

Complementary Silicon Plastic Power Transistors

Designed for use in general purpose power amplifier and switching applications.

- Collector-emitter sustaining voltage- $V_{CEO(sus)} = 100V$ (minimum).
- Collector-emitter saturation voltage- $V_{CE(sat)} = 1.5V$ (maximum) at $I_C = 6A$.
- Current gain-bandwidth product $f_T = 3MHz$ (minimum) at $I_C = 500mA$.

Maximum Ratings

Characteristics	Symbol	Values	Unit
Collector-Emitter Voltage	V_{CEO}	100	V
Collector-Base Voltage	V_{CBO}		
Emitter-Base Voltage	V_{EBO}	5	
Collector Current - Continuous - Peak	I_C	6 10	A
Base Current	I_B	2	
Total Power Dissipation at $T_C = 25^\circ C$ Derate above $25^\circ C$	P_D	65 0.52	W W/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	$^\circ C$

Thermal Characteristics

Characteristics	Symbol	Values	Unit
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.92	$^\circ C/W$

Electric Characteristics ($T_C = 25^\circ C$ unless otherwise noted)

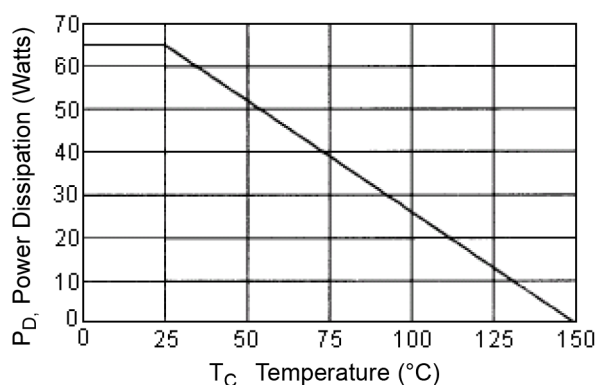
Characteristics	Symbol	Minimum	Maximum	Unit
Off Characteristics				
Collector-Emitter Sustaining Voltage (1) (I _C = 30mA, I _B = 0)	V _{CEO(sus)}	100	-	V
Collector Cut-off Current (V _{CE} = 60V, I _B = 0)	I _{CEO}	-	0.7	mA
Collector Cut-off Current (V _{CE} = 100V, V _{EB} = 0)	I _{CES}	-	0.4	
Emitter Cut-off Current (V _{EB} = 5V, I _C = 0)	I _{EBO}	-	1	
On Characteristics (1)				
DC Current Gain (I _C = 0.3A, V _{CE} = 4V) (I _C = 0.3A, V _{CE} = 4V)	h _{FE}	30 15	75	-

Characteristics	Symbol	Minimum	Maximum	Unit
Collector-Emitter Saturation Voltage (I _C = 6A, I _B = 600mA)	V _{CE(sat)}	-	1.5	V
Base-Emitter on Voltage (I _C = 6A, V _{CE} = 4V)	V _{BE(on)}	-	2	
Dynamic Characteristics				
Current Gain-Bandwidth Product (2) (I _C = 500mA, V _{CE} = 10V, f _{TEST} = 1MHz)	f _T	3	-	MHz
Small Signal Current Gain (I _C = 500mA, V _{CE} = 10V, f = 1kHz)	h _{fe}	20	-	-

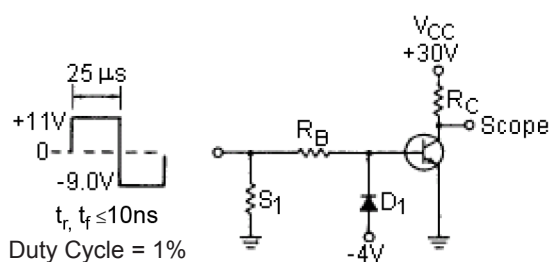
(1) Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

