

TO-220-3L Plastic-Encapsulate Transistors

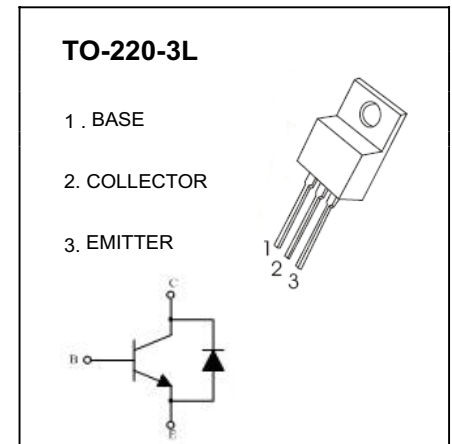
3DD13005ND66 TRANSISTOR (NPN)

FEATURES

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

MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CB0}	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	$^{\circ}\text{C}/\text{W}$
T_j	Junction Temperature	150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	-55-150	$^{\circ}\text{C}$



ELECTRICAL CHARACTERISTICS ($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=1\text{mA}, I_E=0$	700			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=10\text{mA}, I_B=0$	420			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=1\text{mA}, I_C=0$	9			V
Collector cut-off current	I_{CBO}	$V_{CB}=700\text{V}, I_E=0$			50	μA
Collector cut-off current	I_{CEO}	$V_{CE}=400\text{V}, I_B=0$			50	μA
Emitter cut-off current	I_{EBO}	$V_{EB}=7\text{V}, I_C=0$			50	μA
DC current gain	$h_{FE(1)}$	$V_{CE}=5\text{V}, I_C=1\text{A}$	10		40	
	$h_{FE(2)}$	$V_{CE}=5\text{V}, I_C=200\text{mA}$	10		60	
	$h_{FE(3)}$	$V_{CE}=5\text{V}, I_C=10\text{mA}$	5			
	$h_{FE(4)}$	$V_{CE}=5\text{V}, I_C=4\text{A}$	8		40	
Collector-emitter saturation voltage	$V_{CE(sat)(1)}$	$I_C=1\text{A}, I_B=0.2\text{A}$			0.3	V
	$V_{CE(sat)(2)}$	$I_C=2\text{A}, I_B=0.4\text{A}$	A	0.15	0.28	V
			B	0.25	0.35	V
$V_{CE(sat)(3)}$	$I_C=4\text{A}, I_B=1\text{A}$			0.8	V	
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C=2\text{A}, I_B=0.5\text{A}$			1.6	V
Diode forward voltage	V_{FEC}	$I_C=2\text{A}$			2	V
Transition frequency	f_T	$V_{CE}=10\text{V}, I_C=0.5\text{A}, f=1\text{MHz}$	5			MHz
Rise time	t_r	$I_C=250\text{mA}$			0.5	μs
Storage time	t_s	$I_C=250\text{mA}$	2.0		4.0	
Fall time	t_f	$I_C=250\text{mA}$			0.5	

