

COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

... designed for use in power amplifier and switching circuit applications.

FEATURES:

* Collector-Emitter Sustaining Voltage-

$V_{CEO(sus)} = 30 \text{ V (Min) - 2N6111, 2N6288}$

$= 50 \text{ V (Min) - 2N6109, 2N6290}$

$= 70 \text{ V (Min) - 2N6107, 2N6292}$

* DC Current Gain Specified to 7.0 Amperes

$hFE = 30-150 @ I_C = 3.0 \text{ A - 2N6111, 2N6292}$

$= 2.3(\text{Min}) @ I_C = 7.0 \text{ A - All Devices}$

PNP NPN

2N6107 2N6288

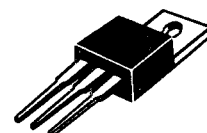
2N6109 2N6290

2N6111 2N6292

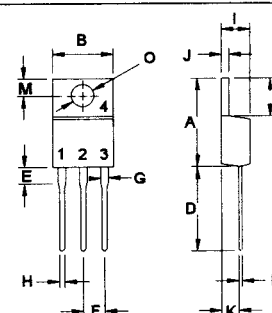
**7 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS**
30-70 Volts
40 Watts

MAXIMUM RATINGS

Characteristic	Symbol	2N6111 2N6288	2N6109 2N6290	2N6107 2N6292	Unit
Collector-Emitter Voltage	V_{CEO}	30	50	70	V
Collector-Base Voltage	V_{CBO}	40	60	80	V
Emitter-Base Voltage	V_{EBO}	5.0			V
Collector Current - Continuous - Peak	I_C	7.0 10			A
Base Current	I_B	3.0			A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	40 0.32			W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150			°C



TO-220

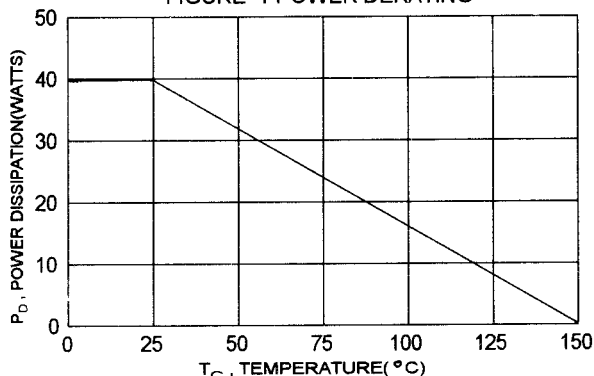


PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR (CASE)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	3.125	°C/W

FIGURE -1 POWER DERATING



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

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) ($I_c = 100\text{ mA}$, $I_B = 0$)	2N6111, 2N6288 2N6109, 2N6290 2N6107, 2N6292	$V_{CE(sus)}$	30 50 70	V
Collector Cutoff Current ($V_{CE} = 20\text{ V}$, $I_B = 0$) ($V_{CE} = 40\text{ V}$, $I_B = 0$) ($V_{CE} = 60\text{ V}$, $I_B = 0$)	2N6111, 2N6288 2N6109, 2N6290 2N6107, 2N6292	I_{CEO}	1.0 1.0 1.0	mA
Collector Cutoff Current ($V_{CE} = 40\text{ V}$, $V_{BE(off)} = 1.5\text{ V}$) ($V_{CE} = 60\text{ V}$, $V_{BE(off)} = 1.5\text{ V}$) ($V_{CE} = 80\text{ V}$, $V_{BE(off)} = 1.5\text{ V}$) ($V_{CE} = 30\text{ V}$, $V_{BE(off)} = 1.5\text{ V}$, $T_c = 125^\circ\text{C}$) ($V_{CE} = 50\text{ V}$, $V_{BE(off)} = 1.5\text{ V}$, $T_c = 125^\circ\text{C}$) ($V_{CE} = 70\text{ V}$, $V_{BE(off)} = 1.5\text{ V}$, $T_c = 125^\circ\text{C}$)	2N6111, 2N6288 2N6109, 2N6290 2N6107, 2N6292 2N6111, 2N6288 2N6109, 2N6290 2N6107, 2N6292	I_{CEX}	0.1 0.1 0.1 2.0 2.0 2.0	mA
Emitter Cutoff Current ($V_{EB} = 5.0\text{ V}$, $I_C = 0$)		I_{EBO}	1.0	mA

ON CHARACTERISTICS (1)

