

High-Power PNP Silicon Transistors

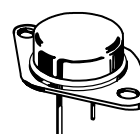
... designed for use in industrial–military power amplifier and switching circuit applications.

- High Collector–Emitter Sustaining Voltage —
 $V_{CE(sus)} = 100 \text{ Vdc (Min)} \text{ — } 2N6437$
 $= 120 \text{ Vdc (Min)} \text{ — } 2N6438$
- High DC Current Gain —
 $h_{FE} = 20\text{--}80 @ I_C = 10 \text{ Adc}$
 $= 12 \text{ (Min)} @ I_C = 25 \text{ Adc}$
- Low Collector–Emitter Saturation Voltage —
 $V_{CE(sat)} = 1.0 \text{ Vdc (Max)} @ I_C = 10 \text{ Adc}$
- Fast Switching Times @ $I_C = 10 \text{ Adc}$
 $t_r = 0.3 \mu\text{s (Max)}$
 $t_s = 1.0 \mu\text{s (Max)}$
 $t_f = 0.25 \mu\text{s (Max)}$
- Complement to NPN 2N6339 thru 2N6341

2N6437 2N6438*

*ON Semiconductor Preferred Device

**25 AMPERE
POWER TRANSISTORS
PNP SILICON
100, 120 VOLTS
200 WATTS**



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

MAXIMUM RATINGS (1)

Rating	Symbol	2N6437	2N6438	Unit
Collector–Base Voltage	V_{CB}	120	140	Vdc
Collector–Emitter Voltage	V_{CEO}	100	120	Vdc
Emitter–Base Voltage	V_{EB}	6.0		Vdc
Collector Current — Continuous Peak	I_C	25 50		Adc
Base Current	I_B	10		Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	200 1.14		Watts $\text{W}/^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +200		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.875	$^\circ\text{C}/\text{W}$

(1) Indicates JEDEC Registered Data.

Preferred devices are ON Semiconductor recommended choices for future use and best overall value.

2N6437 2N6438

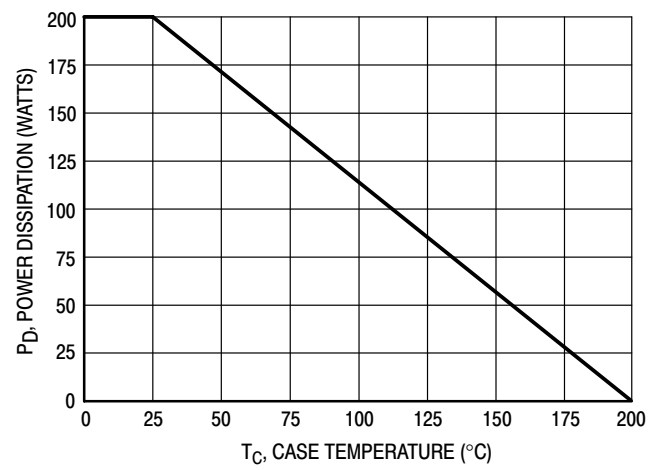


Figure 1. Power Derating

2N6437 2N6438

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Sustaining Voltage (1) ($I_C = 50\text{ mA}$, $I_B = 0$)	$V_{CEO(sus)}$	100 120	— —	Vdc
Collector Cutoff Current ($V_{CE} = 50\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 60\text{ Vdc}$, $I_B = 0$)	I_{CEO}	— —	50 50	μA
Collector Cutoff Current ($V_{CE} = 110\text{ Vdc}$, $V_{BE(off)} = -1.5\text{ Vdc}$) ($V_{CE} = 130\text{ Vdc}$, $V_{BE(off)} = -1.5\text{ Vdc}$) ($V_{CE} = 100\text{ Vdc}$, $V_{BE(off)} = -1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$) ($V_{CE} = 120\text{ Vdc}$, $V_{BE(off)} = -1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$)	I_{CEX}	— — — —	10 10 1.0 1.0	μA mA
Collector Cutoff Current ($V_{CB} = 120\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 140\text{ Vdc}$, $I_E = 0$)	I_{CBO}	— —	10 10	μA
Emitter Cutoff Current ($V_{EB} = 6.0\text{ Vdc}$, $I_C = 0$)	I_{EBO}	—	100	μA

