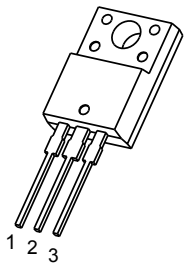
TO-220F Plastic-Encapsulate Transistor

3DD13003F TRANSISTOR (NPN)

TO-220F

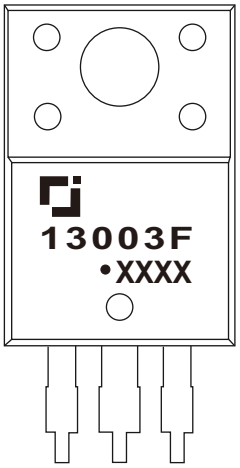


1. BASE
2. COLLECTOR
3. EMITTER

FEATURE

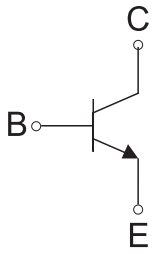
- Power Switching Applications

MARKING



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

Equivalent Circuit



MAXIMUM RATINGS (Ta=25 ℃unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CBO}	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
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	62.5	℃/W
T_J, T_{stg}	Operation Junction and Storage Temperature Range	-55~+150	℃

ELECTRICAL CHARACTERISTICS (T_a=25℃ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	Ic= 5mA,I_E=0	700			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	Ic=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,Ic=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

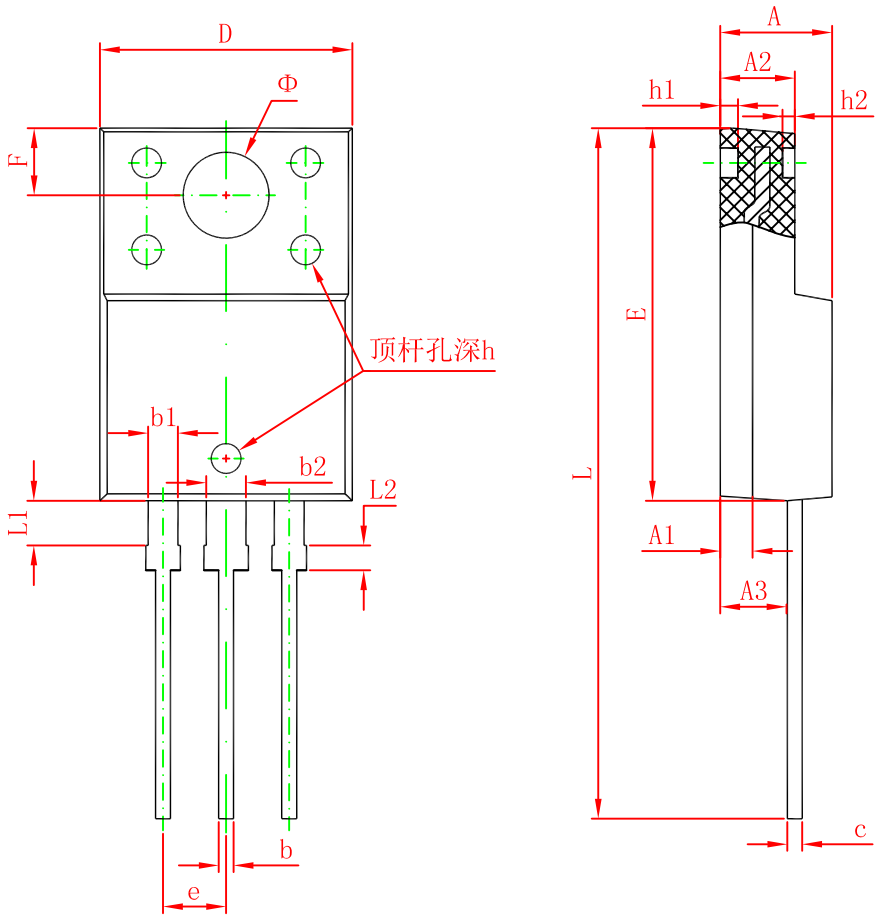
CLASSIFICATION OF $h_{FE(1)}$

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