

Complementary Silicon High-Power Transistors

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

- Low Collector-Emitter Saturation Voltage —
 $V_{CE(sat)} = 1.0 \text{ Vdc}$, (max) at $I_C = 15 \text{ Adc}$
- Low Leakage Current
 $I_{CEX} = 1.0 \text{ mAdc}$ (max) at Rated Voltage
- Excellent DC Current Gain —
 $h_{FE} = 20$ (min) at $I_C = 10 \text{ Adc}$
- High Current Gain Bandwidth Product —
 $f_T = 4.0 \text{ MHz}$ (min) at $I_C = 1.0 \text{ Adc}$

MAXIMUM RATINGS (1)

Rating	Symbol	2N5883 2N5885	2N5884 2N5886	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	Vdc
Collector-Base Voltage	V_{CB}	60	80	Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current — Continuous Peak	I_C	25 50		Adc
Base Current	I_B	7.5		Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	200 1.15		Watts 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	θ_{JC}	0.875	$^\circ\text{C/W}$

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

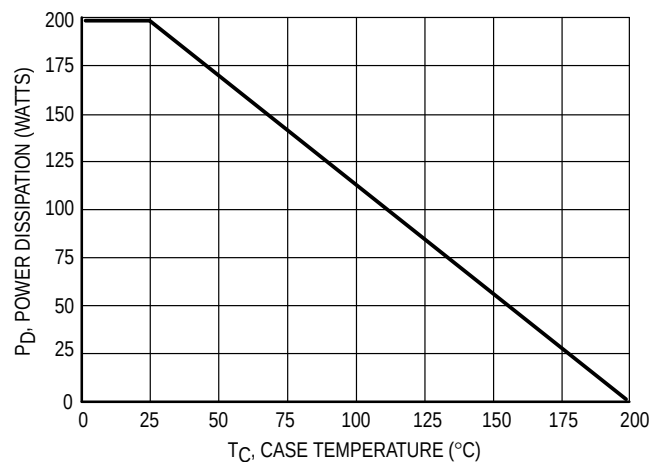


Figure 1. Power Derating

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

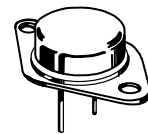
REV 7



PNP
2N5883
2N5884*
NPN
2N5885
2N5886*

*Motorola Preferred Device

**25 AMPERE
 COMPLEMENTARY
 SILICON
 POWER TRANSISTORS
 60-80 VOLTS
 200 WATTS**



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

2N5883 2N5884 2N5885 2N5886***ELECTRICAL CHARACTERISTICS** ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
Collector–Emitter Sustaining Voltage (1) ($I_C = 200\text{ mAdc}$, $I_B = 0$)	2N5883, 2N5885 2N5884, 2N5886	$V_{CE(sus)}$	60 80	— —	Vdc
Collector Cutoff Current ($V_{CE} = 30\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 40\text{ Vdc}$, $I_B = 0$)	2N5883, 2N5885 2N5984, 2N5886	I_{CEO}	— —	2.0 2.0	mAdc
Collector Cutoff Current ($V_{CE} = 60\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$) ($V_{CE} = 80\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$) ($V_{CE} = 60\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$) ($V_{CE} = 80\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$)	2N5883, 2N5885 2N5884, 2N5886 2N5883, 2N5885 2N5884, 2N5886	I_{CEX}	— — 10 10	1.0 1.0 10 10	mAdc
Collector Cutoff Current ($V_{CB} = 60\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 80\text{ Vdc}$, $I_E = 0$)	2N5883, 2N5885 2N5884, 2N5886	I_{CBO}	— —	1.0 1.0	mAdc
Emitter Cutoff Current ($V_{EB} = 5.0\text{ Vdc}$, $I_C = 0$)		I_{EBO}	—	1.0	mAdc

