

## 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

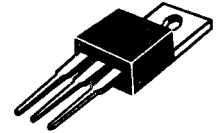
$h_{FE} = 30-150 @ I_C = 3.0\text{ A - 2N6111, 2N6292}$   
 $= 2.3(\text{Min}) @ I_C = 7.0\text{ A - All Devices}$

PNP	NPN
2N6107	2N6288
2N6109	2N6290
2N6111	2N6292

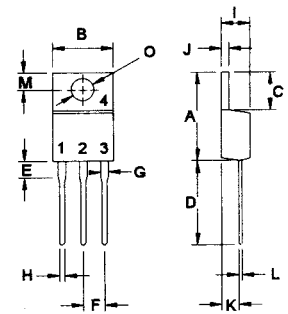
7 AMPERE  
COMPLEMENTARY SILICON  
POWER TRANSISTORS  
30-70 Volts  
40 Watts

### 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 $25^\circ\text{C}$	$P_D$	40 0.32			W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +150			$^\circ\text{C}$



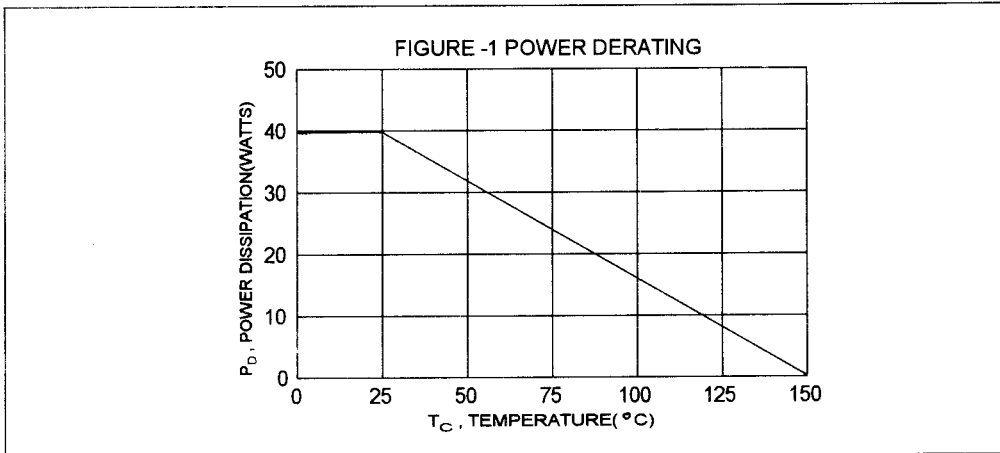
TO-220



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

### THERMAL CHARACTERISTICS

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



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

**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	hFE	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
Base-Emitter On Voltage ( $I_c = 7.0 \text{ A}$ , $V_{CE} = 4.0 \text{ V}$ )		$V_{BE(on)}$		3.0

