

NPN SILICON TRANSISTORS

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

FEATURES:

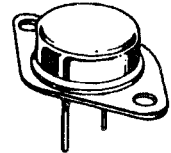
- * Low Collector-Emitter Saturation Voltage
 $V_{CE(sat)} = 0.6 \text{ V (Max.) @ } I_C = 1.0 \text{ A}$
- * Excellent Safe Operating Area
- * Gain Specified to $I_C = 1.0 \text{ Amp.}$
- * Complement to PNP 2N4900

**NPN
2N4912**

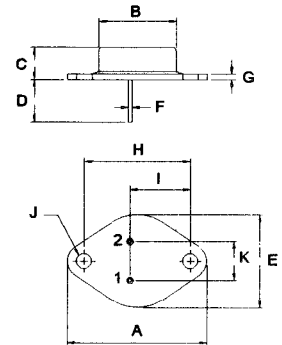
**1 AMPERE
NPN SILICON
POWER TRANSISTOR
80 VOLTS
25 WATTS**

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°C	P_D	25 0.143	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	- 65 to +200	$^\circ\text{C}$



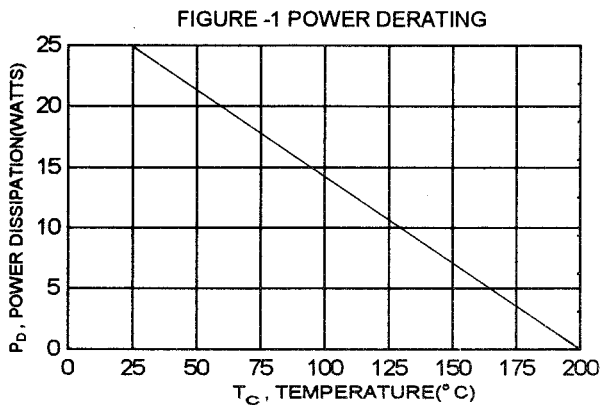
TO-66



PIN 1. BASE
2. EMITTER
COLLECTOR(CASE)

THERMAL CHARACTERISTICS

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



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

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) ($I_c = 100 \text{ mA}$, $I_B = 0$)	$V_{CE(sus)}$	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 ($I_c = 50 \text{ mA}$, $V_{CE} = 1.0 \text{ V}$) ($I_c = 500 \text{ mA}$, $V_{CE} = 1.0 \text{ V}$) ($I_c = 1.0 \text{ A}$, $V_{CE} = 1.0 \text{ V}$)	hFE	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 us , Duty Cycle $\leq 2.0\%$ (2) $f_T = |h_{fe}| \cdot f_{test}$