ON CHARACTERISTICS

DC Current Gain (1) ($I_C = 3.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) ($I_C = 10\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) ($I_C = 25\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	h_{FE}	35 20 4.0	— 100	—
Collector–Emitter Saturation Voltage (1) ($I_C = 15\text{ Adc}$, $I_B = 1.5\text{ Adc}$) ($I_C = 25\text{ Adc}$, $I_B = 6.25\text{ Adc}$)	$V_{CE(sat)}$	— —	1.0 4.0	Vdc
Base–Emitter Saturation Voltage (1) ($I_C = 25\text{ Adc}$, $I_B = 6.25\text{ Adc}$)	$V_{BE(sat)}$	—	2.5	Vdc
Base–Emitter On Voltage (1) ($I_C = 10\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	$V_{BE(on)}$	—	1.5	Vdc

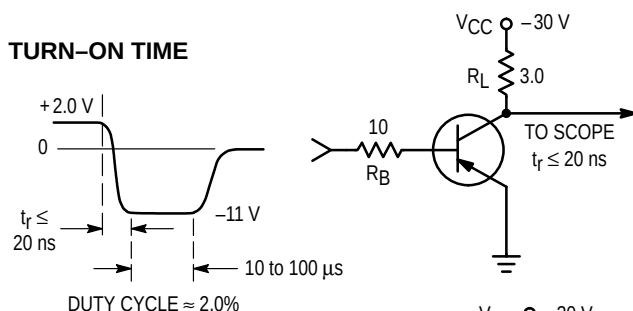
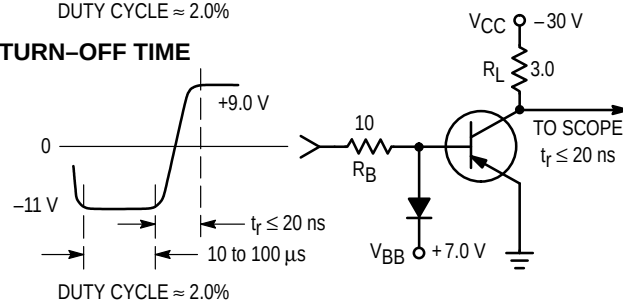
DYNAMIC CHARACTERISTICS

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 ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	— —	1000 500	pF
Small–Signal Current Gain ($I_C = 3.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$, $f_{test} = 1.0\text{ kHz}$)	h_{fe}	20	—	—