CLASSIFICATION of $h_{FE(2)}$

Range	10~15	15~20	20~25	25~30	30~35	35~40	40~45	45~50	50~55	55~60
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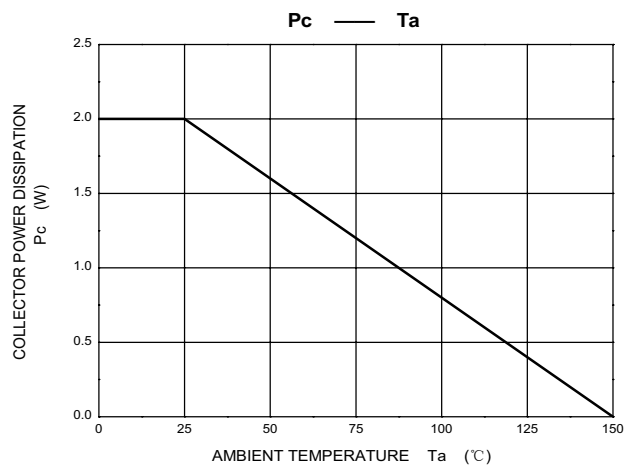
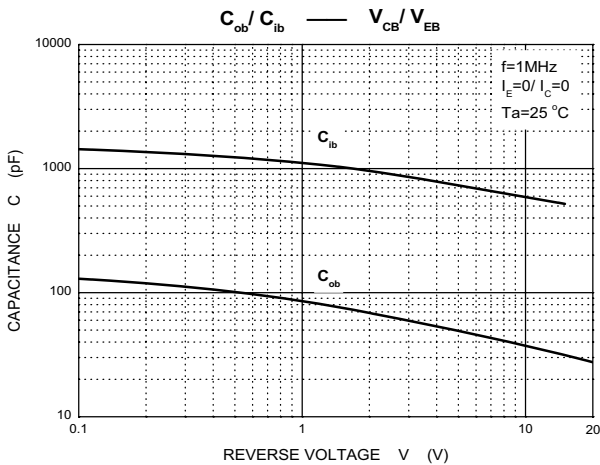
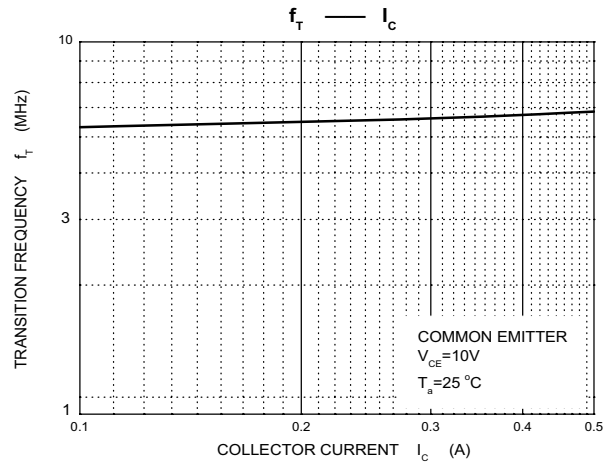
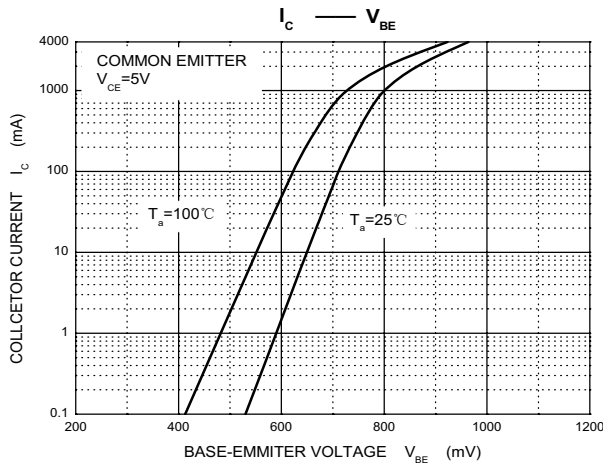
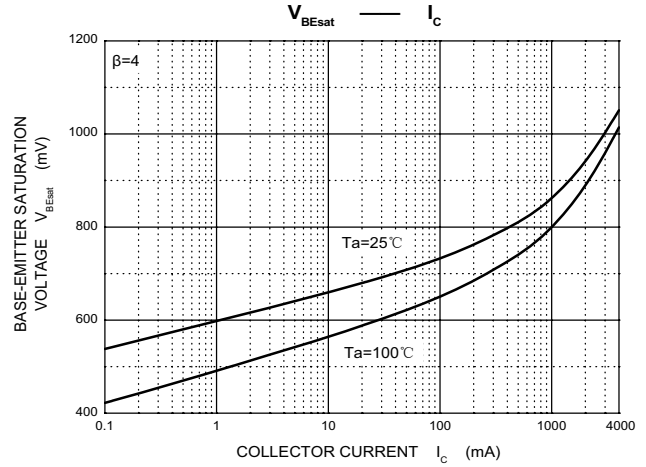
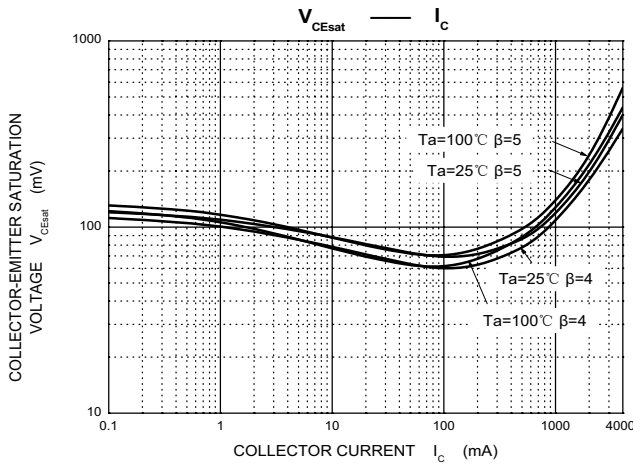
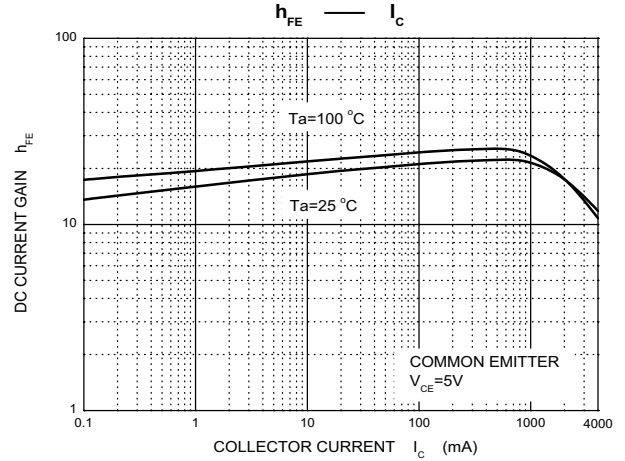
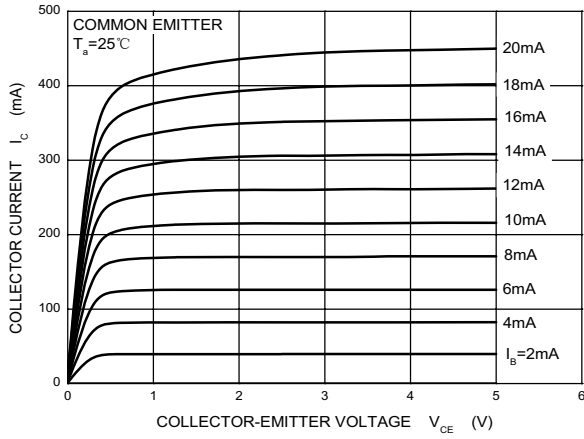
CLASSIFICATION of $t_s(\mu\text{s})$

