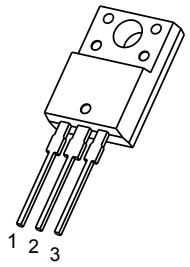
JIANGSU CHANGJING ELECTRONICS TECHNOLOGY CO., LTD.

TO-220F Plastic-Encapsulate Transistor

3DD13005ND66F TRANSISTOR (NPN)

TO-220F



1 . BASE

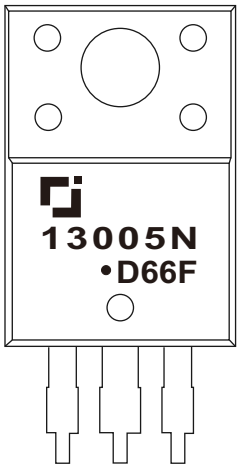
2. COLLECTOR

3. EMITTER

FEATURE

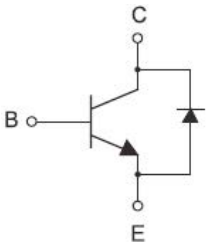
- Power switching applications
- Good high temperature
- Low saturation voltage
- High speed switching

MARKING



13005N=Device code
Solid dot=Green moldinn compound device, if none,the normal device
D66F=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	420	V
V_{EBO}	Emitter-Base Voltage	9	V
I_C	Collector Current -Continuous	4	A
P_C	Collector Power 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	$V_{(BR)CBO}$	I_C= 1mA,I_E=0	700			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C= 10mA,I_B=0	420			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E= 1mA,I_C=0	9			V
Collector cut-off current	I_{CBO}	V_{CB}=700V,I_E=0			100	μA
Collector cut-off current	I_{CEO}	V_{CE}=400V,I_B=0			100	μA
Emitter cut-off current	I_{EBO}	V_{EB}=7V,I_C=0			100	μA
DC current gain	$h_{FE(1)}$	V_{CE}=5V, I_C=1A	10		40	
	$h_{FE(2)}$	V_{CE}=5V, I_C=200mA	10		60	
	$h_{FE(3)}$	V_{CE}=5V, I_C=10mA	5			
	$h_{FE(4)}$	V_{CE}=5V, I_C=4A	8		40	
Collector-emitter saturation voltage	$V_{CE(sat)(1)}$	I_C=1A,I_B=0.2A			0.3	V
	$V_{CE(sat)(2)}$	I_C=2A,I_B=0.4A	0.15		0.35	V
	$V_{CE(sat)(3)}$	I_C=4A,I_B=1A			0.8	V
Base-emitter saturation voltage	$V_{BE(sat)}$	I_C=2A,I_B=0.5A			1.6	V
Diode forward voltage	V_{FEC}	I_C=2A			2	V
Transition frequency	f_T	V_{CE}=10V, I_C=0.5A,f=1MHz	5			MHz
Rise time	t_r	I_C=250mA			0.5	μs
Storage time	t_S	I_C=250mA	2.0		4.0	
Fall time	t_f	I_C=250mA			0.5	

CLASSIFICATION of $h_{FE(2)}$

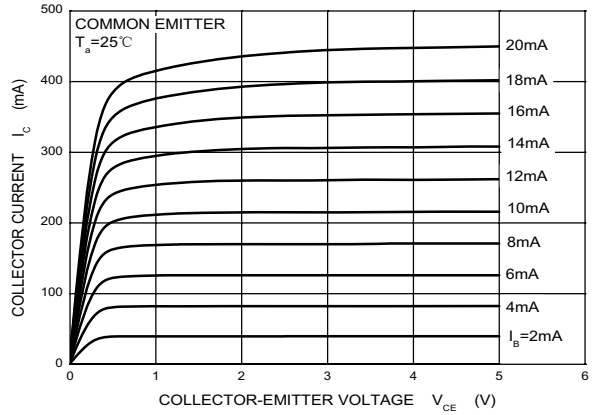
Range	20~30	30~40

CLASSIFICATION of t_S(μs)

