2N4921, 2N4922, 2N4923

2N4923 is a Preferred Device

Medium-Power Plastic NPN Silicon Transistors

These high−performance plastic devices are designed for driver circuits, switching, and amplifier applications.

Features

- Low Saturation Voltage − $V_{CE(sat)}$ = 0.6 Vdc (Max) @ I_C = 1.0 A
- Excellent Power Dissipation Due to Thermopad Construction − P_D = 30 W @ T_C = 25°C
- Excellent Safe Operating Area
- Gain Specified to I_C = 1.0 A
- Complement to PNP 2N4918, 2N4919, 2N4920
- Pb−Free Packages are Available*

MAXIMUM RATINGS

Rating		Symbol	Value	Unit
Collector−Emitter Voltage	2N4921 2N4922 2N4923	V_{CEO}	40 60 80	Vdc
Collector−Emitter Voltage	2N4921 2N4922 2N4923	V_{CB}	40 60 80	Vdc
Emitter Base Voltage		V_{EB}	5.0	Vdc
Collector Current − Continuous (Note 1)		I_C	1.0 3.0	Adc
Base Current − Continuous		I_B	1.0	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C		P_D	30 0.24	W mW/°C
Operating and Storage Junction Temperature Range		T_J, T_{stg}	−65 to +150	°C

THERMAL CHARACTERISTICS (Note 2)

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	θ_{JC}	4.16	°C/W

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. The 1.0 A maximum I_C value is based upon JEDEC current gain requirements. The 3.0 A maximum value is based upon actual current handling capability of the device (see Figures 5 and 6).
2. Recommend use of thermal compound for lowest thermal resistance.

*Indicates JEDEC Registered Data.

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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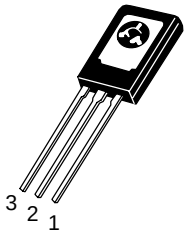
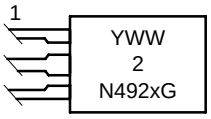
http://onsemi.com

1.0 AMPERE GENERAL PURPOSE POWER TRANSISTORS 40−80 VOLTS, 30 WATTS



TO−225
CASE 77
STYLE 1

MARKING DIAGRAM



Y = Year
WW = Work Week
2N492x = Device Code
x = 1, 2, or 3
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping
2N4921	TO−225	500 Units / Box
2N4921G	TO−225 (Pb−Free)	500 Units / Box
2N4922	TO−225	500 Units / Box
2N4922G	TO−225 (Pb−Free)	500 Units / Box
2N4923	TO−225	500 Units / Box
2N4923G	TO−225 (Pb−Free)	500 Units / Box

Preferred devices are recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector−Emitter Sustaining Voltage (Note 3) (I_C = 0.1 Adc, I_B = 0)	2N4921 2N4922 2N4923	$V_{CEO(sus)}$	 40 60 80	 – – –	Vdc
Collector Cutoff Current (V_{CE} = 20 Vdc, I_B = 0) (V_{CE} = 30 Vdc, I_B = 0) (V_{CE} = 40 Vdc, I_B = 0)	 2N4921 2N4922 2N4923	I_{CEO}	 – – –	 0.5 0.5 0.5	mAdc
Collector Cutoff Current (V_{CE} = Rated V_{CEO}, $V_{EB(off)}$ = 1.5 Vdc) (V_{CE} = Rated V_{CEO}, $V_{EB(off)}$ = 1.5 Vdc, T_C = 125°C		I_{CEX}	 – –	 0.1 0.5	mAdc
Collector Cutoff Current (V_{CB} = Rated V_{CB}, I_E = 0)		I_{CBO}	 –	 0.1	mAdc
Emitter Cutoff Current (V_{EB} = 5.0 Vdc, I_C = 0)		I_{EBO}	 –	 1.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (Note 3) (I_C = 50 mAdc, V_{CE} = 1.0 Vdc) (I_C = 500 mAdc, V_{CE} = 1.0 Vdc) (I_C = 1.0 Adc, V_{CE} = 1.0 Vdc)		h_{FE}	 40 30 10	 – 150 –	–
Collector−Emitter Saturation Voltage (Note 3) (I_C = 1.0 Adc, I_B = 0.1 Adc)		$V_{CE(sat)}$	 –	 0.6	Vdc
Base−Emitter Saturation Voltage (Note 3) (I_C = 1.0 Adc, I_B = 0.1 Adc)		$V_{BE(sat)}$	 –	 1.3	Vdc
Base−Emitter On Voltage (Note 3) (I_C = 1.0 Adc, V_{CE} = 1.0 Vdc)		$V_{BE(on)}$	 –	 1.3	Vdc
SMALL−SIGNAL CHARACTERISTICS					
Current−Gain − Bandwidth Product (I_C = 250 mAdc, V_{CE} = 10 Vdc, f = 1.0 MHz)		f_T	 3.0	 –	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)		C_{ob}	 –	 100	pF
Small−Signal Current Gain (I_C = 250 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)		h_{fe}	 25	 –	–

