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High-Power Industrial Transistors

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

Features

- Collector –Emitter Sustaining Voltage V_{CEO(sus)} = 140 Vdc (Min)
- Excellent Second Breakdown Capability
- Pb-Free Package is Available*

MAXIMUM RATINGS (Note 1)

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	Ι _C	10 15	Adc
Base Current – Continuous – Peak	Ι _Β	7.0 -	Adc
Total Device Dissipation @ $T_C = 25^{\circ}C$ Derate above 25°C (Note 2)	PD	117 0.67	W W/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-65 to +200	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{ ext{ heta}JC}$	1.17	°C/W

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. Indicates JEDEC Registered Data.

2. This data guaranteed in addition to JEDEC registered data.



ON Semiconductor®

http://onsemi.com

10 AMPERE POWER TRANSISTOR NPN SILICON 140 VOLTS – 117 WATTS



TO-204AA (TO-3) CASE 1-07 STYLE 1

MARKING DIAGRAM



2N3442	= Device Code
G	= Pb–Free Package
Α	= Assembly Location
Y	= Year
WW	= Work Week
MEX	= Country of Origin

ORDERING INFORMATION

Device	Package	Shipping
2N3442	TO-204	100 Units / Tray
2N3442G	TO–204 (Pb–Free)	100 Units / Tray

*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

2N3442

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

Characteristic	Symbol	Min	Мах	Unit
OFF CHARACTERISTICS				
Collector–Emitter Sustaining Voltage $(I_{C} = 200 \text{ mAdc}, I_{B} = 0)$	V _{CEO(sus)}	140	-	Vdc
Collector Cutoff Current ($V_{CE} = 140 \text{ Vdc}, I_B = 0$)	I _{CEO}	-	200	mAdc
$ Collector Cutoff Current \\ (V_{CE} = 140 \text{ Vdc}, V_{BE(off)} = 1.5 \text{ Vdc}) \\ (V_{CE} = 140 \text{ Vdc}, V_{BE(off)} = 1.5 \text{ Vdc}, T_{C} = 150^{\circ}\text{C}) $	ICEX		5.0 30	mAdc
Emitter Cutoff Current ($V_{BE} = 7.0 \text{ Vdc}, I_C = 0$)	I _{EBO}	_	5.0	mAdc
ON CHARACTERISTICS (Note 3)				-
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 $(I_C = 10 \text{ Adc}, I_B = 2.0 \text{ Adc})$	V _{CE(sat)}	-	5.0	Vdc
Base–Emitter On Voltage ($I_C = 10 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$)	V _{BE(on)}	-	5.7	Vdc
DYNAMIC CHARACTERISTICS	·			
Current–Gain – Bandwidth Product (Note 4) ($I_C = 2.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}, f_{test} = 40 \text{ kHz}$)	f _T	80	-	kHz
Small–Signal Current Gain	h _{fe}	12	72	-

 $(I_C = 2.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}, f = 1.0 \text{ kHz})$

3. Pulse Test: Pulse Width = 300 μ s, Duty Cycle \leq 2.0%. 4. f_T = |h_{fe}| • f_{test}

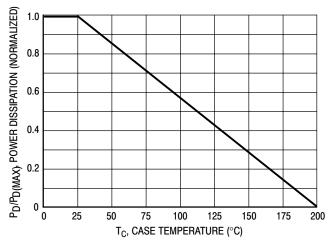


Figure 1. Power Derating

2N3442

ACTIVE REGION SAFE OPERATING AREA INFORMATION

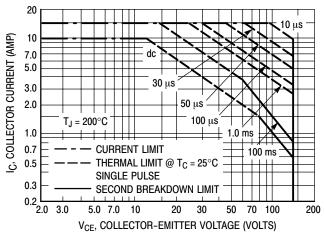


Figure 2. 2N3442

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 $T_{J(pk)} = 200^{\circ}C$; 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.

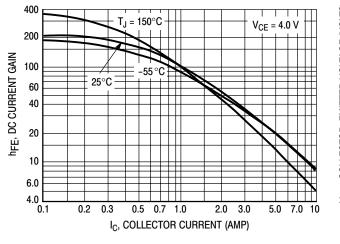


Figure 3. DC Current Gain

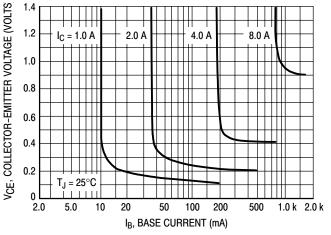
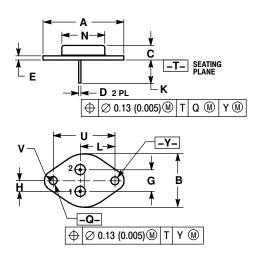


Figure 4. Collector–Saturation Region

2N3442

PACKAGE DIMENSIONS

TO-204 (TO-3) CASE 1–07 ISSUE Z



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 MILLIMETER		ETERS	
DIM	MIN	MAX	MIN	MAX
Α	1.550 REF		39.37 REF	
В		1.050		26.67
С	0.250	0.335	6.35	8.51
D	0.038	0.043	0.97	1.09
Е	0.055	0.070	1.40	1.77
G	0.430	30 BSC 10.92 BSC		BSC
Н	0.215 BSC		5.46 BSC	
K	0.440	0.480	11.18	12.19
Г	0.665 BSC		16.89 BSC	
Ν		0.830		21.08
Ø	0.151	0.165	3.84	4.19
C	1.187 BSC		30.15 BSC	
۷	0.131	0.188	3.33	4.77

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

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