

Silicon NPN High-Power Transistor

2N5882

Motorola Preferred Device

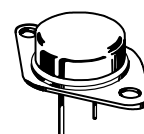
... designed for general-purpose power amplifier and switching applications.

- Collector-Emitter Sustaining Voltage —
 $V_{CE(sus)} = 80 \text{ Vdc (Min)}$
- DC Current Gain —
 $h_{FE} = 20 \text{ (Min) @ } I_C = 6.0 \text{ Adc}$
- Low Collector — Emitter Saturation Voltage —
 $V_{CE(sat)} = 1.0 \text{ Vdc (Max) @ } I_C = 7.0 \text{ Adc}$
- High Current — Gain-Bandwidth Product —
 $f_T = 4.0 \text{ MHz (Min) @ } I_C = 1.0 \text{ Adc}$

**15 AMPERE
SILICON
POWER TRANSISTOR
80 VOLTS
160 WATTS**

MAXIMUM RATINGS (1)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CB}	80	Vdc
Emitter-Base Voltage	V_{EB}	5.0	Vdc
Collector Current — Continuous Peak	I_C	15 30	Adc
Base Current	I_B	5.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	160 0.915	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	$^\circ\text{C}$



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

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	1.1	$^\circ\text{C/W}$

(1) Indicates JEDEC registered data. Units and conditions differ on some parameters and re-registration reflecting these changes has been requested. All above values meet or exceed present JEDEC registered data.

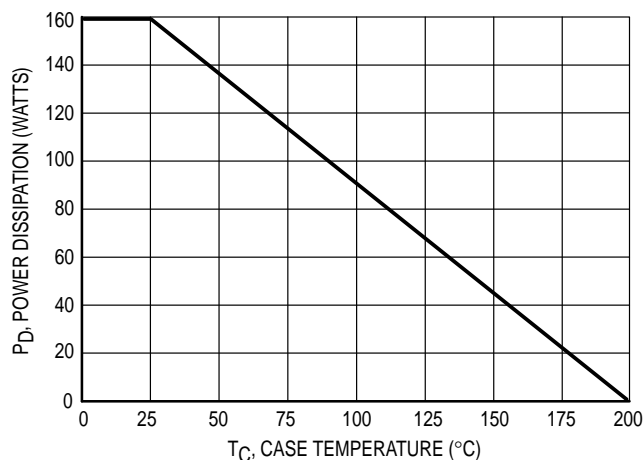


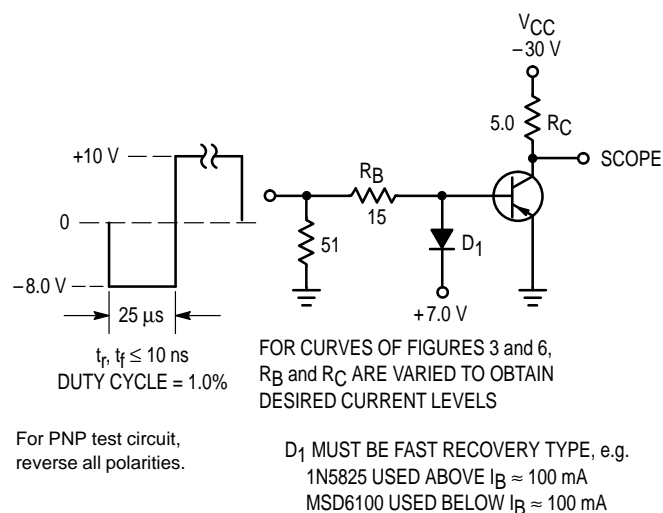
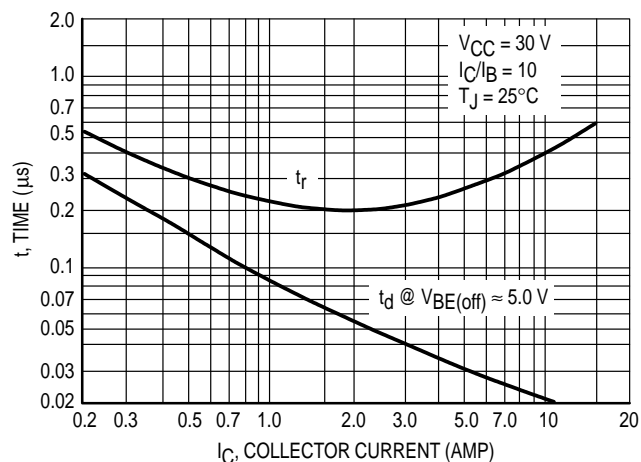
Figure 1. Power Derating

