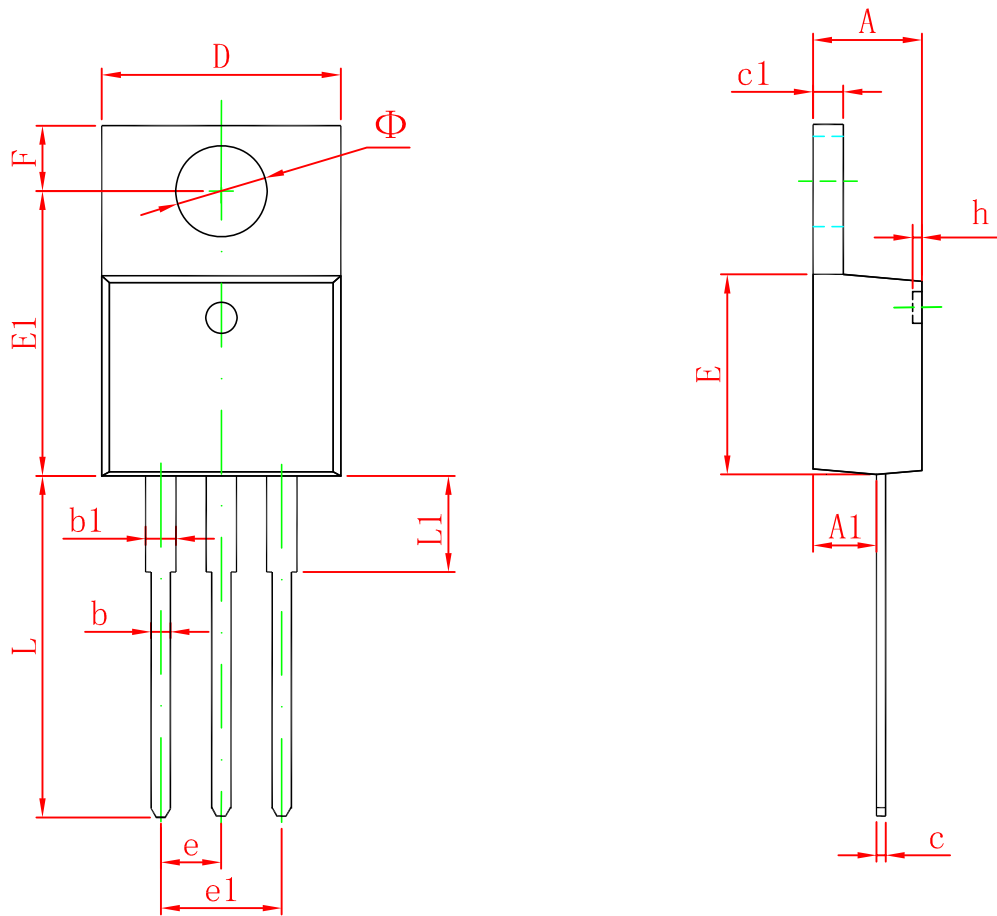
### CLASSIFICATION of h<sub>FE(1)</sub>

Rank	O	Y
Range	70-140	120-240

# 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