HIGH-POWER INDUSTRIAL TRANSISTORS

NPN silicon power transistors designed for application in industrial and commercial equipment including high fidelity audio amplifiers, series and shunt regulators and power switches.

NPN
2N3442
2N4347

Boca Semiconductor Corp.
BSC

5.0 and 10 AMPERE
NPN SILICON
POWER TRANSISTORS
120 , 140 VOLTS
100 , 117 WATTS

FEATURES:

* Collector-Emitter Sustaining Voltage - $V_{CEO(SUS)}$ = 120 V (Min.) - 2N4347
  = 140 V (Min.) - 2N3442
* Low Collector-Emitter Saturation Voltage - $V_{CE(sat)}$ = 1.0 V (Max.) @ I_C = 2.0 A, I_B = 0.2 A - 2N4347

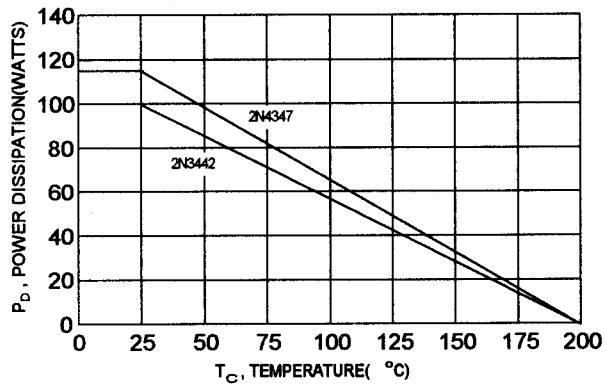
MAXIMUM RATINGS

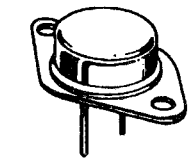
Characteristic	Symbol	2N4347	2N3442	Unit
Collector-Emitter Voltage	V_{CEO}	120	140	V
Collector-Base Voltage	V_{CBO}	140	160	V
Emitter-Base Voltage	V_{EBO}	7.0		V
Collector Current - Continuous - Peak	I_C	5.0 10	10 15	A
Base Current - Continuous - Peak	I_B	3.0 8.0	7.0	A
Total Power Dissipation @T_C=25°C Derate above 25°C	P_D	100 0.57	117 0.67	W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	- 65 to +200		°C

THERMAL CHARACTERISTICS

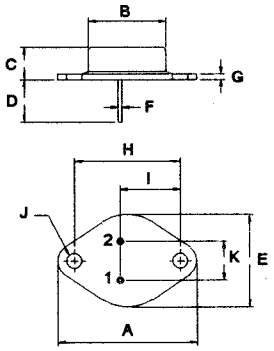
Characteristic	Symbol	2N4347	2N3442	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.75	1.5	°C/W

FIGURE -1 POWER DERATING





TO-3



PIN 1.BASE
2.EMITTER
COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.20	26.67
F	0.92	1.09
G	1.38	1.62
H	29.90	30.40
I	16.64	17.30
J	3.88	4.36
K	10.67	11.18

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector - Emitter Sustaining Voltage (1) (I_C = 200 mA, I_B = 0)	2N4347 2N3442	$V_{CEO(SUS)}$	 120 140		V
Collector Cutoff Current (V_{CE} = 100 V, I_B = 0) (V_{CE} = 140 V, I_B = 0)	 2N4347 2N3442	I_{CEO}		 200 200	mA
Collector Cutoff Current (V_{CE} = 120 V, $V_{EB(off)}$ = 1.5 V) (V_{CE} = 140 V, $V_{EB(off)}$ = 1.5 V)	 2N4347 2N3442	I_{CEX}		 2.0 5.0	mA
Emitter Cutoff Current (V_{EB}= 7.0 V , I_C = 0)		I_{EBO}		 5.0	mA
ON CHARACTERISTICS (1)					
DC Current Gain (I_C =2.0 A , V_{CE} = 4.0 V) (I_C =5.0 A , V_{CE} = 4.0 V) (I_C =3.0 A , V_{CE} = 4.0 V) (I_C = 10 A , V_{CE} = 4.0 V)	 2N4347 2N4347 2N3442 2N3442	hFE	 15 10 20 7.5	 60 70	
Collector - Emitter Saturation Voltage (I_C =2.0 A, I_B = 0.2 A) (I_C =5.0 A, I_B = 0.63 A) (I_C = 10 A, I_B = 2.0 A)	 2N4347 2N4347 2N3442	$V_{CE(sat)}$		 1.0 2.0 5.0	V
Base - Emitter On Voltage (I_C =2.0 A, V_{CE} = 4.0 V) (I_C =5.0 A, V_{CE} = 4.0 V) (I_C = 10 A, V_{CE} = 4.0 V)	 2N4347 2N4347 2N3442	$V_{BE(on)}$		 2.0 3.0 5.7	V
DYNAMIC CHARACTERISTICS					
Current Gain - Bandwidth Product (I_C = 0.5 A , V_{CE} = 4.0 V , f_{test} = 50 KHz) (I_C = 2.0 A , V_{CE} = 4.0 V f_{test} = 40 KHz)	 2N4347 2N3442	f_T	 200 80		KHz

