

# COMPLEMENTARY SILICON HIGH-POWER TRANSISTORS

General-Purpose Power Amplifier and Switching Applications

<b>PNP</b>	<b>NPN</b>
<b>2N5879</b>	<b>2N5881</b>
<b>2N5880</b>	<b>2N5882</b>

## FEATURES:

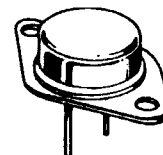
- \* Low Collector-Emitter Saturation Voltage -  
 $V_{CE(SAT)} = 1.0V(\text{Max.}) @ I_C = 7.0A$
- \* Excellent DC Current Gain -  
 $hFE = 20 \sim 100 @ I_C = 6.0 A$

**Boca Semiconductor Corp.**  
**BSC**  
<http://www.bocasemi.com>

## MAXIMUM RATINGS

Characteristic	Symbol	2N5879 2N5881	2N5880 2N5882	Unit
Collector-Emitter Voltage	$V_{CEO}$	60	80	V
Collector-Base Voltage	$V_{CBO}$	60	80	V
Emitter-Base Voltage	$V_{EBO}$	5.0		V
Collector Current-Continuous -Peak	$I_C$ $I_{CM}$	15 30		A
Base Current	$I_B$	5.0		A
Total Power Dissipation@ $T_C=25^\circ C$ Derate above $25^\circ C$	$P_D$	160 0.915		W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 65 to +200		$^\circ C$

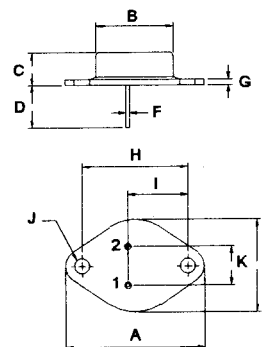
15 AMPERE  
COMPLEMENTARY SILICON  
POWER TRANSISTORS  
60 - 80 Volts  
160 Watts



TO-3

## THERMAL CHARACTERISTICS

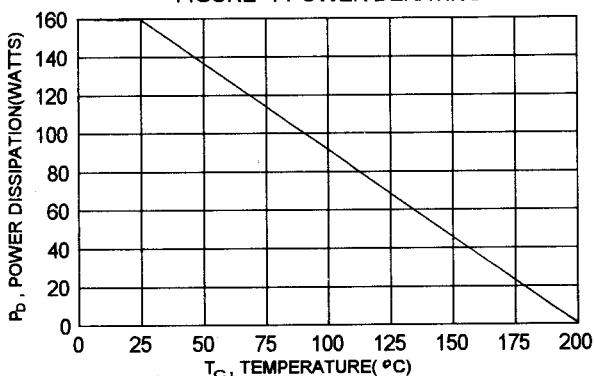
Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.1	$^\circ C/W$



PIN 1. BASE  
2. EMITTER  
COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.20	26.67
F	0.92	1.09
G	1.38	1.62
H	29.90	30.40
I	16.64	17.30
J	3.88	4.36
K	10.67	11.18

FIGURE -1 POWER DERATING



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

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector - Emitter Sustaining Voltage (1) ( $I_c = 200\text{ mA}$ , $I_B = 0$ ) 2N5879, 2N5881 2N5880, 2N5882	$V_{CE(sus)}$	60 80		V
Collector Cutoff Current ( $V_{CE} = 30\text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 40\text{ V}$ , $I_B = 0$ ) 2N5879, 2N5881 2N5880, 2N5882	$I_{CEO}$		1.0 1.0	mA
Collector Cutoff Current ( $V_{CE} = 60\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ ) ( $V_{CE} = 80\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ ) ( $V_{CE} = 60\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ , $T_c = 150^\circ\text{C}$ ) ( $V_{CE} = 80\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ , $T_c = 150^\circ\text{C}$ ) 2N5879, 2N5881 2N5880, 2N5882 2N5879, 2N5881 2N5880, 2N5882	$I_{CEX}$		0.5 0.5 5.0 5.0	mA
Collector Cutoff Current ( $V_{CB} = 60\text{ V}$ , $I_E = 0$ ) ( $V_{CB} = 80\text{ V}$ , $I_E = 0$ ) 2N5879, 2N5881 2N5880, 2N5882	$I_{CBO}$		0.5 0.5	mA
Emitter Cutoff Current ( $V_{EB} = 5.0\text{ V}$ , $I_C = 0$ )	$I_{EBO}$		1.0	mA

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_c = 2.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ ) ( $I_c = 6.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ ) ( $I_c = 15\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )	hFE	35 20 4.0	100	
Collector-Emitter Saturation Voltage ( $I_c = 7.0\text{ A}$ , $I_B = 0.7\text{ A}$ ) ( $I_c = 15\text{ A}$ , $I_B = 3.75\text{ A}$ )	$V_{CE(sat)}$		1.0 4.0	V
Base-Emitter On Voltage ( $I_c = 6.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )	$V_{BE(on)}$		1.5	V
Base-Emitter Saturation Voltage ( $I_c = 15\text{ A}$ , $I_B = 3.75\text{ A}$ )	$V_{BE(sat)}$		2.5	V