3. Pulse Test: PW ≈ 300 μs, Duty Cycle ≈ 2.0%.

*Indicates JEDEC Registered Data.

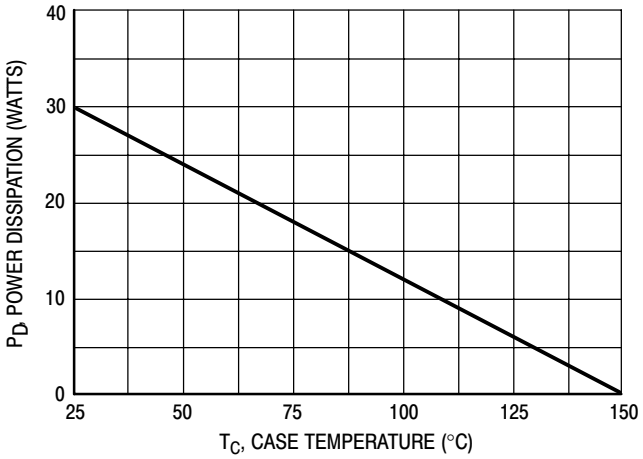


Figure 1. Power Derating

Safe Area Curves are indicated by Figure 5. All limits are applicable and must be observed.

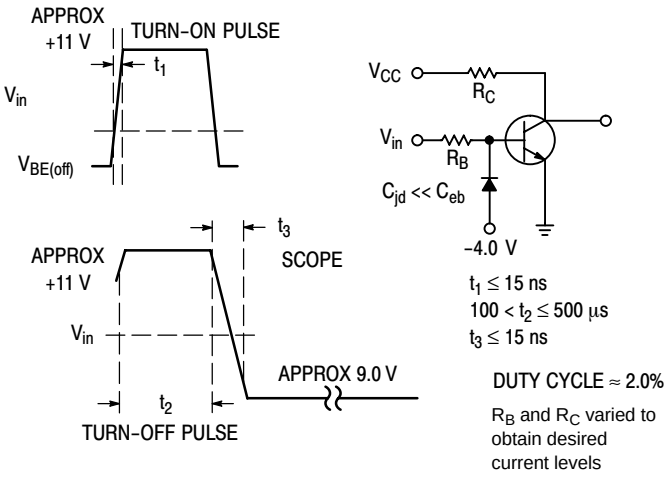


Figure 2. Switching Time Equivalent Circuit

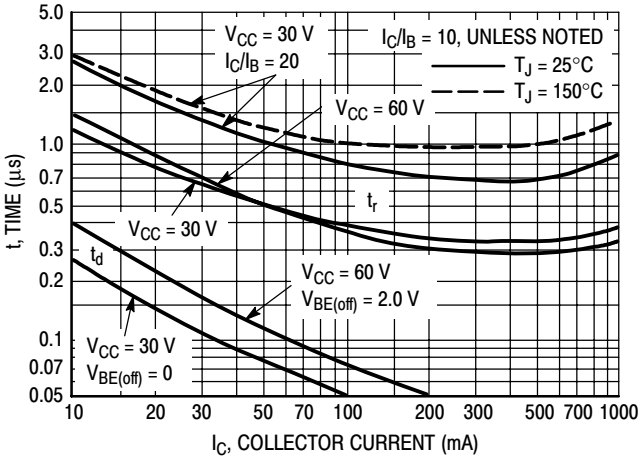


Figure 3. Turn−On Time

