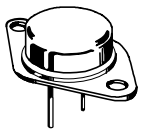
2N3442

High-Power Industrial Transistors

10 AMPERE
POWER TRANSISTOR
NPN SILICON
140 VOLTS
117 WATTS

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

- Collector –Emitter Sustaining Voltage —
  $V_{CEO(sus)}$ = 140 Vdc (Min)
- Excellent Second Breakdown Capability



CASE 1–07
TO–204AA
(TO–3)

***MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	140	Vdc
Collector–Base Voltage	V_{CB}	160	Vdc
Emitter–Base Voltage	V_{EB}	7.0	Vdc
Collector Current — Continuous Peak	I_C	10 15**	Adc
Base Current — Continuous Peak	I_B	7.0 —	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	117 0.67	Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.5	°C/W

* Indicates JEDEC Registered Data.
** This data guaranteed in addition to JEDEC registered data.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Sustaining Voltage (I_C = 200 mAdc, I_B = 0)	$V_{CEO(sus)}$	140	—	Vdc
Collector Cutoff Current (V_{CE} = 140 Vdc, I_B = 0)	I_{CEO}	—	200	mAdc
Collector Cutoff Current (V_{CE} = 140 Vdc, $V_{BE(off)}$ = 1.5 Vdc) (V_{CE} = 140 Vdc, $V_{BE(off)}$ = 1.5 Vdc, T_C = 150°C)	I_{CEX}	— —	5.0 30	mAdc
Emitter Cutoff Current (V_{BE} = 7.0 Vdc, I_C = 0)	I_{EBO}	—	5.0	mAdc
ON CHARACTERISTICS (1)				
DC Current Gain (I_C = 3.0 Adc, V_{CE} = 4.0 Vdc) (I_C = 10 Adc, V_{CE} = 4.0 Vdc)	h_{FE}	20 7.5	70 —	—
Collector–Emitter Saturation Voltage (I_C = 10 Adc, I_B = 2.0 Adc)	$V_{CE(sat)}$	—	5.0	Vdc
Base–Emitter On Voltage (I_C = 10 Adc, V_{CE} = 4.0 Vdc)	$V_{BE(on)}$	—	5.7	Vdc
DYNAMIC CHARACTERISTICS				
Current–Gain — Bandwidth Product (2) (I_C = 2.0 Adc, V_{CE} = 4.0 Vdc, f_{test} = 40 kHz)	f_T	80	—	kHz
Small–Signal Current Gain (I_C = 2.0 Adc, V_{CE} = 4.0 Vdc, f = 1.0 kHz)	h_{fe}	12	72	—

* Indicates JEDEC Registered Data.

NOTES:

1. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.
2. $f_T = |h_{fe}| \cdot f_{test}$

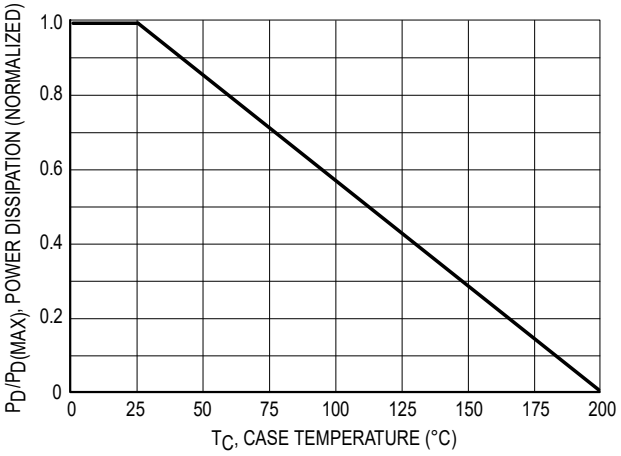


Figure 1. Power Derating

ACTIVE REGION SAFE OPERATING AREA INFORMATION

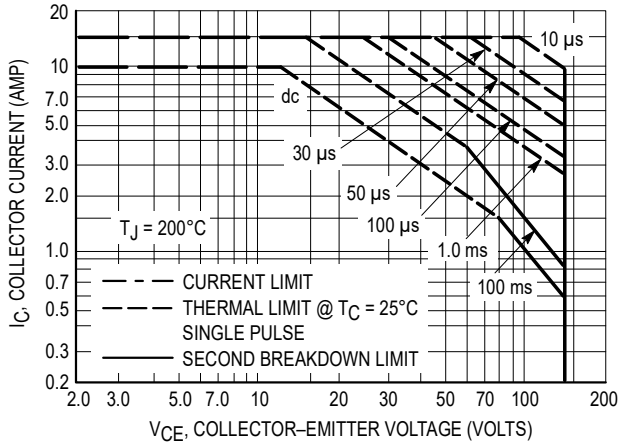


Figure 2. 2N3442

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 2 is based on $T_{J(pk)}$ = 200°C; T_C is variable depending on conditions. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

