

## 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.

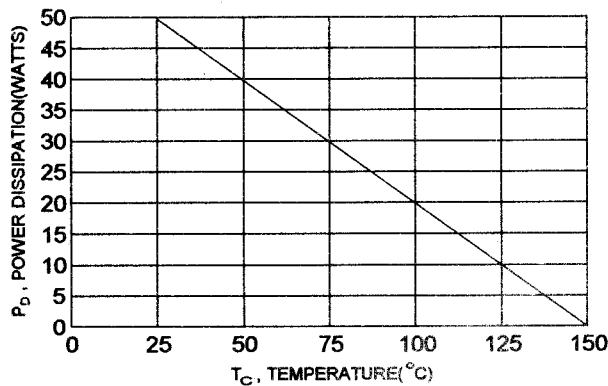
### MAXIMUM RATINGS

| Characteristic                                                                           | Symbol            | D44H1,2<br>D45H1,2 | D44H4,5<br>D45H4,5 | D44H7,8<br>D45H7,8 | D44H10,11<br>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>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$             | 50<br>0.4          |                    |                    |                        | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage<br>Junction Temperature Range                                      | $T_J, T_{STG}$    | -55 to +150        |                    |                    |                        | $^\circ\text{C}$         |

### THERMAL CHARACTERISTICS

| Characteristic                      | Symbol          | Max | Unit               |
|-------------------------------------|-----------------|-----|--------------------|
| Thermal Resistance Junction to Case | $R_{\theta JC}$ | 2.5 | $^\circ\text{C/W}$ |

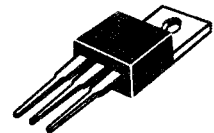
FIGURE -1 POWER DERATING



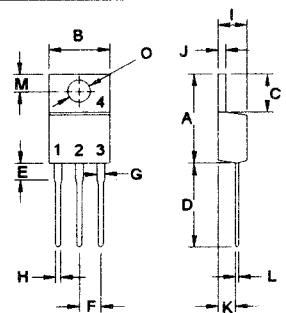
**NPN**  
**D44H**  
**Series**

**PNP**  
**D45H**  
**Series**

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



TO-220



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** (  $T_c = 25^\circ\text{C}$  unless otherwise noted )

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

**OFF CHARACTERISTICS**

|                                                                                                                                                                                                                  |                                            |                                            |               |                      |                      |               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------|---------------|----------------------|----------------------|---------------|
| Collector-Emitter Sustaining Voltage<br>( $I_C = 30\text{mA}$ , $I_B = 0$ )                                                                                                                                      | D44H1,2<br>D44H4,5<br>D44H7,8<br>D44H10,11 | D45H1,2<br>D45H4,5<br>D45H7,8<br>D45H10,11 | $V_{CE(sus)}$ | 30<br>45<br>60<br>80 |                      | V             |
| Collector-Emitter Cutoff Current<br>( $V_{CE} = 30\text{V}$ , $V_{BE} = 0$ )<br>( $V_{CE} = 45\text{V}$ , $V_{BE} = 0$ )<br>( $V_{CE} = 60\text{V}$ , $V_{BE} = 0$ )<br>( $V_{CE} = 80\text{V}$ , $V_{BE} = 0$ ) | D44H1,2<br>D44H4,5<br>D44H7,8<br>D44H10,11 | D45H1,2<br>D45H4,5<br>D45H7,8<br>D45H10,11 | $I_{CES}$     |                      | 10<br>10<br>10<br>10 | $\mu\text{A}$ |
| Emitter-Base Cutoff Current<br>( $V_{BE} = 5\text{V}$ , $I_C = 0$ )                                                                                                                                              |                                            |                                            | $I_{EBO}$     |                      | 100                  | $\mu\text{A}$ |

**ON CHARACTERISTICS(1)**

|                                                                                                                                          |                                                                                                                      |               |                      |            |   |
|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------|----------------------|------------|---|
| DC Current Gain<br>( $I_C = 2.0\text{A}$ , $V_{CE} = 1.0\text{V}$ )<br>( $I_C = 4.0\text{A}$ , $V_{CE} = 1.0\text{V}$ )                  | 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 | $h_{FE}$      | 35<br>60<br>20<br>40 |            |   |
| Collector-Emitter Saturation Voltage<br>( $I_C = 8.0\text{A}$ , $I_B = 800\text{mA}$ )<br>( $I_C = 8.0\text{A}$ , $I_B = 400\text{mA}$ ) | D44H1,4,7,10 /D45H1,4,7,10<br>D44H2,5,8,11 /D45H2,5,8,11                                                             | $V_{CE(sat)}$ |                      | 1.0<br>1.0 | V |
| Base-Emitter Saturation Voltage<br>( $I_C = 8.0\text{A}$ , $I_B = 800\text{mA}$ )                                                        | ALL Devices                                                                                                          | $V_{BE(sat)}$ |                      | 1.5        | V |