(1) Pulse Test: Pulse width = 300 us , Duty Cycle ≦ 2.0%

(2) $f_T = |h_{fe}| \cdot f_{test}$

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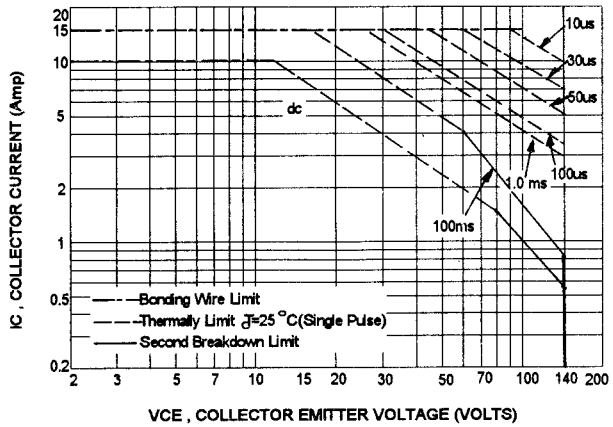
ACTIVE REGION SAFE OPERATING AREA-2N3442 (SOA)



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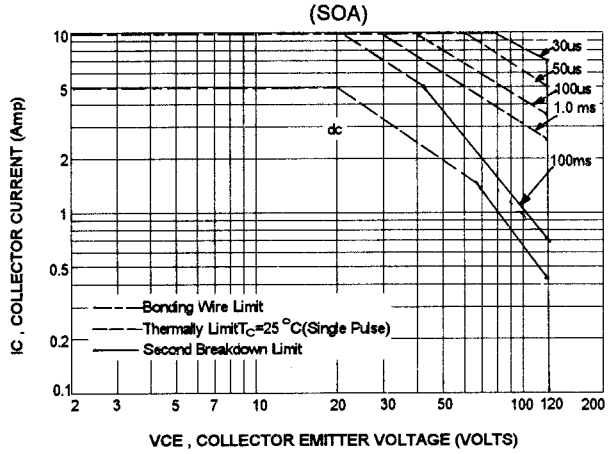
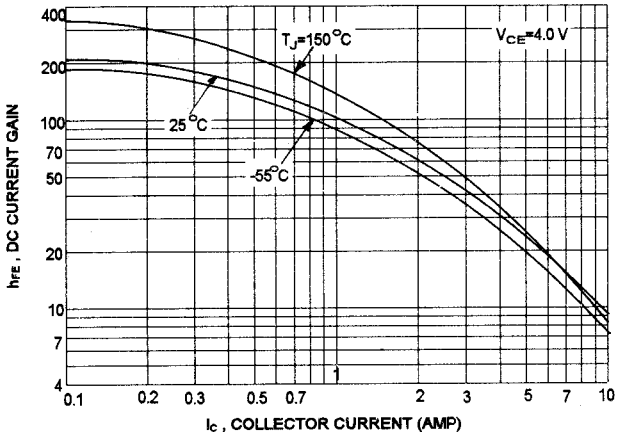


There are two limitation on the power handling ability of a transistor:average junction temperature and second breakdown safe operating area curves indicate I_C-V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation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

The data of SOA curve is base on $T_{J(PK)}$=200 °C;T_C is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)}\leq$200°C, At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

DC CURRENT GAIN



COLLECTOR SATURATION REGION