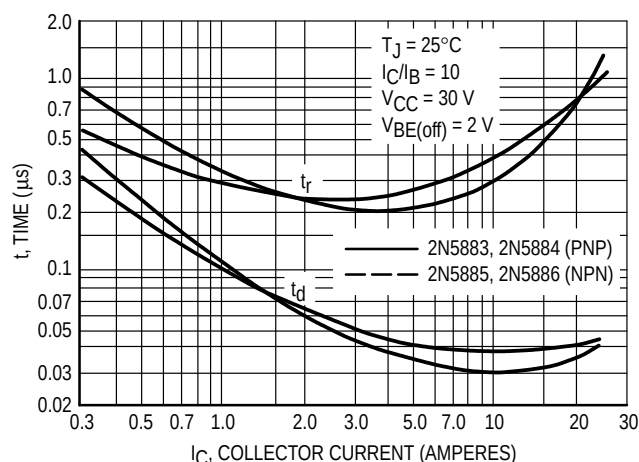
SWITCHING CHARACTERISTICS

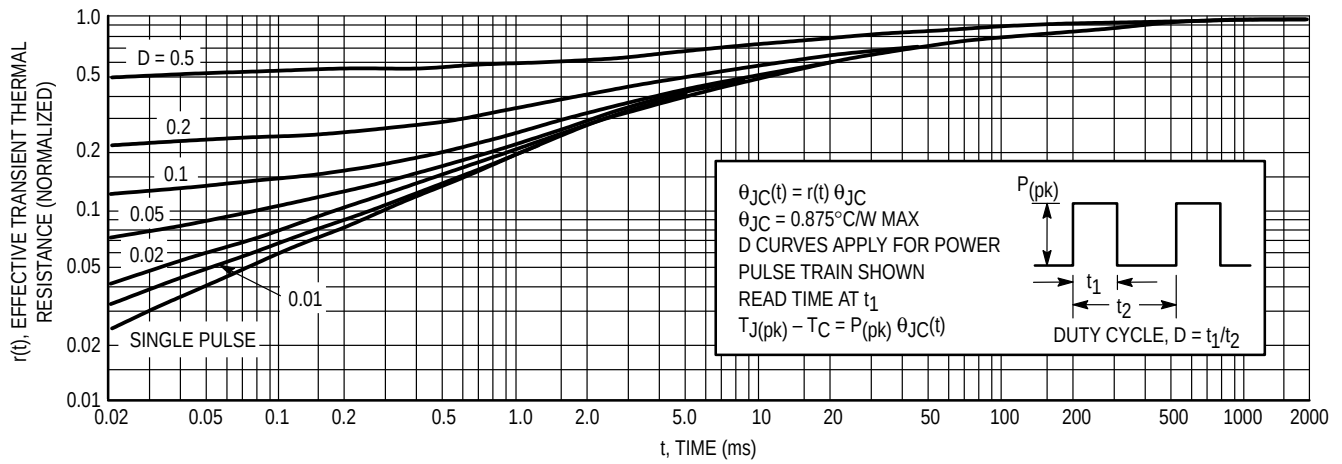
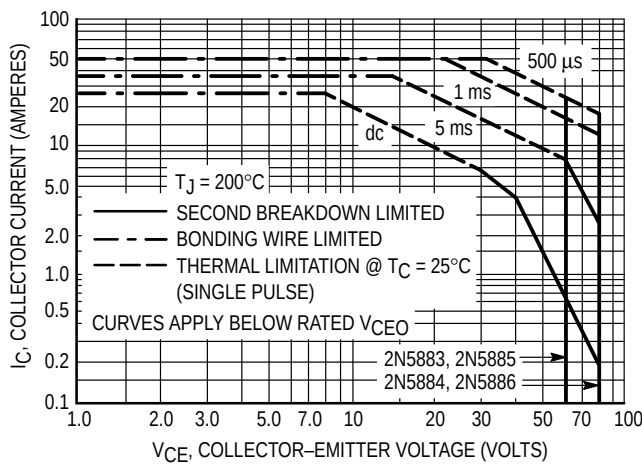
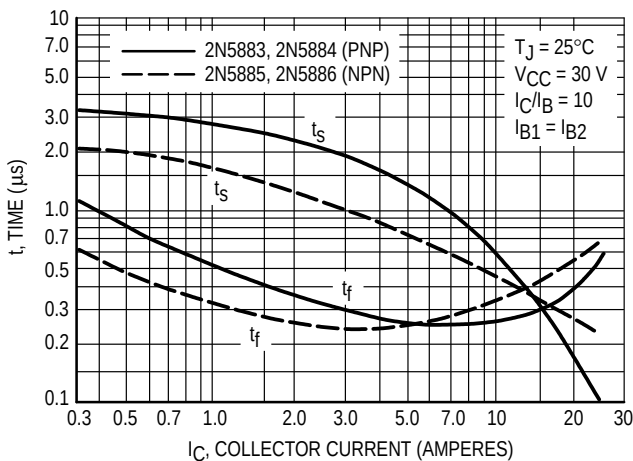
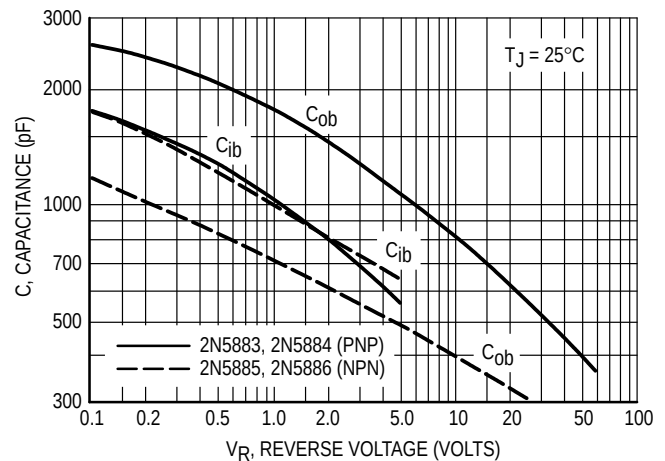
Rise Time	$(V_{CC} = 30\text{ Vdc}$, $I_C = 10\text{ Adc}$, $I_{B1} = I_{B2} = 1.0\text{ Adc}$)	t_r	—	0.7	μs
Storage Time		t_s	—	1.0	μs
Fall Time		t_f	—	0.8	μs