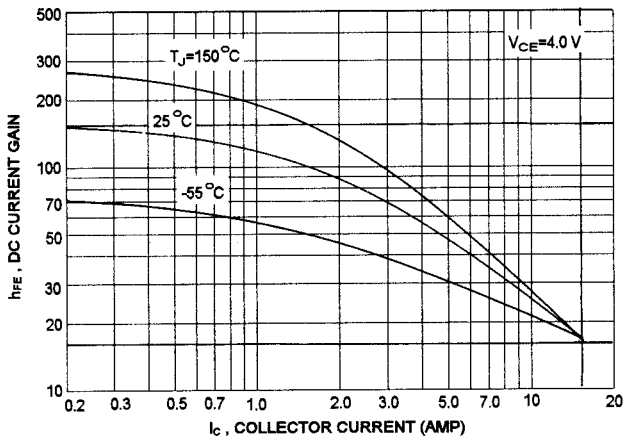
**DYNAMIC CHARACTERISTICS**

Current-Gain-Bandwidth Product (2) ( $I_c = 1.0\text{ A}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ )	$f_T$	4.0		MHz
Small-Signal Current Gain ( $I_c = 2.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ , $f = 1.0\text{ KHZ}$ )	$h_{fe}$	20		

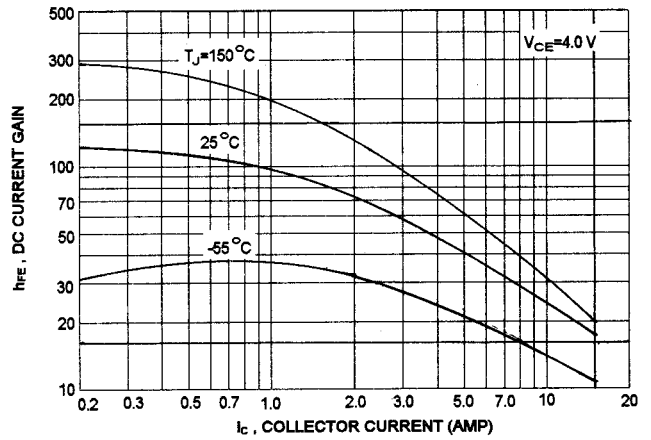
(1) Pulse Test: Pulse width  $\leq 300\text{ us}$ , Duty Cycle  $\leq 2.0\%$

