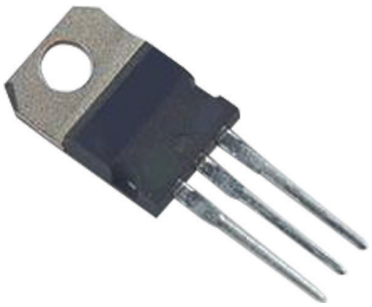
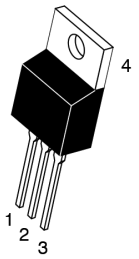
Complementary Power Transistor





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 TC = 25°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

Thermal Characteristic:

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

Electrical Characteristics (T_C = 25°C unless otherwise noted):

Parameter	Symbol	Min.	Max.	Unit
Off Characteristics				
Collector-Emitter Sustaining Voltage (1) (IC = 100mA, IB = 0)	$V_{CEO(sus)}$	50	-	V
Collector Cut off Current (V_{CE} = 40V, I_B = 0)	I_{CEO}	-	1	mA
Collector Cut off Current (V_{CE} = 60V, $V_{BE(off)}$ = 1.5V) (V_{CE} = 50V, $V_{BE(off)}$ = 1.5V, T_C = 125°C)	I_{CEX}	-	0.1 2	
Emitter Cut off Current (V_{EB} = 5V, I_C = 0)	I	-	1	
On Characteristics (1)				
DC Current Gain (I_C = 2.5A, V_{CE} = 4V) (I_C = 7A, V_{CE} = 4V)	h_{FE}	30 2.3	150	-
Collector-Emitter Saturation Voltage (I_C = 7A, I_B = 3A)	V	-	3.5	V
Base-Emitter On Voltage (I_C = 7A, V_{CE} = 4V)	V	-	3	
Dynamic Characteristics				
Current Gain-Bandwidth Product (2) (I_C = 0.5A, V_{CE} = 4V, f = 1MHz)	f	2.5 10	-	MHz
Small Signal Current Gain (I_C = 0.5A, V_{CE} = 4V, f = 50kHz)	h	20	-	-

(1) Pulse Test: Pulse width ≤300μs, Duty Cycle ≤2%

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

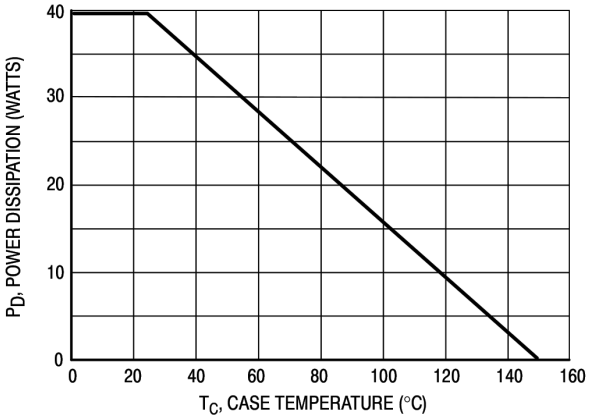
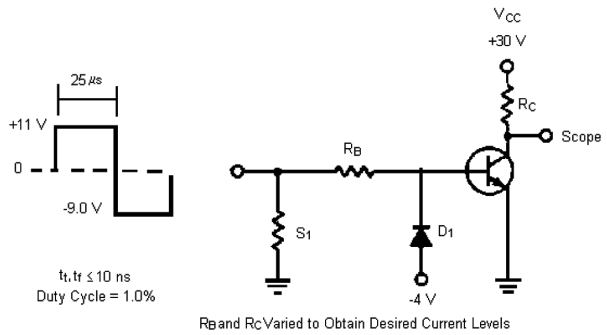


Figure 1. Power Derating

Figure 2 - Switching Time Test Circuit



D1 must be fast recovery type, example:

