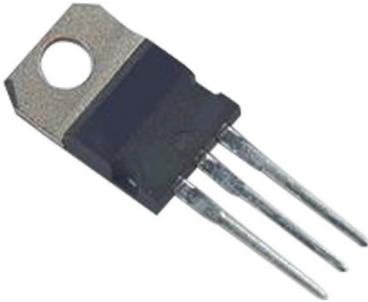


High Voltage Power Transistor



Description:

High Voltage NPN Silicon Power Transistors are designed for line operated audio output amplifier, and switching power supply drivers applications.

Features:

- Collector-Emitter sustaining voltage- 250V - 400V (Min.)
- 1A Rated collector current
- $f_T = 10\text{MHz}$ (Min.) at $I_C = 200\text{mA}$

Maximum Ratings

Characteristic	Symbol	TIP47	TIP50	Unit
Collector-Emitter Voltage	V_{CEO}	250	400	V
Collector-Base Voltage	V_{CBO}	350	500	
Emitter-Base Voltage	V_{EBO}	5		
Collector Current-Continuous -Peak	I_C	1 2		A
Base Current	I_B	0.6		
Total Power Dissipation at $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	40 0.32		W W/ $^\circ\text{C}$
Operation and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150		$^\circ\text{C}$

Thermal Characteristics

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

High Voltage Power Transistor

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

Characteristic	Symbol	Min.	Max.	Unit
----------------	--------	------	------	------

OFF Characteristics

Collector-Emitter Sustaining Voltage (1) $I_C = 30\text{mA}, I_B = 0$ TIP47 TIP50	$V_{CE(sus)}$	250 400	-	V
Collector Cut off Current $V_{CE} = 150\text{V}, I_B = 0$ $V_{CE} = 300\text{V}, I_B = 0$ TIP47 TIP50	I_{CEO}	-	1	mA
Collector Cut off Current $V_{CE} = 350\text{V}, V_{EB} = 0$ $V_{CE} = 500\text{V}, V_{EB} = 0$ TIP47 TIP50	I_{CES}	-	1	
Emitter Cut off Current $V_{EB} = 5\text{V}, I_C = 0$	I_{EBO}	-	1	

ON Characteristics (1)

DC Current Gain $I_C = 0.3\text{A}, V_{CE} = 10\text{V}$ $I_C = 1.0\text{A}, V_{CE} = 10\text{V}$	h_{FE}	30 10	150	-
Collector-Emitter Saturation Voltage $I_C = 1\text{A}, I_B = 200\text{mA}$	$V_{CE(sat)}$	-	1	V
Base-Emitter On Voltage $I_C = 1\text{A}, V_{CE} = 10\text{V}$	$V_{BE(on)}$	-	1.5	

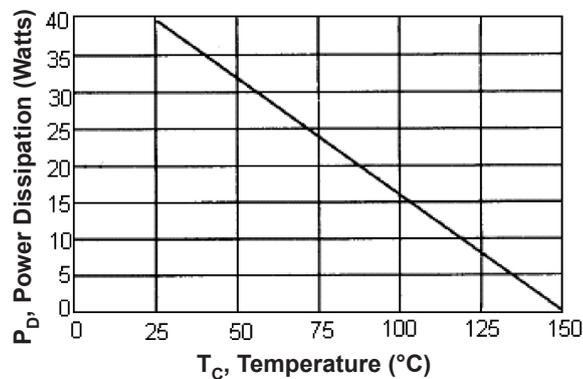
Dynamic Characteristics

Current Gain-Bandwidth Product (2) $I_C = 200\text{mA}, V_{CE} = 10\text{V}, f_{TEST} = 2\text{MHz}$	f_T	10	-	MHz
Small Signal Current Gain $I_C = 200\text{mA}, V_{CE} = 10\text{V}, f = 1\text{kHz}$	h_{FE}	25	-	-