(2)  $f_T = |h_{fe}| \cdot f_{test}$

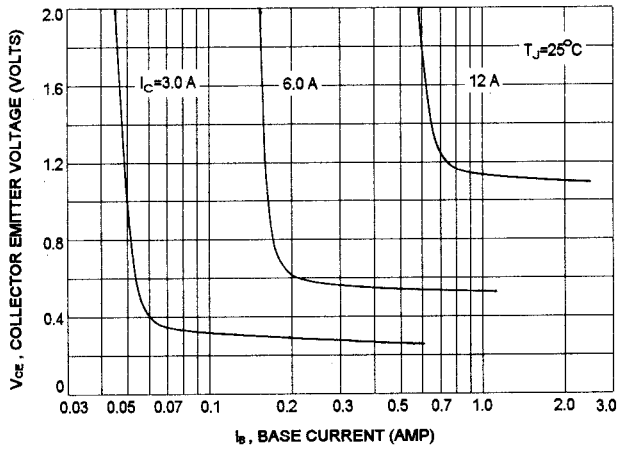
PNP 2N5879,2N5880  
DC CURRENT GAIN



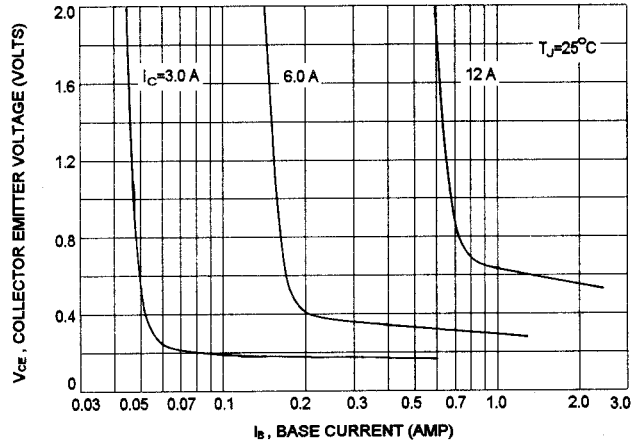
NPN 2N5881,2N5882  
DC CURRENT GAIN



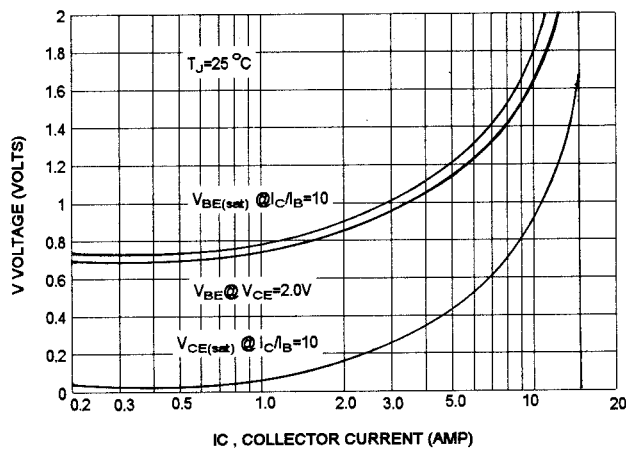
COLLECTOR SATURATION REGION



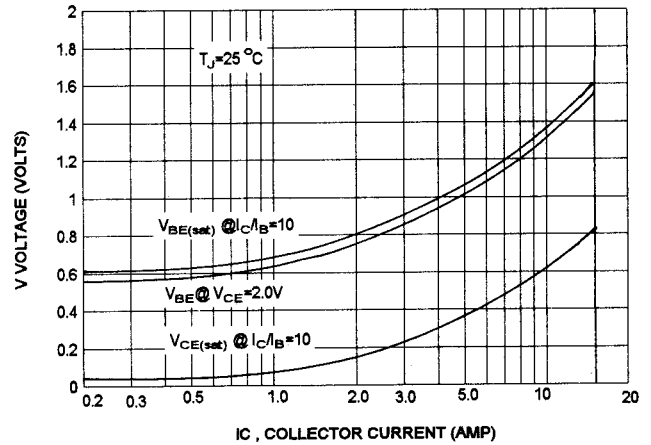
COLLECTOR SATURATION REGION



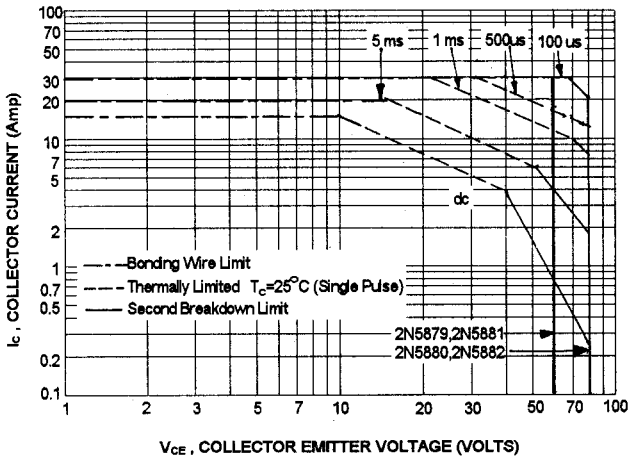
"ON" VOLTAGES



"ON" VOLTAGES



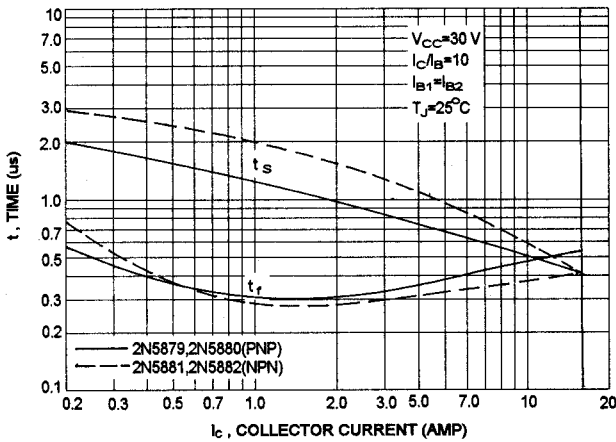
ACTIVE-REGION SAFE OPERATING AREA (SOA)



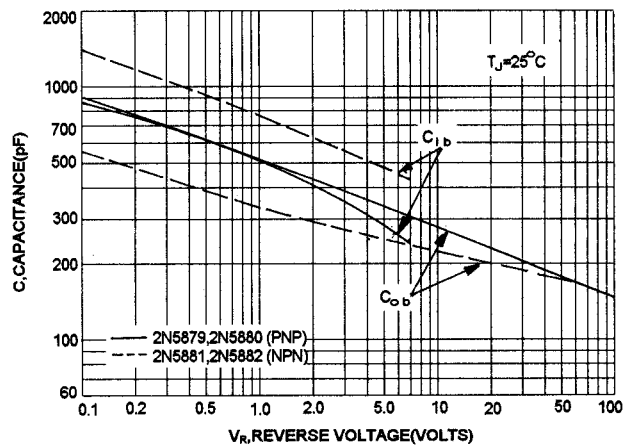
There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

The data of SOA curve is base on  $T_{J(PK)}=200^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(PK)} \leq 200^\circ\text{C}$ . At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

TURN-OFF TIME



CAPACITANCES



TURN-ON TIME

