

## NPN SILICON TRANSISTORS

..designed for driver circuits, switching and amplifier applications.

### FEATURES:

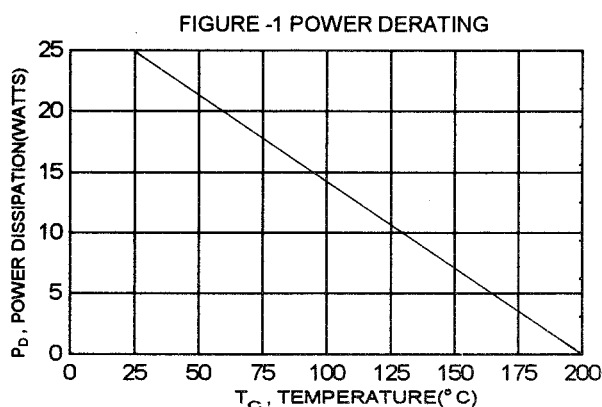
- \* Low Collector-Emitter Saturation Voltage  
 $V_{CE(sat)} = 0.6 \text{ V (Max.) @ } I_C = 1.0 \text{ A}$
- \* Excellent Safe Operating Area
- \* Gain Specified to  $I_C = 1.0 \text{ Amp.}$
- \* Complement to PNP 2N4900

### MAXIMUM RATINGS

Characteristic	Symbol	2N4912	Unit
Collector-Emitter Voltage	$V_{CEO}$	80	V
Collector-Base Voltage	$V_{CBO}$	80	V
Emitter-Base Voltage	$V_{EBO}$	5.0	V
Collector Current-Continuous -Peak	$I_C$ $I_{CM}$	1.0 4.0	A
Base Current	$I_B$	1.0	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	25 0.143	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 65 to +200	$^\circ\text{C}$

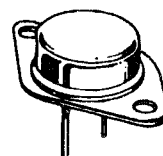
### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	7.0	$^\circ\text{C/W}$

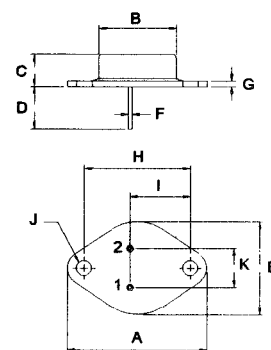


**NPN  
2N4912**

**1 AMPERE  
NPN SILICON  
POWER TRANSISTOR  
80 VOLTS  
25 WATTS**



**TO-66**



PIN 1.BASE  
2.EMITTER  
COLLECTOR(CASE)

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

**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) ( $I_C = 100\text{ mA}$ , $I_B = 0$ )	$V_{CEO(sus)}$	80		V
Collector Cutoff Current ( $V_{CE} = 40\text{ V}$ , $I_B = 0$ )	$I_{CEO}$		0.5	mA
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CEO}$ , $V_{BE(off)} = 1.5\text{ V}$ ) ( $V_{CE} = \text{Rated } V_{CEO}$ , $V_{BE(off)} = 1.5\text{ V}$ , $T_c = 150^\circ\text{C}$ )	$I_{CEX}$		0.1 1.0	mA
Collector Cutoff Current ( $V_{CB} = \text{Rated } V_{CBO}$ , $I_E = 0$ )	$I_{CBO}$		0.1	mA
Emitter Cutoff Current ( $V_{EB} = 5.0\text{ V}$ , $I_C = 0$ )	$I_{EBO}$		1.0	mA

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_C = 50\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ ) ( $I_C = 500\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ ) ( $I_C = 1.0\text{ A}$ , $V_{CE} = 1.0\text{ V}$ )	$h_{FE}$	40 20 10	100	
Collector-Emitter Saturation Voltage ( $I_C = 1.0\text{ A}$ , $I_B = 0.1\text{ A}$ )	$V_{CE(sat)}$		0.6	V
Base-Emitter Saturation Voltage ( $I_C = 1.0\text{ A}$ , $I_B = 0.1\text{ A}$ )	$V_{BE(sat)}$		1.3	V
Base-Emitter Saturation Voltage ( $I_C = 1.0\text{ A}$ , $V_{CE} = 1.0\text{ V}$ )	$V_{BE(on)}$		1.3	V

