

## HIGH-POWER PNP SILICON TRANSISTORS

... designed for use in industrial power amplifiers and switching circuit applications.

### FEATURES:

- \* High DC Current Gain  
 $h_{FE} = 20-80 @ I_C = 10A$   
 $= 12 \text{ (Min)} @ I_C = 25A$
- \* Low Collector-Emitter Saturation Voltage  
 $V_{CE(SAT)} = 1.0V \text{ (Max.)} @ I_C = 10 A, I_B = 1.0A$
- \* Complement to 2N6338 thru 2N6340

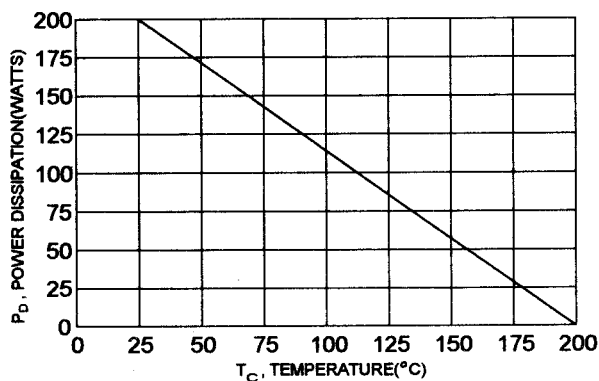
### MAXIMUM RATINGS

Characteristic	Symbol	2N6436	2N6437	2N6438	Unit
Collector-Emitter Voltage	$V_{CEO}$	80	100	120	V
Collector-Base Voltage	$V_{CBO}$	100	120	140	V
Emitter-Base Voltage	$V_{EBO}$	6.0			V
Collector Current-Continuous -Peak	$I_C$	25 50			A
Base Current	$I_B$	10			A
Total Power Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	$P_D$	200 1.14			W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +200			$^\circ C$

### THERMAL CHARACTERISTICS

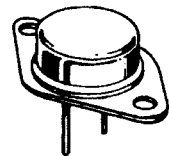
Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	0.875	$^\circ C/W$

FIGURE -1 POWER DERATING

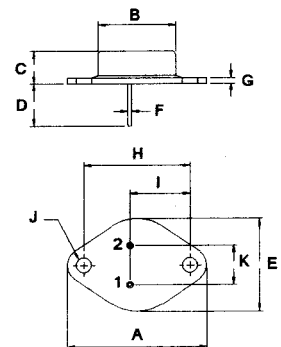


PNP  
**2N6436**  
**2N6437**  
**2N6438**

25 AMPERE  
 POWER TRANSISTOR  
 PNP SILICON  
 80-120 VOLTS  
 200 WATTS



TO-3



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

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) ( $I_C = 50 \text{ mA}$ , $I_B = 0$ )	2N6436 2N6437 2N6438	$V_{CE(sus)}$	80 100 120	V
Collector Cutoff Current ( $V_{CE} = 40 \text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 50 \text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 60 \text{ V}$ , $I_B = 0$ )	2N6436 2N6437 2N6438	$I_{CEO}$	50 50 50	$\mu\text{A}$
Collector Cutoff Current ( $V_{CB} = \text{Rated } V_{CB}$ , $I_E = 0$ )		$I_{CBO}$	10	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 6.0 \text{ V}$ , $I_C = 0$ )		$I_{EBO}$	100	$\mu\text{A}$

## ON CHARACTERISTICS (1)

DC Current Gain ( $I_C = 0.5 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ ) ( $I_C = 10 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ ) ( $I_C = 25 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ )		hFE	30 20 12	80
Collector-Emitter Saturation Voltage ( $I_C = 10 \text{ A}$ , $I_B = 1.0 \text{ A}$ ) ( $I_C = 25 \text{ A}$ , $I_B = 2.5 \text{ A}$ )		$V_{CE(sat)}$	1.0 1.8	V
Base-Emitter Saturation Voltage ( $I_C = 10 \text{ A}$ , $I_B = 1.0 \text{ A}$ ) ( $I_C = 25 \text{ A}$ , $I_B = 2.5 \text{ A}$ )		$V_{BE(sat)}$	1.8 2.5	V