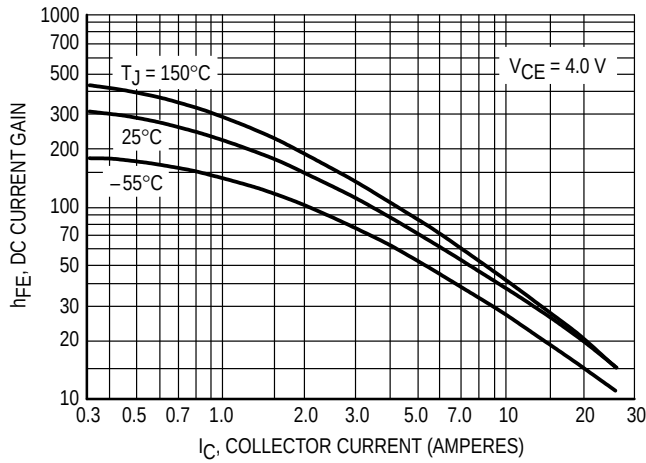
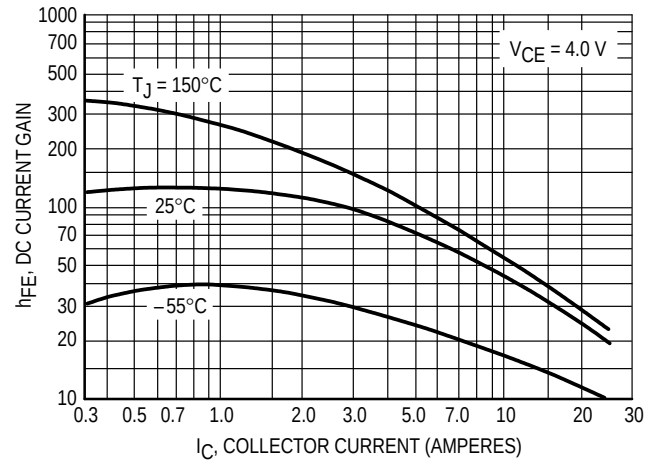
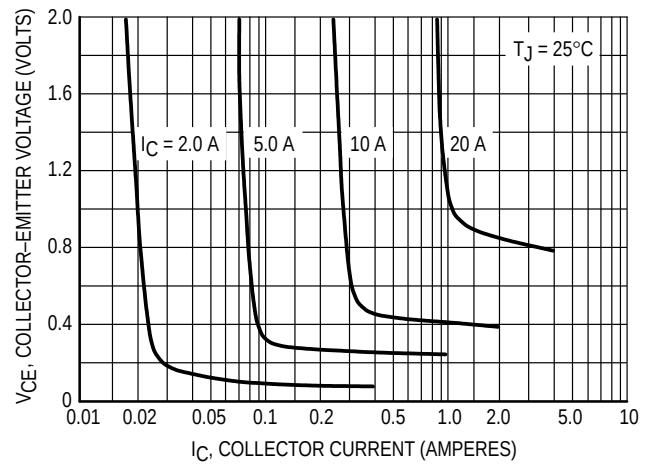
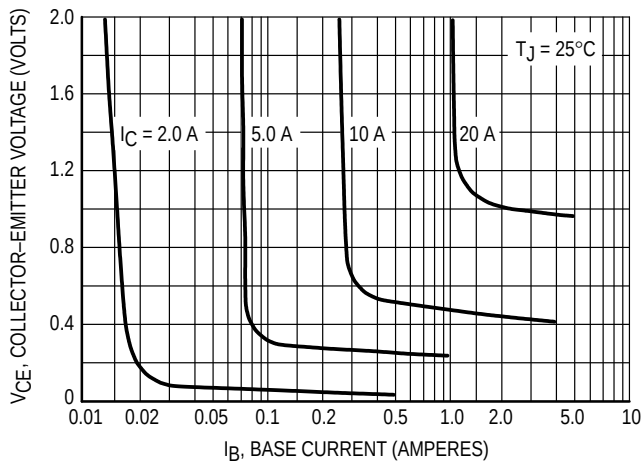
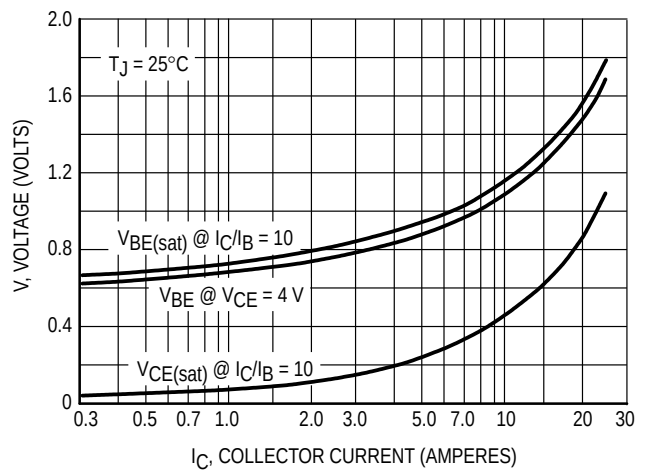
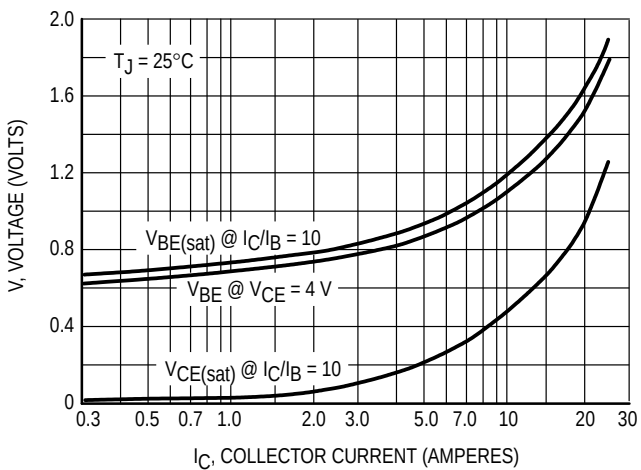
* Indicates JEDEC Registered Data.

