

## COMPLEMENTARY SILICON TRANSISTORS

General Purpose use in power amplifier and switching circuits.

### FEATURES:

\*DC Current Gain Specified

HFE=20 - 80 @  $I_c = 1.0$  A

\* Low Collector-Emitter Saturation Voltage -

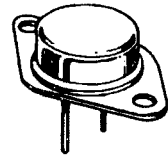
$V_{CE(sat)} = 1.5$  V (Max.) @  $I_c = 5.0$  A

PNP	NPN
2N4901	2N5067
2N4902	2N5068
2N4903	2N5069

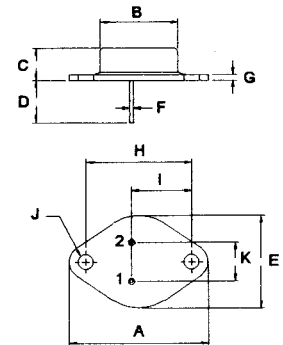
5.0 AMPERE  
COMPLEMENTARY SILICON  
POWER TRANSISTORS  
40-80 Volts  
87.5 Watts

### MAXIMUM RATINGS

Characteristic	Symbol	2N4901 2N5067	2N4902 2N5068	2N4903 2N5069	Unit
Collector-Emitter Voltage	$V_{CBO}$	40	60	80	V
Collector-Emitter Voltage	$V_{CEO}$	40	60	80	V
Emitter-Base Voltage	$V_{EB}$	5.0			V
Collector Current-Continuous -Peak	$I_c$	5.0 10			A
Base current - Continuous	$I_B$	1.0			A
Total Power Dissipation @ $T_c = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	87.5 0.5			W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 65 to +200			$^\circ\text{C}$



TO-3



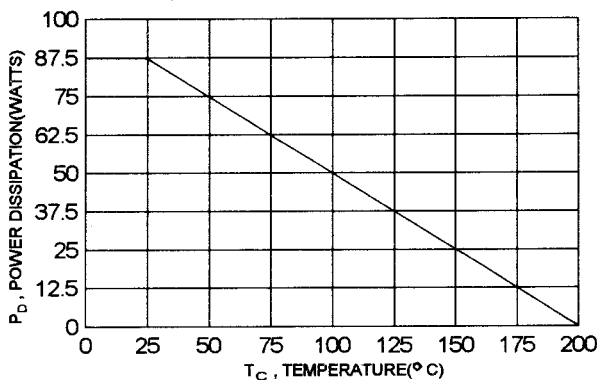
PIN 1. BASE  
2. EMITTER  
COLLECTOR (CASE)

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	2.0	$^\circ\text{C}/\text{W}$

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) ( $I_C = 200 \text{ mA}$ , $I_B = 0$ ) 2N4901,2N5067 2N4902,2N5068 2N4903,2N5069	$V_{CE(sus)}$	40 60 80		V
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CE0}$ , $I_B = 0$ )	$I_{CEO}$		1.0	mA
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CE0}$ , $V_{BE(off)} = 1.5 \text{ V}$ ) ( $V_{CE} = \text{Rated } V_{CE0}$ , $V_{BE(off)} = 1.5 \text{ V}$ , $T_c = 150^\circ\text{C}$ )	$I_{CEX}$		0.1 2.0	mA
Collector Cutoff Current ( $V_{CB} = \text{Rated } V_{CBO}$ , $I_E = 0$ )	$I_{CBO}$		0.1	mA
Emitter Cutoff Current ( $V_{EB} = 5.0 \text{ V}$ , $I_C = 0$ )	$I_{EBO}$		1.0	mA

