2N3904-AP Datasheet

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DiGi Electronics Part Number	2N3904-AP-DG
Manufacturer	Micro Commercial Co
Manufacturer Product Number	2N3904-AP
Description	TRANS NPN 40V 0.2A TO92
Detailed Description	Bipolar (BJT) Transistor NPN 40 V 200 mA 250MHz 625 mW Through Hole TO-92

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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
2N3904-AP	Micro Commercial Co
Series:	Product Status:
-	Obsolete
Transistor Type:	Current - Collector (Ic) (Max):
NPN	200 mA
Voltage - Collector Emitter Breakdown (Max):	Vce Saturation (Max) @ Ib, Ic:
40 V	400mV @ 5mA, 50mA
Current - Collector Cutoff (Max):	DC Current Gain (hFE) (Min) @ Ic, Vce:
-	100 @ 10mA, 1V
Power - Max:	Frequency - Transition:
625 mW	250MHz
Operating Temperature:	Mounting Type:
-55°C ~ 150°C (TJ)	Through Hole
Package / Case:	Supplier Device Package:
TO-226-3, TO-92-3 (TO-226AA) Formed Leads	TO-92
Base Product Number:	
2N3904	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	Not Applicable
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.21.0075	

Features

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

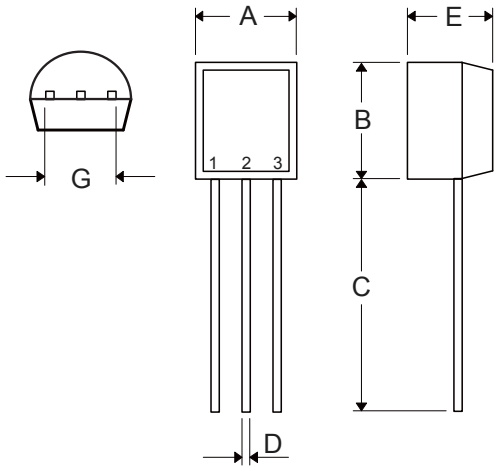
NPN General Purpose Amplifier

Maximum Ratings @ 25°C Unless Otherwise Specified

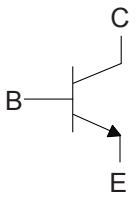
- Operating Junction Temperature Range: -55℃ to +150℃
- Storage Temperature Range: -55℃ to +150℃
- Thermal Resistance: 200℃/W Junction to Ambient

Parameter	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Continuous Collector Current	I_C	200	mA
Power Dissipation	P_D	625	mW

TO-92



Internal Structure



1.EMITTER
2.BASE
3.COLLECTOR

DIMENSIONS					
DIM	INCHES		MM		NOTE
	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_A=25°C Unless Otherwise Specified

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60			V	I_C=10μA, I_E=0
Collector-Emitter Breakdown Voltage*	$V_{(BR)CEO}$	40			V	I_C=1mA, I_B=0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6			V	I_E=10μA, I_C=0
Base Cutoff Current	I_{BL}			0.05	μA	V_{CE}=30V, V_{BE}=3V
Collector Cut-off Current	I_{CEX}			0.05	μA	V_{CE}=30V, V_{BE}=3V
DC Current Gain*	$h_{FE(1)}$	40				V_{CE}=1V, I_C=0.1mA
	$h_{FE(2)}$	70				V_{CE}=1V, I_C=1mA
	$h_{FE(3)}$	100		300		V_{CE}=1V, I_C=10mA
	$h_{FE(4)}$	60				V_{CE}=1V, I_C=50mA
	$h_{FE(5)}$	30				V_{CE}=1V, I_C=100mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.2	V	I_C=10mA, I_B=1mA
				0.4	V	I_C=50mA, I_B=5mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	0.65		0.85	V	I_C=10mA, I_B=1mA
				0.95	V	I_C=50mA, I_B=5mA
Transition Frequency	f_T	250			MHz	V_{CE}=20V, I_C=10mA, f=100MHz
Delay Time	t_d			35	ns	V_{CC}=3V, V_{BE}=0.5V, I_C=10mA, I_{B1}=1mA
Rise Time	t_r			35	ns	
Storage Time	t_s			200	ns	V_{CC}=3V, I_C=10mA, I_{B1}=I_{B2}=1mA
Fall Time	t_f			50	ns	
Output Capacitance	C_{obo}			4	pF	V_{CB}=5V, I_E=0,f=1MHz
Input Capacitance	C_{ibo}			8	pF	V_{BE}=0.5V, I_C=0, f=1MHz
Noise Figure	N_F			5	dB	V_{CE}=5V,I_C=0.1mA,f=10Hz to 15.7KHz,R_S=1KΩ