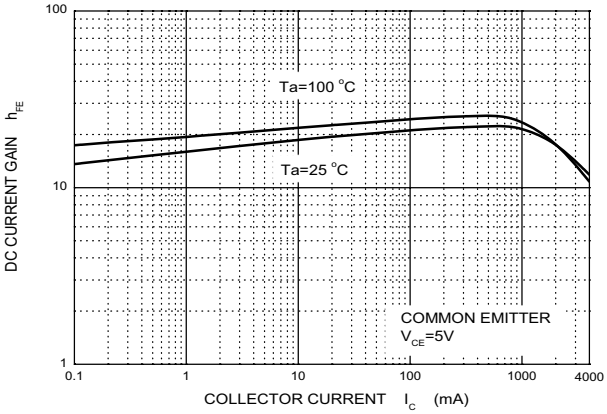
Rank	A	B
Range	2.0-3.0	3.0-4.0

Typical Characteristics

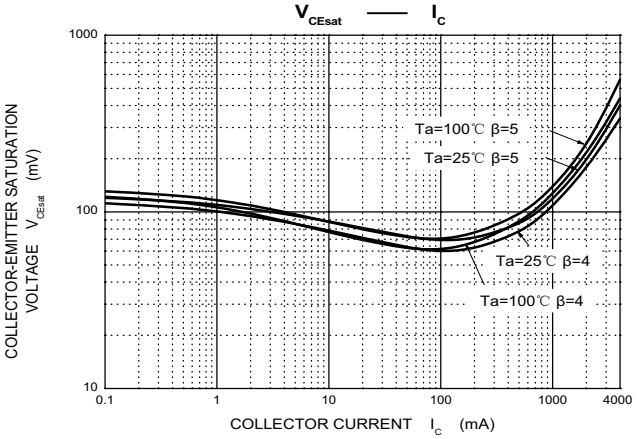
Static Characteristic



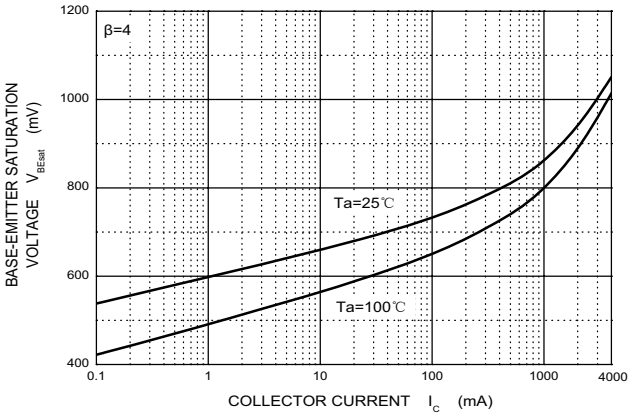
h_{FE} —— I_C



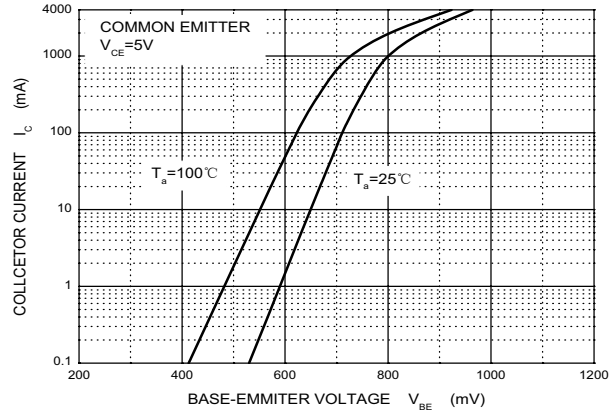
V_{CEsat} —— I_C



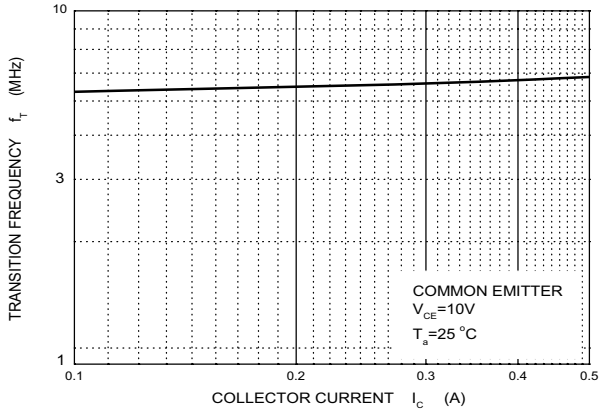
V_{BEsat} —— I_C



