

## NPN SILICON POWER TRANSISTORS

2SD1047 transistor is designed for use in general purpose Power amplifier, application

### FEATURES:

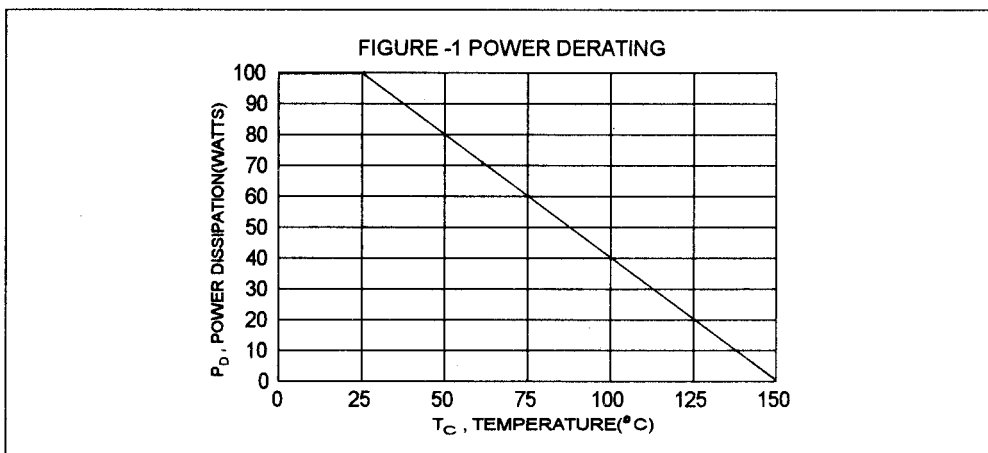
- \* Collector-Emitter Voltage  
 $V_{CEO} = 140V(\text{Min})$
- \* DC Current Gain  
 $hFE = 60-200 @ I_C = 1.0A$
- \* Complement to 2SB817

### MAXIMUM RATINGS

Characteristic	Symbol	2SD1047	Unit
Collector-Emitter Voltage	$V_{CEO}$	140	V
Collector-Base Voltage	$V_{CBO}$	160	V
Emitter-Base Voltage	$V_{EBO}$	6.0	V
Collector Current - Continuous - Peak	$I_C$ $I_{CM}$	12 15	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	100 0.8	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

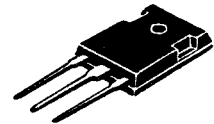
### THERMAL CHARACTERISTICS

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

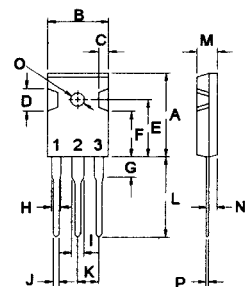


**NPN  
2SD1047**

**12 AMPERE  
POWER  
TRANSISTORS  
140 VOLTS  
100 WATTS**



**TO-247(3P)**



PIN 1.BASE  
2.COLLECTOR  
3.EMITTER

DIM	MILLIMETERS	
	MIN	MAX
A	20.63	22.38
B	15.38	16.20
C	1.90	2.70
D	5.10	6.10
E	14.81	15.22
F	11.72	12.84
G	4.20	4.50
H	1.82	2.46
I	2.92	3.23
J	0.89	1.53
K	5.26	5.66
L	18.50	21.50
M	4.68	5.36
N	2.40	2.80
O	3.25	3.65
P	0.55	0.70

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

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Base Breakdown Voltage ( $I_C = 5.0\text{ mA}$ , $I_E = 0$ )	$V_{(BR)CBO}$	160		V
Collector-Emitter Breakdown Voltage ( $I_C = 5.0\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	140		V
Emitter-Base Voltage ( $I_B = 5.0\text{ mA}$ , $I_C = 0$ )	$V_{(BR)EBO}$	6.0		V
Collector Cutoff Current ( $V_{CB} = 80\text{ V}$ , $I_E = 0$ )	$I_{CBO}$		100	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 4.0\text{ V}$ , $I_C = 0$ )	$I_{EBO}$		100	$\mu\text{A}$

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_C = 1.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )* ( $I_C = 6.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )	$h_{FE(2)}$ $h_{FE}$	60 20	200	
Collector-Emitter Saturation Voltage ( $I_C = 5.0\text{ A}$ , $I_B = 0.5\text{ A}$ )	$V_{CE(sat)}$		2.5	V
Base-Emitter On Voltage ( $I_C = 1.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )	$V_{BE(on)}$		1.5	V

**SWITCHING CHARATERISTICS**

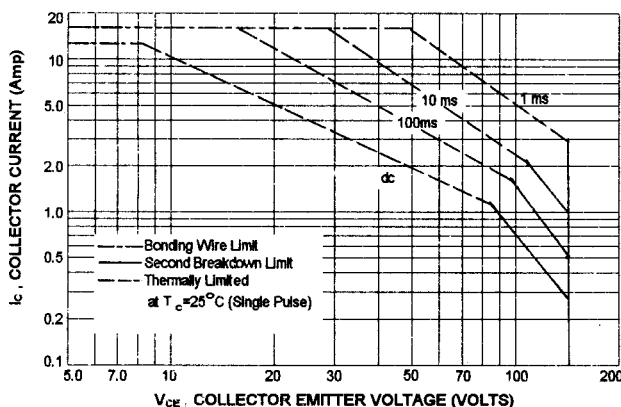
Turn-on Time	$V_{CC} = 20\text{ V}$ , $I_C = 1.0\text{ A}$ $I_{B1} = -I_{B2} = 100\text{ mA}$ $PW = 20\mu\text{ s}$	$t_{on}$	0.3	$\mu\text{s}$
Storage Time		$t_s$	7.0	$\mu\text{s}$
Fall Time		$t_f$	0.7	$\mu\text{s}$

