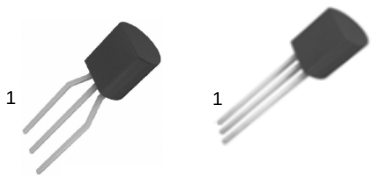
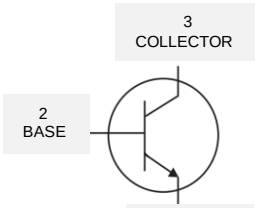
2N3904N

NPN GENERAL PURPOSE SWITCHING TRANSISTOR

Voltage	40V	Current	0.2A



TO-92 AMMO TO-92



Features

- Silicon NPN, Planar design
- Low Vce(sat) 0.2V(max)@Ic/Ib= 10mA/1mA
- High collector current capability
- Excellent DC current gain characteristics
- Lead free in compliance with EU RoHS 2011/65/EU directive.
- Green molding compound as per IEC61249 Std. (Halogen Free)

Mechanical Data

- Case: TO-92 and TO-92 AMMO Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.007 ounces, 0.196 grams
- Marking: 2N3904N

Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNITS
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current (DC)	I_C	0.2	A
Collector Current (Pulse)	I_{CP}	0.4	A
Collector Power Dissipation	P_D	625	mW
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55~150	°C
Typical Thermal Resistance from Junction to Ambient (Note)	$R_{\theta JA}$	200	°C/W

Note: Limited only By Maximum Junction Temperature

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Electrical Characteristics (T_A=25°C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
OFF Characteristics						
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C= 1mA, I_B= 0A	40	-	-	V
Collector-Base Breakdown Voltage	BV_{CBO}	I_C= 0.01mA, I_E= 0A	60	-	-	V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E= 0.01mA, I_C= 0A	6	-	-	V
Collector-Base Cutoff Current	I_{CBO}	V_{CB}= 30V, I_E= 0A	-	-	50	nA
Emitter-Base Cutoff Current	I_{EBO}	V_{EB}= 3V	-	-	50	nA
Collector-Emitter Cutoff Current	I_{CES}	V_{CES}= 30V	-	-	50	nA
ON characteristics						
DC Current Gain	h_{FE}	V_{CE}= 1V, I_C= 0.1mA	40	-	-	-
		V_{CE}= 1V, I_C= 1mA	70	-	-	
		V_{CE}= 1V, I_C= 10mA	100	-	300	
		V_{CE}= 1V, I_C= 50mA	60	-	-	
		V_{CE}= 1V, I_C= 100mA	30	-	-	
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	I_C= 10mA, I_B= 1mA	-	-	200	mV
		I_C= 50mA, I_B= 5mA	-	-	300	
Base-Emitter Saturation voltage	$V_{BE(SAT)}$	I_C= 10mA, I_B= 1mA	0.65	-	0.85	V
		I_C= 50mA, I_B= 5mA	-	-	0.95	
Transition Frequency	f_T	I_C= 10mA, V_{CE}= 20V f=100MHz	300	-	-	MHz
Collector-Base Capacitance	Ccbo	V_{CB}= 5V, I_E= 0A, f=1MHz	-	-	4	pF
Emitter-Base Capacitance	Cebo	V_{EB}= 0.5V, I_C= 0A, f=1MHz	-	-	8	pF
Delay Time	Td	Vcc=3V, V_{BE}= -0.5V	-	-	35	nS
Rise Time	Tr	Ic= 10mA, I_B= 1mA	-	-	35	nS
Storage Time	Ts	Vcc=3V, Ic= 10mA	-	-	200	nS
Fall Time	Tf	I_{B1} = I_{B2} =1mA	-	-	50	nS

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TYPICAL CHARACTERISTIC CURVES