**ON CHARACTERISTICS (1)**

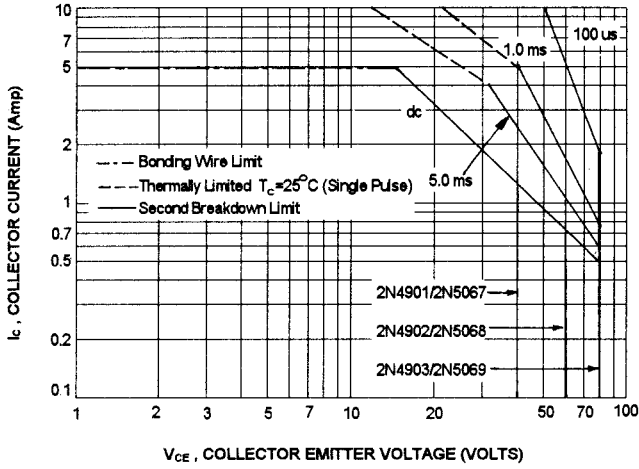
DC Current Gain ( $I_C = 1.0 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ ) ( $I_C = 5.0 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ )	hFE	20 7.0	80	
Collector-Emitter Saturation Voltage ( $I_C = 1.0 \text{ A}$ , $I_B = 0.1 \text{ A}$ ) ( $I_C = 5.0 \text{ A}$ , $I_B = 1.0 \text{ A}$ )	$V_{CE(sat)}$		0.4 1.5	V
Base-Emitter On Voltage ( $I_C = 1.0 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ )	$V_{BE(on)}$		1.2	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 ( $I_C = 0.5 \text{ A}$ , $V_{CE} = 10 \text{ V}$ , $f = 1.0 \text{ KHz}$ )	$h_{fe}$	20		

(1) Pulse Test: Pulse width = 300 us , Duty Cycle  $\leq 2.0\%$ (2)  $f_T = |h_{fe}| \cdot f_{test}$

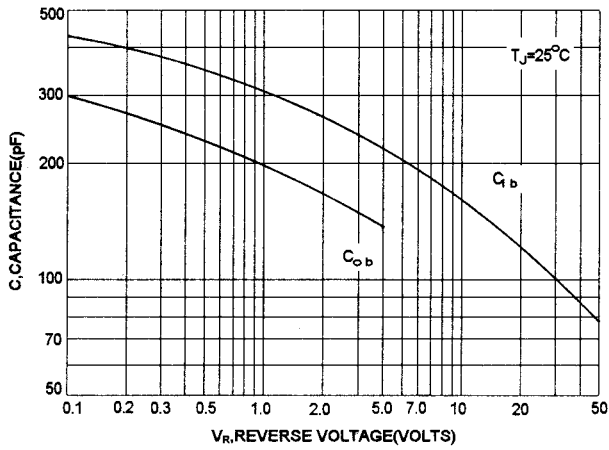
ACTIVE-REGION SAFE OPERATING AREA (SOA)



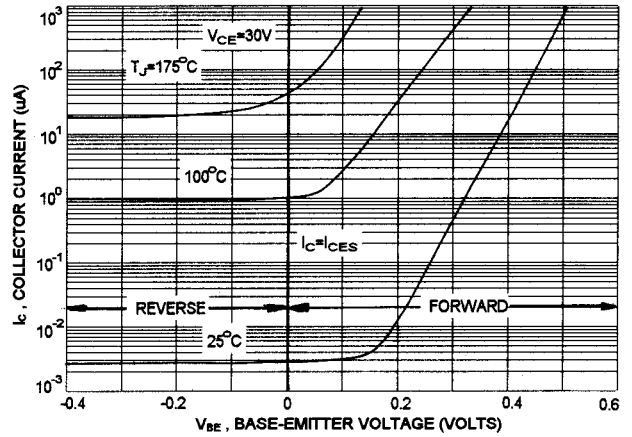
There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater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