ON CHARACTERISTICS

DC Current Gain (1) ($I_C = 0.5\text{ A}$, $V_{CE} = 2.0\text{ Vdc}$) ($I_C = 10\text{ A}$, $V_{CE} = 2.0\text{ Vdc}$) ($I_C = 25\text{ A}$, $V_{CE} = 2.0\text{ Vdc}$)	h_{FE}	30 20 12	— 120 —	—
Collector-Emitter Saturation Voltage (1) ($I_C = 10\text{ A}$, $I_B = 1.0\text{ A}$) ($I_C = 25\text{ A}$, $I_B = 2.5\text{ A}$)	$V_{CE(sat)}$	— —	1.0 1.8	Vdc
Base-Emitter Saturation Voltage (1) ($I_C = 10\text{ A}$, $I_B = 1.0\text{ A}$) ($I_C = 25\text{ A}$, $I_B = 2.5\text{ A}$)	$V_{BE(sat)}$	— —	1.8 2.5	Vdc

DYNAMIC CHARACTERISTICS

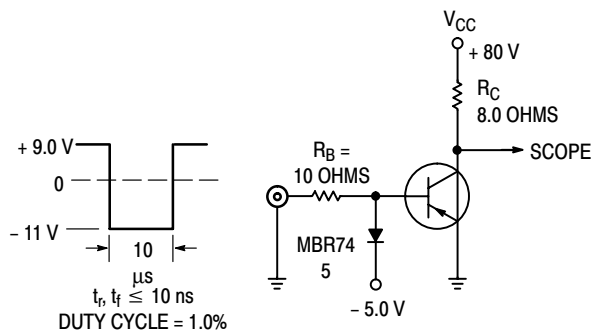
Current-Gain — Bandwidth Product ($I_C = 1.0\text{ A}$, $V_{CE} = 10\text{ Vdc}$, $f_{test} = 10\text{ MHz}$)	f_T	40	—	MHz
Output Capacitance ($V_{CE} = 10\text{ Vdc}$, $I_E = 0$, $f = 100\text{ kHz}$)	C_{ob}	—	700	pF

SWITCHING CHARACTERISTICS

Rise Time ($V_{CC} = 80\text{ Vdc}$, $I_C = 10\text{ A}$, $V_{BE(off)} = 6.0\text{ Vdc}$, $I_{B1} = 1.0\text{ A}$)	t_r	—	0.3	μs
Storage ($V_{CC} = 80\text{ Vdc}$, $I_C = 10\text{ A}$, $V_{BE(off)} = 6.0\text{ Vdc}$, $I_{B1} = I_{B2} = 1.0\text{ A}$)	t_s	—	1.0	μs
Fall Time ($V_{CC} = 80\text{ Vdc}$, $I_C = 10\text{ A}$, $V_{BE(off)} = 6.0\text{ Vdc}$, $I_{B1} = I_{B2} = 1.0\text{ A}$)	t_f	—	0.25	μs

*Indicates JEDEC Registered Data.

(1) Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$; Duty Cycle $\leq 2.0\%$.



NOTE: For information on Figures 3 and 6, R_B and R_C were varied to obtain desired test conditions.