## DYNAMIC CHARACTERISTICS

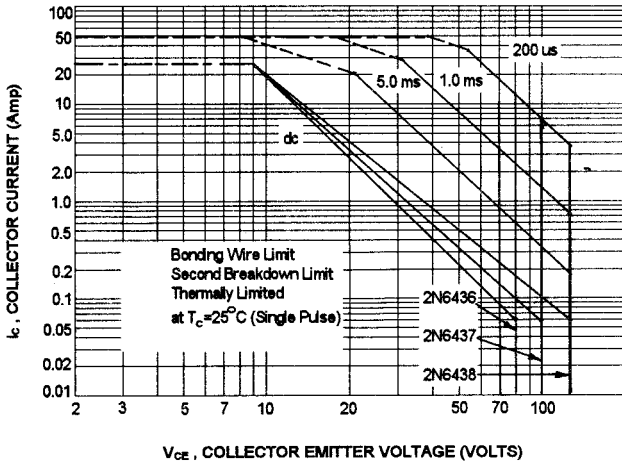
Current-Gain Bandwidth Product (2) ( $I_C = 1.0 \text{ A}$ , $V_{CE} = 10 \text{ V}$ , $f = 10 \text{ MHz}$ )		$f_T$	40	MHz
Output Capacitance ( $V_{CB} = 10 \text{ V}$ , $I_E = 0$ , $f = 0.1 \text{ MHz}$ )		$C_{ob}$	700	pF

## SWITCHING CHARACTERISTICS

Rise Time	$V_{CC} = 80 \text{ V}$ , $I_C = 10 \text{ A}$ $I_{B1} = -I_{B2} = 1.0 \text{ A}$ , $V_{BE(off)} = 6.0 \text{ V}$	$t_r$	0.3	$\mu\text{s}$
Storage Time		$t_s$	2.0	$\mu\text{s}$
Fall Time		$t_f$	0.4	$\mu\text{s}$

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

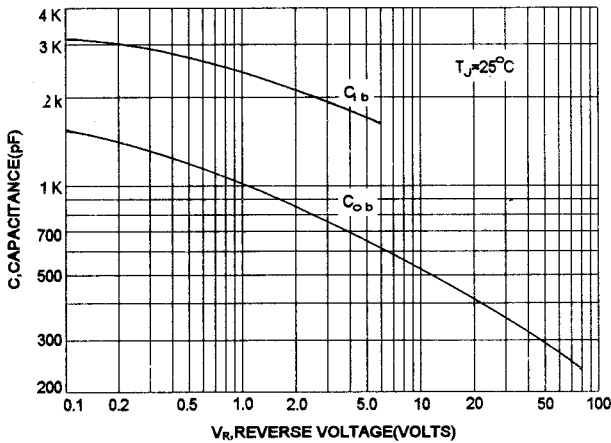
ACTIVE-REGION SAFE OPERATING AREA (SOA)



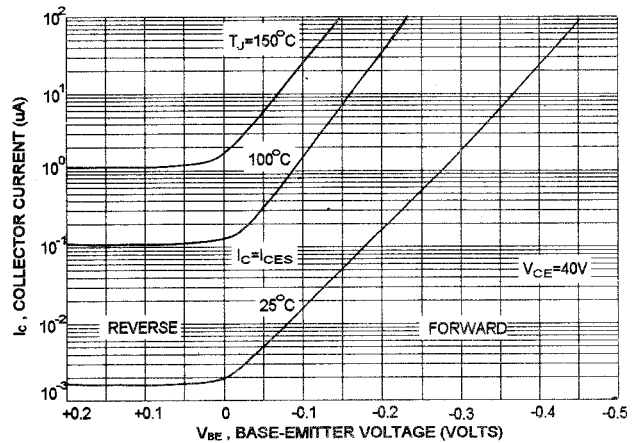
There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater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

