

Complementary Silicon Power Transistors

D44H Series (NPN), D45H Series (PNP)

These series of plastic, silicon NPN and PNP power transistors can be used as general purpose power amplification and switching such as output or driver stages in applications such as switching regulators, converters and power amplifiers.

Features

- Low Collector–Emitter Saturation Voltage
- Fast Switching Speeds
- Complementary Pairs Simplifies Designs
- These Devices are Pb–Free and are RoHS Compliant*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|----------------|-------------|------------------|
| Collector–Emitter Voltage D44H8, D45H8 D44H11, D45H11 | V_{CEO} | 60 80 | Vdc |
| Emitter Base Voltage | V_{EB} | 5.0 | Vdc |
| Collector Current – Continuous | I_C | 10 | Adc |
| Collector Current – Peak (Note 1) | I_{CM} | 20 | Adc |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ @ $T_A = 25^\circ\text{C}$ | P_D | 70 2.0 | W |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

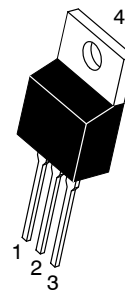
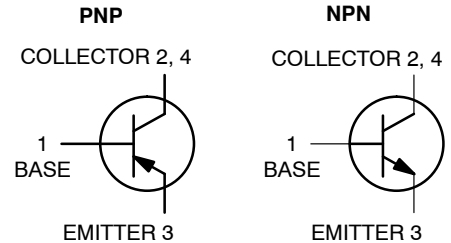
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Pulse Width ≤ 6.0 ms, Duty Cycle $\leq 50\%$.

THERMAL CHARACTERISTICS

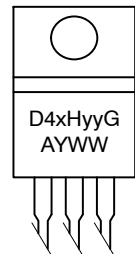
| Characteristic | Symbol | Max | Unit |
|---|-----------------|------|---------------------------|
| Thermal Resistance, Junction–to–Case | $R_{\theta JC}$ | 1.8 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction–to–Ambient | $R_{\theta JA}$ | 62.5 | $^\circ\text{C}/\text{W}$ |
| Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds | T_L | 275 | $^\circ\text{C}$ |

10 AMP COMPLEMENTARY SILICON POWER TRANSISTORS 60, 80 VOLTS



TO-220
CASE 221A
STYLE 1

MARKING DIAGRAM



D4xHyy = Device Code
x = 4 or 5
yy = 8 or 11
A = Assembly Location
Y = Year
WW = Work Week
G = Pb–Free Package

ORDERING INFORMATION

| Device | Package | Shipping |
|---------|---------------------|---------------|
| D44H8G | TO-220 (Pb–Free) | 50 Units/Rail |
| D44H11G | TO-220 (Pb–Free) | 50 Units/Rail |
| D45H8G | TO-220 (Pb–Free) | 50 Units/Rail |
| D45H11G | TO-220 (Pb–Free) | 50 Units/Rail |

*For additional information on our Pb–Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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

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

OFF CHARACTERISTICS

| | | | | | | |
|---|--------------------------------|---------------|----------|--------|--------|---------------|
| Collector-Emitter Sustaining Voltage ($I_C = 30\text{ mA}$, $I_B = 0\text{ A}$) | D44H8, D45H8 D44H11, D45H11 | $V_{CE(sus)}$ | 60 80 | – – | – – | Vdc |
| Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CE0}$, $V_{BE} = 0$) | | I_{CES} | – | – | 10 | μA |
| Emitter Cutoff Current ($V_{EB} = 5.0\text{ Vdc}$) | | I_{EBO} | – | – | 10 | μA |

