

## HIGH POWER NPN SILICON POWER TRANSISTORS

High-Current, High-Speed, High-Power Type for Switching and Amplifier Applications.

### FEATURES:

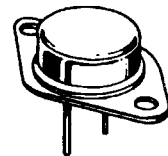
- \* DC Current Gain  $hFE = 20 \sim 100 @ I_C = 15 A, V_{CE} = 2.0 V$
- \* Low  $V_{CE(SAT)} \leq 0.75 V @ I_C = 15A, I_B = 1.2A$
- \* Maximum Safe-Area-of-Operation Curves...  
 $I_{sb}$  limit line beginning 24 V

**NPN**  
**2N5671**  
**2N5672**

**30 AMPERE**  
**SILICON POWER**  
**TRANSISTORS**  
**90-120 VOLTS**  
**140 WATTS**

### MAXIMUM RATINGS

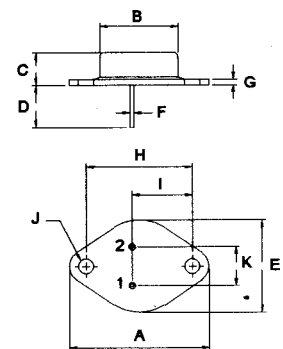
Characteristic	Symbol	2N5671	2N5672	Unit
Collector-Emitter Voltage	$V_{CEO}$	90	120	V
Collector-Base Voltage	$V_{CBO}$	120	150	V
Emitter-Base Voltage	$V_{EBO}$	7.0		V
Collector Current-Continuous	$I_C$	30		A
Base Current	$I_B$	10		A
Total Power Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	$P_D$	140 0.8		W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 65 to +200		$^\circ C$



**TO-3**

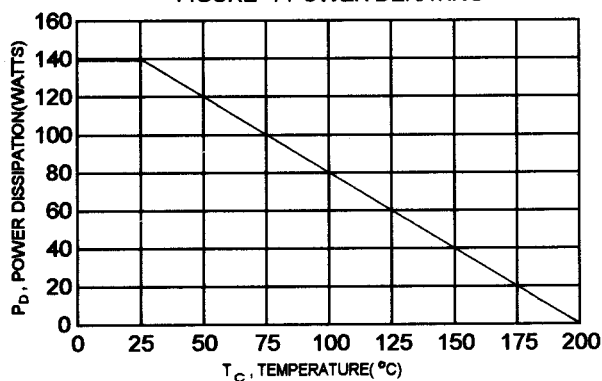
### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.25	$^\circ C/W$



PIN 1. BASE  
 2. EMITTER  
 COLLECTOR(CASE)

FIGURE -1 POWER DERATING



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

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) ( $I_C = 200 \text{ mA}$ , $I_B = 0$ ) 2N5671 2N5672	$V_{CEO(sus)}$	90 120		V
Collector Cutoff Current ( $V_{CE} = 80 \text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 80 \text{ V}$ , $I_B = 0$ ) 2N5671 2N5672	$I_{CEO}$		10 10	mA
Collector Cutoff Current ( $V_{CE} = 110 \text{ V}$ , $V_{BE(on)} = 1.5 \text{ V}$ ) ( $V_{CE} = 135 \text{ V}$ , $V_{BE(on)} = 1.5 \text{ V}$ ) ( $V_{CE} = 100 \text{ V}$ , $V_{BE(on)} = 1.5 \text{ V}$ , $T_c = 150^\circ\text{C}$ ) 2N5671 2N5672 2N5671 2N5672	$I_{CEV}$		12 10 15 10	mA
Emitter Cutoff Current ( $V_{EB} = 7.0 \text{ V}$ , $I_C = 0$ )	$I_{EBO}$		10	mA

## ON CHARACTERISTICS (1)

DC Current Gain ( $I_C = 15.0 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ ) ( $I_C = 20.0 \text{ A}$ , $V_{CE} = 5.0 \text{ V}$ )	$h_{FE}$	20 20	100	
Collector - Emitter Saturation Voltage ( $I_C = 15.0 \text{ A}$ , $I_B = 1.2 \text{ A}$ )	$V_{CE(sat)}$		0.75	V
Base - Emitter Saturation Voltage ( $I_C = 15.0 \text{ A}$ , $I_B = 1.2 \text{ A}$ )	$V_{BE(sat)}$		1.5	V
Base - Emitter On Voltage ( $I_C = 15.0 \text{ A}$ , $V_{CE} = 5.0 \text{ V}$ )	$V_{BE(on)}$		1.6	V

