

## MEDIUM-POWER HIGH VOLTAGE PNP POWER TRANSISTORS

Designed for high-speed switching and linear amplifier application for high-voltage operational amplifier, switching regulators, converters, inverters, deflection stages and high fidelity amplifiers.

### FEATURES:

\* Collector-Emitter Sustaining Voltage-

$$V_{CEO(SUS)} = 225-350V @ I_C = 200mA$$

\* Usable DC Current Gain to 2.0A

**PNP  
2N6211  
2N6212  
2N6213**

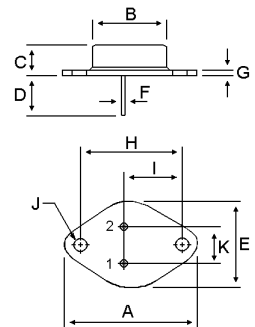
**2 AMPERES  
POWER TRANSISTOR  
PNP SILICON  
225-350 VOLTS  
35 WATTS**

### MAXIMUM RATINGS

Rating	Symbol	2N6211	2N6212	2N6213	Unit
Collector-Base Voltage	$V_{CB0}$	275	350	400	V
Collector-Emitter Voltage	$V_{CE0}$	225	300	350	V
Emitter-Base Voltage	$V_{EB0}$	6.0			V
Collector Current-Continuous	$I_C$	2.0			A
Peak	$I_{CM}$	5.0			A
Base Current	$I_B$	1.0			A
Total Device Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	$P_D$	35			Watts
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +200			$^\circ C$



**TO-66**



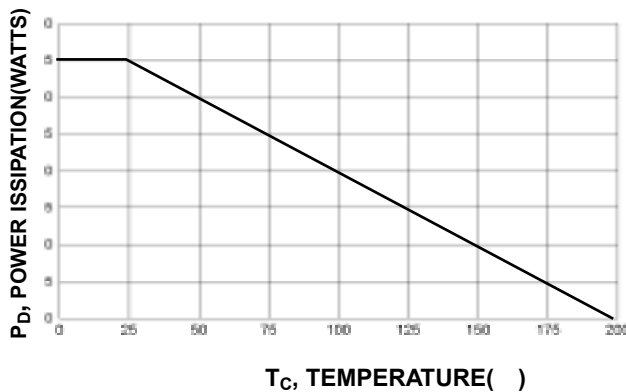
PIN 1.BASE  
2.EMITTER  
COLLECTOR(CASE)

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance to Case	$R_{JC}$	5.0	$^\circ C/W$

DIM	MILLIMETERS	
	MIN	MAX
A	30.60	32.52
B	13.85	14.16
C	6.54	7.22
D	9.50	10.50
E	17.26	18.46
F	0.76	0.92
G	1.38	1.65
H	24.16	24.78
I	13.84	15.60
J	3.32	3.92
K	4.86	5.34

**FIGURE-1 POWER DETATING**



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

Characteristic		Symbol	Min	Max	Unit
Collector-Emitter Sustaining Voltage(1) ( $I_C = 200\text{mA}$ , $I_B = 0$ )	2N6211	$V_{CE(sus)}$	225		V
	2N6212		300		
	2N6213		350		
Collector-Emitter Sustaining Voltage ( $I_C = 200\text{mA}$ , $I_B = 0$ , $R_{BE} = 50\ \Omega$ )	2N6211	$V_{CER(sus)}$	250		V
	2N6212		325		
	2N6213		375		
Emitter-Base Breakdown Voltage ( $I_E = 0.5\text{mA}$ , $I_C = 0$ ) ( $I_E = 1.0\text{mA}$ , $I_C = 0$ )	2N6212 2N6213	$V_{EBO}$	6.0		V
	2N6211		6.0		
Collector Cutoff Current ( $V_{CE} = 250\text{V}$ , $V_{BE(off)} = 1.5\text{V}$ ) ( $V_{CE} = 315\text{V}$ , $V_{BE(off)} = 1.5\text{V}$ ) ( $V_{CE} = 360\text{V}$ , $V_{BE(off)} = 1.5\text{V}$ )	2N6211	$I_{CEV}$		0.5	mA
	2N6212			0.5	
	2N6213			0.5	
Collector Cutoff Current ( $V_{CE} = 150\text{V}$ , $I_B = 0$ )	All Types	$I_{CEO}$		5.0	mA
Emitter Cutoff Current ( $V_{BE} = 6.0\text{V}$ , $I_C = 0$ )	2N6211	$I_{EBO}$		1.0	mA
	2N6212			0.5	
	2N6213			0.5	

## ON CHARACTERISTICS ( 1 )

DC Current Gain ( $V_{CE} = 2.8\text{V}$ , $I_C = 1.0\text{A}$ ) ( $V_{CE} = 3.2\text{V}$ , $I_C = 1.0\text{A}$ ) ( $V_{CE} = 4.0\text{V}$ , $I_C = 1.0\text{A}$ )	2N6211	$h_{FE}$	10	100	
	2N6212		10	100	
	2N6213		10	100	
Collector-Emitter Saturation Voltage ( $I_C = 1.0\text{A}$ , $I_B = 125\text{mA}$ )	2N6211	$V_{CE(sat)}$		1.4	V
	2N6212			1.6	
	2N6213			2.0	
Base-Emitter Saturation Voltage ( $I_C = 1.0\text{A}$ , $I_B = 125\text{mA}$ )		$V_{BE(sat)}$		1.4	V

