

**Features**

- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

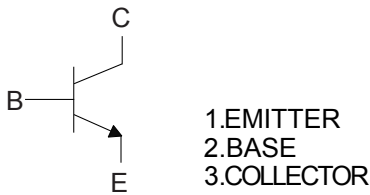
**Maximum Ratings @ 25°C Unless Otherwise Specified**

- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 200°C/W Junction to Ambient
- Thermal Resistance: 83.3°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	75	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Continuous Collector Current	$I_C$	600	mA
Power Dissipation	$P_D$	625	mW

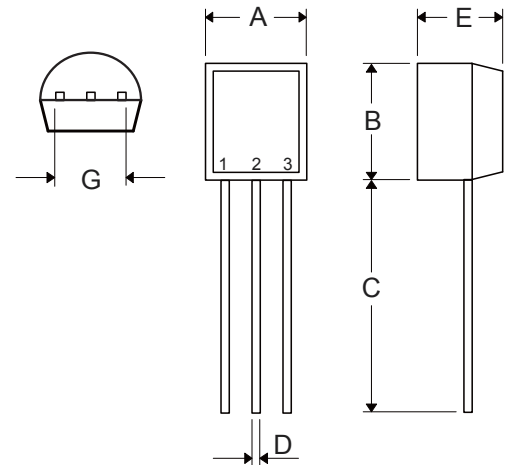
**Marking:** Type Number

**Internal Structure**



**NPN General Purpose Amplifier**

TO-92



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.169	0.185	4.30	4.70	
B	0.169	0.185	4.30	4.70	
C	0.500	-----	12.70	-----	
D	0.015	0.022	0.38	0.55	
E	0.130	0.146	3.30	3.70	
G	0.095	0.105	2.42	2.67	Straight Lead
	0.173	0.220	4.40	5.60	Bent

**Electrical Characteristics @ T<sub>A</sub>=25°C Unless Otherwise Specified**

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	75			V	I <sub>C</sub> =10μA, I <sub>E</sub> =0
Collector-Emitter Breakdown Voltage*	V <sub>(BR)CEO</sub>	40			V	I <sub>C</sub> =10mA, I <sub>B</sub> =0
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	6			V	I <sub>E</sub> =10μA, I <sub>C</sub> =0
Base Cutoff Current	I <sub>BL</sub>			0.02	μA	V <sub>CE</sub> =60V, V <sub>BE</sub> =3V
Collector Cut-off Current	I <sub>CEX</sub>			0.01	μA	V <sub>CE</sub> =60V, V <sub>BE</sub> =3V
DC Current Gain*	h <sub>FE(1)</sub>	35				V <sub>CE</sub> =10V, I <sub>C</sub> =0.1mA
	h <sub>FE(2)</sub>	50				V <sub>CE</sub> =10V, I <sub>C</sub> =1mA
	h <sub>FE(3)</sub>	75				V <sub>CE</sub> =10V, I <sub>C</sub> =10mA
	h <sub>FE(4)</sub>	100		300		V <sub>CE</sub> =10V, I <sub>C</sub> =150mA
	h <sub>FE(5)</sub>	50				V <sub>CE</sub> =1V, I <sub>C</sub> =150mA
	h <sub>FE(6)</sub>	40				V <sub>CE</sub> =10V, I <sub>C</sub> =500mA
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>			0.3	V	I <sub>C</sub> =150mA, I <sub>B</sub> =15mA
				1	V	I <sub>C</sub> =500mA, I <sub>B</sub> =50mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	0.6		1.2	V	I <sub>C</sub> =150mA, I <sub>B</sub> =15mA
				2	V	I <sub>C</sub> =500mA, I <sub>B</sub> =50mA
Transition Frequency	f <sub>T</sub>	300			MHz	V <sub>CE</sub> =20V, I <sub>C</sub> =20mA, f=100MHz
Delay Time	t <sub>d</sub>			10	ns	V <sub>CC</sub> =30V, V <sub>BE</sub> =0.5V, I <sub>C</sub> =150mA,
Rise Time	t <sub>r</sub>			25	ns	I <sub>B1</sub> =15mA
Storage Time	t <sub>s</sub>			225	ns	V <sub>CC</sub> =30V, I <sub>C</sub> =150mA, I <sub>B1</sub> =I <sub>B2</sub> =15mA
Fall Time	t <sub>f</sub>			60	ns	
Output Capacitance	C <sub>cbo</sub>			8	pF	V <sub>CB</sub> =10V, I <sub>E</sub> =0, f=100Hz
Input Capacitance	C <sub>ibo</sub>			25	pF	V <sub>BE</sub> =0.5V, I <sub>C</sub> =0, f=100Hz
Noise Figure	N <sub>F</sub>			4	dB	V <sub>CE</sub> =10V, I <sub>C</sub> =0.1mA, f=1KHz, R <sub>S</sub> =1KΩ