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

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Sustaining Voltage (1) ($I_C = 200\text{ mAdc}$, $I_B = 0$)	$V_{CEO(sus)}$	80	—	Vdc
Collector Cutoff Current ($V_{CE} = 40\text{ Vdc}$, $I_B = 0$)	I_{CEO}	—	1.0	mAdc
Collector Cutoff Current ($V_{CE} = 80\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$) ($V_{CE} = 80\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$)	I_{CEX}	—	0.5 5.0	mAdc
Collector Cutoff Current ($V_{CB} = 80\text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	0.5	mAdc
Emitter Cutoff Current ($V_{EB} = 5.0\text{ Vdc}$, $I_C = 0$)	I_{EBO}	—	1.0	mAdc
ON CHARACTERISTICS				
DC Current Gain (1) ($I_C = 2.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) ($I_C = 6.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) ($I_C = 15\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	h_{FE}	35 20 4.0	— 100 —	—
Collector–Emitter Saturation Voltage (1) ($I_C = 7.0\text{ Adc}$, $I_B = 0.7\text{ Adc}$) ($I_C = 15\text{ Adc}$, $I_B = 3.75\text{ Adc}$)	$V_{CE(sat)}$	— —	1.0 4.0	Vdc
Base–Emitter Saturation Voltage (1) ($I_C = 15\text{ Adc}$, $I_B = 3.75\text{ Adc}$)	$V_{BE(sat)}$	—	2.5	Vdc
Base–Emitter On Voltage (1) ($I_C = 6.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	$V_{BE(on)}$	—	1.5	Vdc
DYNAMIC CHARACTERISTICS				
Current–Gain — Bandwidth Product (2) ($I_C = 1.0\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f_{test} = 1.0\text{ MHz}$)	f_T	4.0	—	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 100\text{ kHz}$)	C_{ob}	—	400	pF
Small–Signal Current Gain ($I_C = 2.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{fe}	20	—	—
SWITCHING CHARACTERISTICS				
Rise Time	$(V_{CC} = 30\text{ Vdc}$, $I_C = 6.0\text{ Adc}$, $I_{B1} = I_{B2} = 0.6\text{ Adc}$ See Figure 2)	t_r	—	0.7 μs
Storage Time		t_s	—	1.0 μs
Fall Time		t_f	—	0.8 μs

* Indicates JEDEC Registered Data.

(1) Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$ (2) $f_T = |h_{fe}| \cdot f_{test}$.**Figure 2. Switching Times Test Circuit****Figure 3. Turn–On Time**

