## COMPLEMENTARY SILICON POWER TRANSISTORS

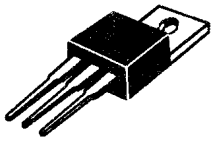
...designed for various specific and general purpose application such as;output and driver stages of amplifiers operating at frequencies from DC to greater than 1.0MHz; series,shunt and switching regulators; low and high frequency inverters/converters and many others.

FEATURES:

* NPN Complement to D45H PNP
* Very Low Collector Saturation Voltage
* Excellent Linearity
* Fast Switching
* PNP Values are Negative,Observe Proper Polarity.

**NPN D44H Series** **PNP D45H Series**

10 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS
30-80 VOLTS
50 WATTS



**TO-220**

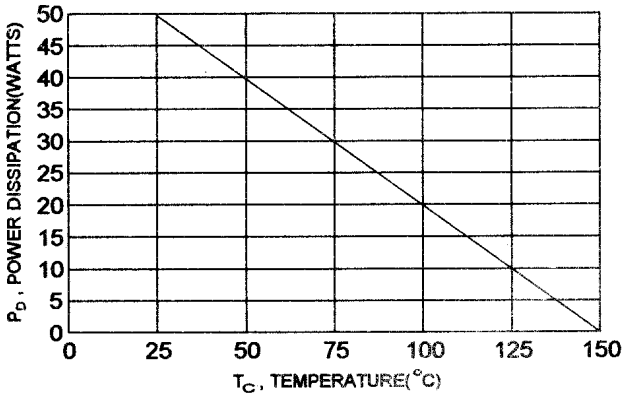
### MAXIMUM RATINGS

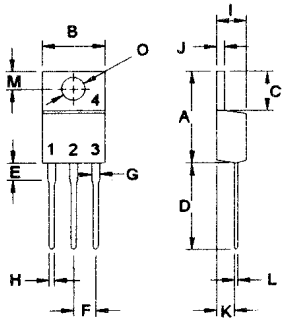
| Characteristic | Symbol | D44H1,2 D45H1,2 | D44H4,5 D45H4,5 | D44H7,8 D45H7,8 | D44H10,11 D45H10,11 | Unit |
|---|---|---|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 30 | 45 | 60 | 80 | V |
| Collector-Emitter Voltage | $V_{CES}$ | 30 | 45 | 60 | 80 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 5 | | | | V |
| Collector Current - Continuous<br>Peak | $I_C$<br>$I_{CM}$ | 10<br>20 | | | | A |
| Base Current | $I_B$ | 2 | | | | A |
| Total Power Dissipation<br>@$T_C$ = 25°C<br>Derate above 25 °C | $P_D$ | 50<br>0.4 | | | | W<br>W/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | | | | °C |

### THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance Junction to Case | RθjC | 2.5 | °C/W |

FIGURE -1 POWER DERATING




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

| 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 |

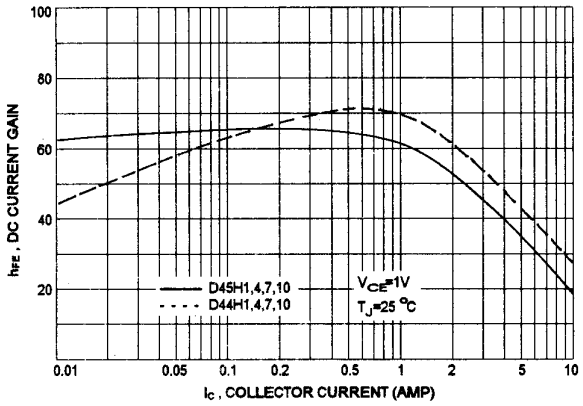
## ELECTRICAL CHARACTERISTICS ( $T_C$ = 25°C unless otherwise noted )