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

Curve Characteristics

Fig. 1 - Static Characteristics

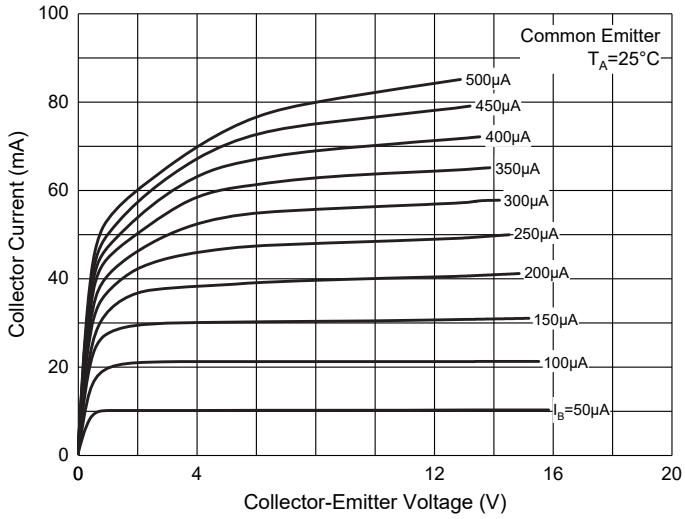


Fig. 2 - DC Current Gain Characteristics

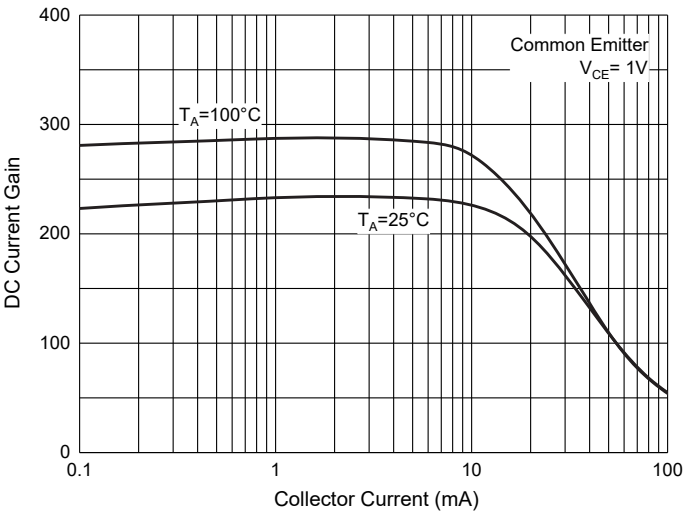


Fig. 4 - Collector-Emitter Saturation Voltage Characteristics

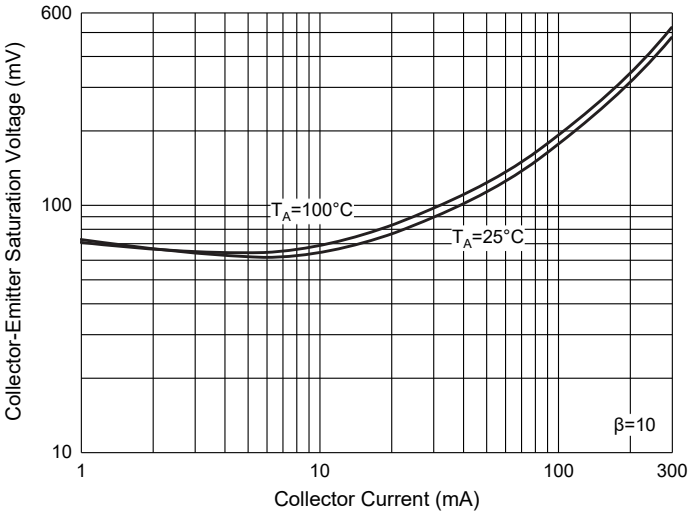


Fig. 4 - Base-Emitter Saturation Voltage Characteristics