MB05300 used above IB = 100mA

MSD6100 used below IB = 100mA

Figure 3 - Turn-Off Time

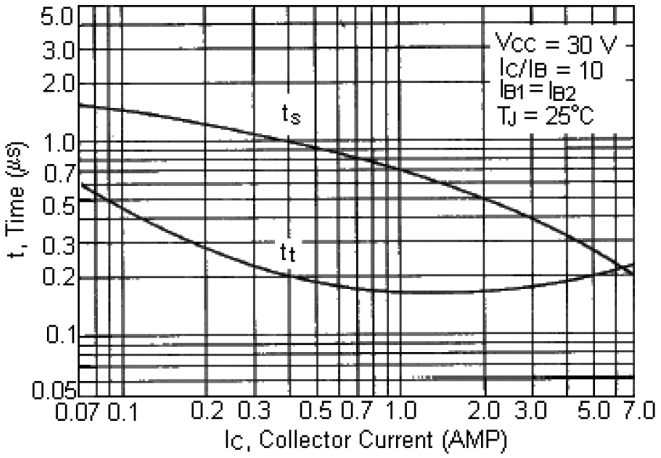


Figure 4 - DC Current Gain

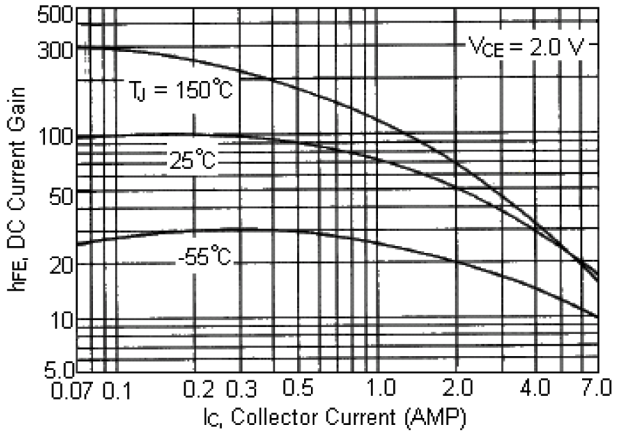


Figure 5 - Turn-On Time

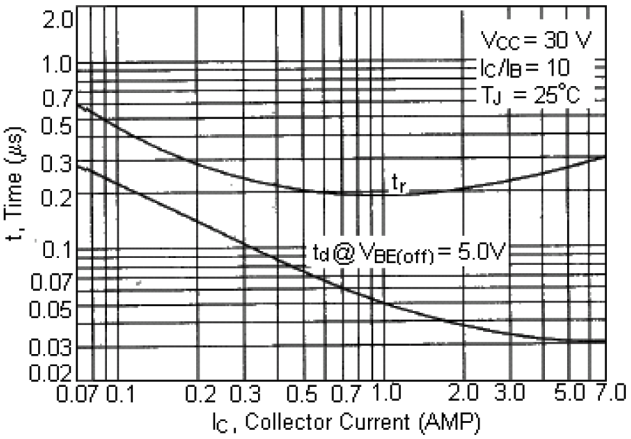
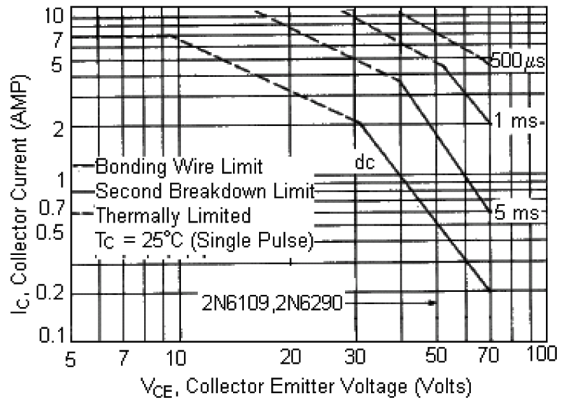


Figure - 6 Active Region Safe Operating Area



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°C; T_C is variable depending on the power level. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)}$ ≤150°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