Rank	A1	A2	B1	B2
Range	2.0-2.5	2.5-3.0	3.0-3.5	3.5-4.0

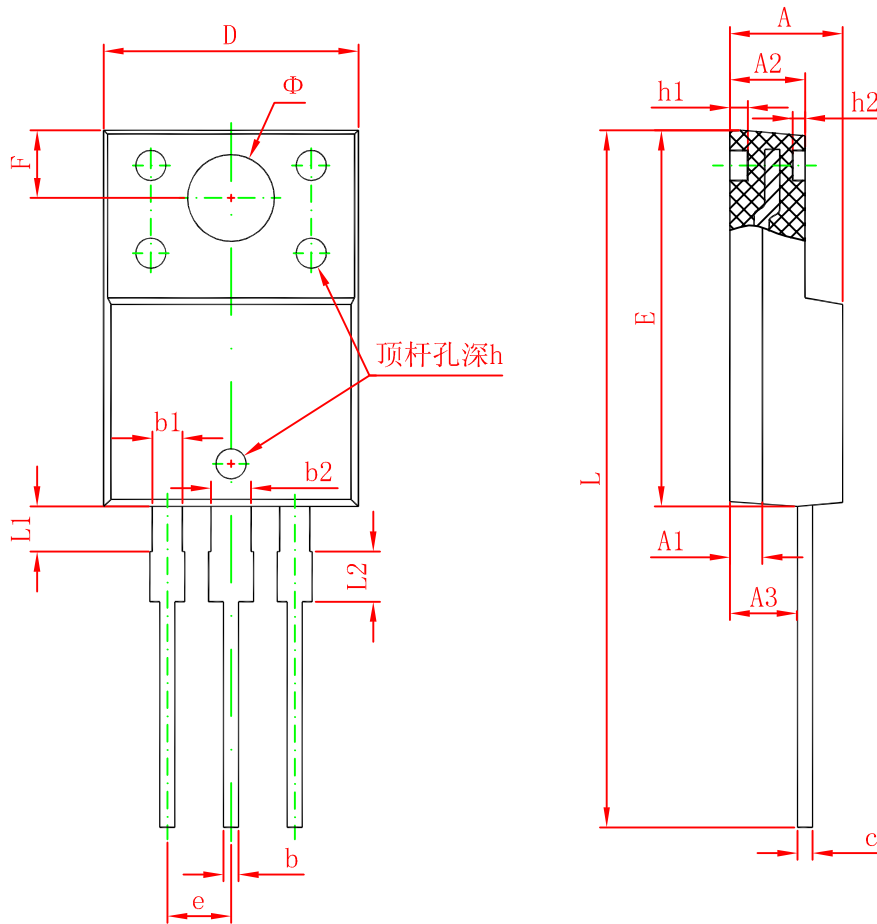
Typical Characteristics

3DD13005ND66

Static Characteristic



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	1.900	2.100	0.075	0.083