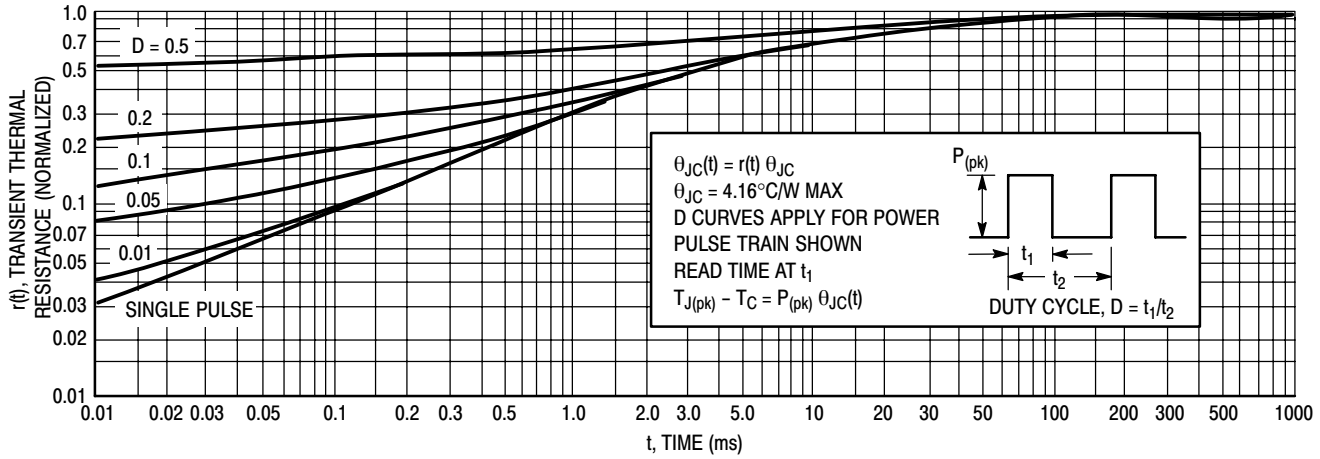


Figure 4. Thermal Response

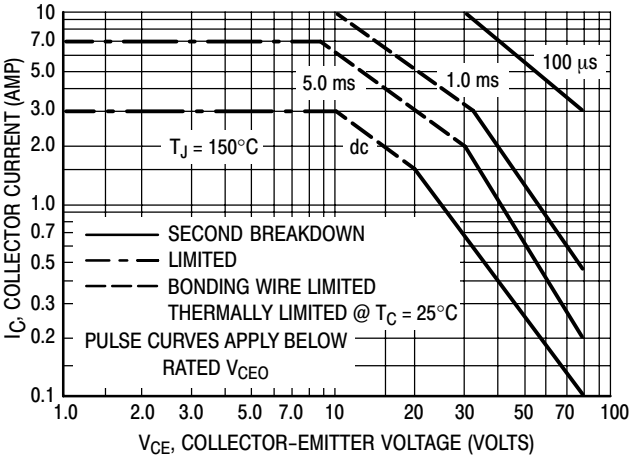


Figure 5. Active−Region Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ operation i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 5 is based on $T_{J(pk)} = 150°C$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150°C$. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