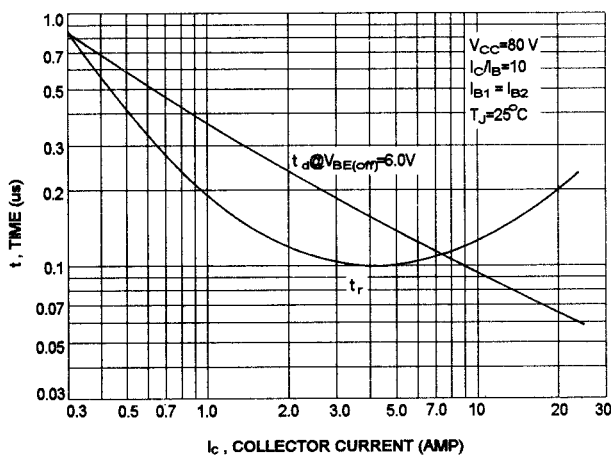
CAPACITANCES



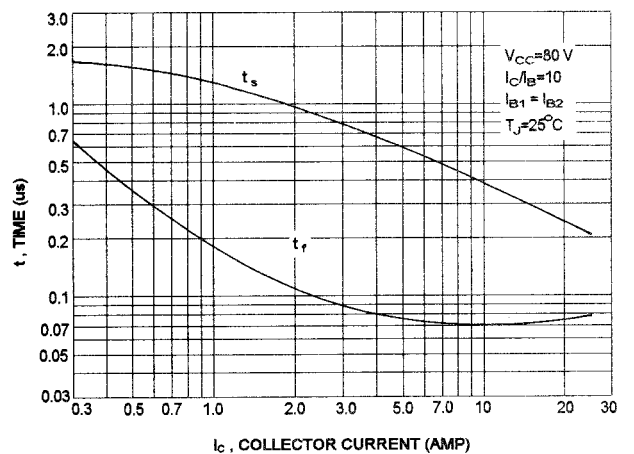
COLLECTOR CUT-OFF REGION



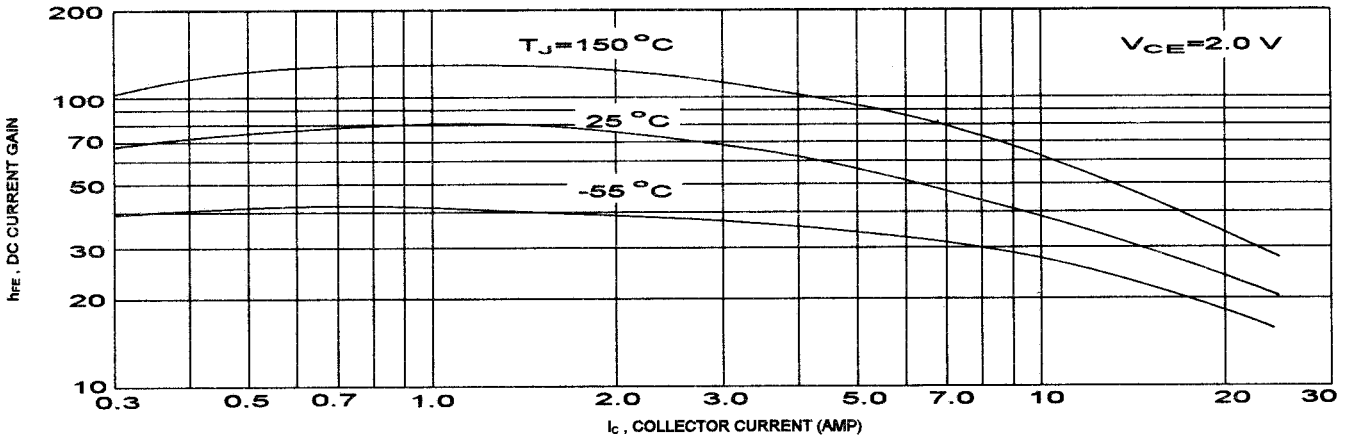
TURN-ON TIME