Figure 2. Switching Time Test Circuit

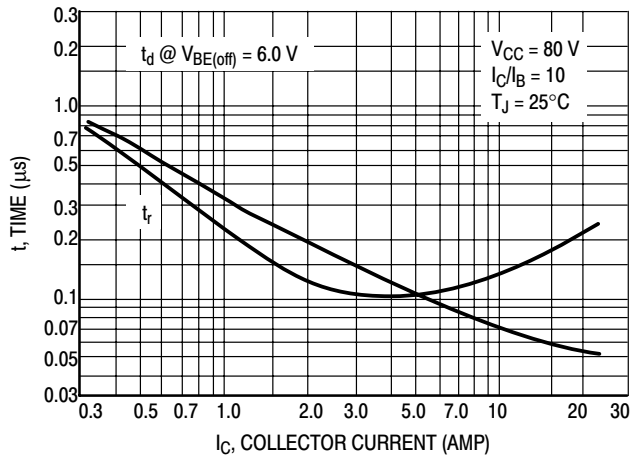


Figure 3. Turn-On Time

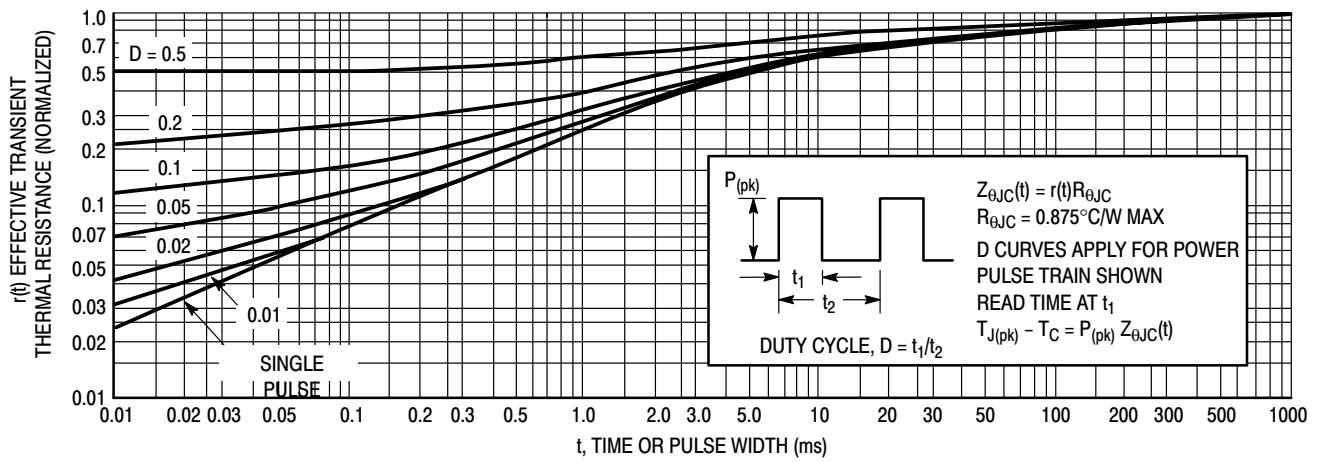


Figure 4. Thermal Response

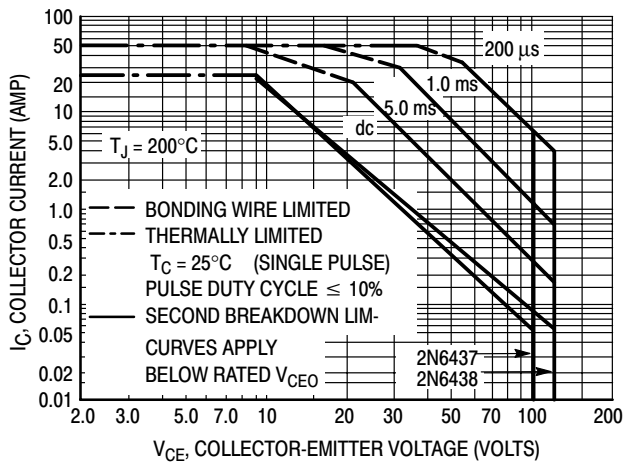


Figure 5. Active Region Safe Operating Area

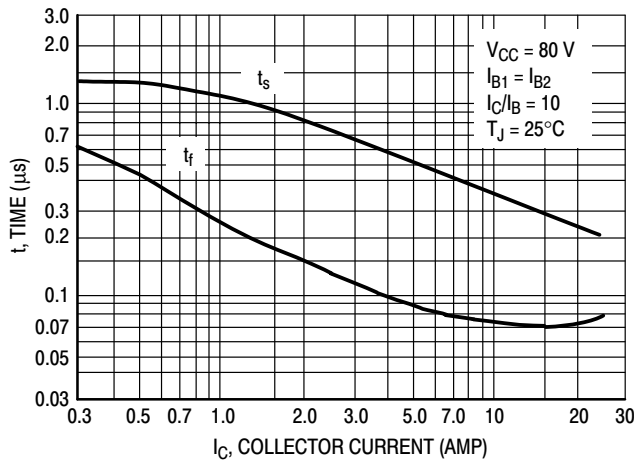


Figure 6. Turn-Off Time

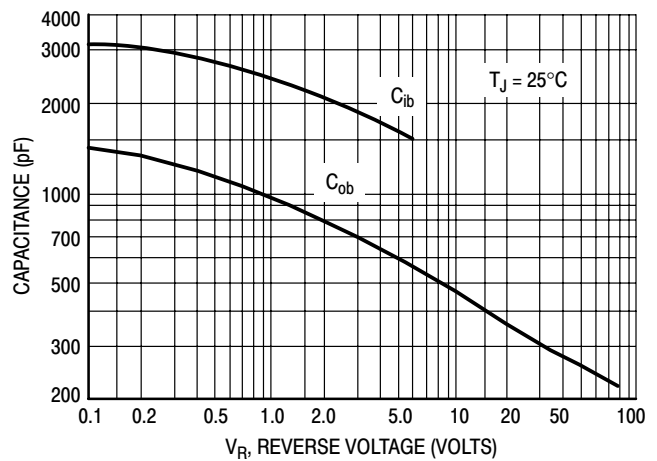