**DYNAMIC CHARACTERISTICS**

Current - Gain - Bandwidth Product (2) ( $I_C = 250\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ )	$f_T$	3.0		MHz
Output Capacitance ( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 100\text{ KHz}$ )	$C_{ob}$		100	pF
Small-Signal Current Gain ( $I_C = 250\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ KHz}$ )	$h_{fe}$	25		

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

FIGURE 2 — SWITCHING TIME EQUIVALENT CIRCUIT

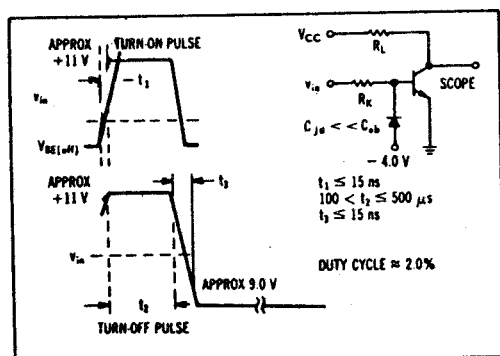


FIG-3 TURN-ON TIME

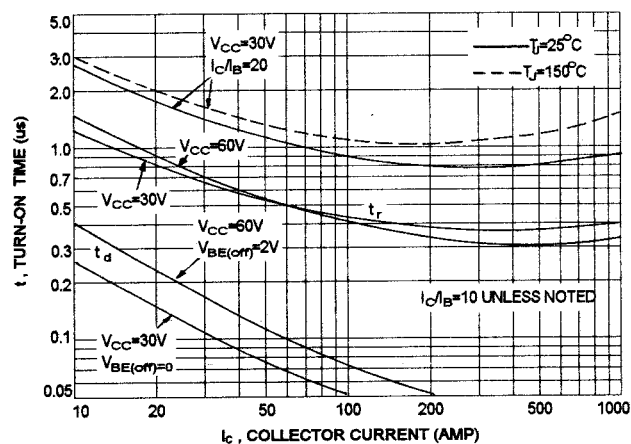


FIG-4 STORAGE TIME

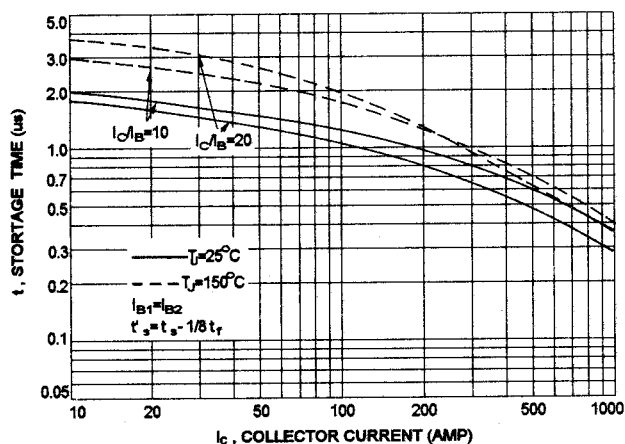


FIG-5 FALL TIME

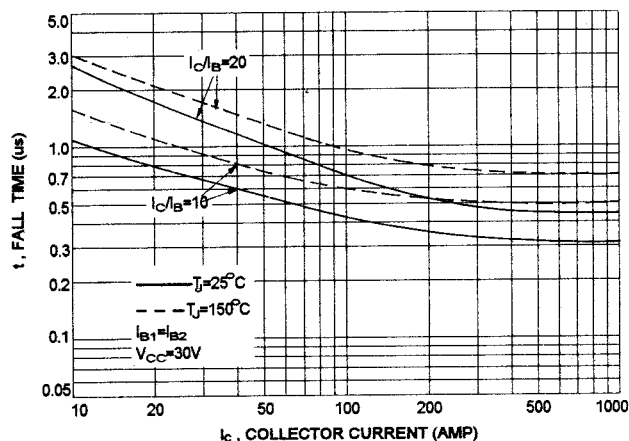
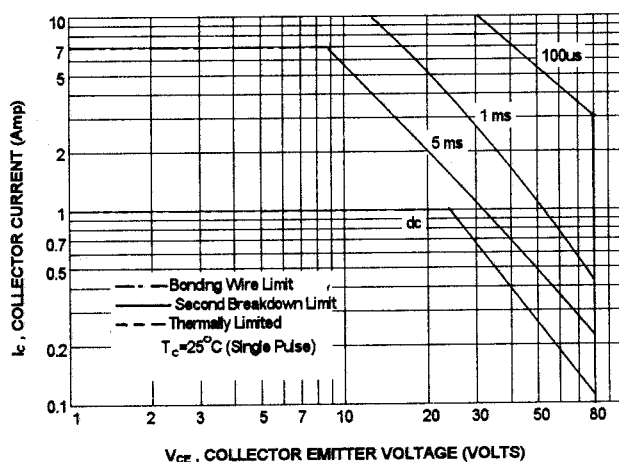