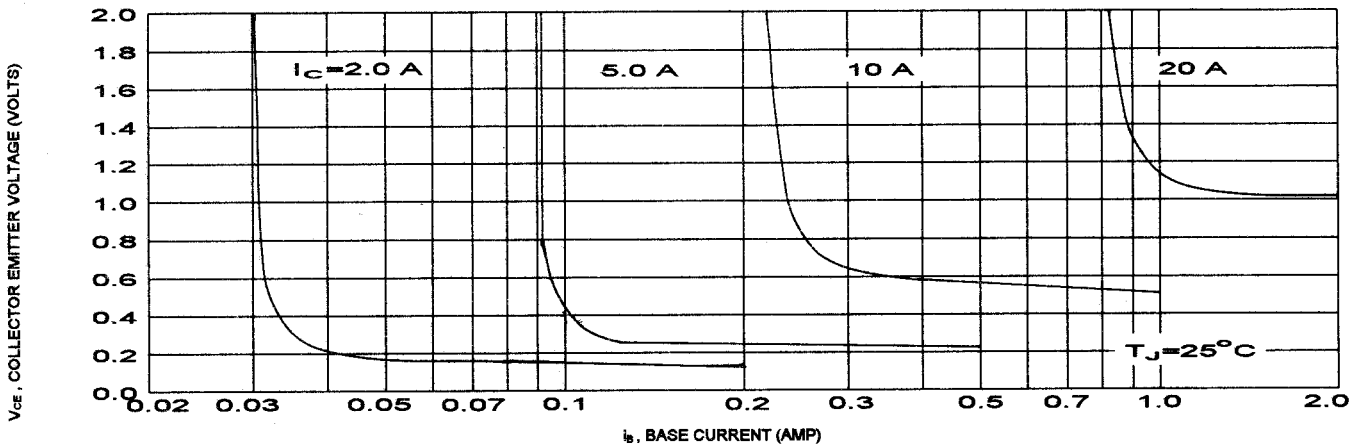
TURN-OFF TIME



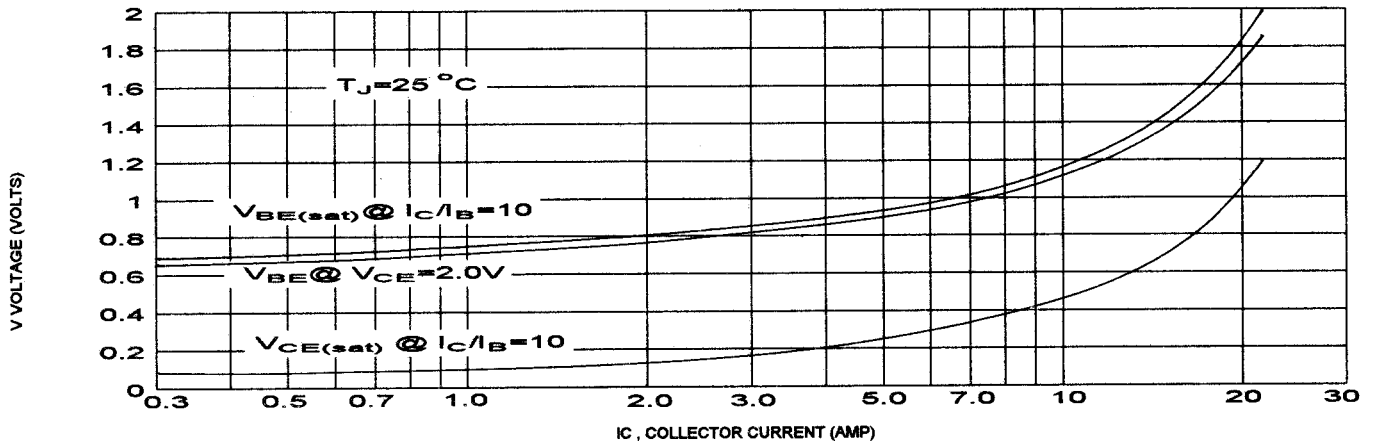
DC CURRENT GAIN



COLLECTOR SATURATION REGION



"ON" VOLTAGES





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