(1) Pulse Test: Pulse Width =  $300\mu\text{ s}$ , Duty Cycle  $\leq 2.0\%$

\*  $h_{FE(2)}$  Classification:

60	D	120	100	E	200
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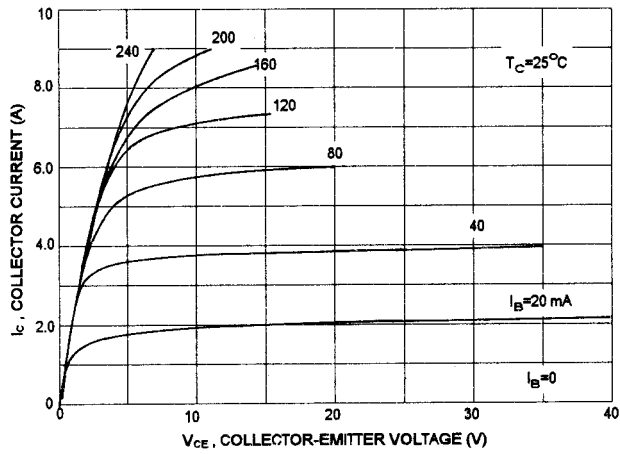
**ACTIVE-REGION SAFE OPERATING AREA (SOA)**



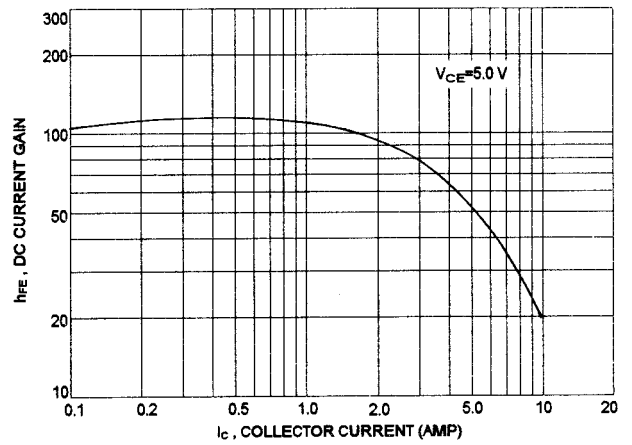
There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater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

The data of SOA curve is base on  $T_{J(PK)} = 150^\circ\text{C}$ ;  $T_c$  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.

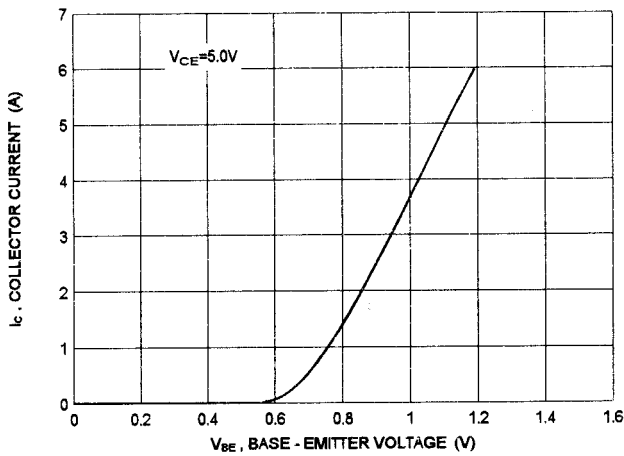
Ic - Vce



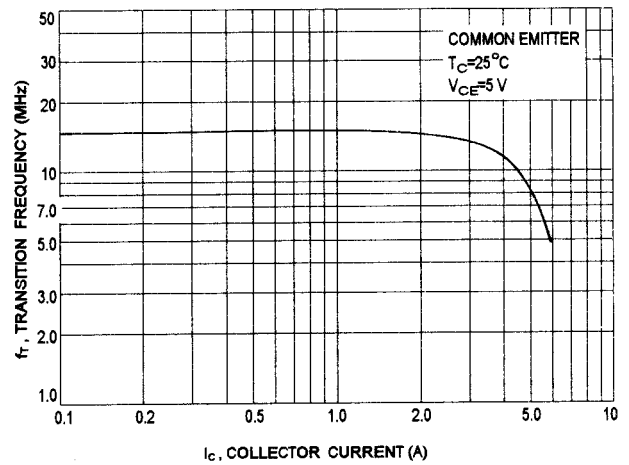
DC CURRENT GAIN



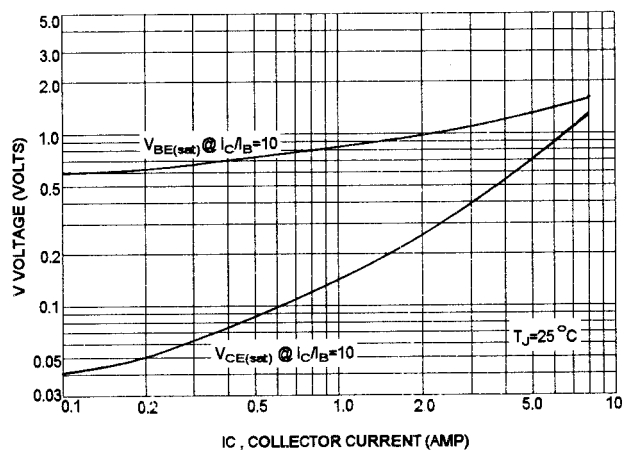
Ic - Vbe



fT - Ic



"ON" VOLTAGES



CAPACITANCES