Figure 7. Capacitance

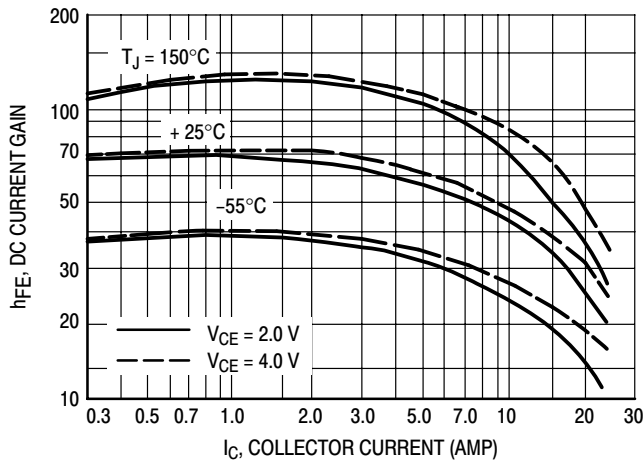


Figure 8. DC Current Gain

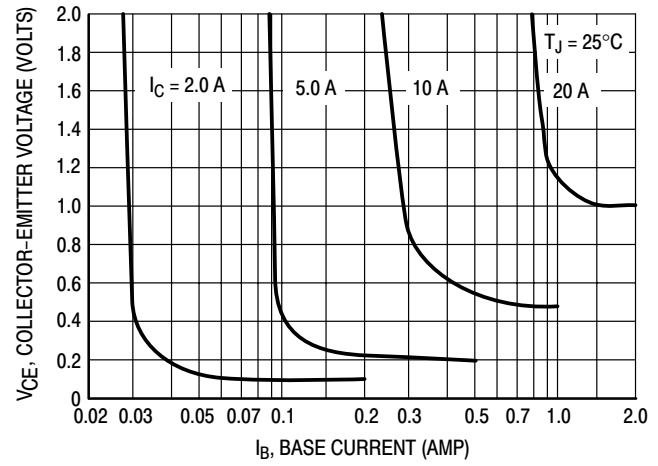


Figure 9. Collector Saturation Region

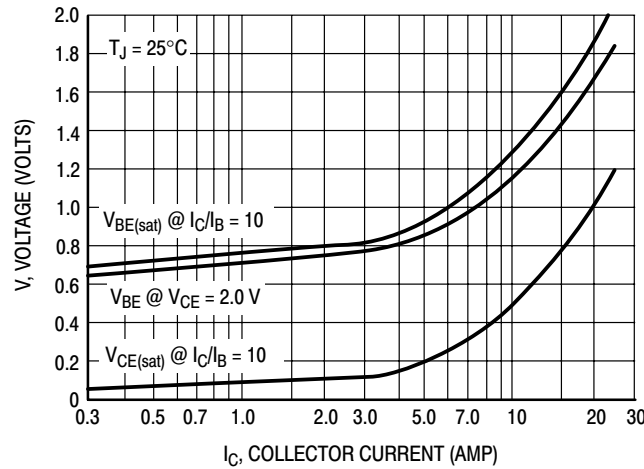


Figure 10. "On" Voltages

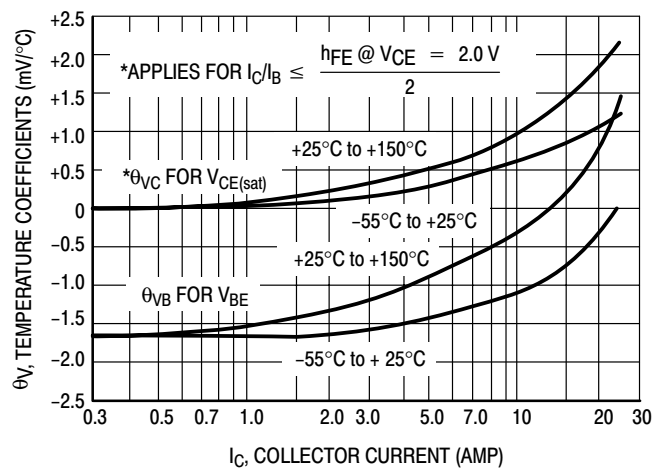


Figure 11. Temperature Coefficients

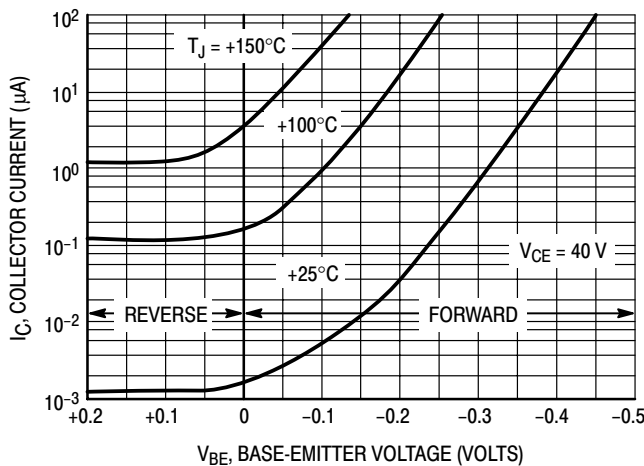


