

**Electrical Characteristics @  $T_A=25^{\circ}\text{C}$  Unless Otherwise Specified**

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60			V	$I_C=10\text{mA}$ , $I_E=0$
Collector-Emitter Breakdown Voltage*	$V_{(BR)CEO}$	40			V	$I_C=1\text{mA}$ , $I_B=0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6			V	$I_E=100\mu\text{A}$ , $I_C=0$
Base Cutoff Current	$I_{BL}$			0.1	$\mu\text{A}$	$V_{CE}=35\text{V}$ , $V_{BE}=0.4\text{V}$
Collector Cutoff Current	$I_{CEX}$			0.1	$\mu\text{A}$	$V_{CE}=35\text{V}$ , $V_{BE}=0.4\text{V}$
DC Current Gain*	$h_{FE(1)}$	20				$V_{CE}=1\text{V}$ , $I_C=0.1\text{mA}$
	$h_{FE(2)}$	40				$V_{CE}=1\text{V}$ , $I_C=1\text{mA}$
	$h_{FE(3)}$	80				$V_{CE}=1\text{V}$ , $I_C=10\text{mA}$
	$h_{FE(4)}$	100		300		$V_{CE}=1\text{V}$ , $I_C=150\text{mA}$
	$h_{FE(5)}$	40				$V_{CE}=1\text{V}$ , $I_C=500\text{mA}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.4	V	$I_C=150\text{mA}$ , $I_B=15\text{mA}$
				0.75	V	$I_C=500\text{mA}$ , $I_B=50\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		0.75	0.95	V	$I_C=150\text{mA}$ , $I_B=15\text{mA}$
				1.2	V	$I_C=500\text{mA}$ , $I_B=50\text{mA}$
Transition Frequency	$f_T$	250			MHz	$V_{CE}=10\text{V}$ , $I_C=20\text{mA}$ , $f=100\text{MHz}$
Delay Time	$t_d$			15	ns	$V_{CC}=30\text{V}$ , $V_{BE}=0.2\text{V}$ , $I_C=150\text{mA}$ , $I_{B1}=15\text{mA}$
Rise Time	$t_r$			20	ns	
Storage Time	$t_s$			225	ns	$V_{CC}=30\text{V}$ , $I_C=150\text{mA}$ , $I_{B1}=I_{B2}=15\text{mA}$
Fall Time	$t_f$			30	ns	
Collector-Base Capacitance	$C_{cb}$			6.5	pF	$V_{CB}=5\text{V}$ , $I_E=0$ , $f=1\text{MHz}$
Emitter-Base Capacitance	$C_{eb}$			30	pF	$V_{EB}=0.5\text{V}$ , $I_C=0$ , $f=1\text{MHz}$

\*.Pulse test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycle $\leq 2.0\%$ .

