

NPN SILICON MEDIUM POWER TRANSISTORS

- For Power Output Stages and Line Driver in Television Receivers

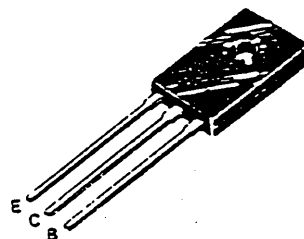
0.5 AMPERES

NPN SILICON POWER TRANSISTOR

300 VOLTS
20 WATTS

MAXIMUM RATINGS

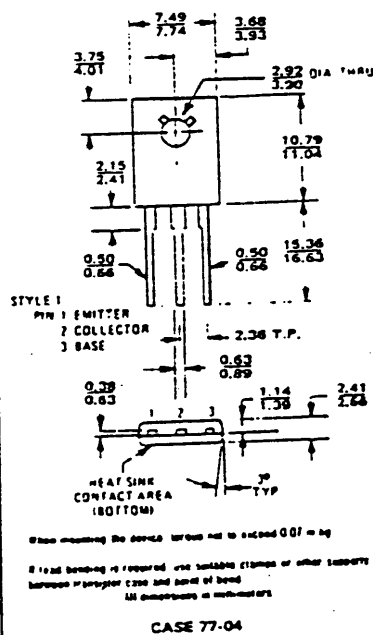
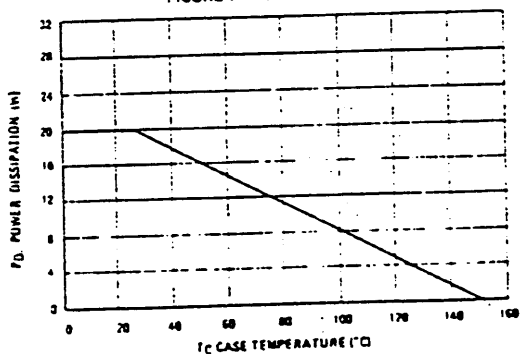
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	300	V _{dc}
Collector-Emitter Voltage	V _{CES}	500	V _{dc}
Emitter-Base Voltage	V _{EBO}	5	V _{dc}
Collector Current - Continuous	I _C	0.5	A _{dc}
Base Current	I _B	0.25	A _{dc}
Total Device Dissipation @ T _c = 25°C Derate above 25°C	P _D	20 160	Watts W/°C
Operating and Storage Temperature Range	T _J , T _{stg}	-55 to 150	°C



THERMAL CHARACTERISTICS

Characteristic	Symbol	Max.	Unit
Thermal Resistance, Junction to Case	θ _{JC}	6.25	°C/W

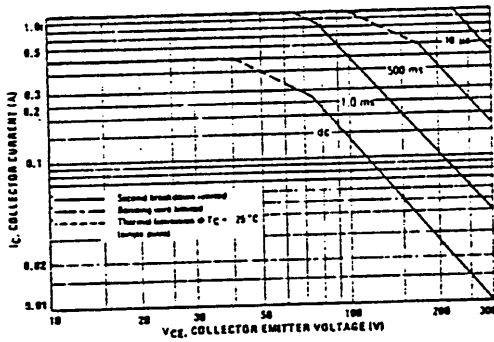
FIGURE 1 - POWER DERATING



ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

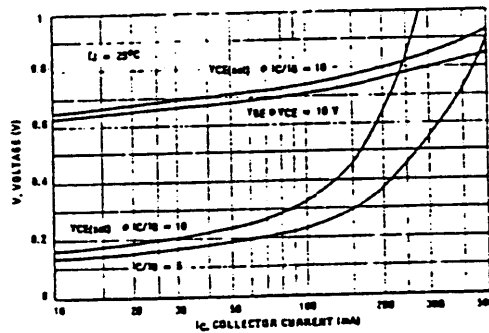
Characteristic	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS (1)				
Collector-Emitter Sustaining Voltage ($I_C = 10 \text{ mA dc}, I_B = 0$)	$V_{CE0(sus)}$	300	-	Vdc
Collector Cutoff Current ($V_{CE} = 500 \text{ Vdc}, V_{BE} = 0$)	I_{CES}	-	0.1	mA dc
Base-Emitter Voltage ($V_{CE} = 5 \text{ Vdc}, I_C = 150 \text{ mA}$)	V_{BE}	-	1.0	Vdc
DC Current Gain ($V_{CE} = 5 \text{ V}, I_C = 50 \text{ mA}$) ($V_{CE} = 5 \text{ V}, I_C = 150 \text{ mA}$)	h_{FE}	25 20	150	
Collector-Emitter Saturation Voltage ($I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$)	$V_{CE(sat)}$	-	1.0	Vdc

FIGURE 2 - 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} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than the curves indicate. The data of figure 6 is based on $T_{J(pk)} = 150^\circ\text{C}$. T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} < 150^\circ\text{C}$. $T_{J(pk)}$ may be calculated from the data in figure 7. 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-415A)

FIGURE 3 - "ON" VOLTAGES



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