(1) Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$. (2) $f_T = |h_{fe}| \cdot f_{test}$.**TURN-ON TIME****TURN-OFF TIME**

FOR CURVES OF FIGURES 3 & 6, R_B & R_L ARE VARIED.
INPUT LEVELS ARE APPROXIMATELY AS SHOWN.
FOR NPN, REVERSE ALL POLARITIES.

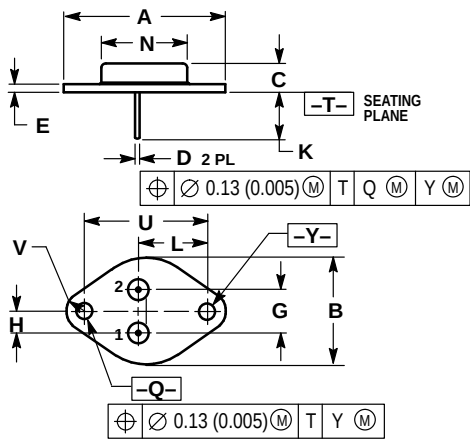
Figure 2. Switching Time Equivalent Test Circuits**Figure 3. Turn-On Time**

2N5883 2N5884 2N5885 2N5886**Figure 4. Thermal Response****Figure 5. Active-Region Safe Operating Area****Figure 6. Turn-Off Time****Figure 7. Capacitance**

2N5883 2N5884 2N5885 2N5886**PNP DEVICES**
2N5883 and 2N5884**NPN DEVICES**
2N5885 and 2N5886**Figure 8. DC Current Gain****Figure 9. Collector Saturation Region****Figure 10. "On" Voltages**

2N5883 2N5884 2N5885 2N5886

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

2N5883 2N5884 2N5885 2N5886

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**2N5883/D**