## Curve Characteristics

Fig. 1 - Static Characteristics

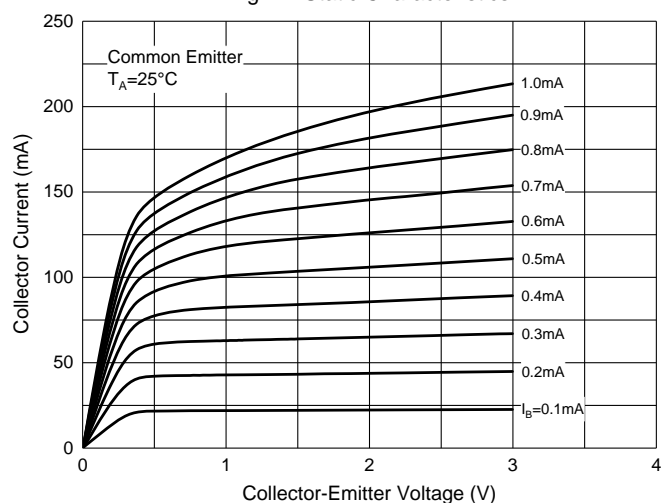


Fig. 2 - DC Current Gain Characteristics

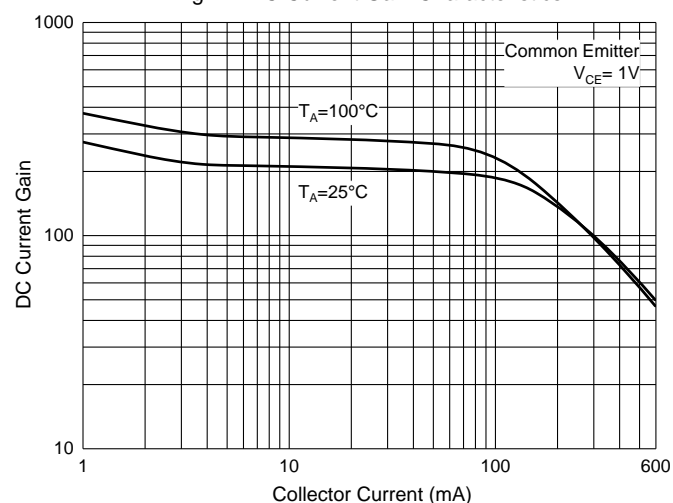


Fig. 3 - Base-Emitter Saturation Voltage Characteristics

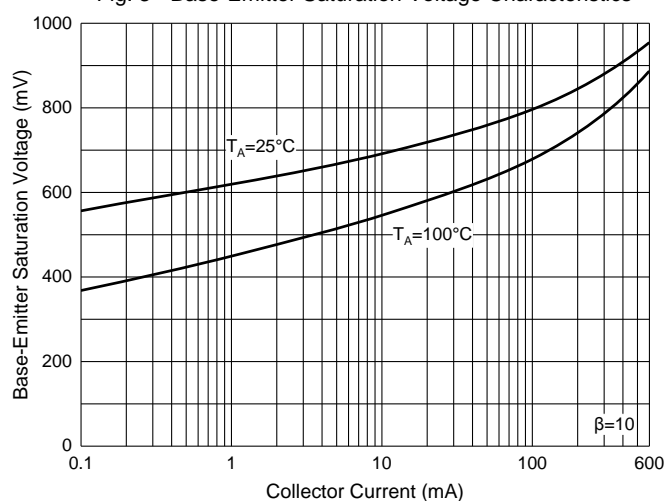


Fig. 4 - Collector-Emitter Saturation Voltage Characteristics

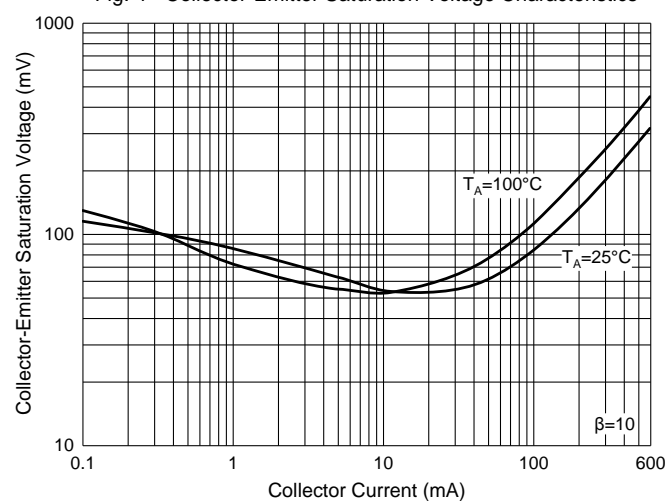


Fig. 5 - Base-Emitter Voltage Characteristics

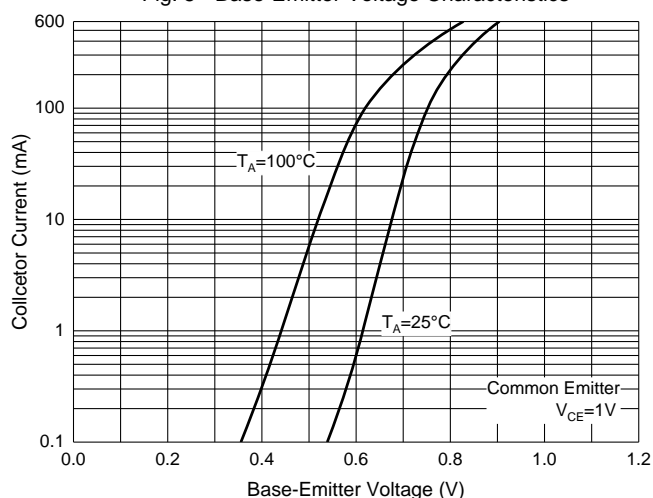
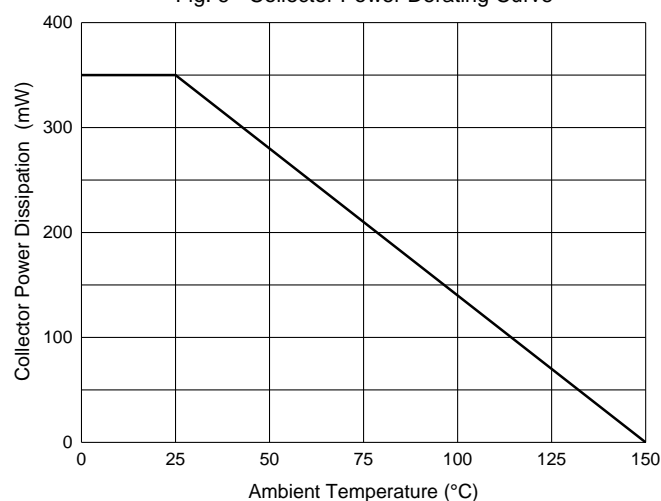


Fig. 6 - Collector Power Derating Curve



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel

Note : Adding "-HF" Suffix for Halogen Free, eg. Part Number-TP-HF

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