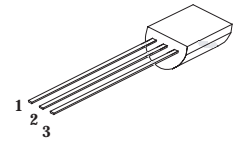
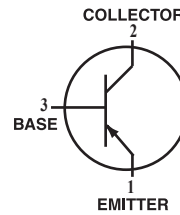


### PNP General Purpose Transistors

 Lead(Pb)-Free



1. EMITTER  
2. COLLECTOR  
3. BASE

TO-92MOD

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	-50	Vdc
Collector-Base Voltage	$V_{CBO}$	-50	Vdc
Emitter-Base Voltage	$V_{EBO}$	-5	Vdc
Collector Current-Continuous	$I_C$	-2.0	Adc

#### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Total Device Dissipation Alumina Substrate, (1) $T_A=25^{\circ}\text{C}$ Derate above $25^{\circ}\text{C}$	$P_D$	900	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	7.25	$\text{mW}/^{\circ}\text{C}$
Junction and Storage, Temperature	$T_J, T_{stg}$	138	$^{\circ}\text{C}/\text{W}$
		-55 to +150	$^{\circ}\text{C}$

#### DEVICE MARKING

2SA1020=A1020

#### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min	Max	Unit
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#### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ( $I_C=-10\text{ mAdc}, I_B=0$ )	$V_{(BR)CEO}$	-50	-	Vdc
Collector Cutoff Current ( $V_{CB}=-40\text{Vdc}, I_E=0$ )	$I_{CBO}$	-	-0.1	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB}=-5.0\text{Vdc}, I_C=0$ )	$I_{EBO}$	-	-0.1	$\mu\text{Adc}$