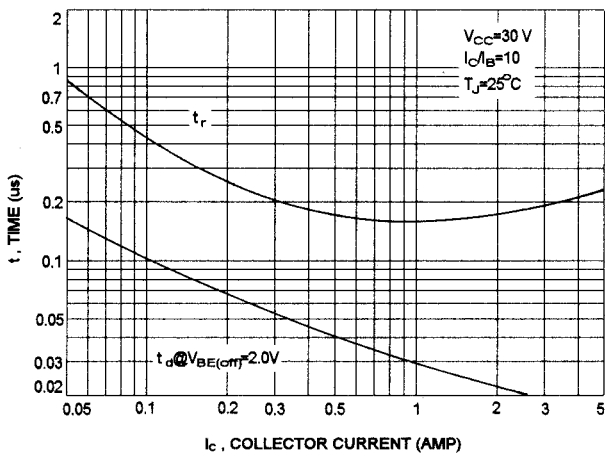
CAPACITANCES



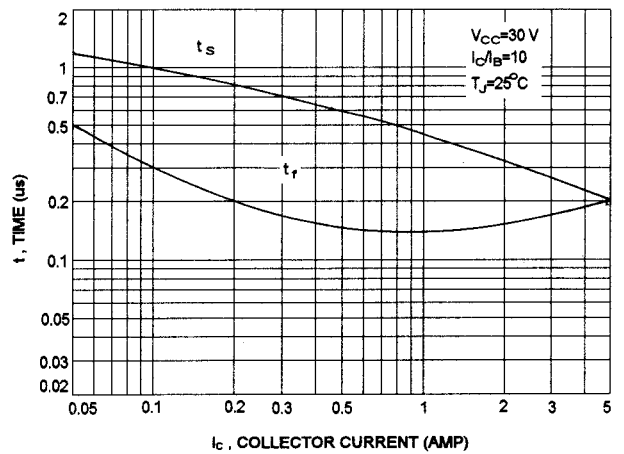
COLLECTOR CUT-OFF REGION



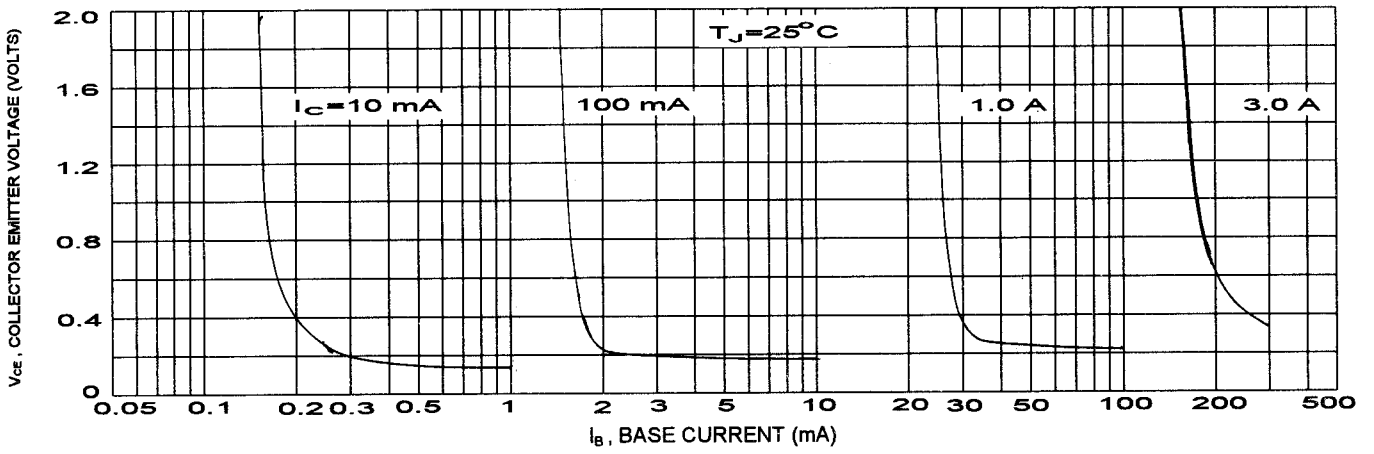
TURN-ON TIME



