TO-220-3L Plastic-Encapsulate Transistor

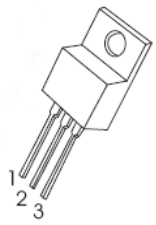
3DD13005ND66 TRANSISTOR (NPN)

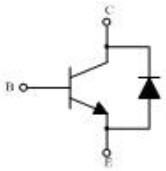
TO-220-3L

1 . BASE

2. COLLECTOR

3. EMITTER





FEATURES

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

MAXIMUM RATINGS (T_a=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 $h_{FE(2)}$

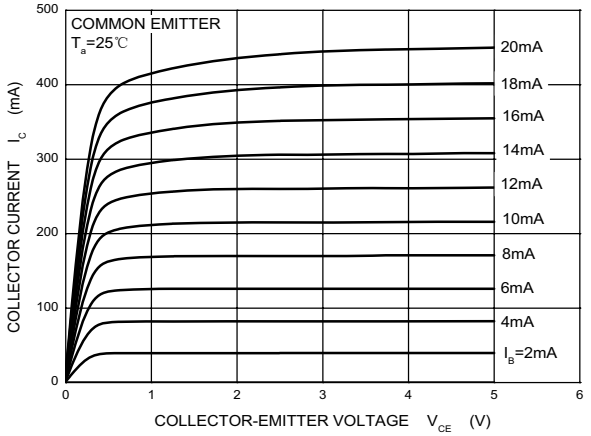
Range	20~30	30~40

CLASSIFICATION of t_S(μs)

