



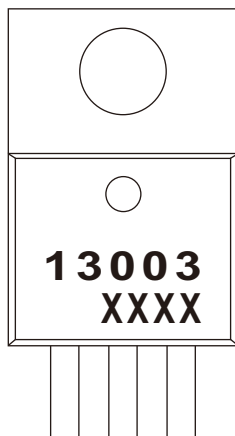
## TO-220-3L Plastic-Encapsulate Transistors

### 3DD13003 TRANSISTOR (NPN)

#### FEATURES

- power switching applications

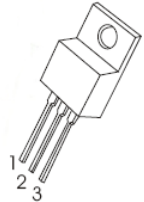
#### MARKING



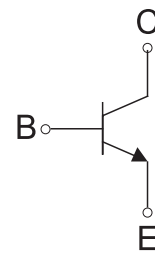
13003=Device code  
XXXX=Code

#### TO-220-3L

1. BASE
2. COLLECTOR
3. EMITTER



#### Equivalent Circuit



#### MAXIMUM RATINGS (Ta=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V <sub>CBO</sub>	Collector-Base Voltage	700	V
V <sub>CEO</sub>	Collector-Emitter Voltage	400	V
V <sub>EBO</sub>	Emitter-Base Voltage	9	V
I <sub>C</sub>	Collector Current -Continuous	1.5	A
P <sub>C</sub>	Collector Power Dissipation	2	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	T		Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =5mA, I <sub>E</sub> =0	700			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =10mA, I <sub>B</sub> =0	400			V
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =2mA, I <sub>C</sub> =0	9			V
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> =700V, I <sub>E</sub> =0			1	mA
Collector cut-off current	I <sub>CEO</sub>	V <sub>CE</sub> =400V, I <sub>B</sub> =0			0.5	mA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> =9V, I <sub>C</sub> =0			1	mA
DC current gain	h <sub>FE1</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> = 0.5 A	20		40	
	h <sub>FE2</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> = 1.5A	5			
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =1A, I <sub>B</sub> =0.25A			0.6	V
Base-emitter saturation voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> =1A, I <sub>B</sub> =0.25A			1.2	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> =10V, I <sub>C</sub> =100mA, f =1MHz	5			MHz
Fall time	t <sub>f</sub>	I <sub>C</sub> =1A, I <sub>B1</sub> =-I <sub>B2</sub> =0.2A, V <sub>CC</sub> =100V			0.5	μs
Storage time	t <sub>s</sub>	I <sub>C</sub> =250mA (UI9600)	2		4	μs

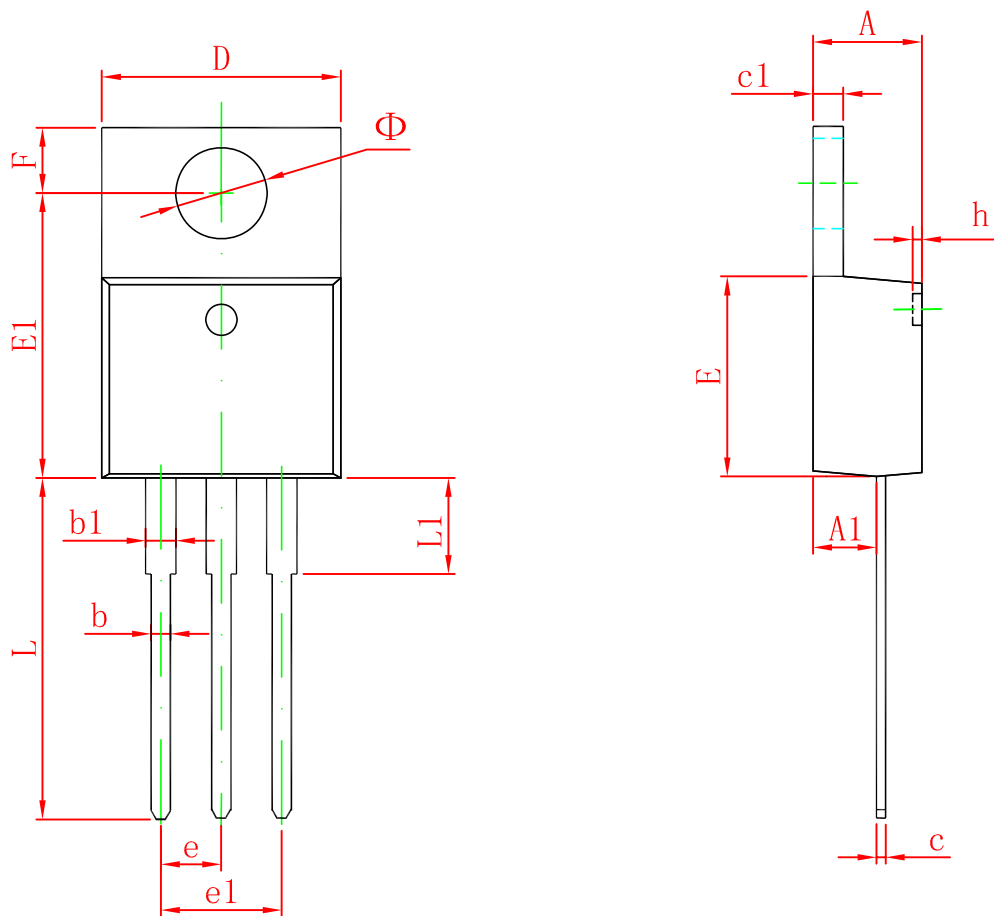
**CLASSIFICATION OF h<sub>FE(1)</sub>**

Range	20-30	30-40

**CLASSIFICATION OF t<sub>s</sub>**

Rank	A	B
Range	2.0-3.0 (μs)	3.0-4.0(μs)

# 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