

2N4918 thru 2N4920 (SILICON)
MJE4918 thru MJE4920

MEDIUM-POWER PLASTIC PNP SILICON TRANSISTORS

... designed for driver circuits, switching, and amplifier applications. These high-performance plastic devices feature:

- Low Saturation Voltage – $V_{CE(sat)} = 0.6$ Vdc (Max) @ $I_C = 1.0$ Amp
- Excellent Power Dissipation Due to Thermopad Construction – $P_D = 30$ and 40 W @ $T_C = 25^\circ\text{C}$
- Excellent Safe Operating Area
- Gain Specified to $I_C = 1.0$ Amp
- Complement to NPN 2N4921, 2N4922, 2N4923 and MJE4921, MJE4922, MJE4923
- Choice of Packages – 2N4918 thru 2N4920, 30 Watts, Case 77
MJE4918 thru MJE4920, 40 Watts, Case 199

*MAXIMUM RATINGS

Ratings	Symbol	2N4918 MJE4918	2N4919 MJE4919	2N4920 MJE4920	Unit
Collector-Emitter Voltage	V_{CEO}	40	60	80	Vdc
Collector-Base Voltage	V_{CB}	40	60	80	Vdc
Emitter-Base Voltage	V_{EB}	5.0			Vdc
Collector Current – Continuous (1)	I_C^*	1.0			Adc
		3.0			Adc
Base Current	I_B	1.0			Adc
		2N4918 series		MJE4918 series	
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	30 0.24	40 0.32		Watts W/ $^\circ\text{C}$
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +150			$^\circ\text{C}$

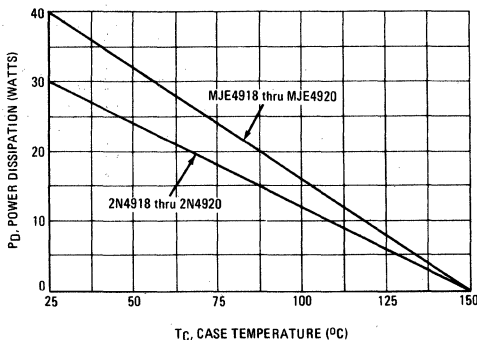
THERMAL CHARACTERISTICS (2)

Characteristic	Symbol	2N4918/20	MJE4918/20	Unit
Thermal Resistance, Junction to Case	θ_{JC}	4.16	3.125	$^\circ\text{C}/\text{W}$

*Indicates JEDEC Registered Data for 2N4918 Series

- (1) The 1.0 Amp maximum I_C value is based upon JEDEC current gain requirements. The 3.0 Amp maximum value is based upon actual current-handling capability of the device (See Figure 5).
- (2) Recommend use of thermal compound for lowest thermal resistance.

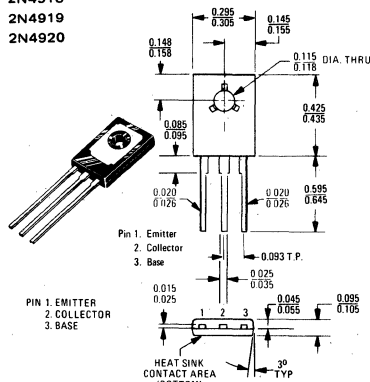
FIGURE 1 – POWER DERATING



3 AMPERE
GENERAL-PURPOSE
POWER TRANSISTORS

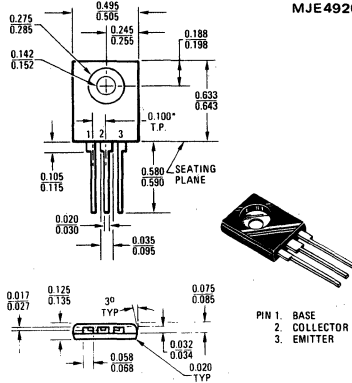
40-80 VOLTS
30 and 40 WATTS

2N4918
2N4919
2N4920



CASE 77-03

MJE4918
MJE4919
MJE4920



*Dimension is to centerline of leads

CASE 199-04

2N4918 thru 2N4920, MJE4918 thru MJE4920 (continued)