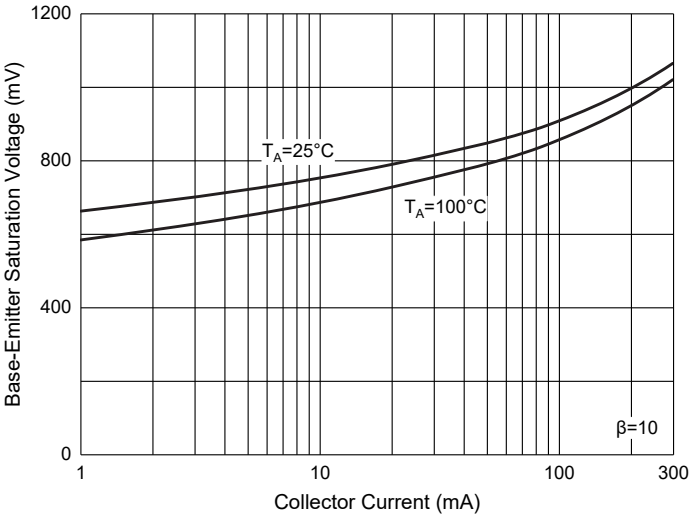


Fig. 5 - Base-Emitter Voltage Characteristics

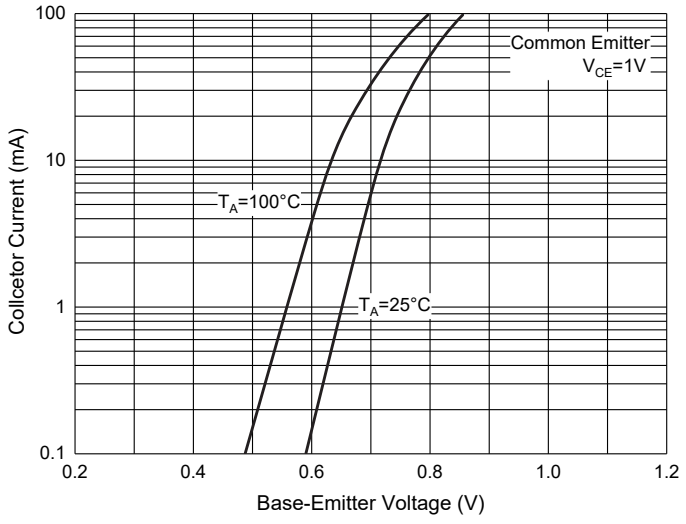
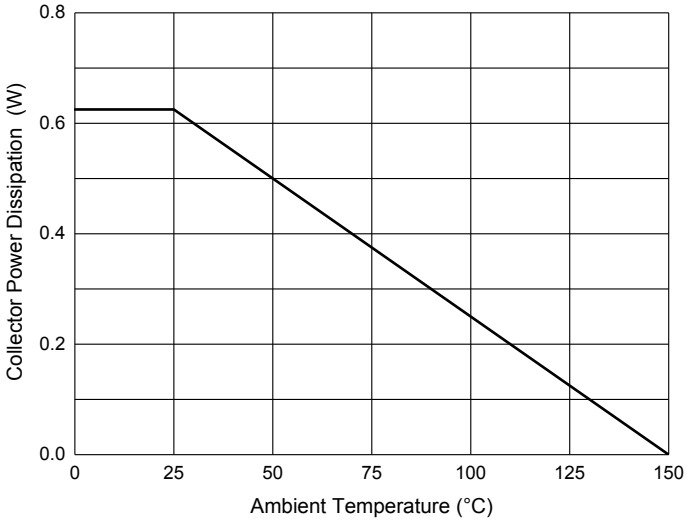


Fig. 6 - Collector Power Derating Curve



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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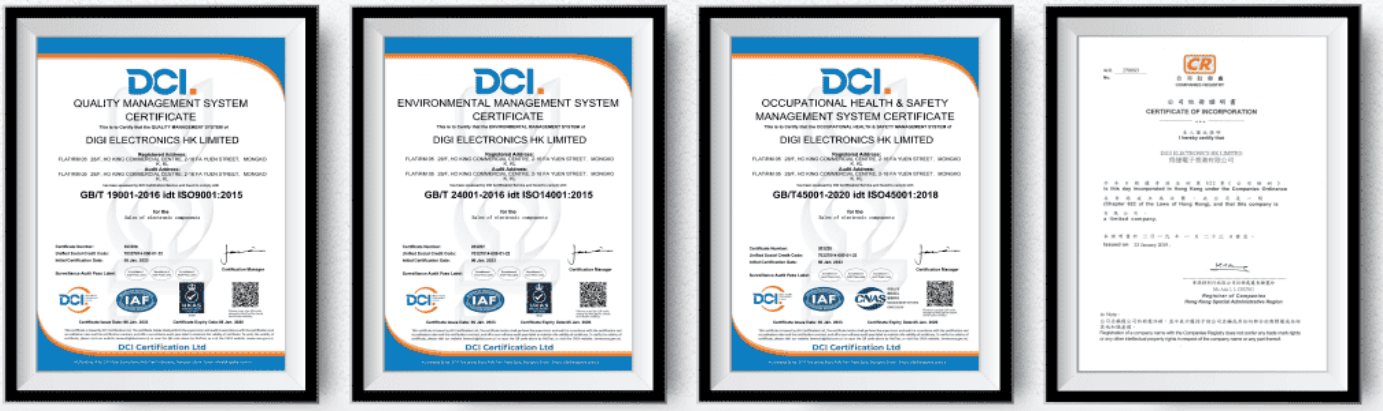

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