

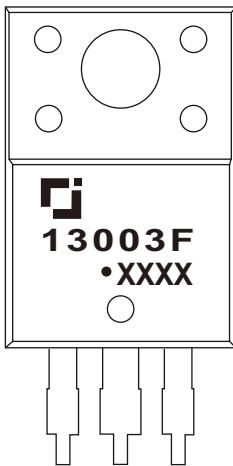
TO-20F Plastic-Encapsulate Transistor

3DD13003F TRANSISTOR (NPN)

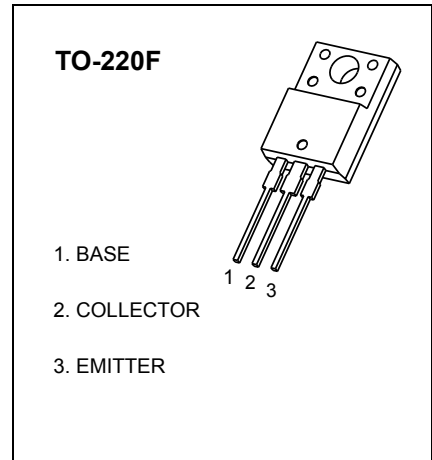
FEATURE

- Power Switching Applications

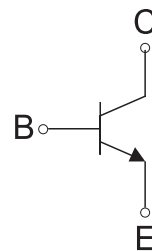
MARKING



13003F=Device code
 Solid dot=Green moldinn compound device,
 if none,the normal device
 XXXX=Code



Equivalent Circuit



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

Symbol	Parameter	Value	Unit
V _{CB0}	Collector-Base Voltage	700	V
V _{CEO}	Collector-Emitter Voltage	400	V
V _{EBO}	Emitter-Base Voltage	9	V
I _c	Collector Current -Continuous	1.5	A
P _c	Collector Dissipation	2	W
R _{θJA}	Thermal Resistance from Junction to Ambient	62.5	°C/W
T _J , T _{stg}	Operation Junction and Storage Temperature Range	-55~+150	°C

ELECTRICAL CHARACTERISTICS (T_a=25°C unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	V _{(BR)CBO}	I _C = 5mA, I _E =0	700			V
Collector-emitter breakdown voltage	V _{(BR)CEO}	I _C = 10mA, I _B =0	400			V
Emitter-base breakdown voltage	V _{(BR)EBO}	I _E = 2mA, I _C =0	9			V
Collector cut-off current	I _{CBO}	V _{CB} =700V, I _E =0			1	mA
Collector cut-off current	I _{CEO}	V _{CE} =400V, I _B =0			0.5	mA
Emitter cut-off current	I _{EBO}	V _{EB} =9V, I _C =0			1	mA
DC current gain	h _{FE(1)}	V _{CE} =5V, I _C =0.5 A	8		40	
	h _{FE(2)}	V _{CE} =5V, I _C =1.5 A	5			
Collector-emitter saturation voltage	V _{CE(sat)}	I _C = 1A, I _B =250mA			0.6	V
Base-emitter saturation voltage	V _{BE(sat)}	I _C = 1A, I _B =250mA			1.2	V
Transition frequency	f _T	V _{CE} =10V, I _C =100mA f =1MHz	5			MHz
Fall time	t _f	I _C = 1A, I _{B1} =-I _{B2} =0.2A V _{CC} =100V			0.5	μs
Storage time	t _s	I _C =250mA	2		4	μs

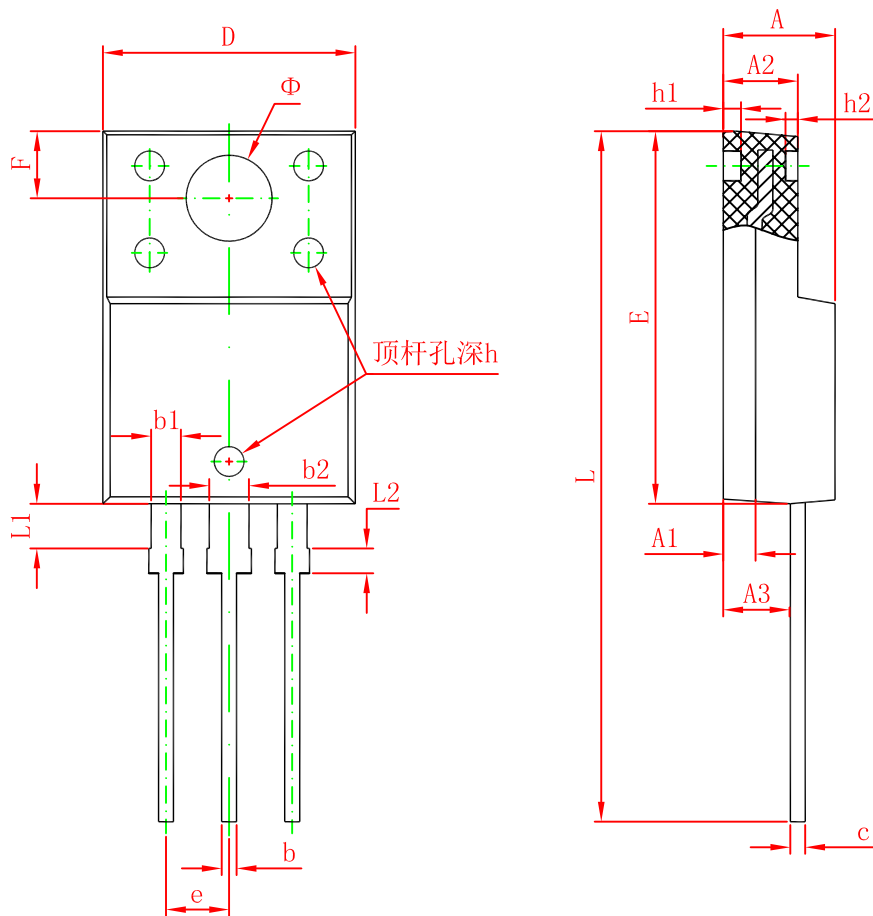
CLASSIFICATION OF h_{FE(1)}

Rank							
Range	8-10	10-15	15-20	20-25	25-30	30-35	35-40

CLASSIFICATION OF t_s

Rank	A1	A2	B1	B2
Range	2-2.5 (μs)	2.5-3(μs)	3-3.5(μs)	3.5-4 (μs)

TO-220F Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	1.300 REF.		0.051 REF.	
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP.		0.100 TYP.	
F	2.700 REF.		0.106 REF.	
Φ	3.500 REF.		0.138 REF.	
h	0.000	0.300	0.000	0.012
h1	0.800 REF.		0.031 REF.	
h2	0.500 REF.		0.020 REF.	
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	0.900	1.100	0.035	0.043