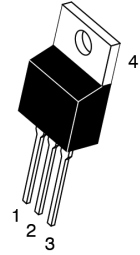
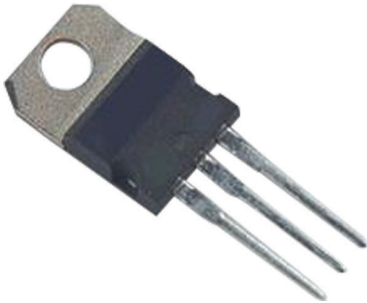


# Complementary Power Transistor



**Pin Configuration:**

- 1. Base
- 2. Collector
- 3. Emitter
- 4. Collector

**Features:**

- Collector-Emitter sustaining voltage-  $V_{CEO(sus)} = 50V$  (Minimum) - 2N6109, 2N6290
- DC current gain specified to 7A  $h_{FE} = 2.3$  (Minimum) at  $I_C = 7A$  - 2N6109, 2N6290
- Complementary Silicon Plastic Power Transistors

**Maximum Ratings:**

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	50	V
Collector-Base Voltage	$V_{CBO}$	60	
Emitter-Base Voltage	$V_{EBO}$	5	
Collector Current-Continuous -Peak	$I_C$	7	A
Base Current	$I_B$	3	
Total Power Dissipation at $T_C = 25^\circ C$ Derate above $25^\circ C$	$P_D$	40 0.32	W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +150	$^\circ C$

**Thermal Characteristic:**

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

# Complementary Power Transistor

## Electrical Characteristics ( $T_C = 25^\circ\text{C}$ unless otherwise noted):

Parameter	Symbol	Min.	Max.	Unit
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### Off Characteristics

Collector-Emitter Sustaining Voltage (1) ( $I_C = 100\text{mA}$ , $I_B = 0$ )	$V_{CEO(sus)}$	50	-	V
Collector Cut off Current ( $V_{CE} = 40\text{V}$ , $I_B = 0$ )	$I_{CEO}$	-	1	mA
Collector Cut off Current ( $V_{CE} = 60\text{V}$ , $V_{BE(off)} = 1.5\text{V}$ ) ( $V_{CE} = 50\text{V}$ , $V_{BE(off)} = 1.5\text{V}$ , $T_C = 125^\circ\text{C}$ )	$I_{CEX}$	-	0.1 2	
Emitter Cut off Current ( $V_{EB} = 5\text{V}$ , $I_C = 0$ )	$I$	-	1	

### On Characteristics (1)

DC Current Gain ( $I_C = 2.5\text{A}$ , $V_{CE} = 4\text{V}$ ) ( $I_C = 7\text{A}$ , $V_{CE} = 4\text{V}$ )	$h_{FE}$	30 2.3	150	-
Collector-Emitter Saturation Voltage ( $I_C = 7\text{A}$ , $I_B = 3\text{A}$ )	$V$	-	3.5	V
Base-Emitter On Voltage ( $I_C = 7\text{A}$ , $V_{CE} = 4\text{V}$ )	$V$	-	3	

### Dynamic Characteristics

Current Gain-Bandwidth Product (2) ( $I_C = 0.5\text{A}$ , $V_{CE} = 4\text{V}$ , $f = 1\text{MHz}$ )	$f$	2.5 10	-	MHz
Small Signal Current Gain ( $I_C = 0.5\text{A}$ , $V_{CE} = 4\text{V}$ , $f = 50\text{kHz}$ )	$h$	20	-	-