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

Power Derating



Switching Time Test Circuit

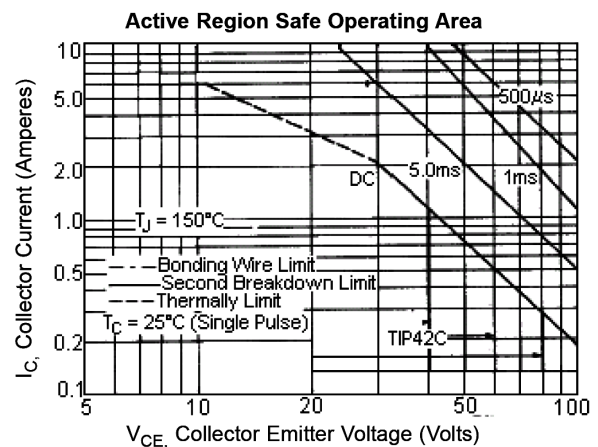
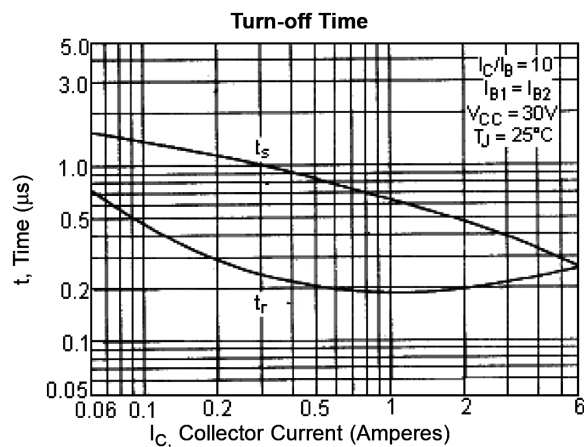
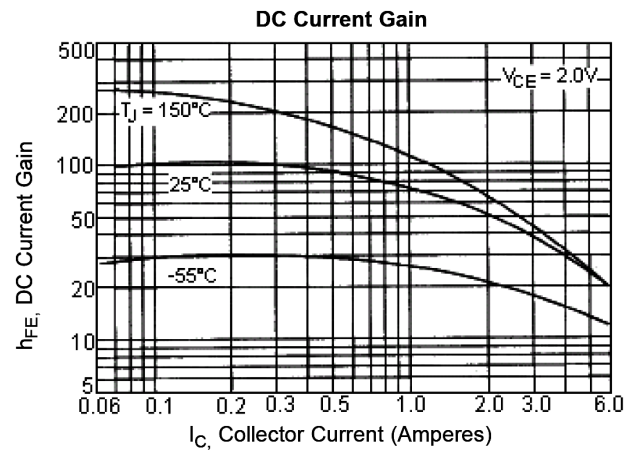
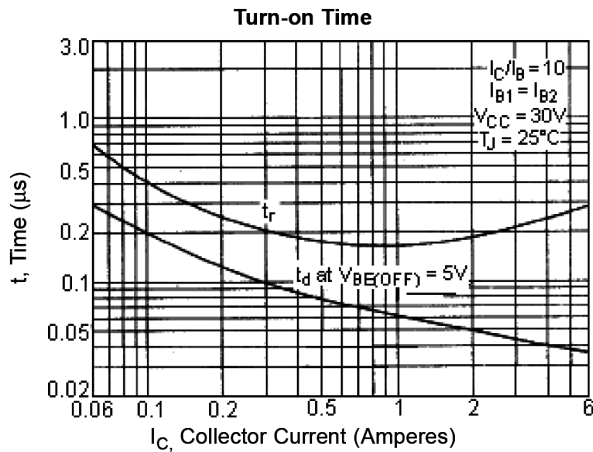


R_B and R_C Varied to Obtain Desired Current Levels

D_1 Must be Fast Recovery Type. eg:

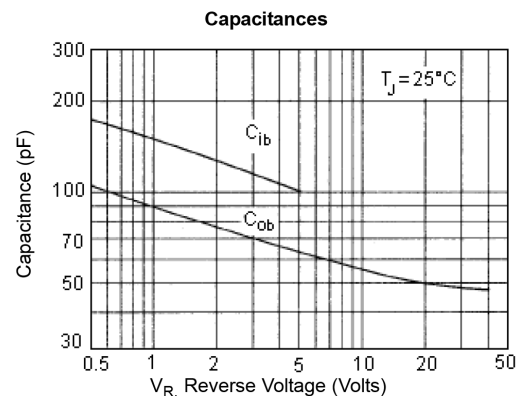
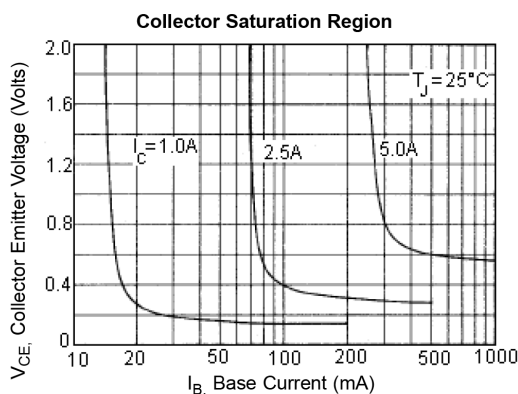
MBD5000 used Above $I_B = 100mA$

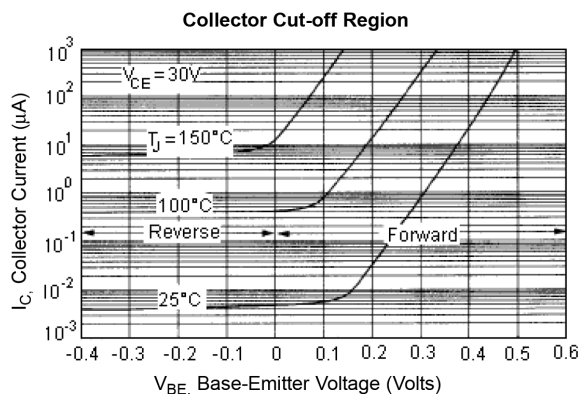
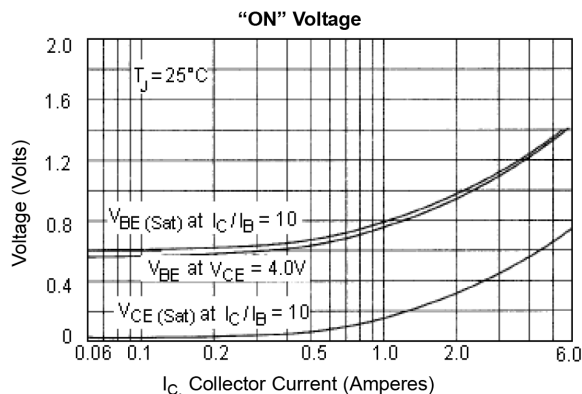
MSD6100 used Below $I_B = 100mA$



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 curve is base on $T_{J(PK)} = 150^\circ C$; T_C is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leq 150^\circ C$. At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.





Part Number Table

Description	Part Number
PNP Power Transistor	TIP42C

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