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

Characteristic	Fig. No.	Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage (1) ($I_C = 0.1 \text{ A dc}$, $I_B = 0$) 2N4918,MJE4918 2N4919,MJE4919 2N4920,MJE4920	—	$V_{CE(sus)}$	40 60 80	— — —	Vdc
Collector Cutoff Current ($V_{CE} = 20 \text{ Vdc}$, $I_B = 0$) ($V_{CE} = 30 \text{ Vdc}$, $I_B = 0$) ($V_{CE} = 40 \text{ Vdc}$, $I_B = 0$) 2N4918,MJE4918 2N4919,MJE4919 2N4920,MJE4920	—	I_{CEO}	— — —	0.5 0.5 0.5	mAdc
Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CEO}$, $V_{BE(off)} = 1.5 \text{ Vdc}$) ($V_{CE} = \text{Rated } V_{CEO}$, $V_{BE(off)} = 1.5 \text{ Vdc}$, $T_C = 125^\circ\text{C}$)	13	I_{CEX}	— —	0.1 0.5	mAdc
Collector Cutoff Current ($V_{CB} = \text{Rated } V_{CB}$, $I_E = 0$)	—	I_{CBO}	—	0.1	mAdc
Emitter Cutoff Current ($V_{BE} = 5.0 \text{ Vdc}$, $I_C = 0$)	—	I_{EBO}	—	1.0	mAdc

ON CHARACTERISTICS

DC Current Gain (1) ($I_C = 50 \text{ mA}$, $V_{CE} = 1.0 \text{ Vdc}$) ($I_C = 500 \text{ mA}$, $V_{CE} = 1.0 \text{ Vdc}$) ($I_C = 1.0 \text{ A}$, $V_{CE} = 1.0 \text{ Vdc}$)	9	h_{FE}	40 20 10	— 100 —	—
Collector-Emitter Saturation Voltage (1) ($I_C = 1.0 \text{ A}$, $I_B = 0.1 \text{ A}$)	10 12 14	$V_{CE(sat)}$	—	0.6	V_{dc}
Base-Emitter Saturation Voltage (1) ($I_C = 1.0 \text{ A}$, $I_B = 0.1 \text{ A}$)	12 14	$V_{BE(sat)}$	—	1.3	V_{dc}
Base-Emitter On Voltage (1) ($I_C = 1.0 \text{ A}$, $V_{CE} = 1.0 \text{ Vdc}$)	12 14	$V_{BE(on)}$	—	1.3	V_{dc}

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ($I_C = 250 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ MHz}$)	—	f_T	3.0	—	MHz
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 100 \text{ kHz}$)	—	C_{ob}	—	100	pF
Small-Signal Current Gain ($I_C = 250 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	—	h_{fe}	25	—	—

*Indicates JEDEC Registered Data for 2N4918 Series.