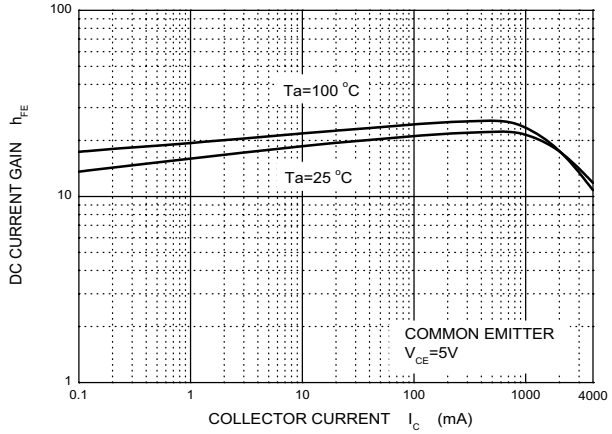
Rank	A	B
Range	2.0-3.0	3.0-4.0

Typical Characteristics

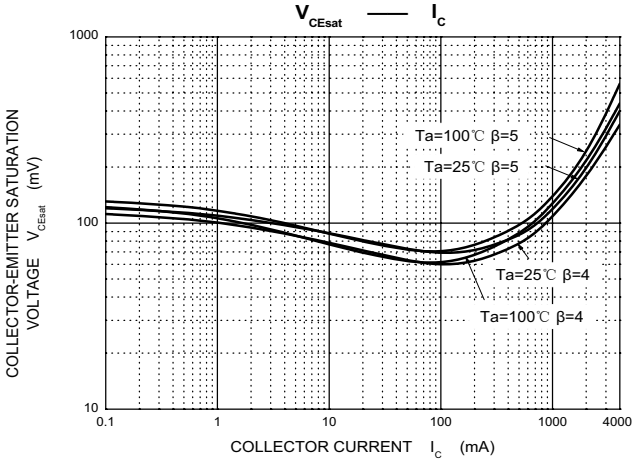
Static Characteristic



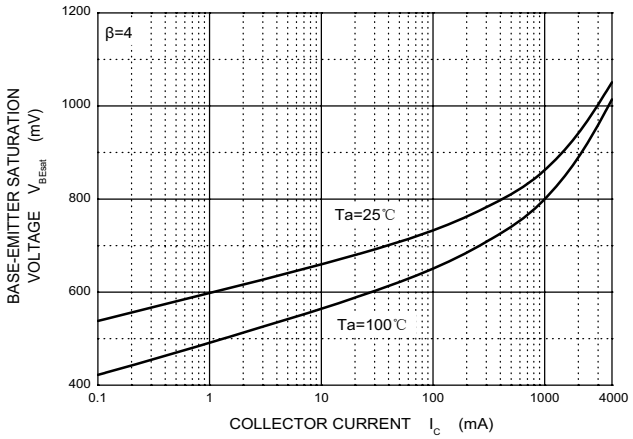
h_{FE} —— I_C



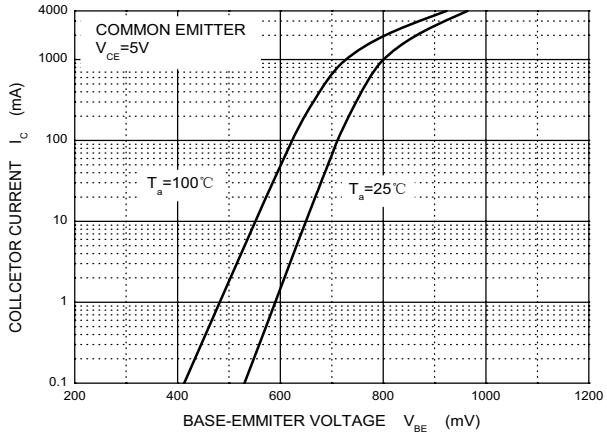
V_{CEsat} —— I_C



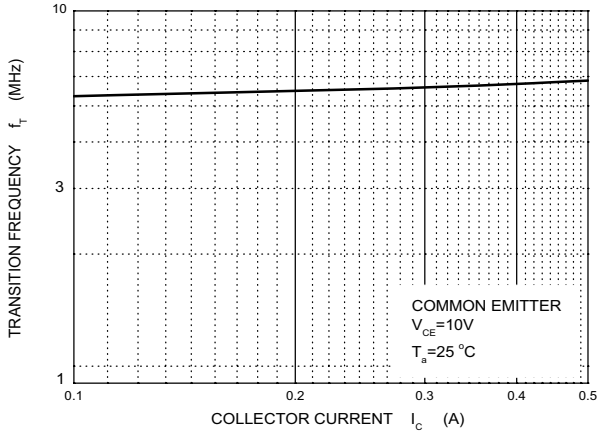
V_{BEsat} —— I_C



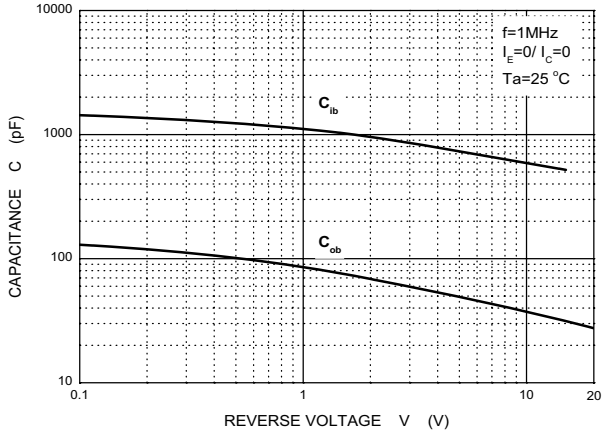
I_C —— V_{BE}



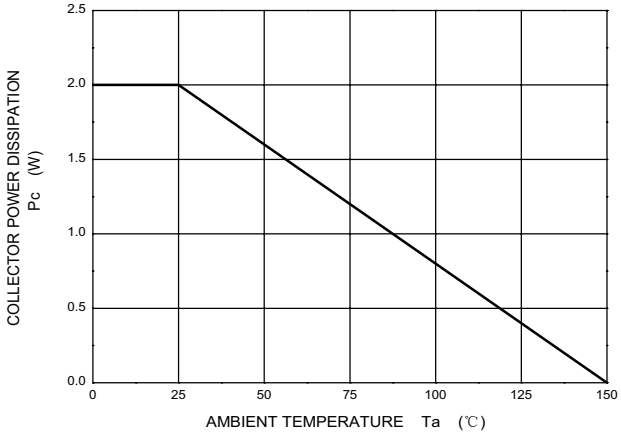
f_T —— I_C



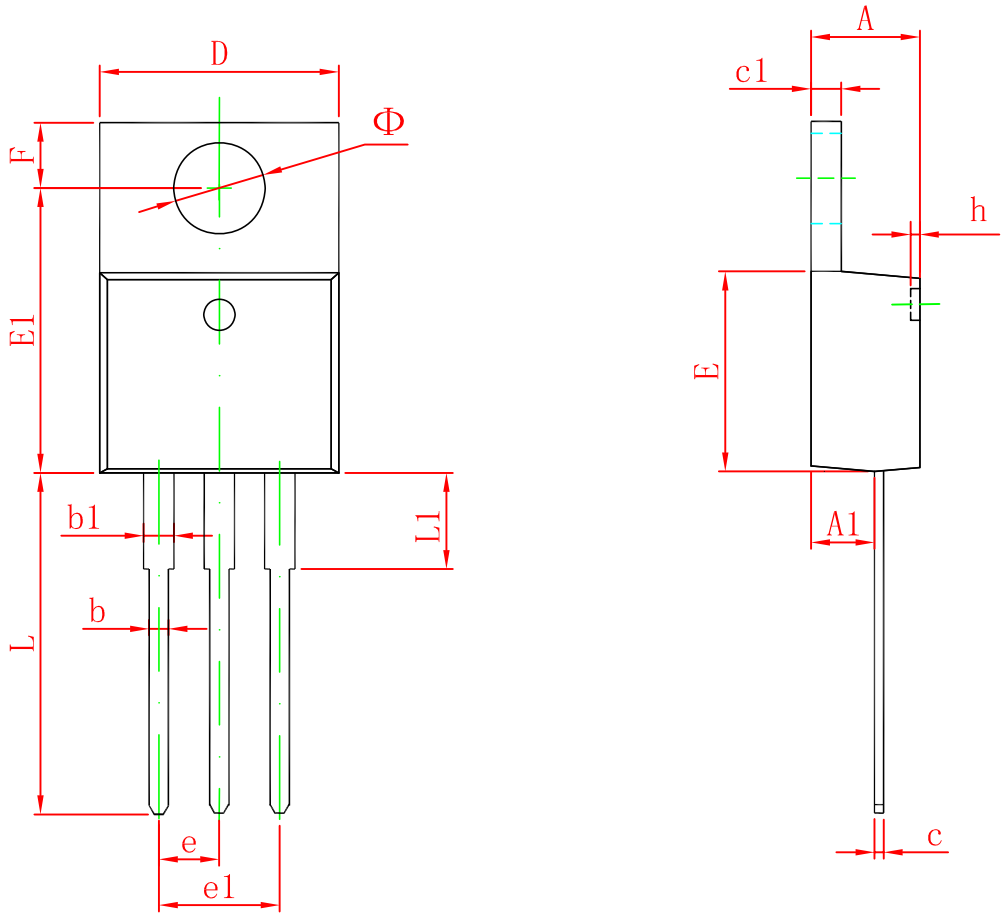
C_{ob}/ C_{ib} —— V_{CB}/ V_{EB}



Pc —— Ta



TO-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
Φ	3.735	3.935	0.147	0.155