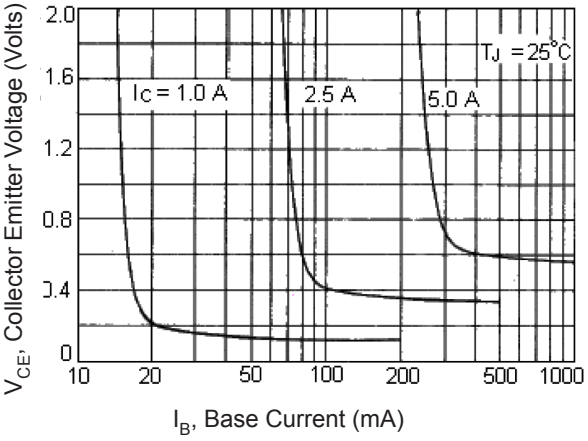
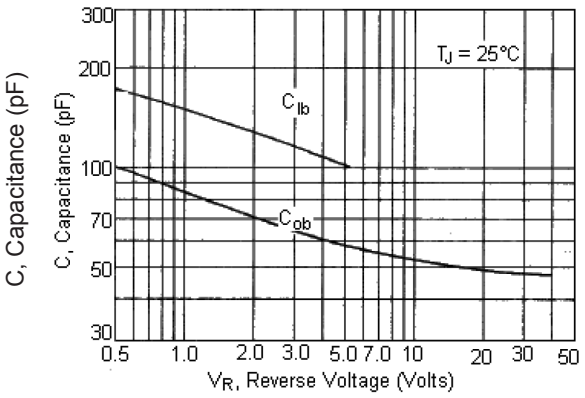


Figure 8 – Capacitances



VR, Reverse Voltage (Volts)

Figure 9 – “ON” Voltage

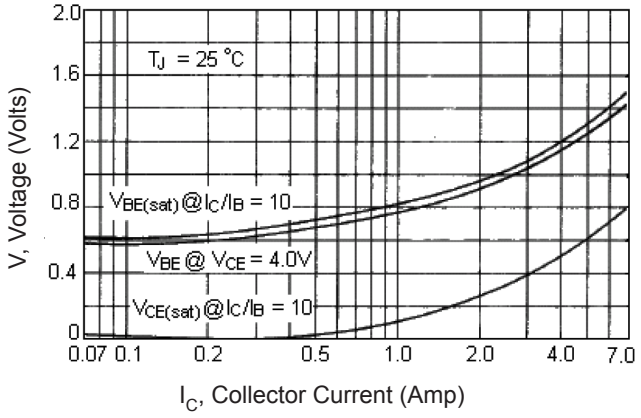
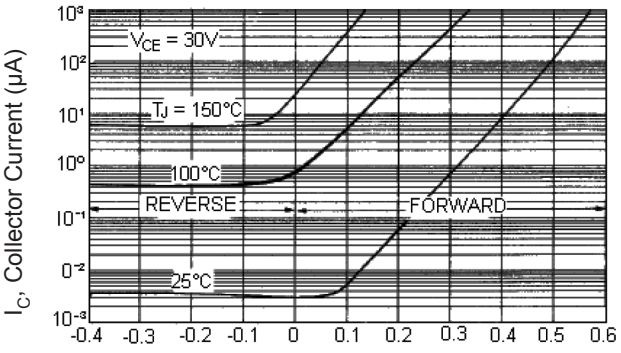
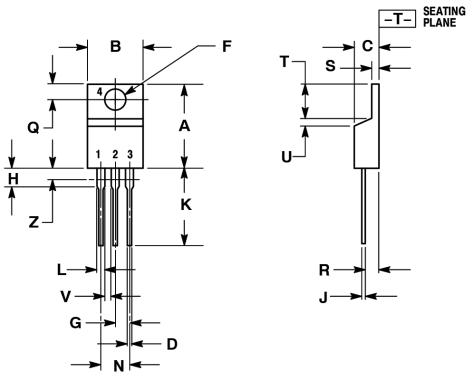


Figure 10 - Collector Cut-Off Region





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

Pin Configuration:

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

Part Number Table

Description	Type	Part Number
Complementary Power Transistor	NPN	2N6290