Figure 12. Collector Cut-Off Region

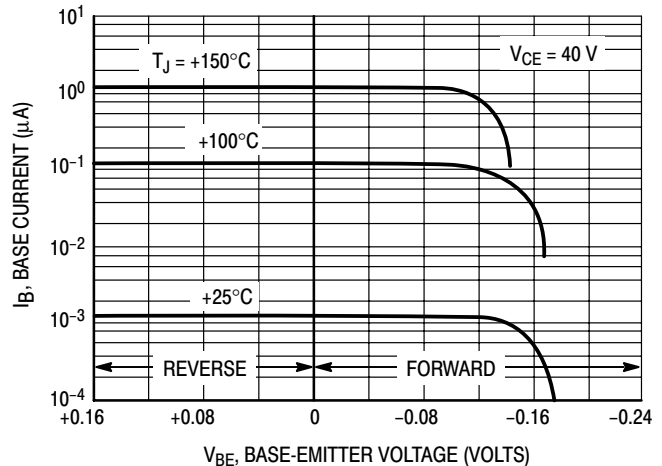
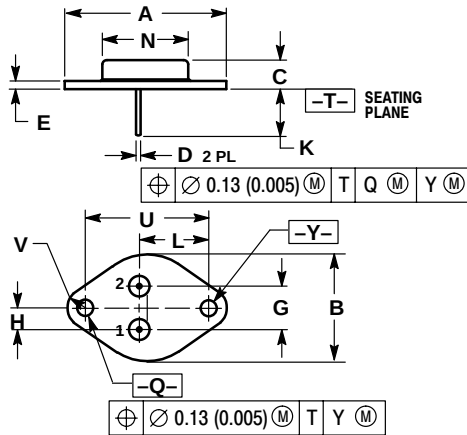


Figure 13. Base Cutoff Region

2N6437 2N6438

PACKAGE DIMENSIONS

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

DIM	INCHES		MILLIMETERS	
	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

Notes

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