DC Current Gain ($I_c = 2.0\text{ A}$, $V_{CE} = 4.0\text{ V}$) ($I_c = 2.5\text{ A}$, $V_{CE} = 4.0\text{ V}$) ($I_c = 3.0\text{ A}$, $V_{CE} = 4.0\text{ V}$) ($I_c = 7.0\text{ A}$, $V_{CE} = 4.0\text{ V}$)	2N6107, 2N6292 2N6109, 2N6290 2N6111, 2N6288 All Devices	h_{FE}	30 30 30 2.3	150 150 150	
Collector-Emitter Saturation Voltage ($I_c = 7.0\text{ A}$, $I_B = 3.0\text{ A}$)		$V_{CE(sat)}$		3.5	V
Base-Emitter On Voltage ($I_c = 7.0\text{ A}$, $V_{CE} = 4.0\text{ V}$)		$V_{BE(on)}$		3.0	V

DYNAMIC CHARACTERISTICS

Current-Gain-Bandwidth Product (2) ($I_c = 0.5\text{ A}$, $V_{CE} = 4.0\text{ V}$, $f = 1.0\text{ MHz}$)	2N6288,90,92 2N6107,09,11	f_T	2.5 10		MHz
Small-Signal Current Gain ($I_c = 0.5\text{ A}$, $V_{CE} = 4.0\text{ V}$, $f = 50\text{ KHz}$)		h_{fe}	20		

