

NPN SILICON POWER TRANSISTORS

...designed for use in audio frequency power amplifier applications

FEATURES:

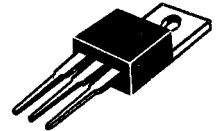
- * Low Collector-Emitter Saturation Voltage
 $V_{CE(sat)} = 1.0V(\text{Max}) @ I_C = 3.0A, I_B = 0.3A$
- * DC Current Gain
 $hFE = 60-300 @ I_C = 0.5A$
- * Complementary to PNP 2SB834

**NPN
2SD880**

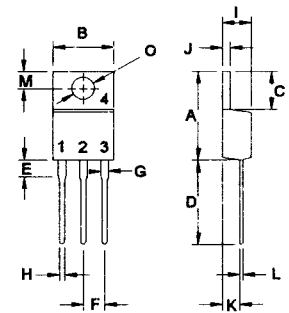
**3 AMPERE
POWER
TRANSISTORS
60 VOLTS
30 WATTS**

MAXIMUM RATINGS

Characteristic	Symbol	2SD880	Unit
Collector-Emitter Voltage	V_{CEO}	60	V
Collector-Base Voltage	V_{CBO}	60	V
Emitter-Base Voltage	V_{EBO}	7.0	V
Collector Current - Continuous - Peak	I_C I_{CM}	3.0 6.0	A
Base current	I_B	0.5	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	30 0.24	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$



TO-220



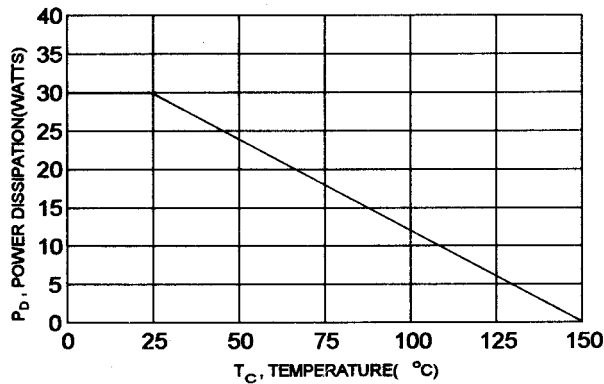
PIN 1.BASE
2.COLLECTOR
3.EMITTER
4.COLLECTOR(CASE)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	4.16	$^\circ\text{C/W}$

DIM	MILLIMETERS	
	MIN	MAX
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

FIGURE -1 POWER DERATING



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

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 50\text{ mA}$, $I_E = 0$)	$V_{(BR)CEO}$	60		V
Emitter-Base Breakdown Voltage ($I_B = 1.0\text{ mA}$, $I_C = 0$)	$V_{(BR)EBO}$	7.0		V
Collector Cutoff Current ($V_{CB} = 60\text{ V}$, $I_E = 0$)	I_{CBO}		100	μA
Emitter Cutoff Current ($V_{EB} = 7.0\text{ V}$, $I_C = 0$)	I_{EBO}		100	μA

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 0.5\text{ A}$, $V_{CE} = 5.0\text{ V}$) *	$h_{FE(2)}$	60	300	
Collector-Emitter Saturation Voltage ($I_C = 3.0\text{ A}$, $I_B = 300\text{ mA}$)	$V_{CE(sat)}$		1.0	V
Base-Emitter On Voltage ($I_C = 0.5\text{ A}$, $V_{CE} = 5.0\text{ V}$)	$V_{BE(on)}$		1.0	V