(1) Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

(2)  $f_T = h_{FE} \cdot f_{TEST}$

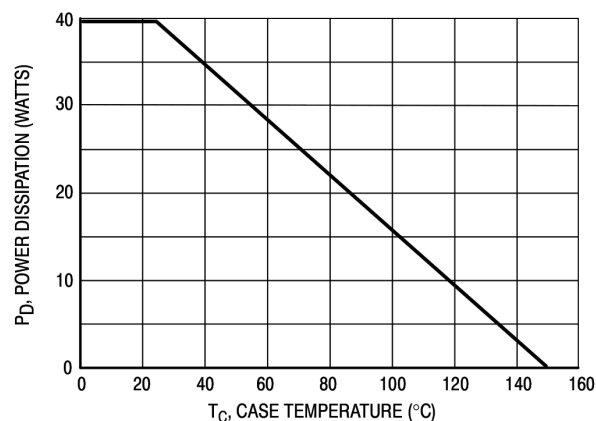
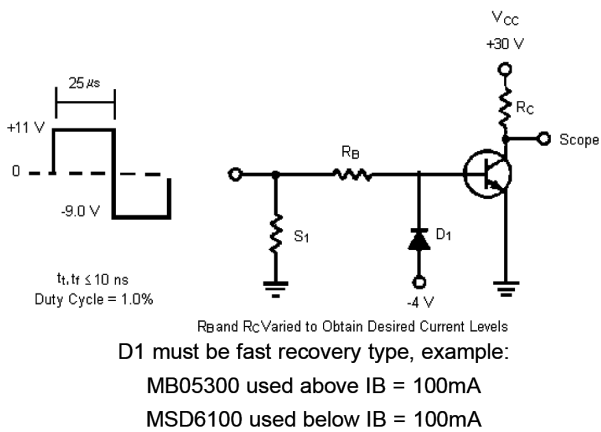
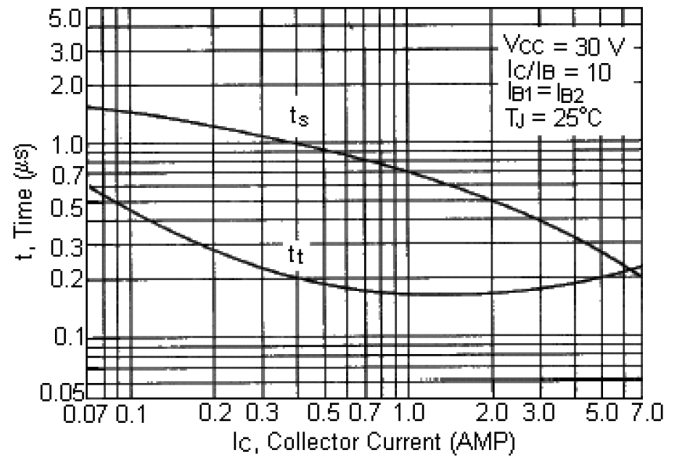


Figure 1. Power Derating

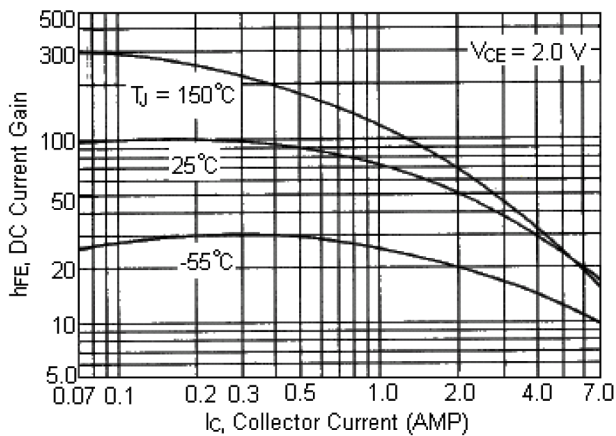
**Figure 2 - Switching Time Test Circuit**



**Figure 3 - Turn-Off Time**



**Figure 4 - DC Current Gain**



**Figure 5 - Turn-On Time**

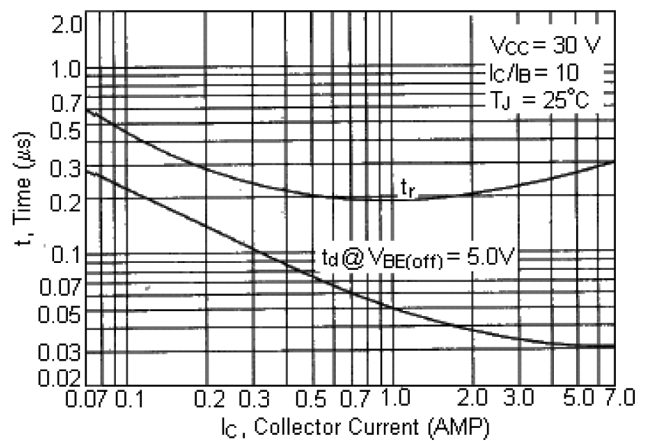
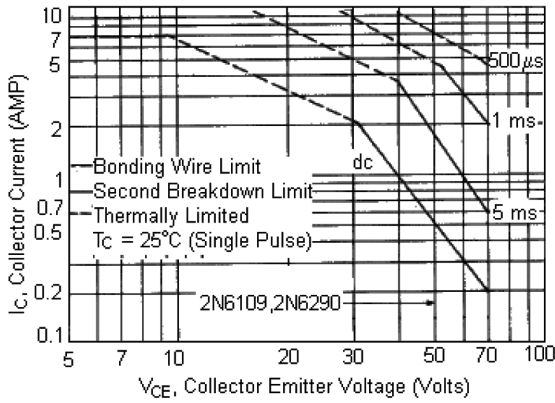


Figure - 6 Active Region Safe Operating Area



There are two limitations 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 the curves indicate.

The data of Figure - 6 curve is based on  $T_{J(PK)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on the power level. 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.

