



## TO-220 Plastic-Encapsulate Transistors

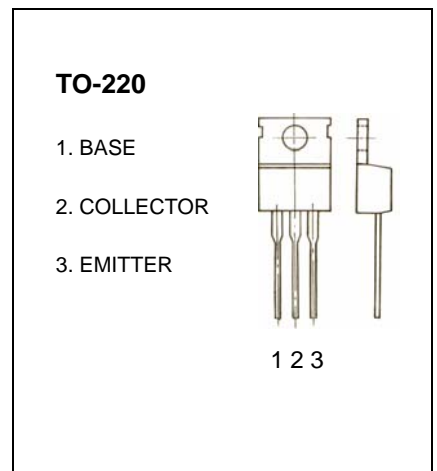
### 3DD13003 TRANSISTOR ( NPN )

#### FEATURES

- power switching applications

#### MAXIMUM RATINGS\* $T_A=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CBO}$	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
$T_J, T_{stg}$	Junction and Storage Temperature	-55-150	$^{\circ}\text{C}$



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

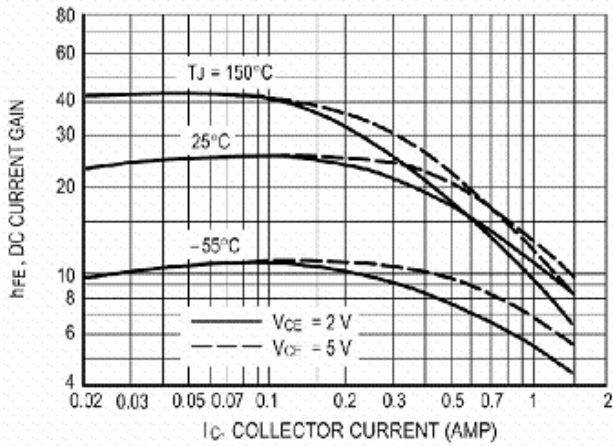
Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	$V(BR)_{CBO}$	$I_C=1000\mu\text{A}, I_E=0$	700			V
Collector-emitter breakdown voltage	$V(BR)_{CEO}$	$I_C=10\text{mA}, I_B=0$	400			V
Emitter-base breakdown voltage	$V(BR)_{EBO}$	$I_E=1\text{mA}, I_C=0$	9			V
Collector cut-off current	$I_{CBO}$	$V_{CB}=700\text{V}, I_E=0$			1000	$\mu\text{A}$
Collector cut-off current	$I_{CEO}$	$V_{CE}=400\text{V}, I_B=0$			500	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB}=9\text{V}, I_C=0$			1000	$\mu\text{A}$
DC current gain	$h_{FE(1)}$	$V_{CE}=5\text{V}, I_C=0.5\text{A}$	8		40	
	$h_{FE(2)}$	$V_{CE}=5\text{V}, I_C=1.5\text{A}$	5			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=1000\text{mA}, I_B=250\text{mA}$			1	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C=1000\text{mA}, I_B=250\text{mA}$			1.2	V
Base-emitter voltage	$V_{BE}$	$I_E=2000\text{mA}$			3	V
Transition frequency	$f_T$	$V_{CE}=10\text{V}, I_C=100\text{mA}$ $f=1\text{MHz}$	5			MHz
Fall time	$t_f$	$I_C=1\text{A}, I_{B1}=-I_{B2}=0.2\text{A}$			0.5	$\mu\text{s}$
Storage time	$t_s$	$V_{CC}=100\text{V}$			2.5	$\mu\text{s}$

#### CLASSIFICATION OF $h_{FE(1)}$

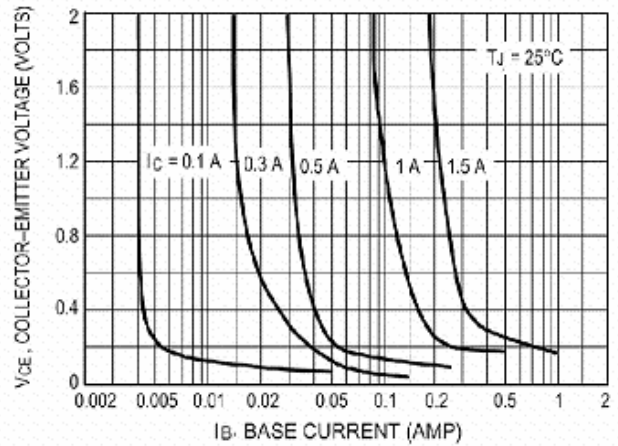
Rank							
Range	8-10	10-15	15-20	20-25	25-30	30-35	35-40