FIGURE 2 - SWITCHING TIME EQUIVALENT CIRCUIT

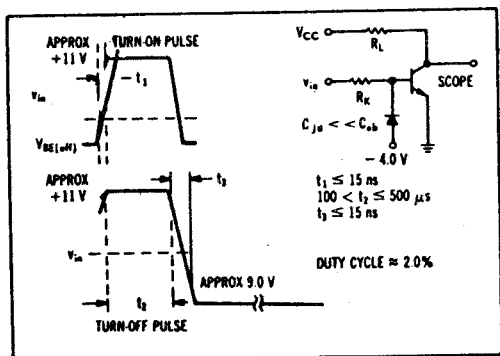


FIG-3 TURN-ON TIME

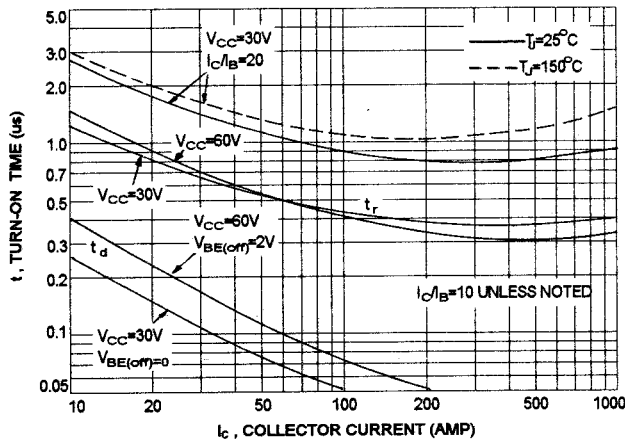


FIG-4 STORAGE TIME

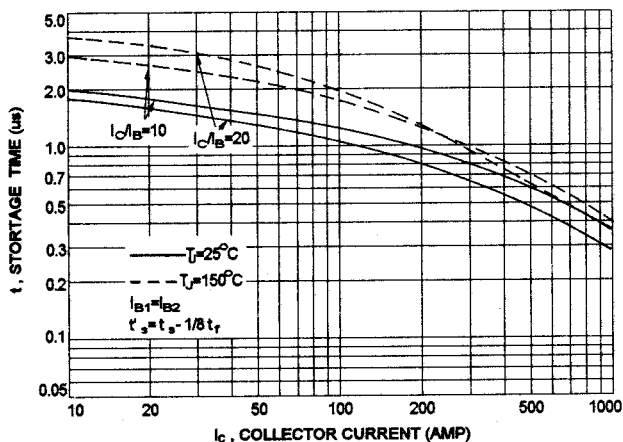


FIG-5 FALL TIME

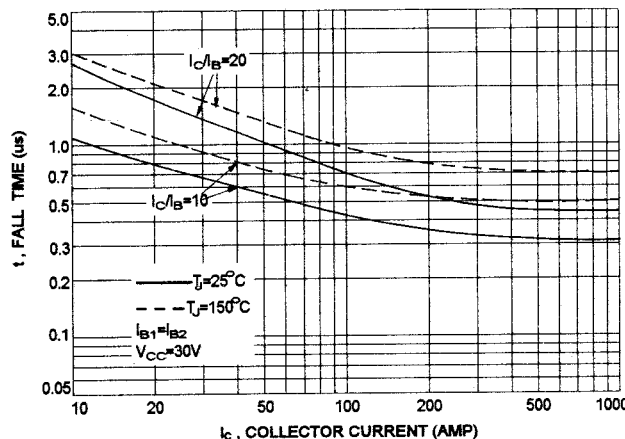
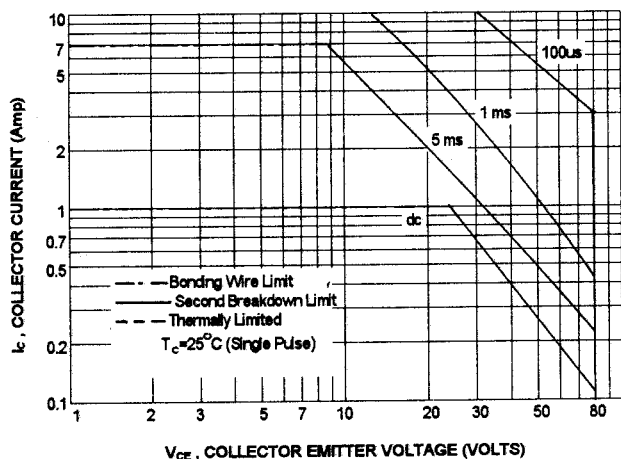


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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

FIG-7 COLLECTOR SATURATION REGION

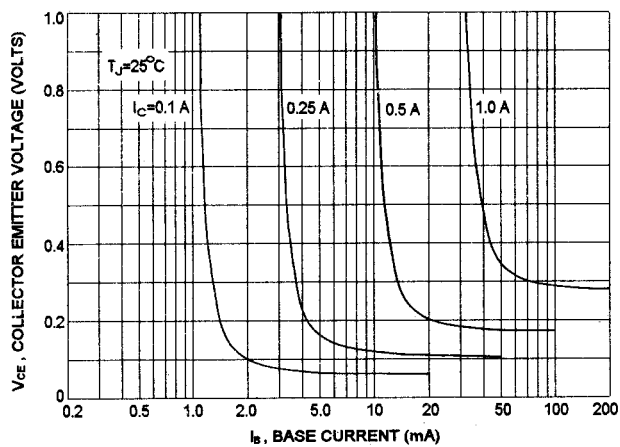


FIG-8 DC CURRENT GAIN

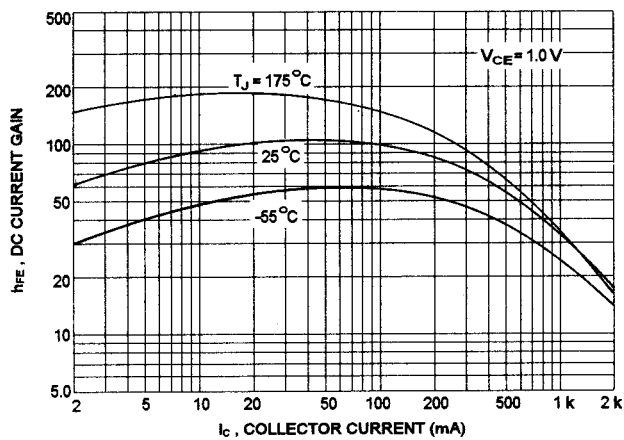


FIG-9 "ON" VOLTAGE

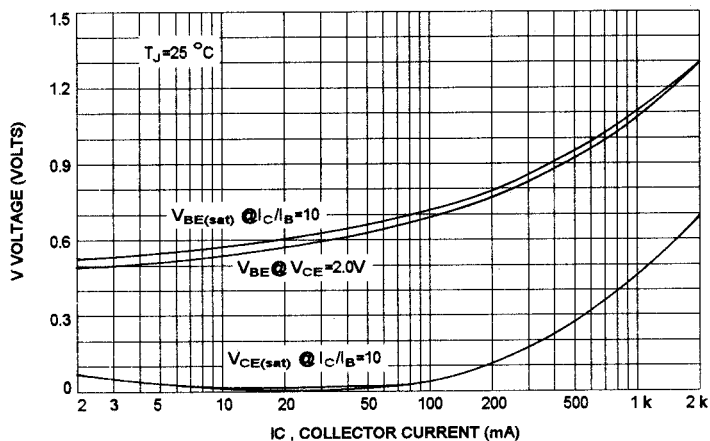


FIG-10 COLLECTOR CUT-OFF REGION