## DYNAMIC CHARACTERISTICS

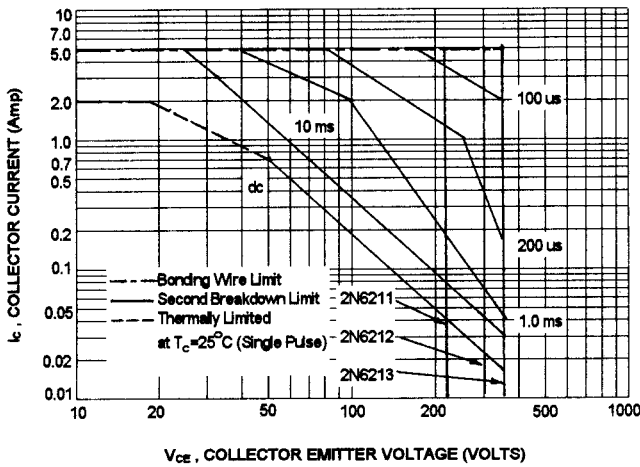
Current Gain-Bandwidth Product (2) ( $I_C = 200\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 5\text{MHz}$ )		$f_T$	10		MHZ
Output Capacitance ( $V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1.0\text{MHz}$ )		$C_{ob}$		220	pF

## SWITCHING CHARACTERISTICS

Rise Time	$V_{CC} = 200\text{V}$ , $I_C = 1\text{A}$ $I_{B1} = -I_{B2} = 125\text{mA}$	$t_r$	0.6	us
Storage Time		$t_s$	2.5	us
Fall Time		$t_f$	0.6	us

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

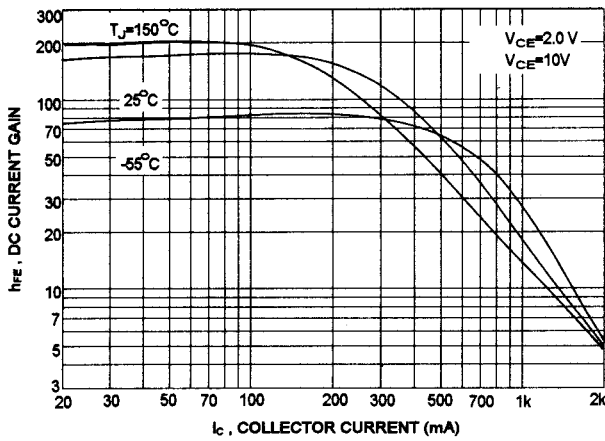
ACTIVE-REGION SAFE OPERATING AREA (SOA)



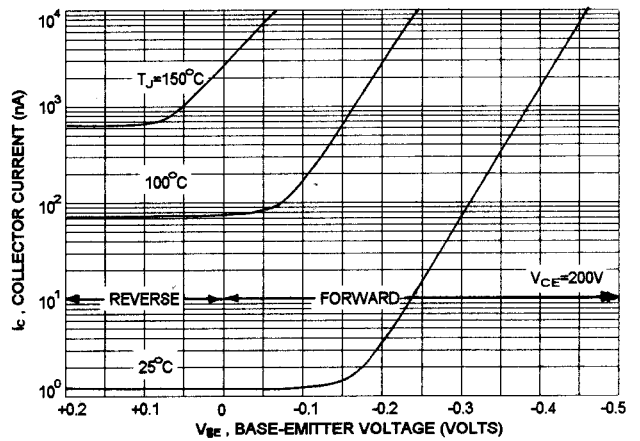
There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater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

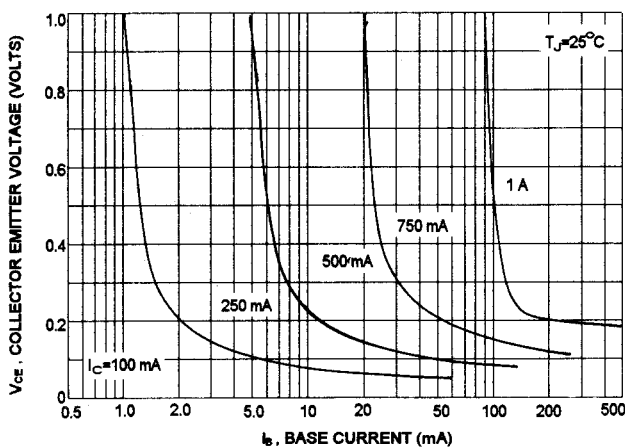
DC CURRENT GAIN



COLLECTOR CUT-OFF REGION



COLLECTOR SATURATION REGION



BASE CUT-OFF REGION