1. Alumina=0.4 x 0.3 x 0.024 in. 99.5% alumina

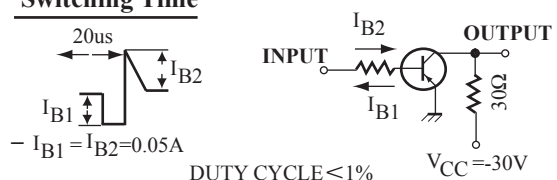
# 2SA1020



## ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

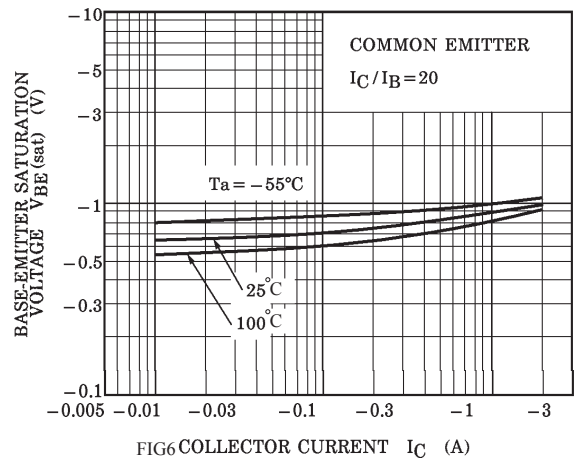
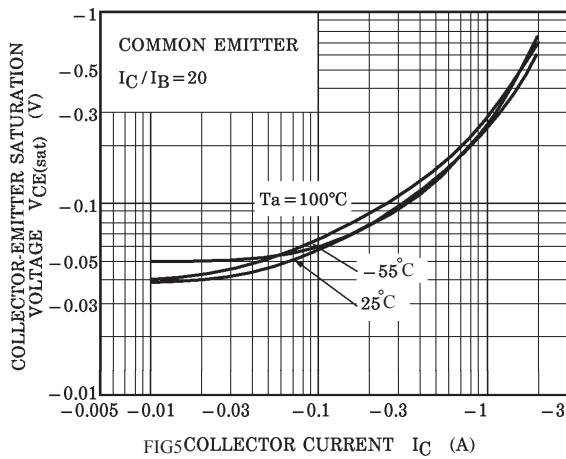
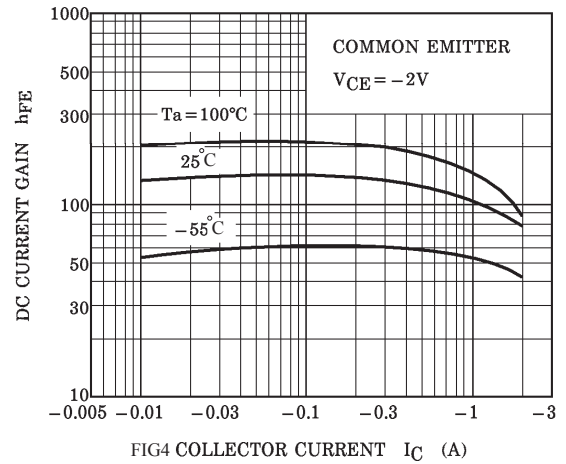
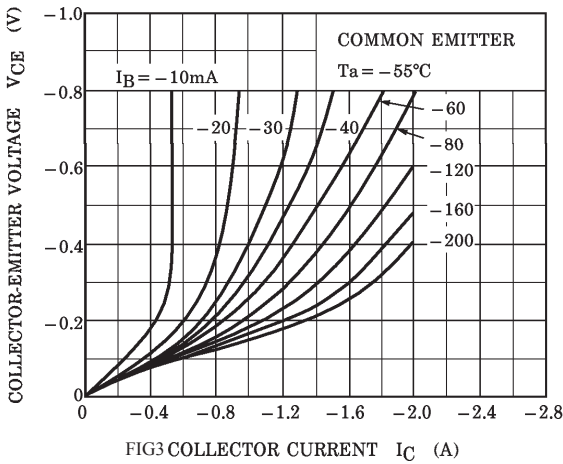
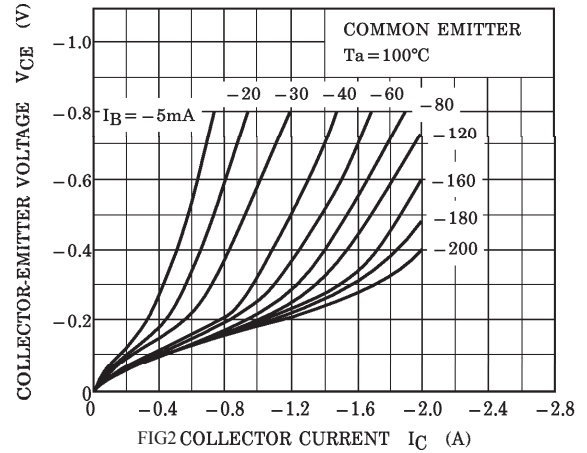
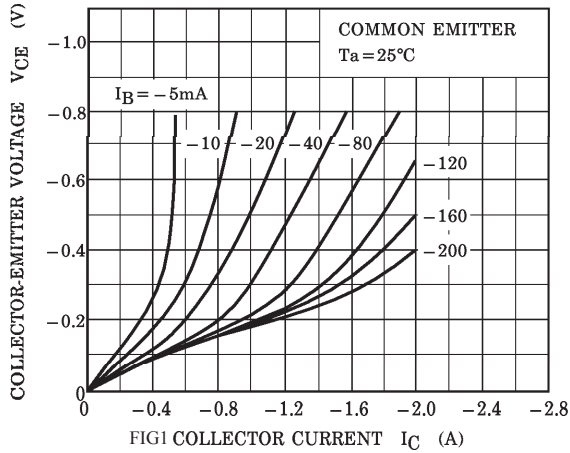
Characteristics	Symbol	Min	Typ	Max	Unit
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### ON CHARACTERISTICS

DC Current Gain ( $I_C=-500\text{ mAdc}$ , $V_{CE}=-2.0\text{ Vdc}$ ) ( $I_C=-1500\text{ mAdc}$ , $V_{CE}=-2.0\text{ Vdc}$ )	$h_{FE}^{(1)}$ $h_{FE}^{(2)}$	70 40	- -	240 -	- -	
Collector-Emitter Saturation Voltage ( $I_C=-1000\text{ mAdc}$ , $I_B=-50\text{ mAdc}$ )	$V_{CE(sat)}$	-	-	-0.5	Vdc	
Base-Emitter Saturation Voltage ( $I_C=-1000\text{ mAdc}$ , $I_B=-50\text{ mAdc}$ )	$V_{BE(sat)}$	-	-	-1.2	Vdc	
Current-Gain-Bandwidth Product ( $I_C=-500\text{ mAdc}$ , $V_{CE}=-2\text{ Vdc}$ )	$f_T$	100	-	-	MHz	
Collector Output Capacitance $V_{CB}=-10\text{V}$ , $I_E=0$ , $f=1\text{MHz}$	$C_{ob}$	-	-40	-	PF	
<b>Switching Time</b>  <p><math>I_{B1} = I_{B2} = 0.05\text{A}</math> DUTY CYCLE <math>\leq 1\%</math> <math>V_{CC} = -30\text{V}</math></p>	Turn-on time	$t_{on}$	-	0.1	-	
	Storage time	$t_{stg}$	-	1.0	-	us
	Fall time	$t_f$	-	0.1	-	-

