3DD13005ND66F TRANSISTOR (NPN)

TO-220F

FEATURE

- 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)

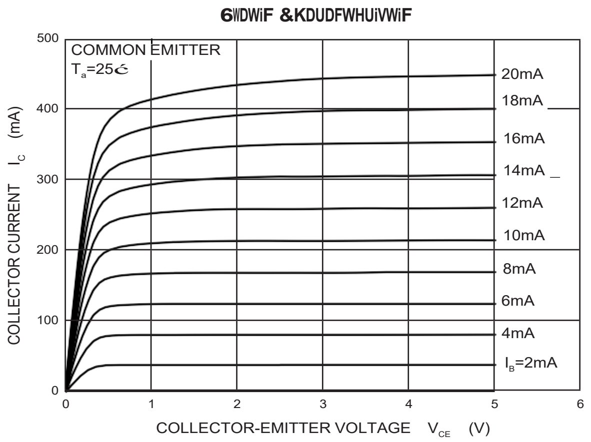
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C= 1mA,I_E=0	700			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C= 10mA,I_B=0	420			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E= 1mA,I_C=0	9			V
Collector cut-off current	I_{CBO}	V_{CB}=700V,I_E=0			50	μA
Collector cut-off current	I_{CEO}	V_{CE}=400V,I_B=0			50	μA
Emitter cut-off current	I_{EBO}	V_{EB}=7V,I_C=0			50	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 A B	0.15 0.25		0.28 0.35	V 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	

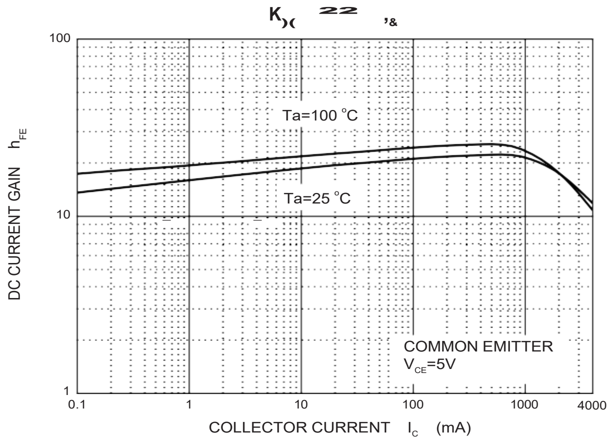
CLASSIFICATION of $h_{FE(2)}$

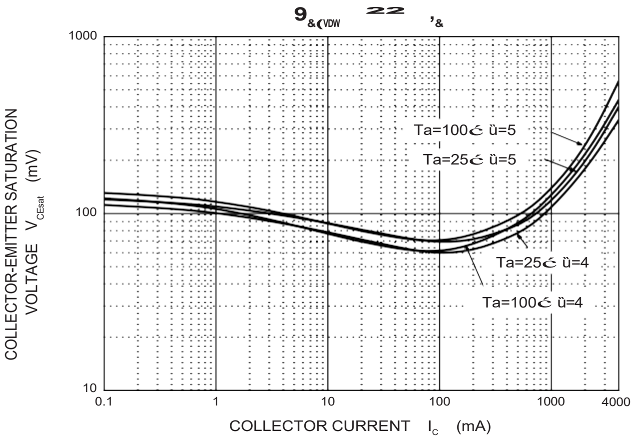
Range	10~15	15~20	20~25	25~30	30~35	35~40	40~45	45~50	50~55	55~60

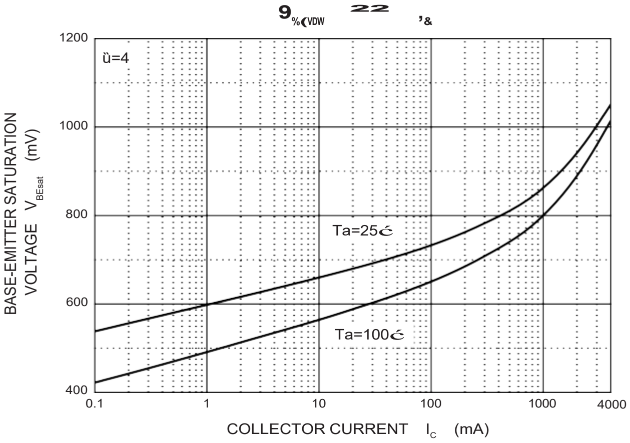
CLASSIFICATION of $\mathbb{W}_6$(⊠V)

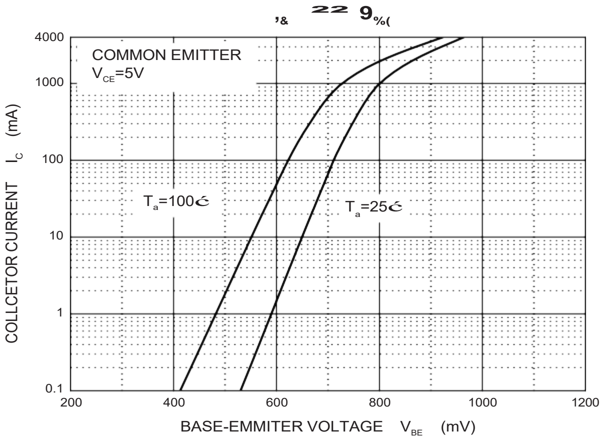
Rank	A		B	
	A1	A2	B1	B2
Range	2.0-2.5	2.5-3.0	3.0-3.5	3.5-4.0