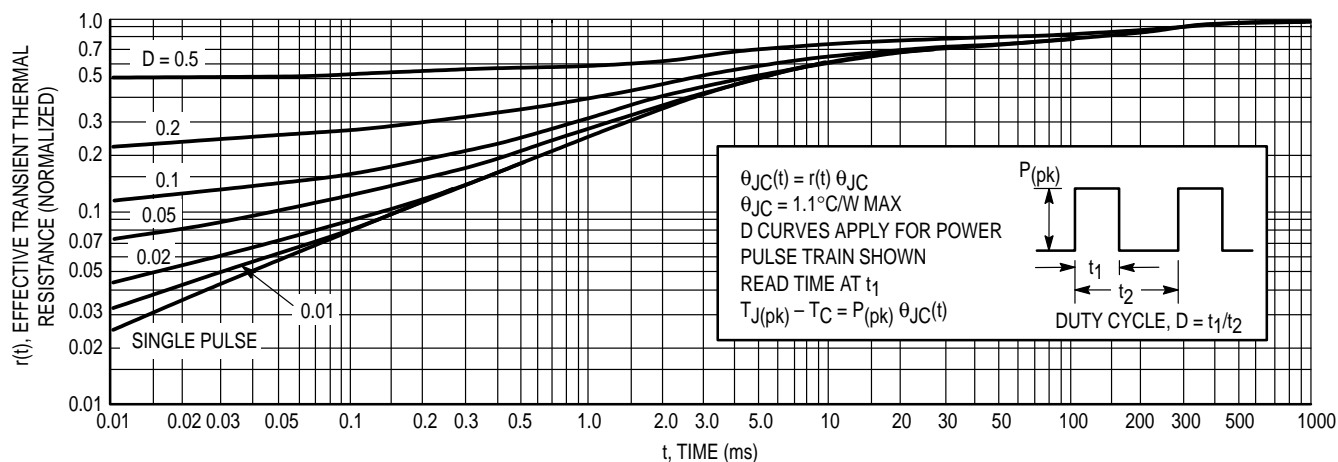


Figure 4. Thermal Response

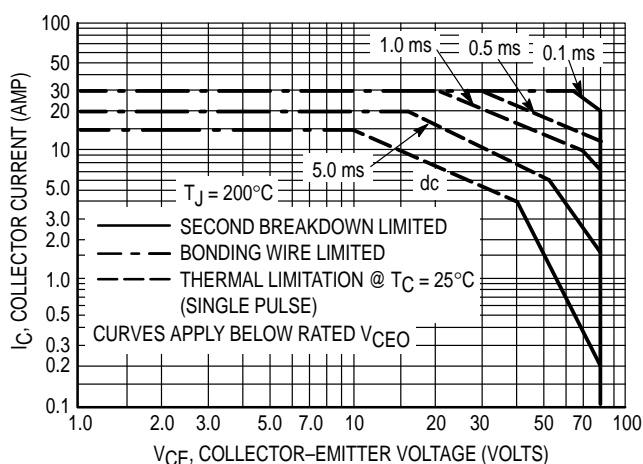


Figure 5. Active-Region Safe Operating Area

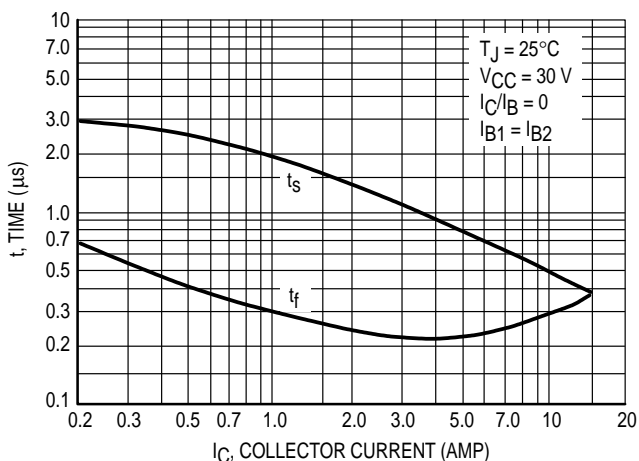


Figure 6. Turn-Off Time

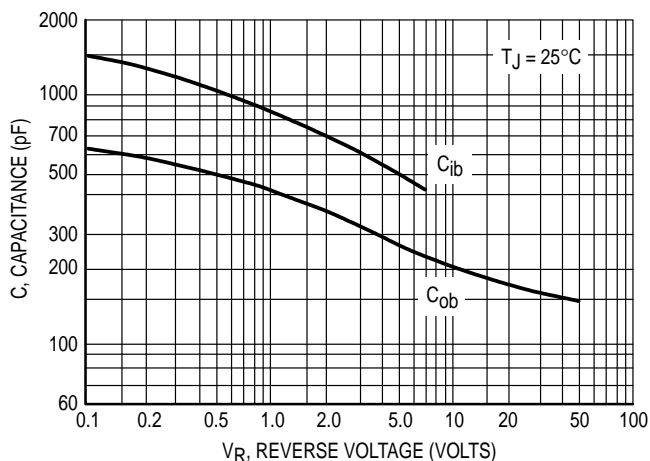


Figure 7. Capacitance

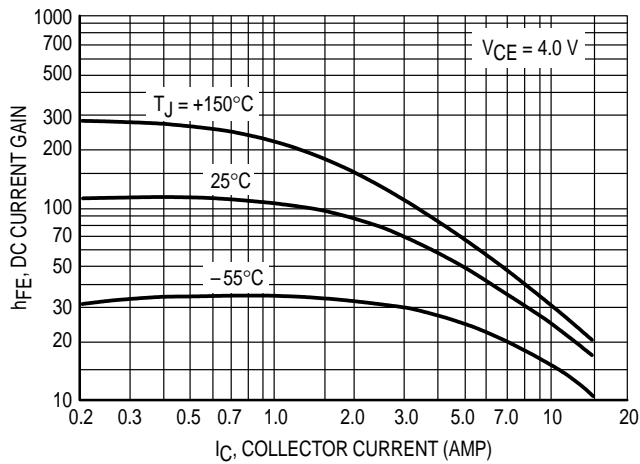


Figure 8. DC Current Gain

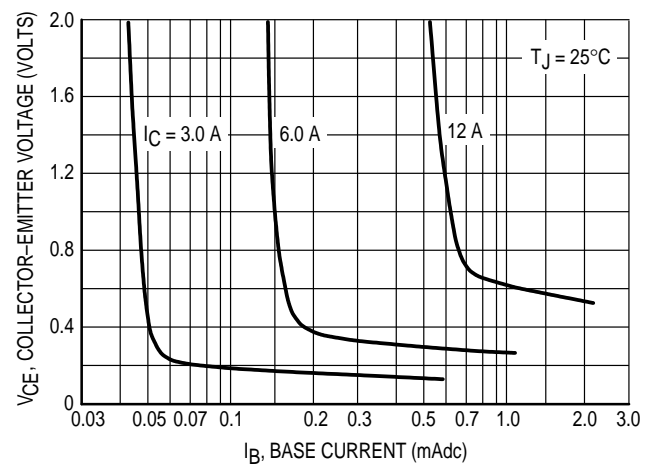


Figure 9. Collector Saturation Region

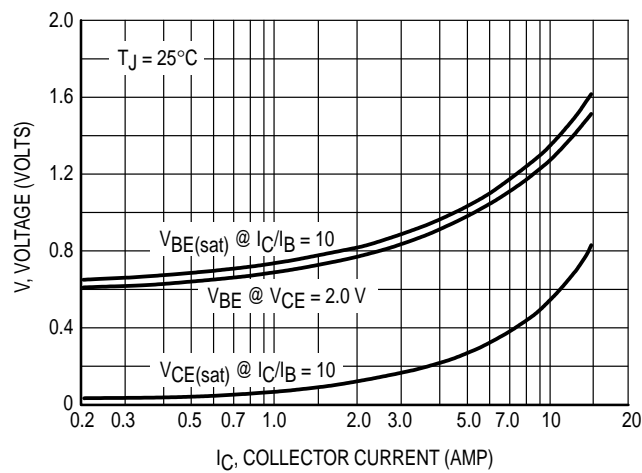
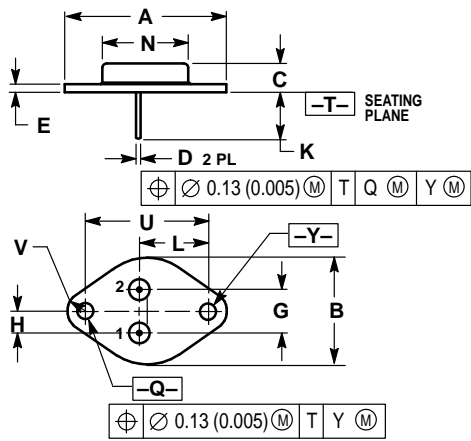


Figure 10. "On" Voltage

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.

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

CASE 1-07
TO-204AA (TO-3)
ISSUE Z

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JAPAN: Nippon Motorola Ltd.; SPD, Strategic Planning Office, 141,
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ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

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