### CLASSIFICATION OF $h_{FE}$

Rank	O	Y
Range	70-140	120-240



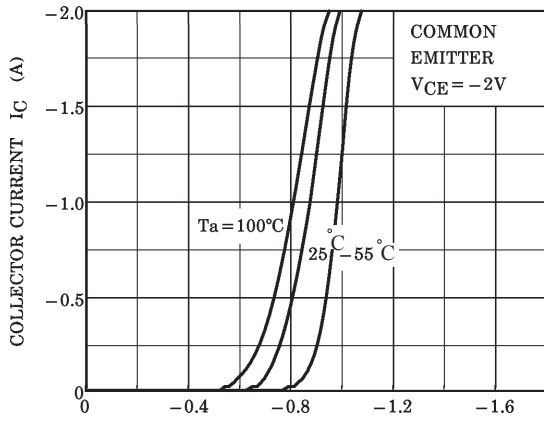


FIG7 BASE-EMITTER VOLTAGE  $V_{BE}$  (V)

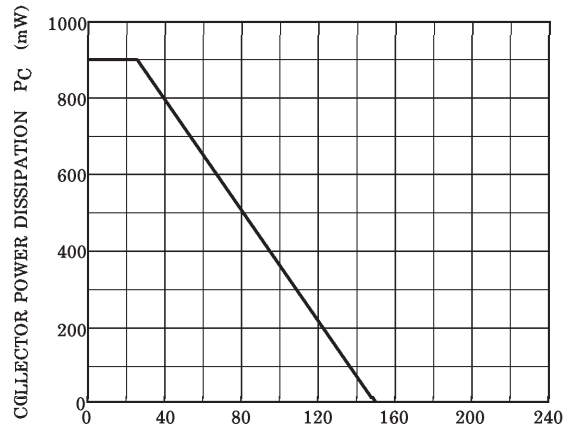


FIG8 AMBIENT TEMPERATURE  $T_a$  ( $^\circ C$ )

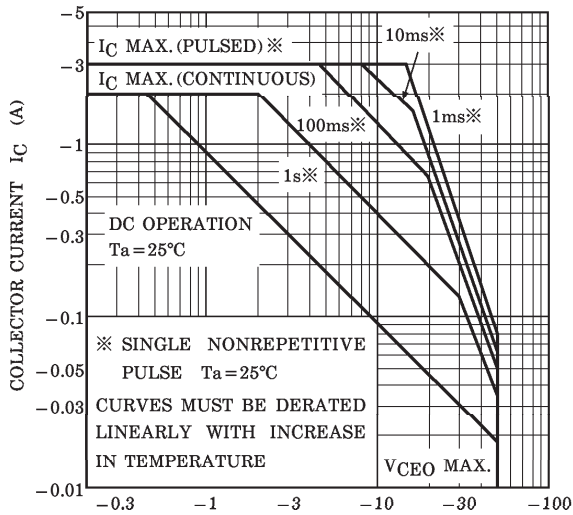
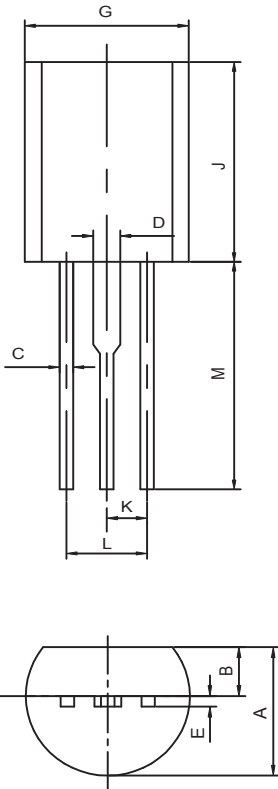


FIG9 COLLECTOR-EMITTER VOLTAGE  $V_{CE}$  (V)

**TO-92MOD Outline Dimensions**

unit:mm



<b>TO-92MOD</b>		
<b>Dim</b>	<b>Min</b>	<b>Max</b>
<b>A</b>	4.700	5.100
<b>B</b>	1.730	2.030
<b>C</b>	0.400	0.600
<b>D</b>	0.900	1.100
<b>E</b>	0.400	0.500
<b>G</b>	5.800	6.200
<b>J</b>	8.400	8.800
<b>K</b>	1.500TYP	
<b>L</b>	2.900	3.100
<b>M</b>	12.20	13.450