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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.

FEATURES:

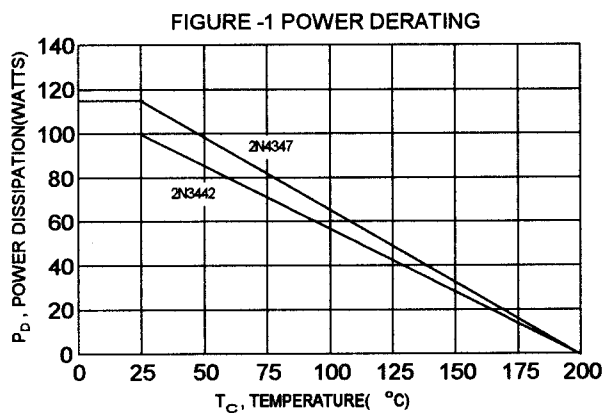
- * Collector-Emitter Sustaining Voltage -
 $V_{CE(sus)} = 120 \text{ V (Min.) - 2N4347}$
 $= 140 \text{ V (Min.) - 2N3442}$
- * Low Collector-Emitter Saturation Voltage -
 $V_{CE(sat)} = 1.0 \text{ V (Max.) @ } I_C = 2.0 \text{ A, } I_B = 0.2 \text{ A - 2N4347}$

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 @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	100 0.57	117 0.67	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	- 65 to +200		$^\circ\text{C}$

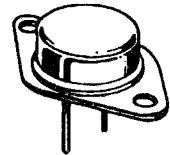
THERMAL CHARACTERISTICS

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

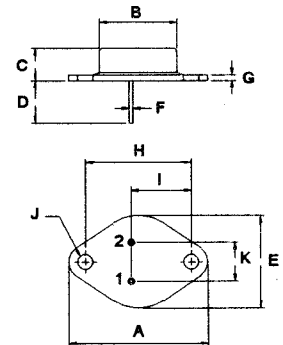


NPN
2N3442
2N4347

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



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 ($T_c = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector - Emitter Sustaining Voltage (1) ($I_C = 200\text{ mA}$, $I_B = 0$)	2N4347 2N3442	$V_{CEO(sus)}$	120 140	V
Collector Cutoff Current ($V_{CE} = 100\text{ V}$, $I_B = 0$) ($V_{CE} = 140\text{ V}$, $I_B = 0$)	2N4347 2N3442	I_{CEO}	200 200	mA
Collector Cutoff Current ($V_{CE} = 120\text{ V}$, $V_{EB(off)} = 1.5\text{ V}$) ($V_{CE} = 140\text{ V}$, $V_{EB(off)} = 1.5\text{ V}$)	2N4347 2N3442	I_{CEX}	2.0 5.0	mA
Emitter Cutoff Current ($V_{EB} = 7.0\text{ V}$, $I_C = 0$)		I_{EBO}	5.0	mA

ON CHARACTERISTICS (1)