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

FIGURE 2 - SWITCHING TIME TEST CIRCUIT

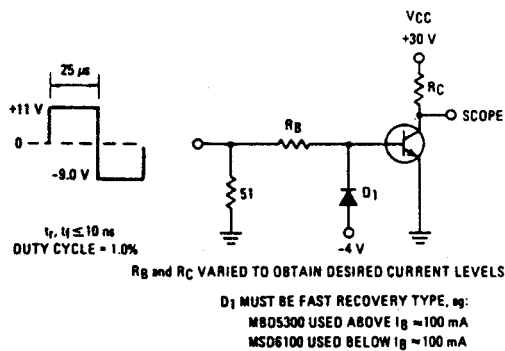


FIG-3 TURN-OFF TIME

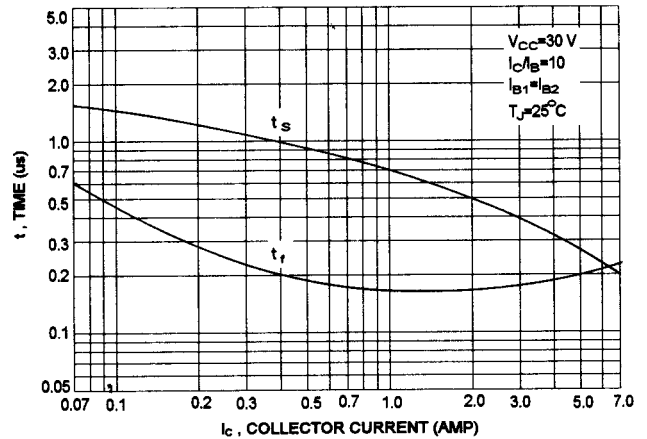


FIG-4 DC CURRENT GAIN

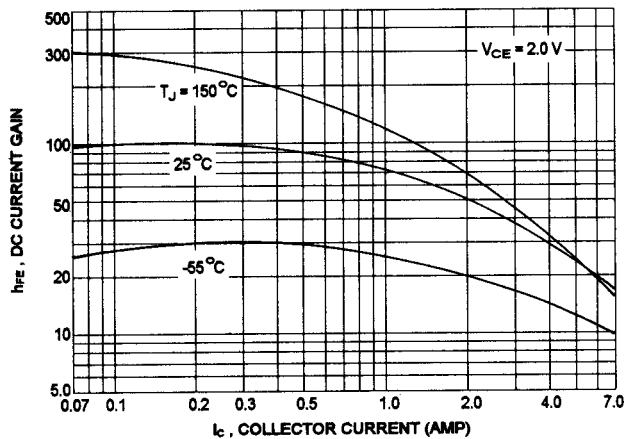


FIG-5 TURN-ON TIME

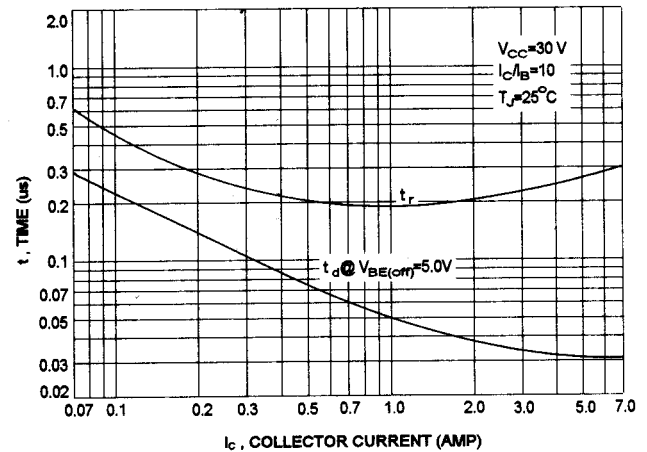
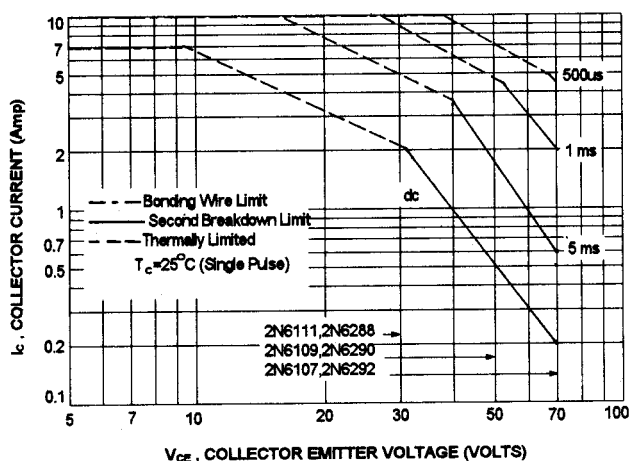


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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 $T_{J(PK)}=150^\circ \text{C}$; T_c is variable depending on power level. second breakdown pulselimits 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.

FIG-7 COLLECTOR SATURATION REGION

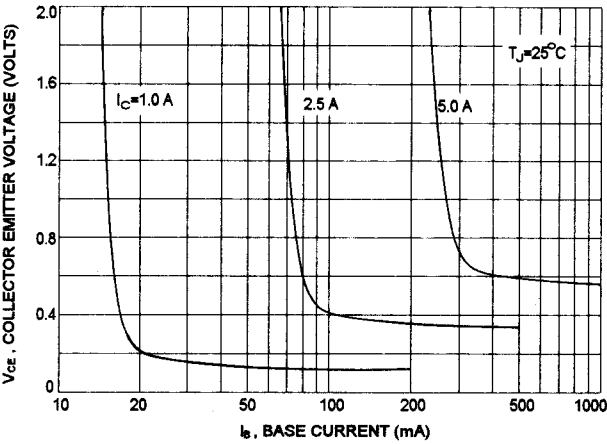


FIG-8 CAPACITANCES

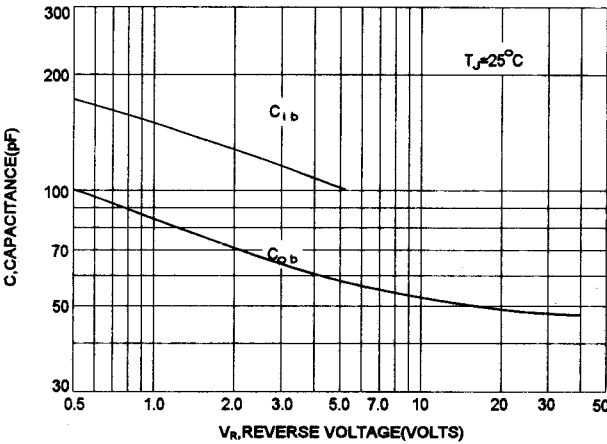


FIG-9 "ON" VOLTAGE

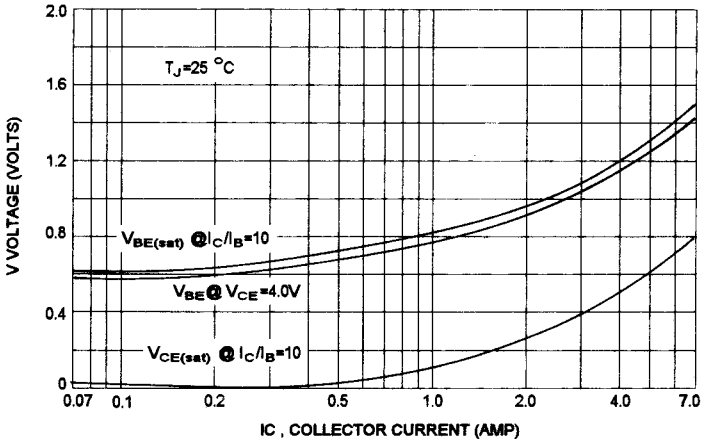


FIG-10 COLLECTOR CUT-OFF REGION