(1) Pulse Test: $PW \approx 300 \mu s$, Duty Cycle $\approx 2.0\%$

FIGURE 2 – SWITCHING TIME EQUIVALENT CIRCUIT

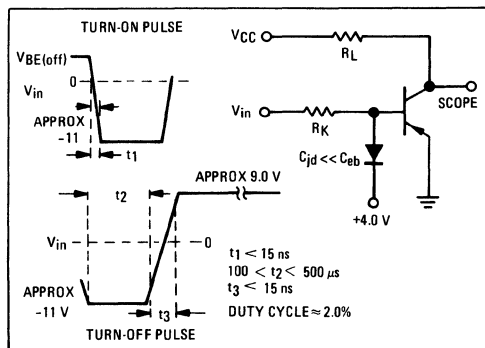
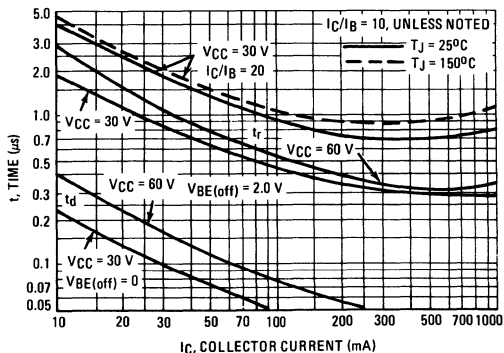
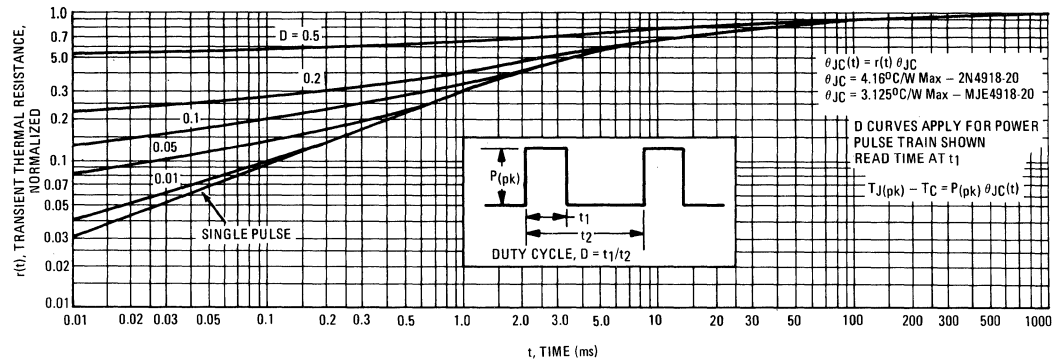


FIGURE 3 – TURN-ON TIME



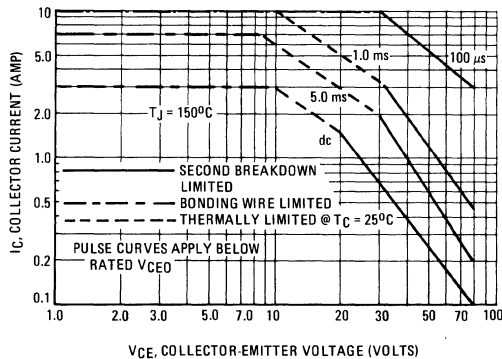
2N4918 thru 2N4920, MJE4918 thru MJE4920 (continued)

FIGURE 4 – THERMAL RESPONSE



ACTIVE-REGION SAFE OPERATING AREA

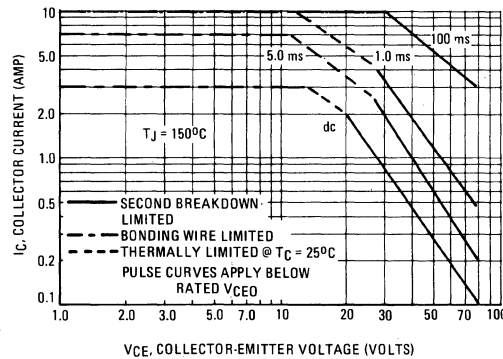
FIGURE 5 – 2N4918 thru 2N4920



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 Figures 5 and 6 is based on $T_{J(pk)} = 150^\circ\text{C}$;

FIGURE 6 – MJE4918 thru MJE4920



T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown. (See AN-415)

FIGURE 7 – STORAGE TIME

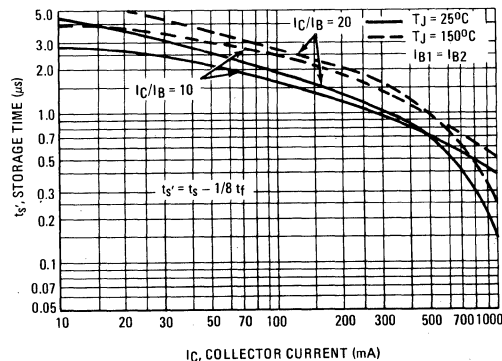
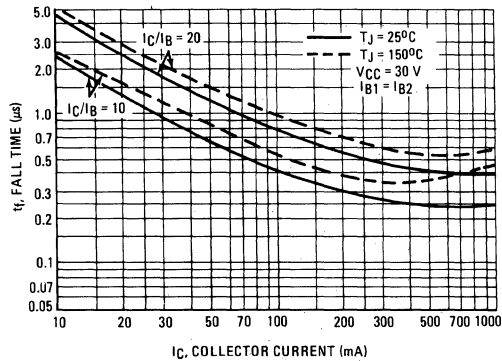