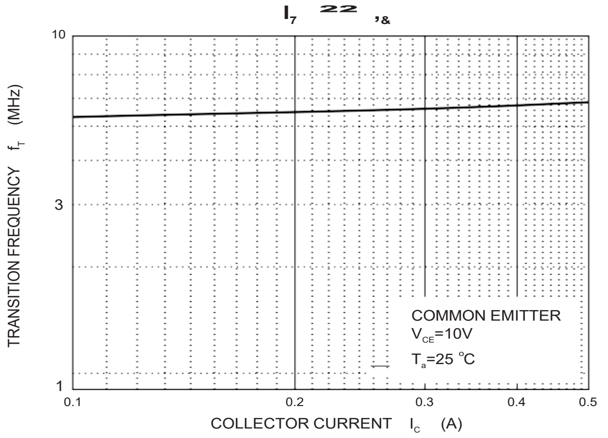

6WDWiF &KDUDFWHUiVWiF
COMMON EMITTER
T_a=25℃
20mA
18mA
16mA
14mA
12mA
10mA
8mA
6mA
4mA
I_B=2mA
500
400
300
200
100
0
0
1
2
3
4
5
6
COLLECTOR CURRENT I_C (mA)
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

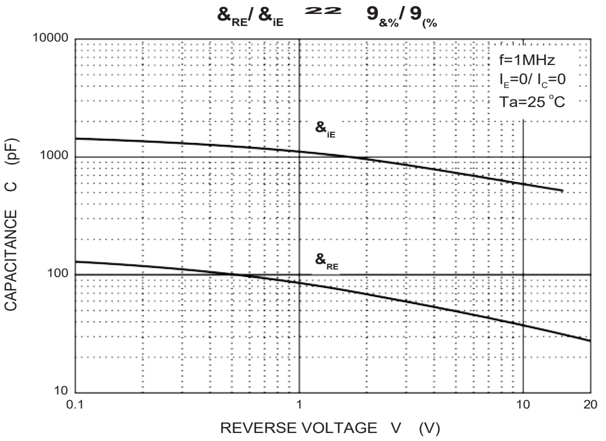

K)(22 ,&
Ta=100 °C
Ta=25 °C
COMMON EMITTER
V_{CE}=5V
100
10
1
0.1
1
10
100
1000
4000
DC CURRENT GAIN h_{FE}
COLLECTOR CURRENT I_C (mA)

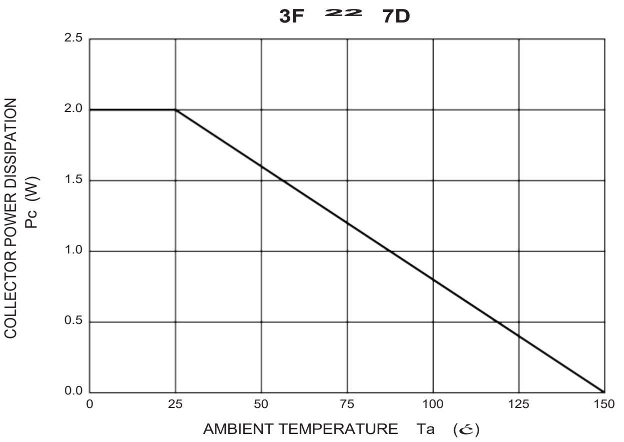

9&(VDW 22 ,&
Ta=100℃ ü=5
Ta=25℃ ü=5
Ta=25℃ ü=4
Ta=100℃ ü=4
1000
100
10
0.1
1
10
100
1000
4000
COLLECTOR-EMITTER SATURATION VOLTAGE V_{CEsat} (mV)
COLLECTOR CURRENT I_C (mA)


9%(VDW 22 ,&
ü=4
Ta=25℃
Ta=100℃
1200
1000
800
600
400
0.1
1
10
100
1000
4000
BASE-EMITTER SATURATION VOLTAGE V_{BEsat} (mV)
COLLECTOR CURRENT I_C (mA)


,& 22 9%(
COMMON EMITTER
V_{CE}=5V
T_a=100℃
T_a=25℃
4000
1000
100
10
1
0.1
200
400
600
800
1000
1200
COLLCETOR CURRENT I_C (mA)
BASE-EMMITER VOLTAGE V_{BE} (mV)


I7 22 ,&
COMMON EMITTER
V_{CE}=10V
T_a=25 °C
10
3
1
0.1
0.2
0.3
0.4
0.5
TRANSITION FREQUENCY f_T (MHz)
COLLECTOR CURRENT I_C (A)


&RE/ &iE 22 9&%/ 9(%
f=1MHz
I_E=0/ I_C=0
Ta=25 °C
&iE
&RE
10000
1000
100
10
0.1
1
10
20
CAPACITANCE C (pF)
REVERSE VOLTAGE V (V)


3F 22 7D
2.5
2.0
1.5
1.0
0.5
0.0
0
25
50
75
100
125
150
COLLECTOR POWER DISSIPATION Pc (W)
AMBIENT TEMPERATURE Ta (℃)