**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 us , Duty Cycle  $\leq 2.0\%$

(2)  $f_T = |h_{fe}| \cdot f_{test}$

FIGURE 2 - SWITCHING TIME TEST CIRCUIT

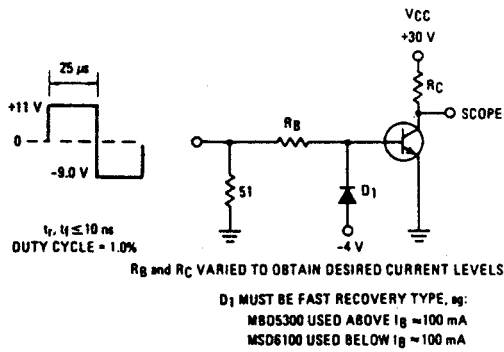


FIG-3 TURN-OFF TIME

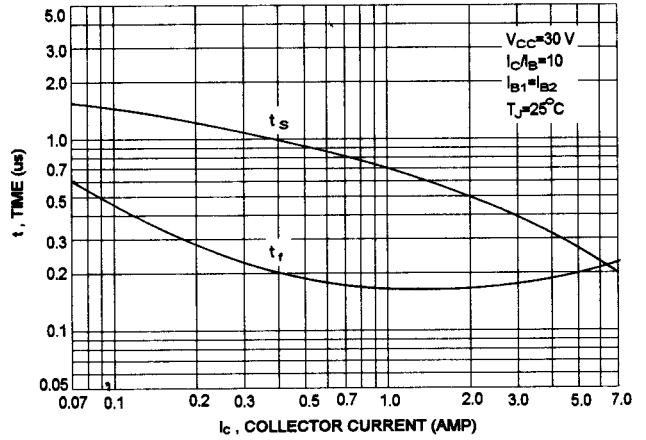


FIG-4 DC CURRENT GAIN

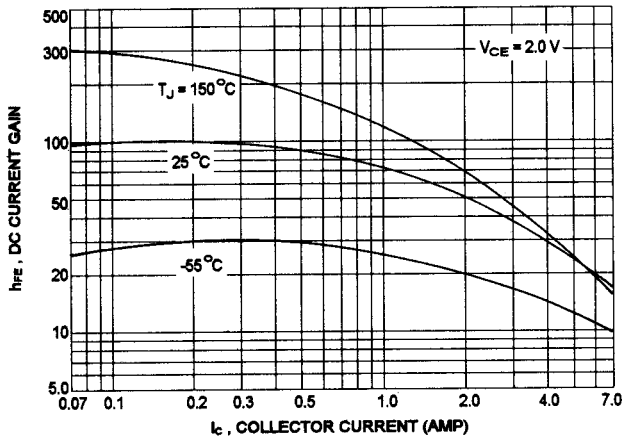


FIG-5 TURN-ON TIME

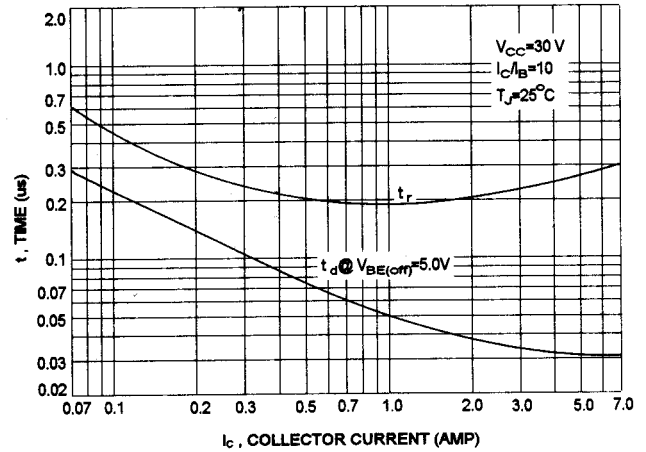
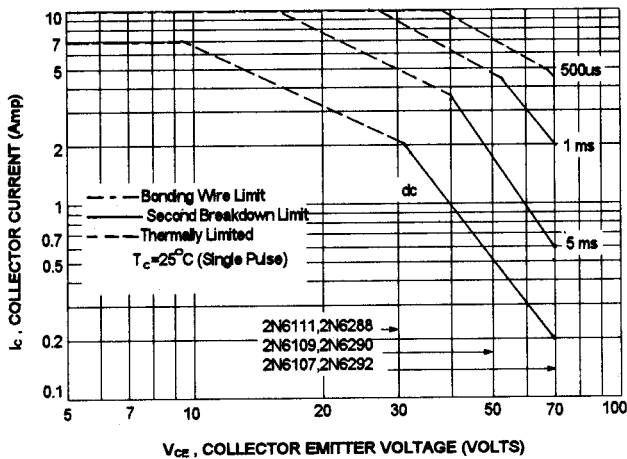


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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

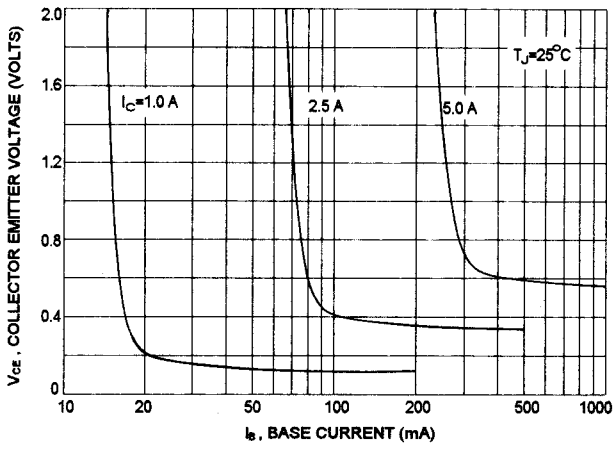


FIG-8 CAPACITANCES

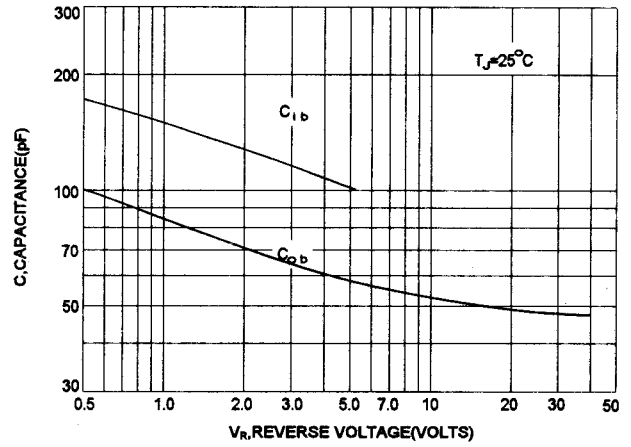


FIG-9 "ON" VOLTAGE

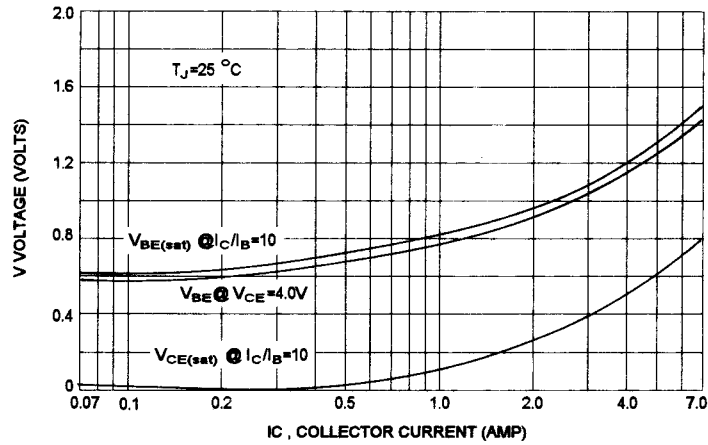


FIG-10 COLLECTOR CUT-OFF REGION