FIGURE 8 – FALL TIME



TYPICAL DC CHARACTERISTICS

FIGURE 9 – CURRENT GAIN

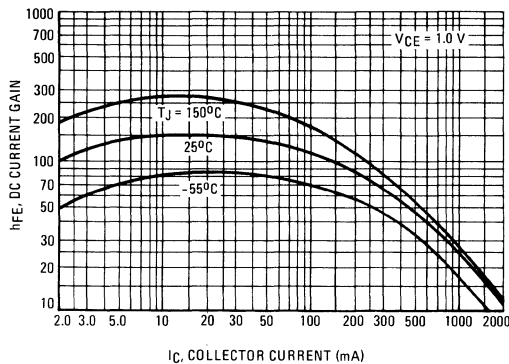


FIGURE 10 – COLLECTOR SATURATION REGION

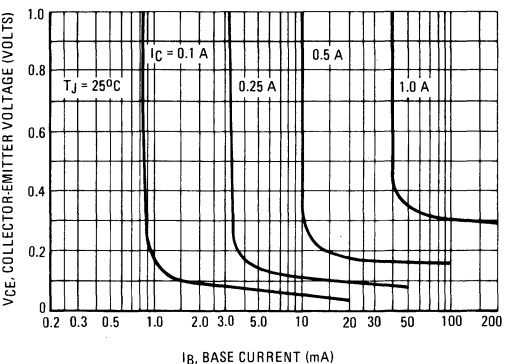


FIGURE 11 – EFFECTS OF BASE-EMITTER RESISTANCE

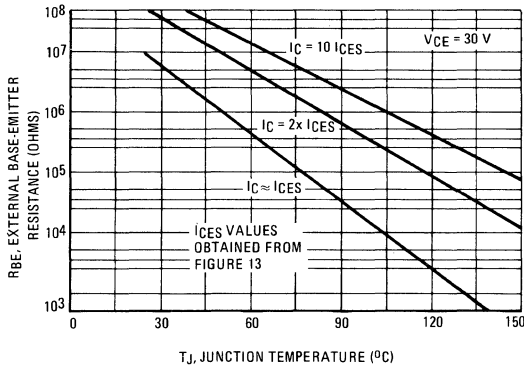


FIGURE 12 – "ON" VOLTAGE

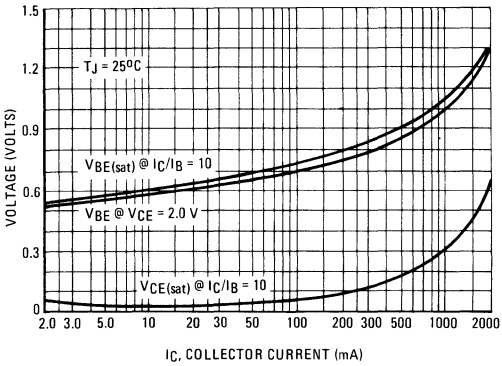


FIGURE 13 – COLLECTOR CUTOFF REGION

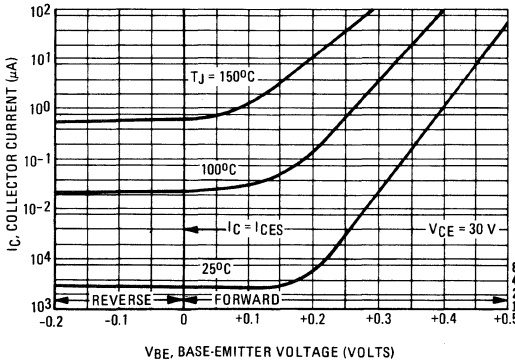


FIGURE 14 – TEMPERATURE COEFFICIENTS