\*.Pulse test: Pulse Width≤300μs,Duty Cycle≤2.0%.

**Curve Characteristics**

Fig. 1 - Static Characteristics

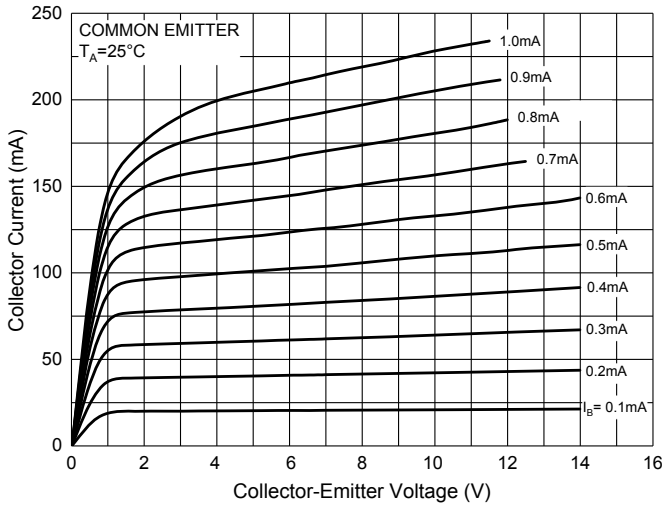


Fig. 2 - DC Current Gain Characteristics

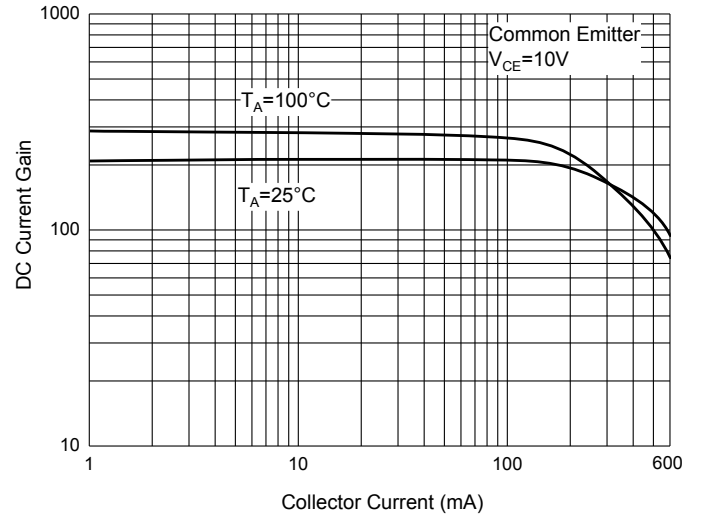


Fig. 3 - Collector-Emitter Saturation Voltage Characteristics

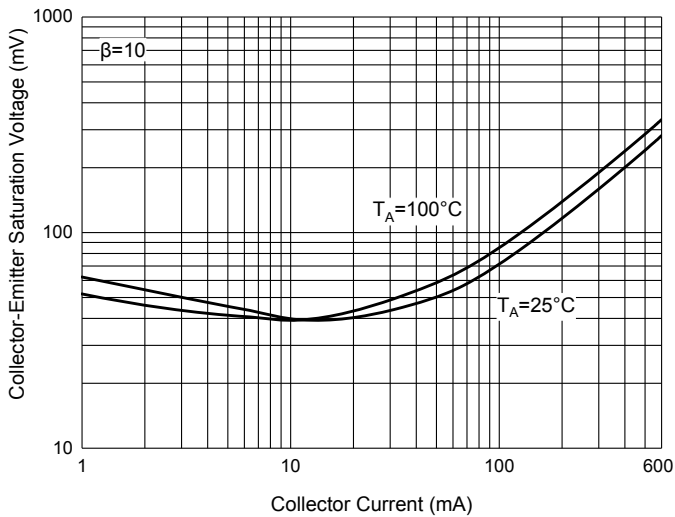


Fig. 4 - Base-Emitter Saturation Voltage Characteristics

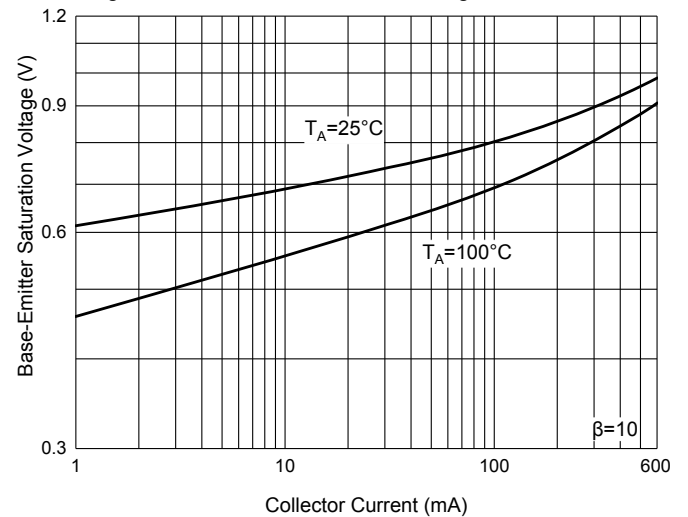