(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



High Voltage Power Transistor

Figure - 2 DC Current Gain

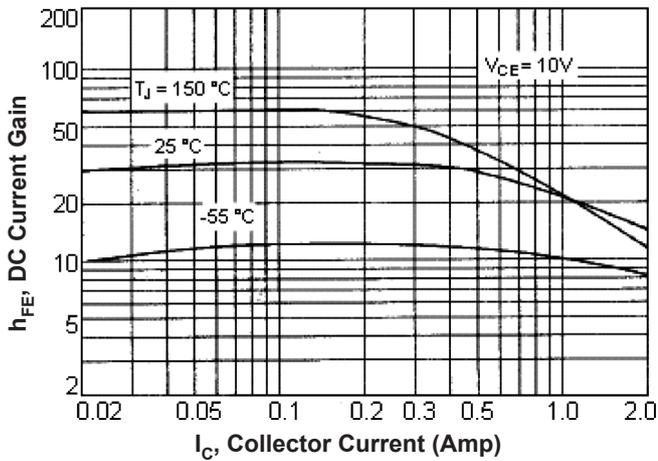


Figure - 3 Turn-On Time

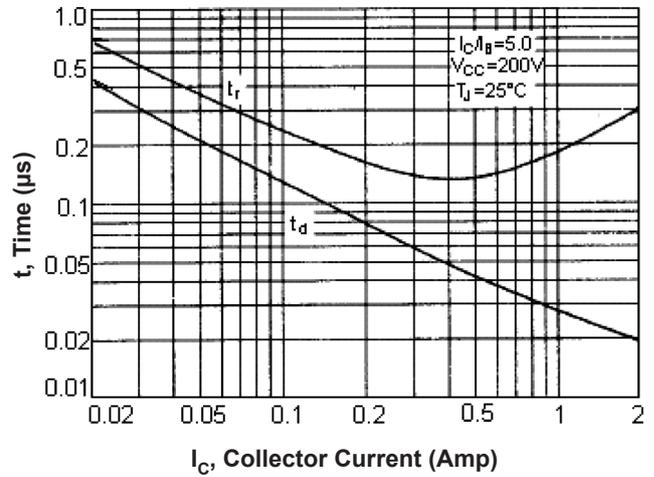


Figure - 4 "ON" Voltages

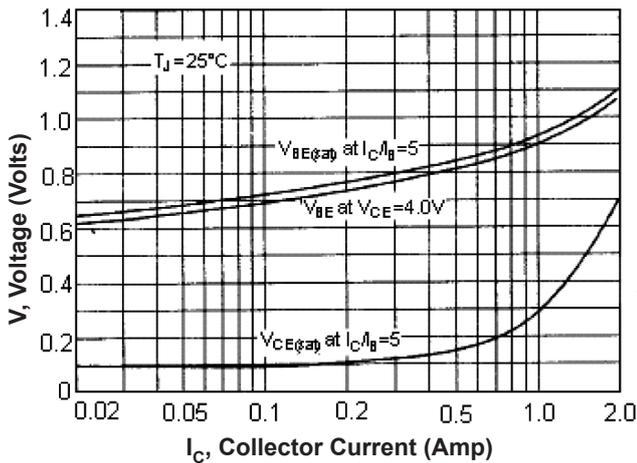


Figure - 5 Turn-Off Time

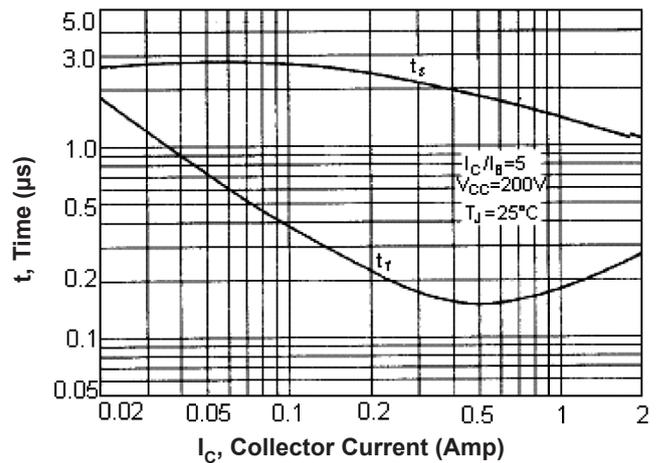
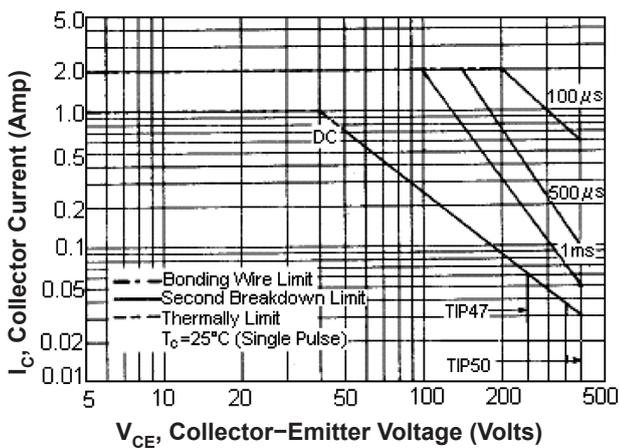


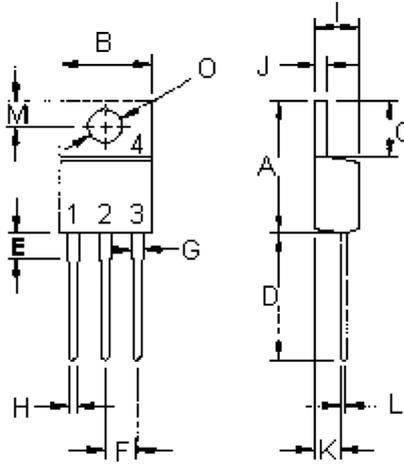
Figure - 6 Active Region Safe Operating Area



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 $T_{J(PK)} = 150^\circ C$; 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.

High Voltage Power Transistor



Pin Configuration:

- 1. Base
- 2. Collector
- 3. Emitter
- 4. Collector(Case)

Dimensions	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	2.2	2.97
L	0.33	0.55
M	2.48	2.98
O	3.7	3.9

Dimensions : Millimetres

Part Number Table

Description	Part Number
Transistor, NPN, TO-220	TIP47
	TIP50

Important Notice : This data sheet and its contents (the "Information") belong to the members of the Premier Farnell group of companies (the "Group") or are licensed to it. No licence is granted for the use of it other than for information purposes in connection with the products to which it relates. No licence of any intellectual property rights is granted. The Information is subject to change without notice and replaces all data sheets previously supplied. The Information supplied is believed to be accurate but the Group assumes no responsibility for its accuracy or completeness, any error in or omission from it or for any use made of it. Users of this data sheet should check for themselves the Information and the suitability of the products for their purpose and not make any assumptions based on information included or omitted. Liability for loss or damage resulting from any reliance on the Information or use of it (including liability resulting from negligence or where the Group was aware of the possibility of such loss or damage arising) is excluded. This will not operate to limit or restrict the Group's liability for death or personal injury resulting from its negligence. Multicomp is the registered trademark of the Group. © Premier Farnell plc 2012.