Figure 7 - Collector Saturation Region

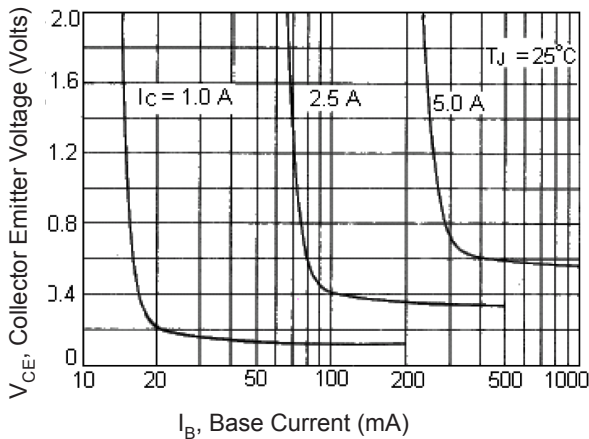
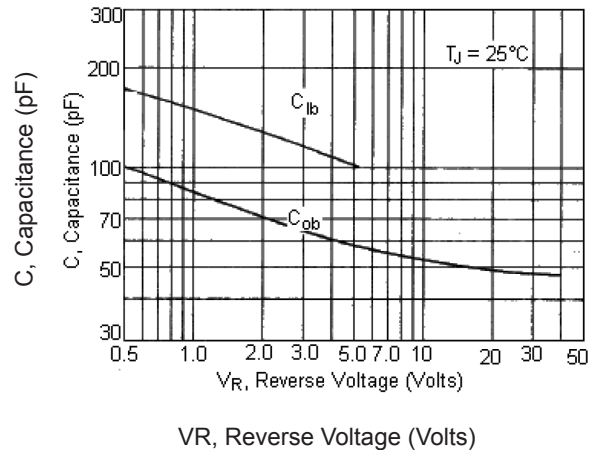


Figure 8 – Capacitances



# Complementary Power Transistor

Figure 9 – “ON” Voltage

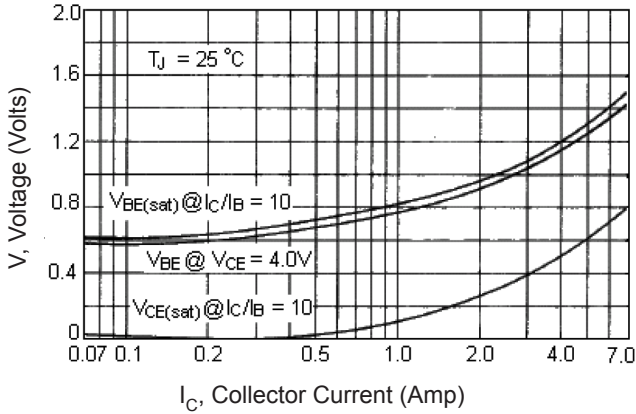
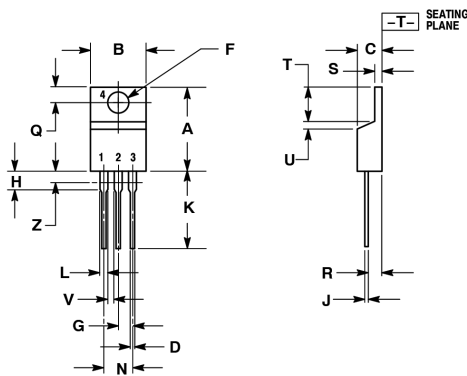
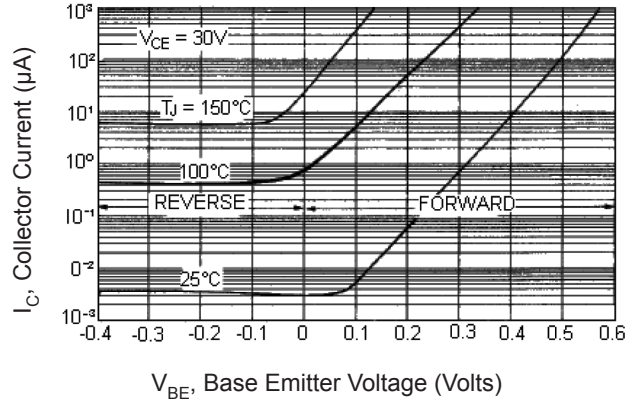


Figure 10 - Collector Cut-Off Region



**Pin Configuration:**

- 1. Base
- 2. Collector
- 3. Emitter
- 4. Collector

Dimension	Min.	Max.
A	14.48	15.75
B	9.66	10.28
C	4.07	4.82
D	0.64	0.91
F	3.61	4.09
G	2.42	2.66
H	2.8	4.1
J	0.36	0.64
K	12.7	14.27
L	1.15	1.52
N	4.83	5.33
Q	2.54	3.04
R	2.04	2.79
S	1.15	1.39
T	5.97	6.47
U	0	1.27
V	1.15	-
Z	-	2.04

Dimensions : Millimetres

**Part Number Table**

Description	Type	Part Number
Complementary Power Transistor	NPN	2N6290

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