**DYNAMIC CHARACTERISTICS**

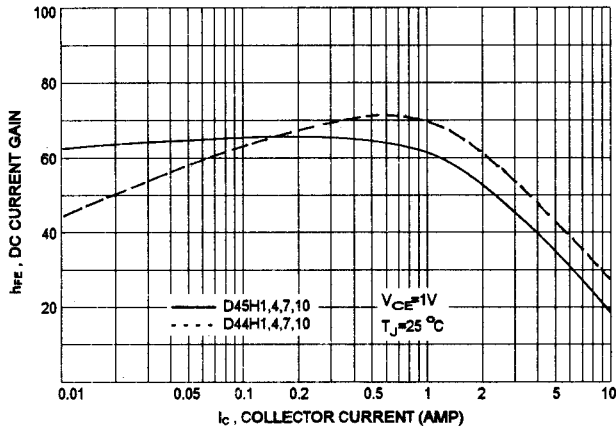
|                                                                                                              |                            |          |            |  |     |
|--------------------------------------------------------------------------------------------------------------|----------------------------|----------|------------|--|-----|
| Current-Gain Bandwidth Product (2)<br>( $I_C = 500\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 0.5\text{MHz}$ ) | D44H Series<br>D45H Series | $f_T$    | 15<br>12   |  | MHz |
| Output Capacitance<br>( $V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1.0\text{MHz}$ )                            | D44H Series<br>D45H Series | $C_{ob}$ | 220<br>400 |  | PF  |

**SWITCHING CHARACTERISTICS**

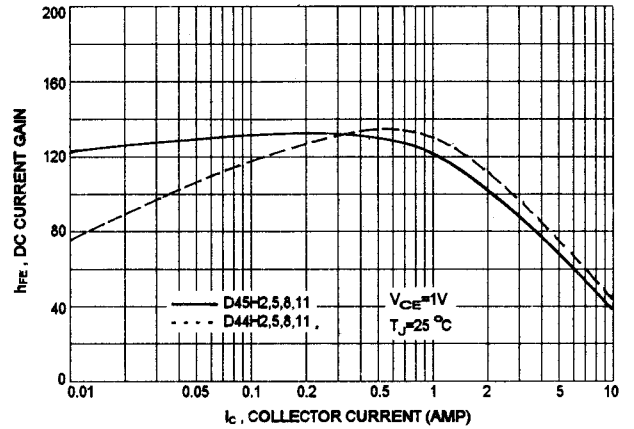
|              |                                                          |                            |       |  |            |               |
|--------------|----------------------------------------------------------|----------------------------|-------|--|------------|---------------|
| Rise Time    | $I_C = 5\text{A}$ ,<br>$I_{B1} = -I_{B2} = 500\text{mA}$ | D44H Series<br>D45H Series | $t_r$ |  | 0.5<br>0.6 | $\mu\text{s}$ |
| Storage Time |                                                          | D44H Series<br>D45H Series | $t_s$ |  | 1.0<br>1.2 | $\mu\text{s}$ |
| Fall Time    |                                                          | D44H Series<br>D45H Series | $t_f$ |  | 0.4<br>0.5 | $\mu\text{s}$ |

(1) Pulse Test: Pulse width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ (2)  $f_T = |h_{fe}| \cdot f_{\text{test}}$

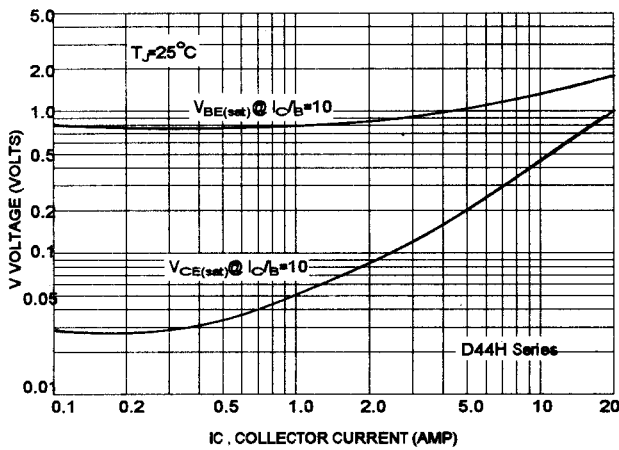
DC CURRENT GAIN



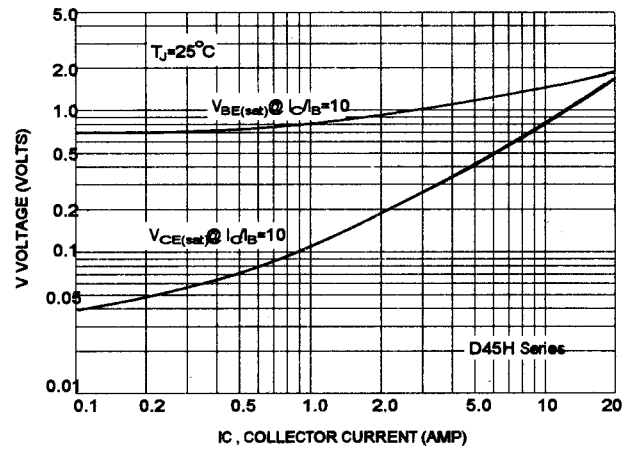
DC CURRENT GAIN



"ON" VOLTAGES



"ON" VOLTAGES



FORWARD BIAS SAFE OPERATING AREA