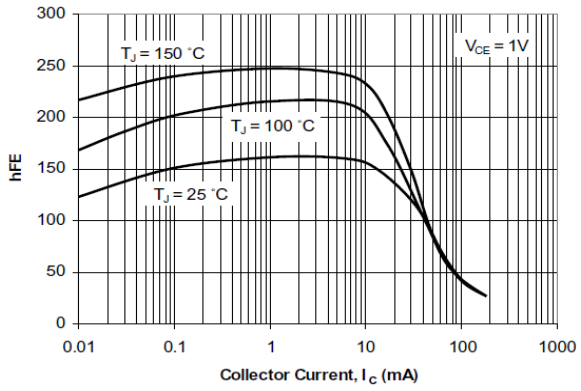

Fig.1 Typical Hfe vs Collector Current

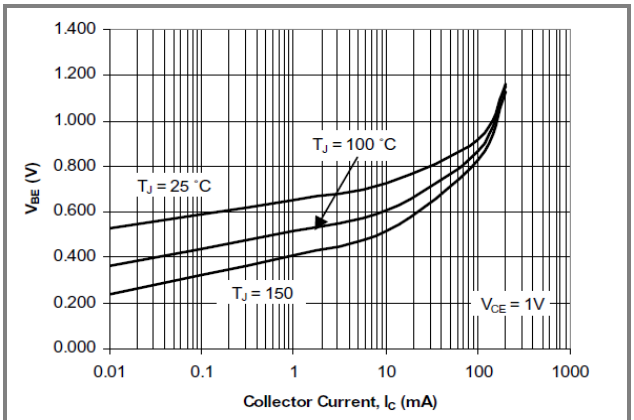

Fig.2 Typical Vbe vs Collector Current

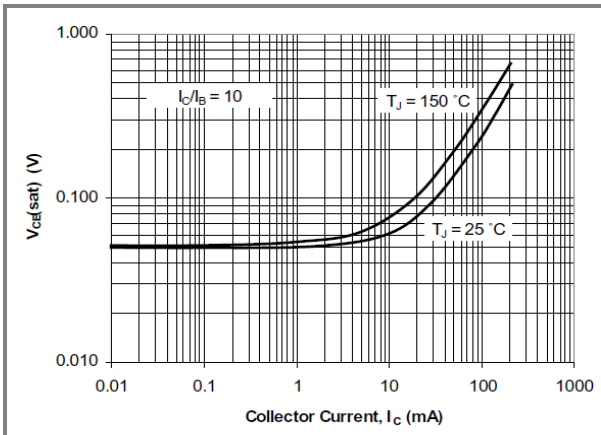

Fig.3 Typical Vce(sat) vs Collector Current

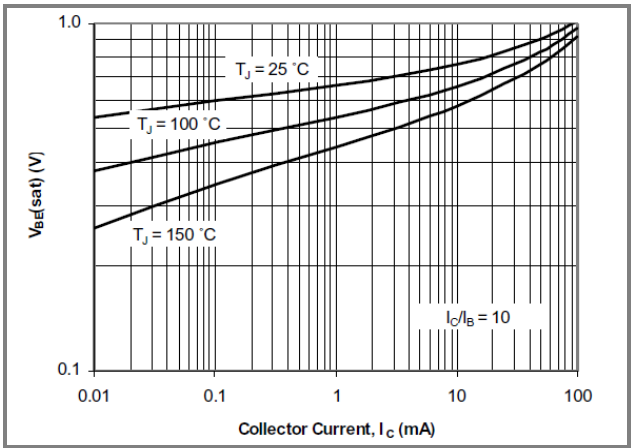

Fig.4 Typical Vbe(sat) vs Collector Current

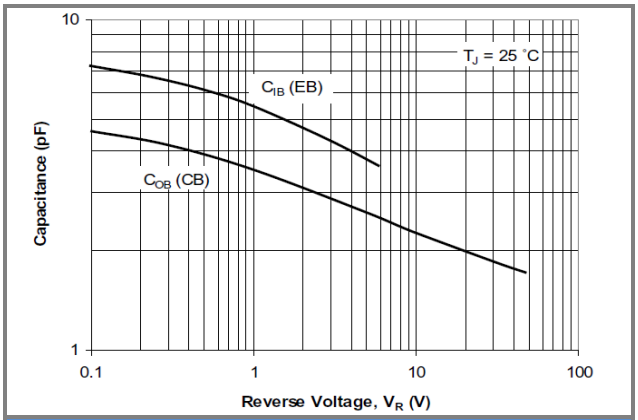

Fig.5 Typical Capacitances vs Reverse Voltage

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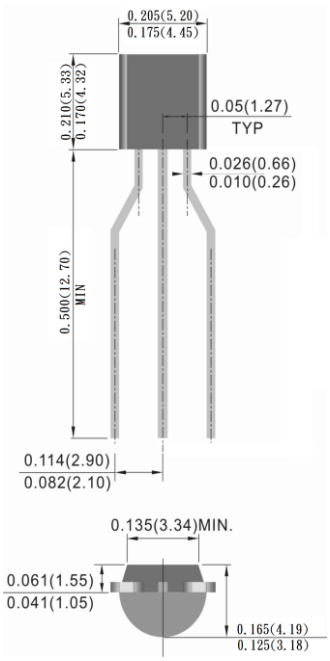
Packaging Information .

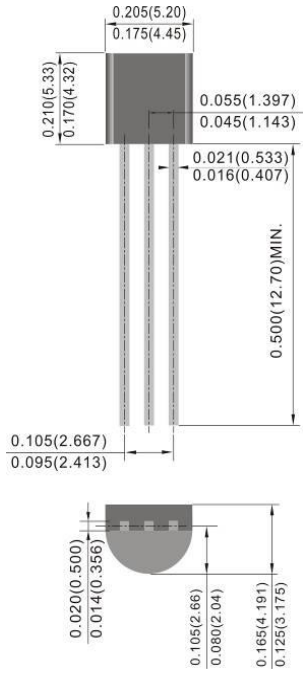
TO-92 AMMO Dimension

Unit: mm



TO-92 Dimension

Unit: mm



2N3904N

PART NO PACKING CODE VERSION

Part No Packing Code	Package Type	Packing type	Marking	Version
2N3904N_B0_00001	TO-92	1000pcs / bag	2N3904N	Halogen free
2N3904N_A0_00001	TO-92 AMMO	2000pcs / box	2N3904N	Halogen free

2N3904N

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