| Characteristic | | | Symbol | Min | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector-Emitter Sustaining Voltage ( $I_C$= 30mA, $I_B$= 0 ) | D44H1,2<br>D44H4,5<br>D44H7,8<br>D44H10,11 | D45H1,2<br>D45H4,5<br>D45H7,8<br>D45H10,11 | $V_{CEO(sus)}$ | 30<br>45<br>60<br>80 | | V |
| Collector-Emitter Cutoff Current<br>( $V_{CE}$= 30V, $V_{BE}$= 0 )<br>( $V_{CE}$= 45V, $V_{BE}$= 0 )<br>( $V_{CE}$= 60V, $V_{BE}$= 0 )<br>( $V_{CE}$= 80V, $V_{BE}$= 0 ) | <br>D44H1,2<br>D44H4,5<br>D44H7,8<br>D44H10,11 | <br>D45H1,2<br>D45H4,5<br>D45H7,8<br>D45H10,11 | $I_{CES}$ | | <br>10<br>10<br>10<br>10 | uA |
| Emitter-Base Cutoff Current ( $V_{BE}$= 5V, $I_C$= 0 ) | | | $I_{EBO}$ | | 100 | uA |
| **ON CHARACTERISTICS(1)** | | | | | | |
| DC Current Gain<br>( $I_C$= 2.0 A, $V_{CE}$= 1.0 V )<br>( $I_C$= 4.0 A, $V_{CE}$= 1.0 V ) | <br>D44H1,4,7,10 /D45H1,4,7,10<br>D44H2,5,8,11 /D45H2,5,8,11<br>D44H1,4,7,10 /D45H1,4,7,10<br>D44H2,5,8,11 /D45H2,5,8,11 | | hFE | <br>35<br>60<br>20<br>40 | | |
| Collector-Emitter Saturation Voltage<br>( $I_C$= 8.0 A, $I_B$= 800 mA )<br>( $I_C$= 8.0 A, $I_B$= 400 mA ) | <br>D44H1,4,7,10 /D45H1,4,7,10<br>D44H2,5,8,11 /D45H2,5,8,11 | | $V_{CE(sat)}$ | | <br>1.0<br>1.0 | V |
| Base-Emitter Saturation Voltage ( $I_C$= 8.0 A, $I_B$= 800mA ) | ALL Devices | | $V_{BE(sat)}$ | | 1.5 | V |
| **DYAMIC CHARATERISTICS** | | | | | | |
| Current-Gain Bandwidth Product (2) ( $I_C$= 500 mA, $V_{CE}$= 10 V, f= 0.5 MHz ) | D44H Series<br>D45H Series | | $f_T$ | 15<br>12 | | MHz |
| Output Capacitance ( $V_{CB}$= 10 V, $I_E$= 0, f = 1.0MHz ) | D44H Series<br>D45H Series | | $C_{ob}$ | 220<br>400 | | PF |
| **SWITCHING CHARATERISTICS** | | | | | | |
| Rise Time | $I_C$= 5A,<br>$I_{B1}$= -$I_{B2}$ = 500mA | D44H Series<br>D45H Series | $t_r$ | | 0.5<br>0.6 | us |
| Storage Time | | D44H Series<br>D45H Series | $t_s$ | | 1.0<br>1.2 | us |
| Fall Time | | D44H Series<br>D45H Series | $t_f$ | | 0.4<br>0.5 | us |

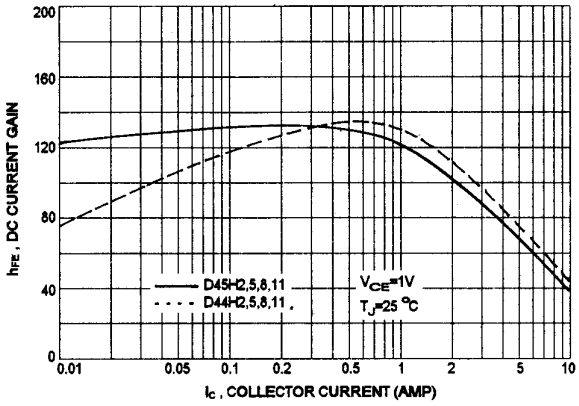
(1) Pulse Test: Pulse width = 300 us , Duty Cycle ≤ 2.0%

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

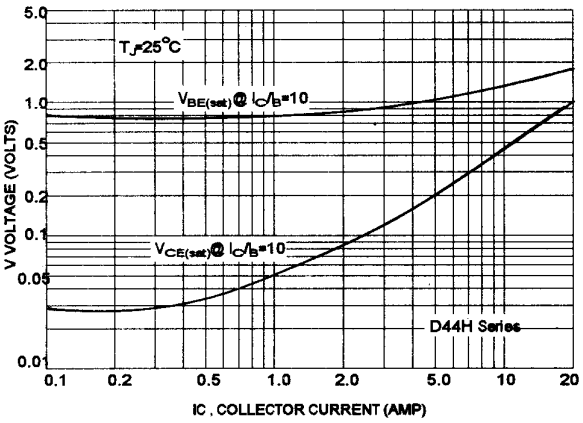
## DC CURRENT GAIN




## DC CURRENT GAIN




## "ON" VOLTAGES

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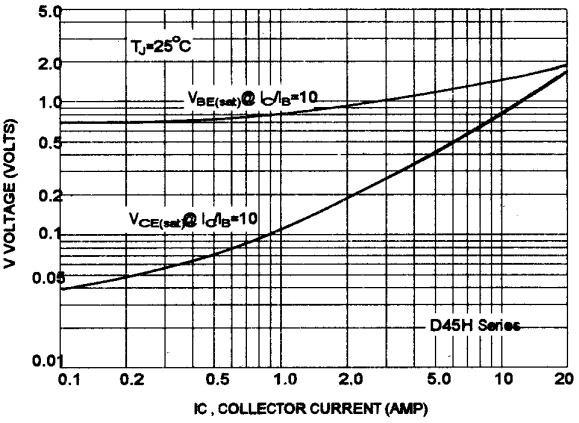


## FORWARD BIAS SAFE OPERATING AREA