Fig. 5 - Base-Emitter Voltage Characteristics

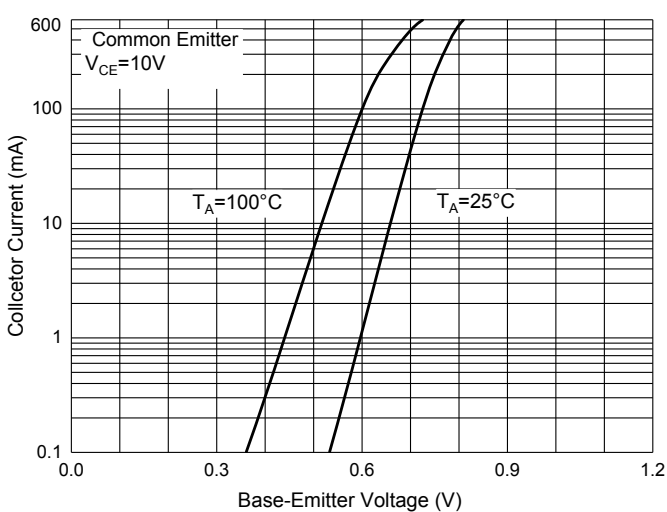
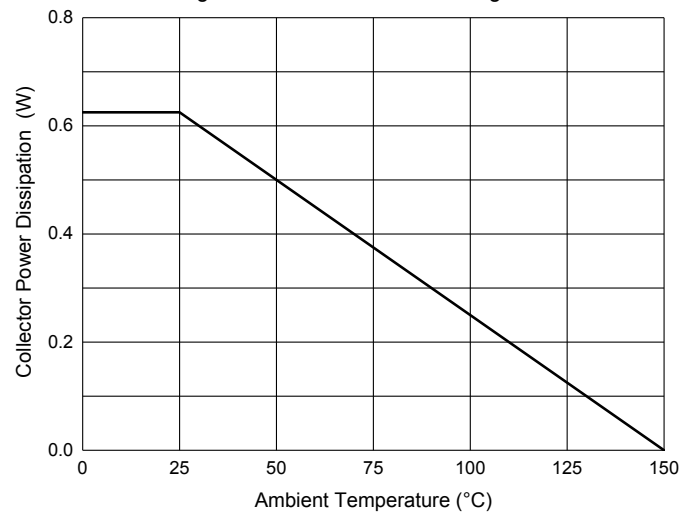


Fig. 6 - Collector Power Derating Curve



## Ordering Information

Device	Packing
Part Number-AP	Ammo Packing: 20Kpcs/Carton
Part Number-BP	Bulk: 1k/Bag, 100K/Ctn;

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

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