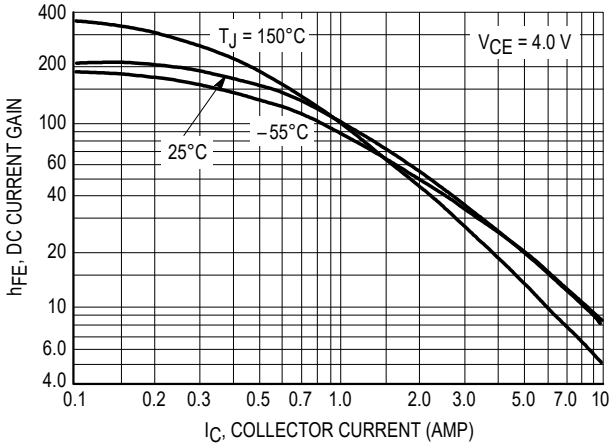


Figure 3. DC Current Gain

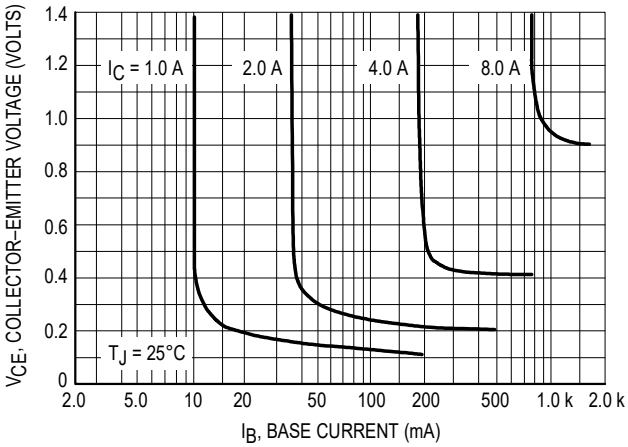
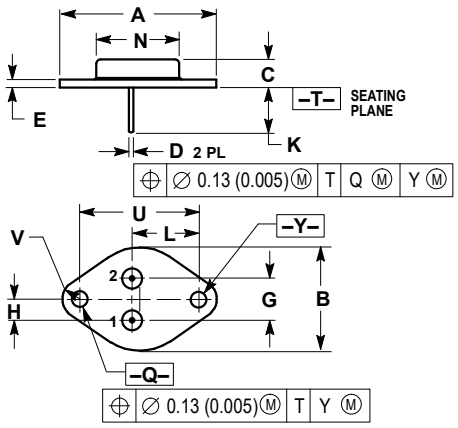


Figure 4. Collector–Saturation Region

PACKAGE DIMENSIONS



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO–204AA OUTLINE SHALL APPLY.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	1.550 REF		39.37 REF	
B	—	1.050	—	26.67
C	0.250	0.335	6.35	8.51
D	0.038	0.043	0.97	1.09
E	0.055	0.070	1.40	1.77
G	0.430 BSC		10.92 BSC	
H	0.215 BSC		5.46 BSC	
K	0.440	0.480	11.18	12.19
L	0.665 BSC		16.89 BSC	
N	—	0.830	—	21.08
Q	0.151	0.165	3.84	4.19
U	1.187 BSC		30.15 BSC	
V	0.131	0.188	3.33	4.77

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

CASE 1–07
TO–204AA (TO–3)
ISSUE Z

How to reach us:
USA / EUROPE: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1–800–441–2447

MFAX: RMFAX0@email.sps.mot.com – TOUCHTONE (602) 244–6609
INTERNET: http://Design–NET.com

JAPAN: Nippon Motorola Ltd.; Tatsumi–SPD–JLDC, Toshikatsu Otsuki,
6F Seibu–Butsuryu–Center, 3–14–2 Tatsumi Koto–Ku, Tokyo 135, Japan. 03–3521–8315

HONG KONG: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298