# Typical Characteristics

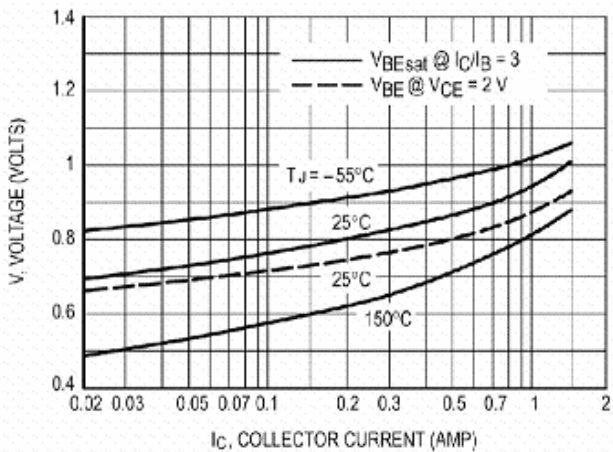
# 3DD13003



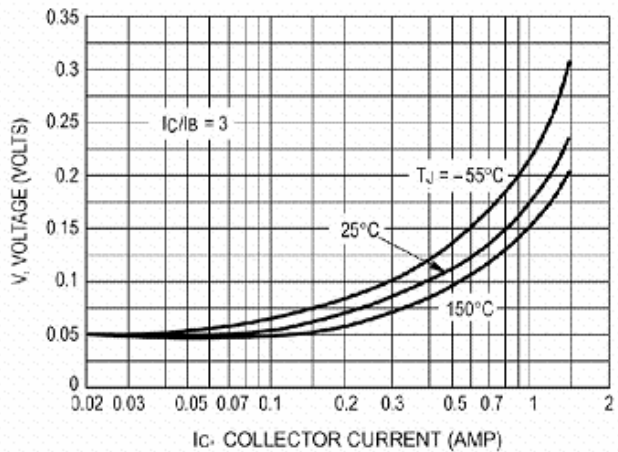
**DC Current Gain**



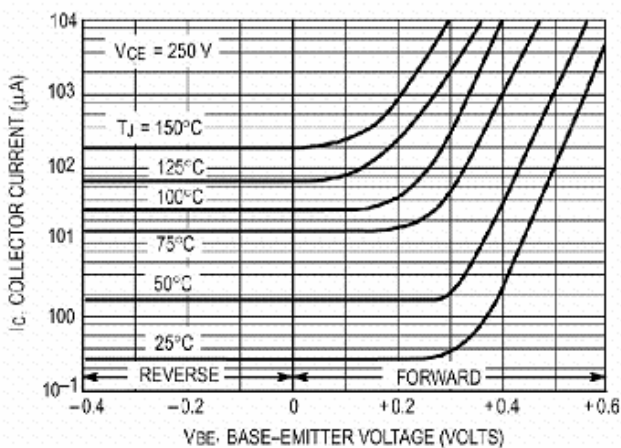
**Collector Saturation Region**



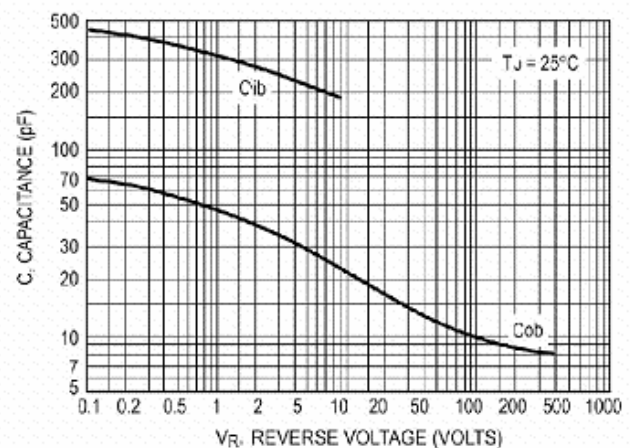
**Base-Emitter Voltage**



**Collector-Emitter Saturation Region**



**Collector Cutoff Region**



**Capacitance**