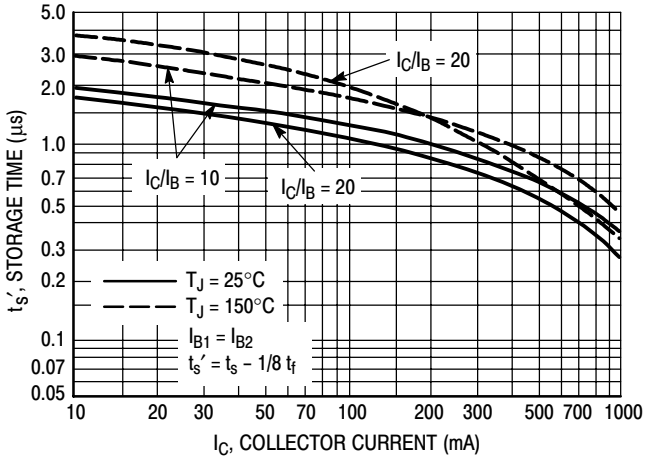


Figure 6. Storage Time

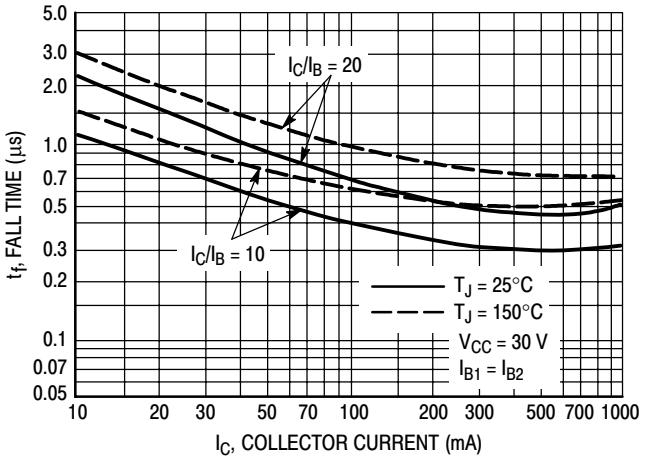


Figure 7. Fall Time

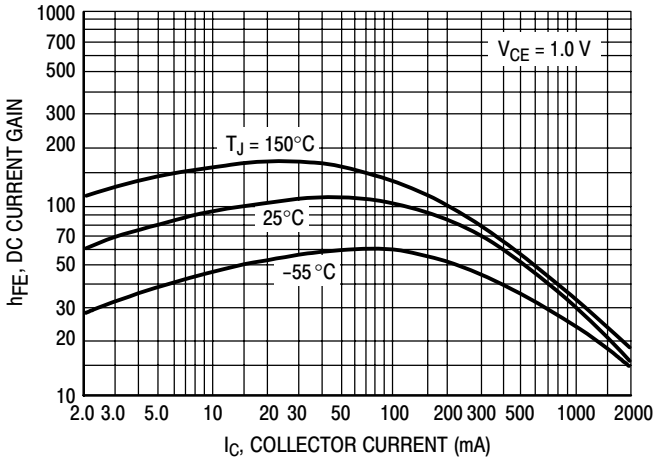


Figure 8. Current Gain

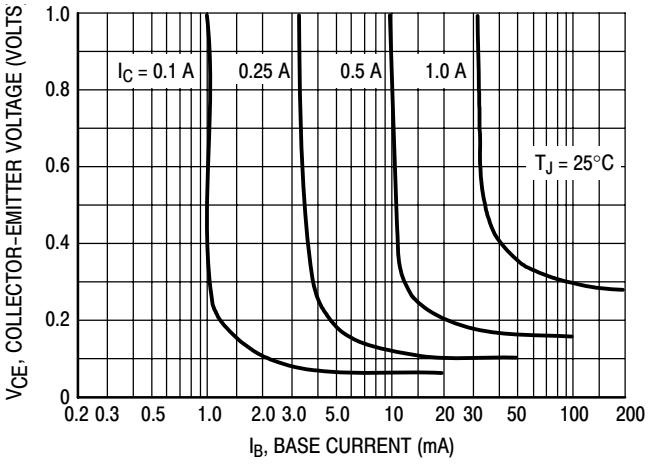


Figure 9. Collector Saturation Region

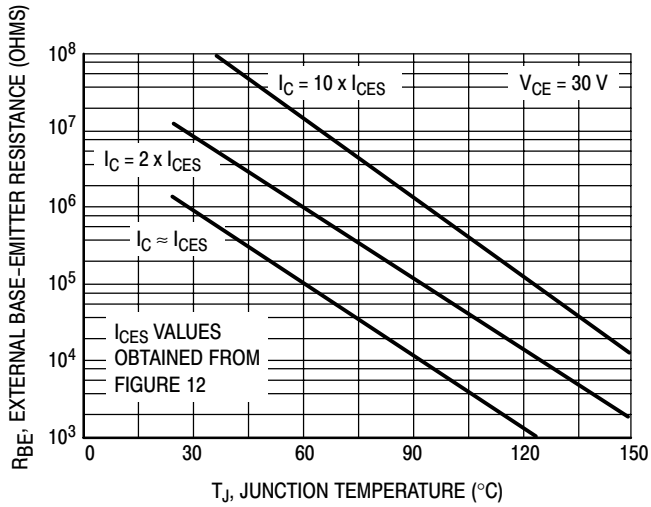


Figure 10. Effects of Base−Emitter Resistance

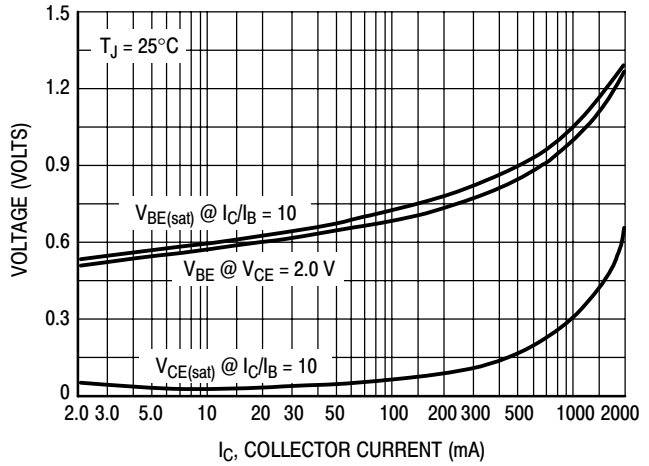


Figure 11. “On” Voltage

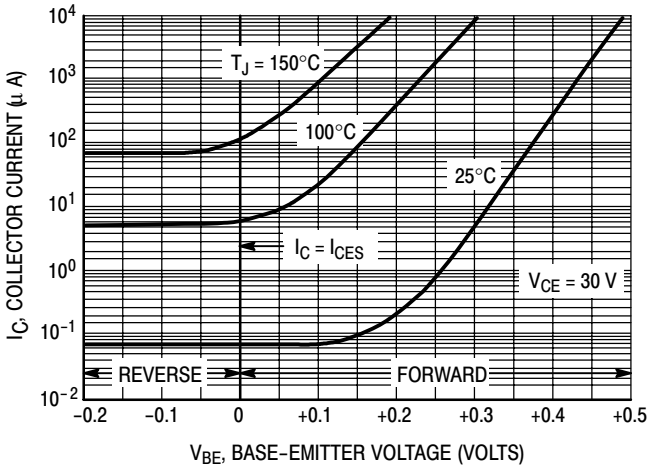


Figure 12. Collector Cut−Off Region

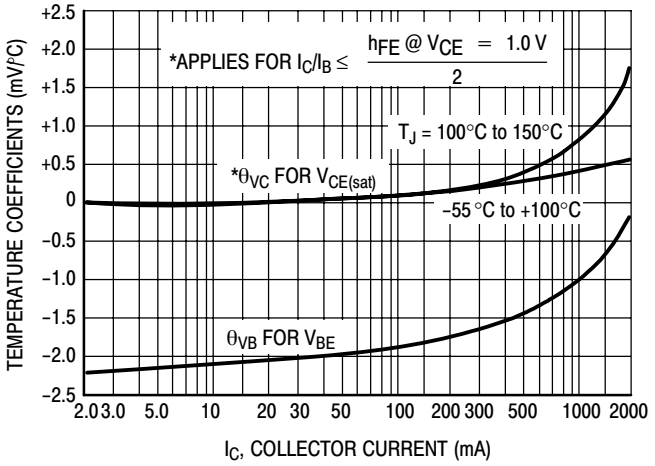
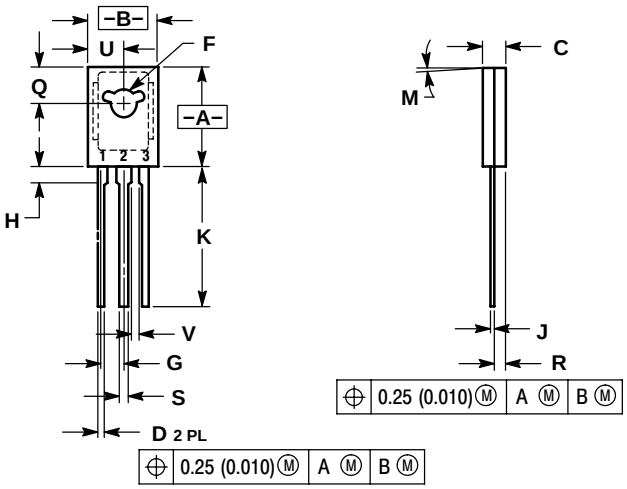


Figure 13. Temperature Coefficients

PACKAGE DIMENSIONS

TO−225
CASE 77−09
ISSUE Z



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 077−01 THRU −08 OBSOLETE, NEW STANDARD 077−09.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.425	0.435	10.80	11.04
B	0.295	0.305	7.50	7.74
C	0.095	0.105	2.42	2.66
D	0.020	0.026	0.51	0.66
F	0.115	0.130	2.93	3.30
G	0.094 BSC		2.39 BSC	
H	0.050	0.095	1.27	2.41
J	0.015	0.025	0.39	0.63
K	0.575	0.655	14.61	16.63
M	5° TYP		5° TYP	
Q	0.148	0.158	3.76	4.01
R	0.045	0.065	1.15	1.65
S	0.025	0.035	0.64	0.88
U	0.145	0.155	3.69	3.93
V	0.040	---	1.02	---

STYLE 1:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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