DYNAMIC CHARACTERISTICS

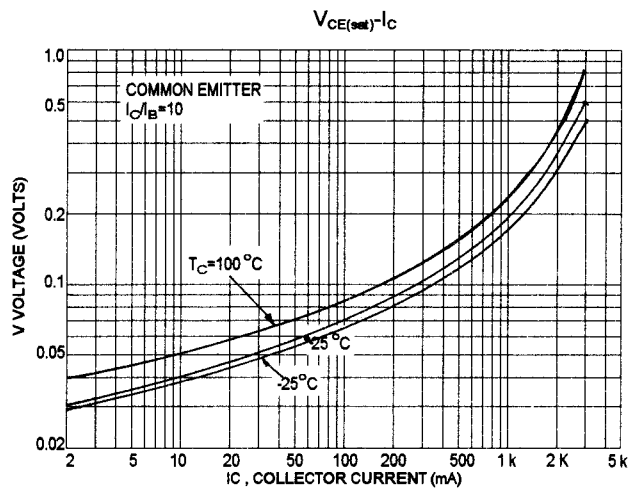
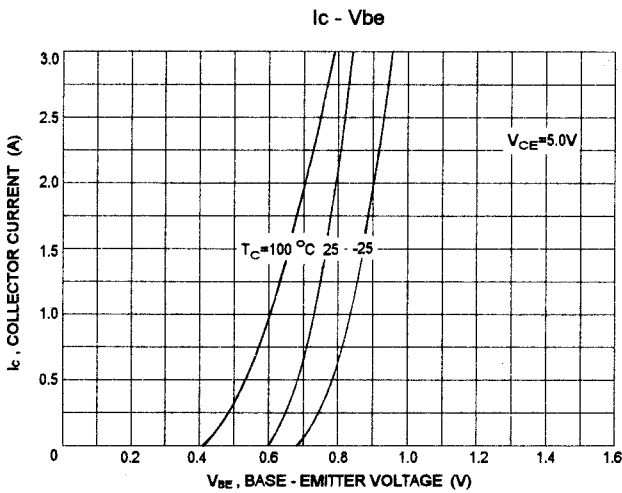
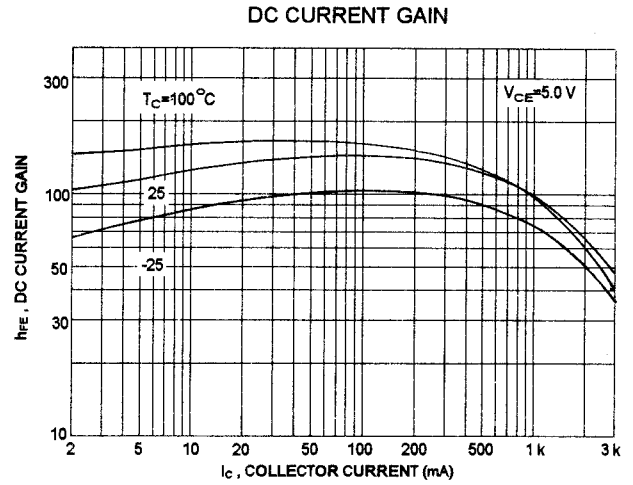
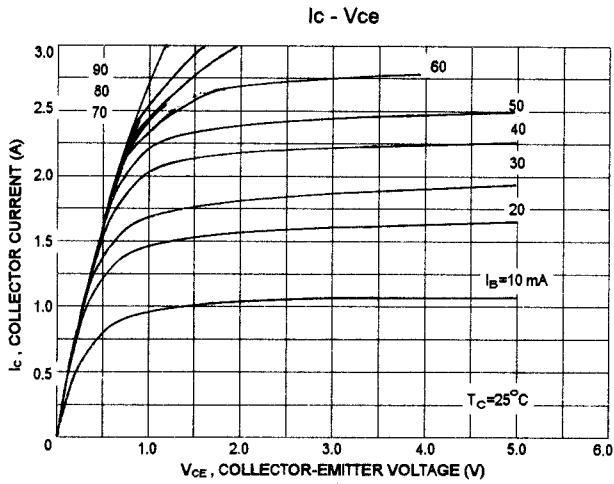
Current-Gain-Bandwidth Product ($I_C = 0.5\text{ A}$, $V_{CE} = 5.0\text{ V}$, $f = 1.0\text{ MHz}$)	f_T	3.0(typ)		MHz
---	-------	----------	--	-----

SWITCHING CHARACTERISTICS

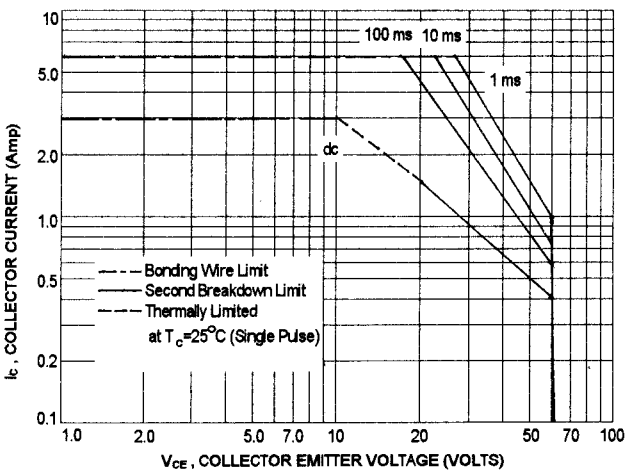
Turn-on Time	$V_{CC} = 30\text{ V}$, $I_C = 2.0\text{ A}$ $I_{B1} = -I_{B2} = 200\text{ mA}$ $PW = 20\text{ us}$	t_{on}	1.2	μs
Storage Time		t_s	2.0	μs
Fall Time		t_f	1.1	μs

(1) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$ * $h_{FE(2)}$ Classification :

60	O	120	100	Y	200	150	GR	300
----	---	-----	-----	---	-----	-----	----	-----



ACTIVE-REGION SAFE OPERATING AREA (SOA)



There are two limitations 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 based on $T_{J(PK)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leq 150^\circ\text{C}$. At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.