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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 FIG-6 is base on  $T_{J(PK)} = 200^\circ C$ ;  $T_C$  is variable depending on power level. second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(PK)} \leq 200^\circ C$ . At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

FIG-7 COLLECTOR SATURATION REGION

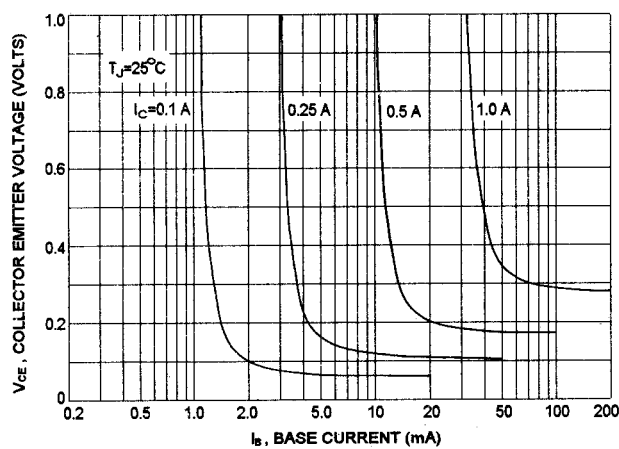


FIG-8 DC CURRENT GAIN

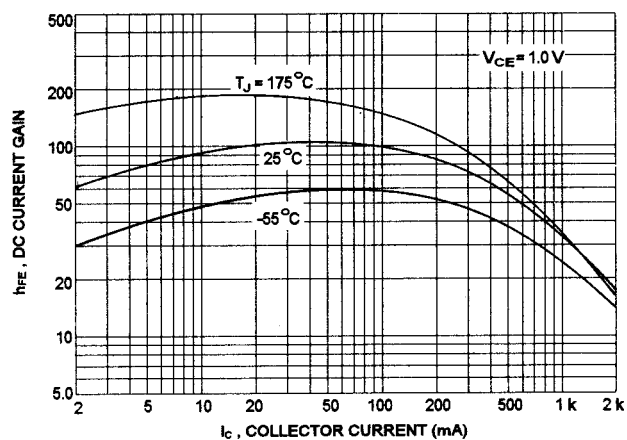


FIG-9 "ON" VOLTAGE

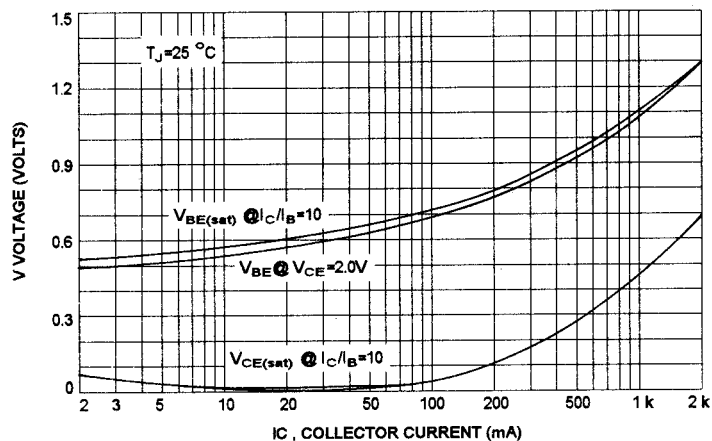


FIG-10 COLLECTOR CUT-OFF REGION