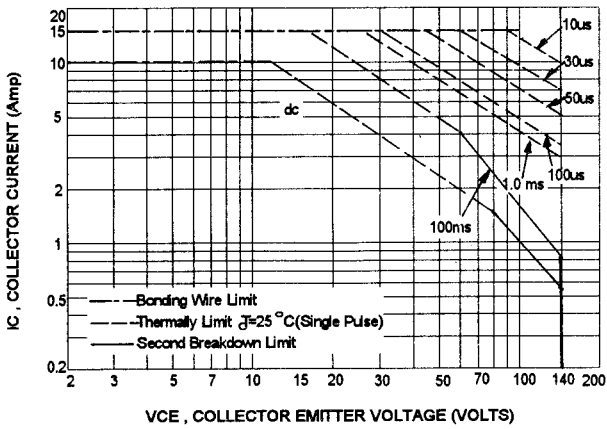
DC Current Gain ($I_C = 2.0\text{ A}$, $V_{CE} = 4.0\text{ V}$) ($I_C = 5.0\text{ A}$, $V_{CE} = 4.0\text{ V}$) ($I_C = 3.0\text{ A}$, $V_{CE} = 4.0\text{ V}$) ($I_C = 10\text{ A}$, $V_{CE} = 4.0\text{ V}$)	2N4347 2N4347 2N3442 2N3442	hFE	15 10 20 7.5	60 70
Collector - Emitter Saturation Voltage ($I_C = 2.0\text{ A}$, $I_B = 0.2\text{ A}$) ($I_C = 5.0\text{ A}$, $I_B = 0.63\text{ A}$) ($I_C = 10\text{ A}$, $I_B = 2.0\text{ A}$)	2N4347 2N4347 2N3442	$V_{CE(sat)}$		1.0 2.0 5.0
Base - Emitter On Voltage ($I_C = 2.0\text{ A}$, $V_{CE} = 4.0\text{ V}$) ($I_C = 5.0\text{ A}$, $V_{CE} = 4.0\text{ V}$) ($I_C = 10\text{ A}$, $V_{CE} = 4.0\text{ V}$)	2N4347 2N4347 2N3442	$V_{BE(on)}$		2.0 3.0 5.7

DYNAMIC CHARACTERISTICS

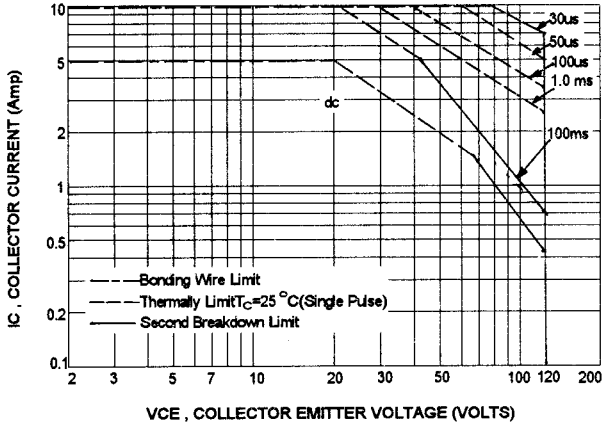
Current Gain - Bandwidth Product ($I_C = 0.5\text{ A}$, $V_{CE} = 4.0\text{ V}$, $f_{test} = 50\text{ KHz}$) ($I_C = 2.0\text{ A}$, $V_{CE} = 4.0\text{ V}$, $f_{test} = 40\text{ KHz}$)	2N4347 2N3442	f_T	200 80	KHz
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(1) Pulse Test: Pulse width = 300 μs , Duty Cycle $\leq 2.0\%$ (2) $f_T = |h_{fe}| \cdot f_{test}$

ACTIVE REGION SAFE OPERATING AREA-2N3442 (SOA)



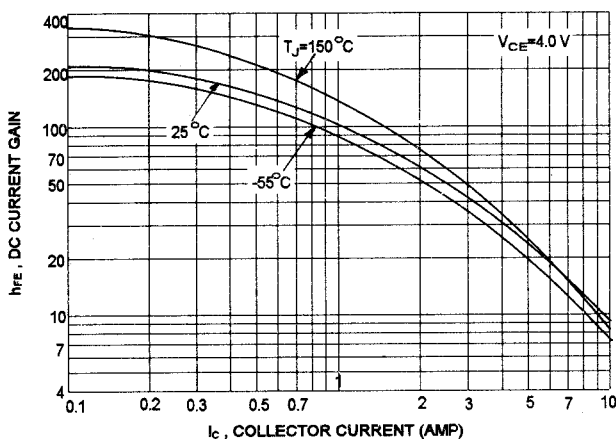
ACTIVE REGION SAFE OPERATING AREA-2N4347 (SOA)



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 $T_{J(PK)}=200^\circ\text{C}$; T_C is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leq 200^\circ\text{C}$. 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