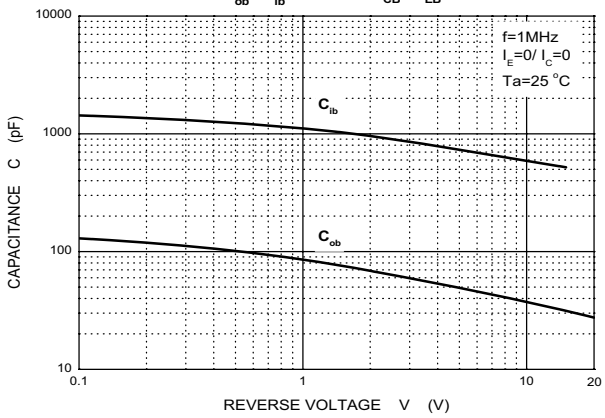
I_C —— V_{BE}



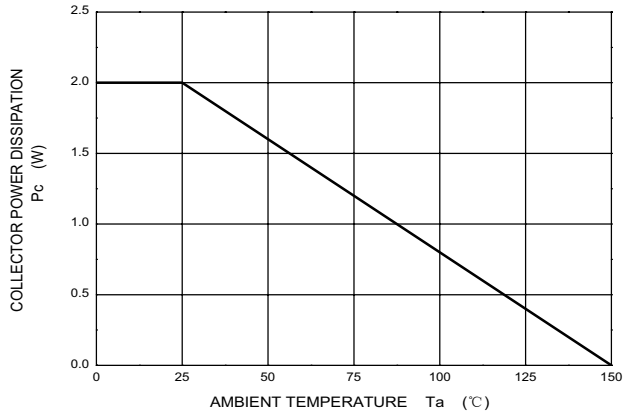
f_T —— I_C



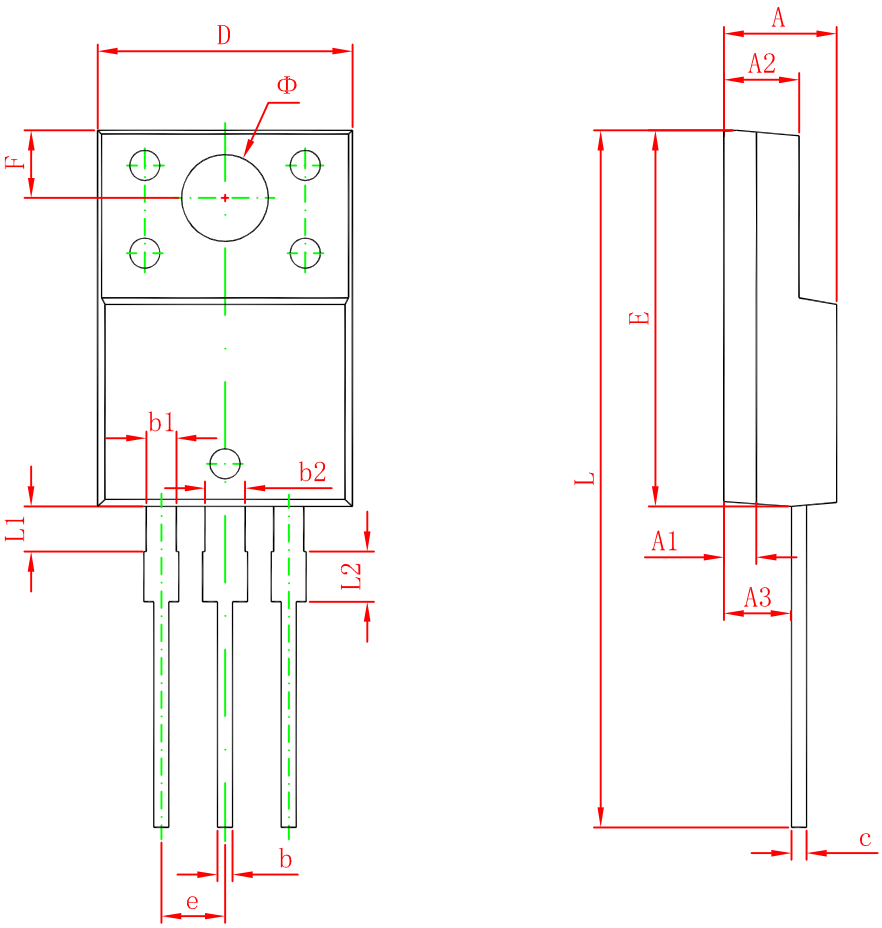
C_{ob} / C_{ib} —— V_{CB} / V_{EB}



Pc —— Ta



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	3.300	3.700	0.130	0.146
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