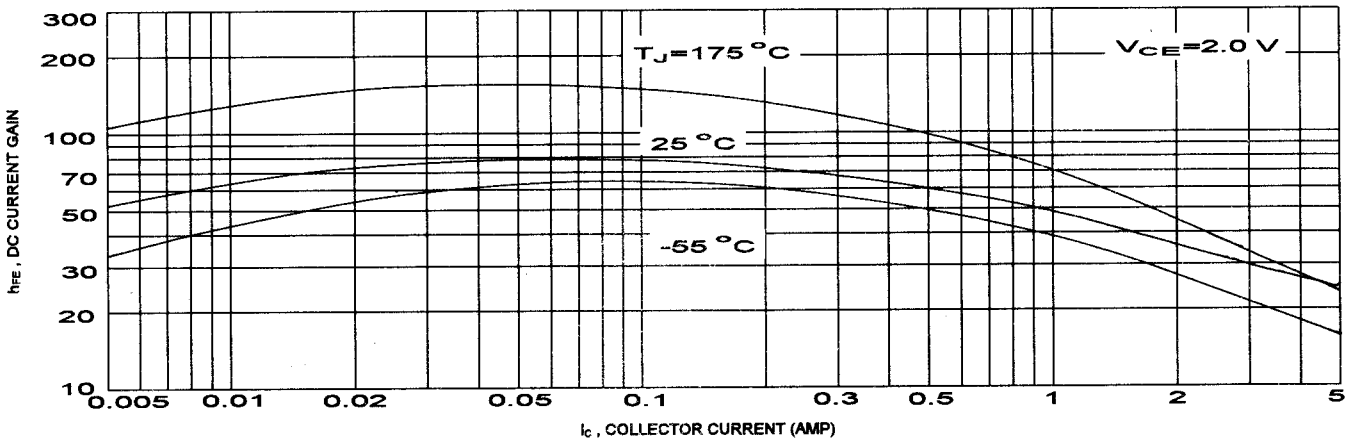
TURN-OFF TIME



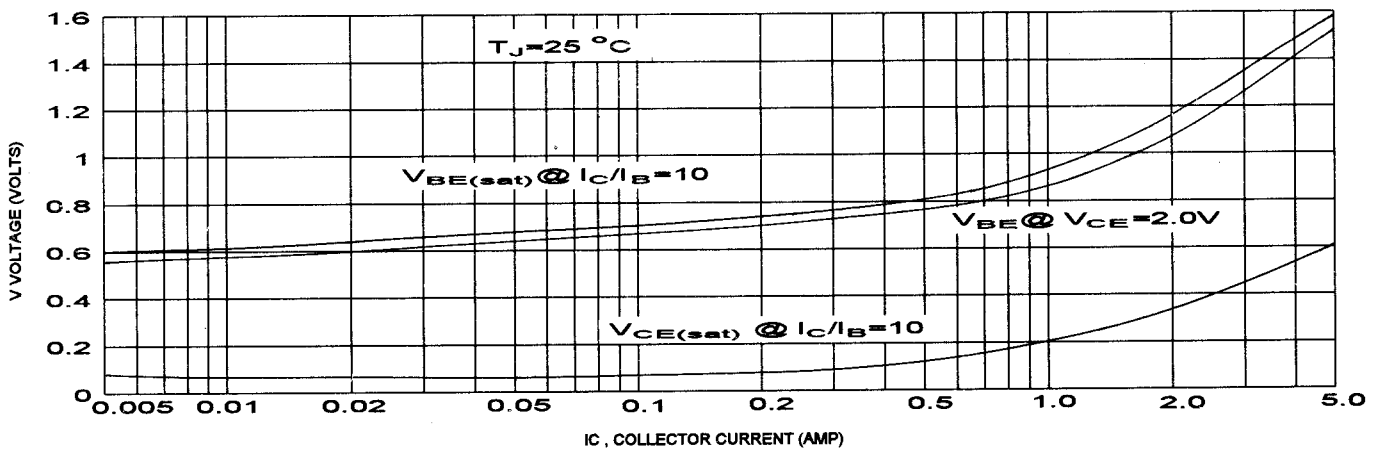
COLLECTOR SATURATION REGION



DC CURRENT GAIN



"ON" VOLTAGE





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