## DYNAMIC CHARACTERISTICS

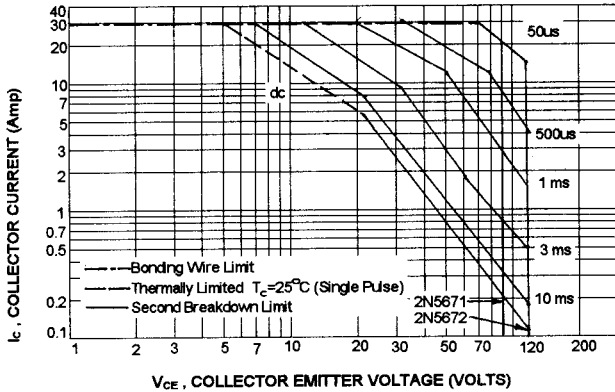
Current - Gain - Bandwidth Product (2) ( $I_C = 2.0 \text{ A}$ , $V_{CE} = 10.0 \text{ V}$ , $f = 1.0 \text{ MHz}$ )	$f_T$	40		MHz
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## SWITCHING CHARACTERISTICS

On Time	$V_{CC} = 30 \text{ V}$ $I_C = 15.0 \text{ A}$ $I_{B1} = -I_{B2} = 1.2 \text{ A}$ $t_p = 0.1 \text{ ms}$ Duty Cycle $\leq 2.0\%$	$t_{on}$		0.5	us
Storage Time		$t_s$		1.5	us
Fall Time		$t_f$		0.5	us

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

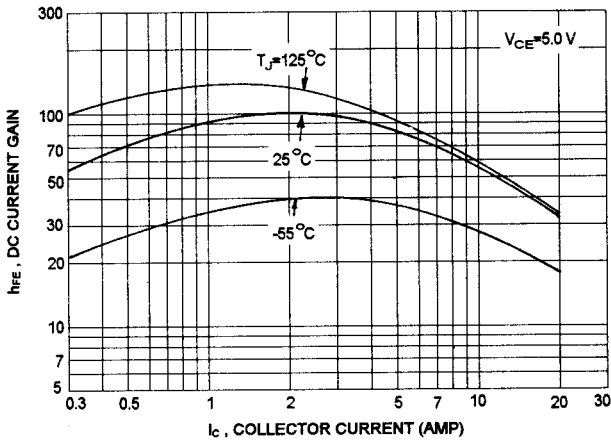
ACTIVE-REGION SAFE OPERATING AREA (SOA)



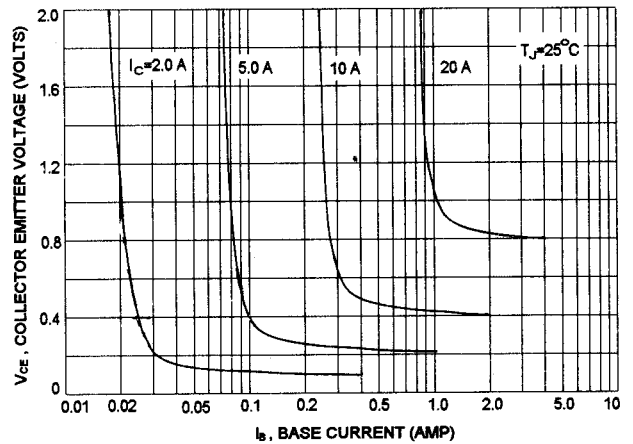
There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater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

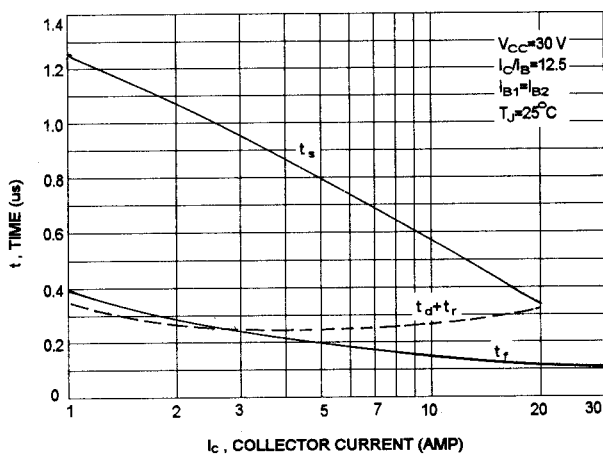
DC CURRENT GAIN



COLLECTOR SATURATION REGION



TYPICAL SWITCHING TIME



CAPACITANCES