ON CHARACTERISTICS

| | | | | | | |
|---|--|---------------|----------|--------|--------|-----|
| DC Current Gain ($V_{CE} = 1.0\text{ Vdc}$, $I_C = 2.0\text{ Adc}$) ($V_{CE} = 1.0\text{ Vdc}$, $I_C = 4.0\text{ Adc}$) | | h_{FE} | 60 40 | – – | – – | – |
| Collector-Emitter Saturation Voltage ($I_C = 8.0\text{ Adc}$, $I_B = 0.4\text{ Adc}$) | | $V_{CE(sat)}$ | – | – | 1.0 | Vdc |
| Base-Emitter Saturation Voltage ($I_C = 8.0\text{ Adc}$, $I_B = 0.8\text{ Adc}$) | | $V_{BE(sat)}$ | – | – | 1.5 | Vdc |

DYNAMIC CHARACTERISTICS

| | | | | | | |
|---|----------------------------|----------|--------|-----------|--------|-----|
| Collector Capacitance ($V_{CB} = 10\text{ Vdc}$, $f_{test} = 1.0\text{ MHz}$) | D44H Series D45H Series | C_{cb} | – – | 90 160 | – – | pF |
| Gain Bandwidth Product ($I_C = 0.5\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f = 20\text{ MHz}$) | D44H Series D45H Series | f_T | – – | 50 40 | – – | MHz |

SWITCHING TIMES

| | | | | | | |
|---|----------------------------|-------------|--------|------------|--------|----|
| Delay and Rise Times ($I_C = 5.0\text{ Adc}$, $I_{B1} = 0.5\text{ Adc}$) | D44H Series D45H Series | $t_d + t_r$ | – – | 300 135 | – – | ns |
| Storage Time ($I_C = 5.0\text{ Adc}$, $I_{B1} = I_{B2} = 0.5\text{ Adc}$) | D44H Series D45H Series | t_s | – – | 500 500 | – – | ns |
| Fall Time ($I_C = 5.0\text{ Adc}$, $I_{B1} = 102 = 0.5\text{ Adc}$) | D44H Series D45H Series | t_f | – – | 140 100 | – – | ns |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

D44H Series (NPN), D45H Series (PNP)

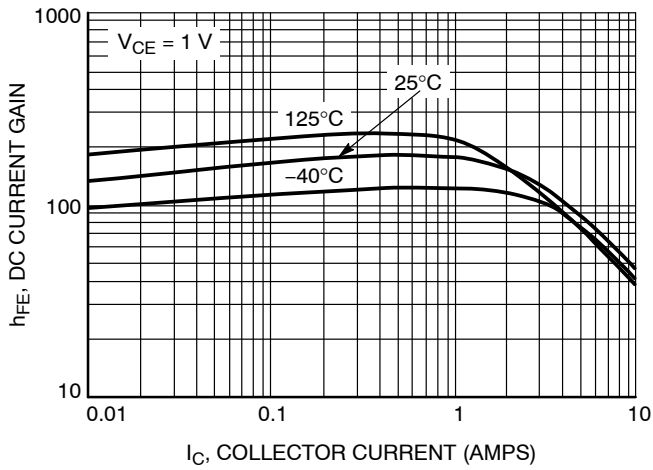


Figure 1. D44H11 DC Current Gain

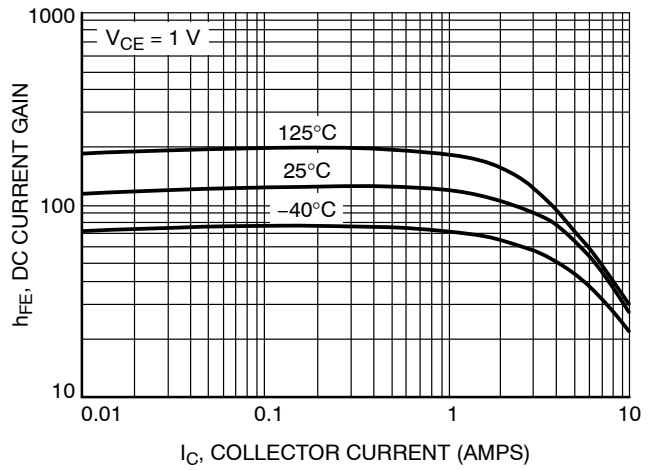


Figure 2. D45H11 DC Current Gain

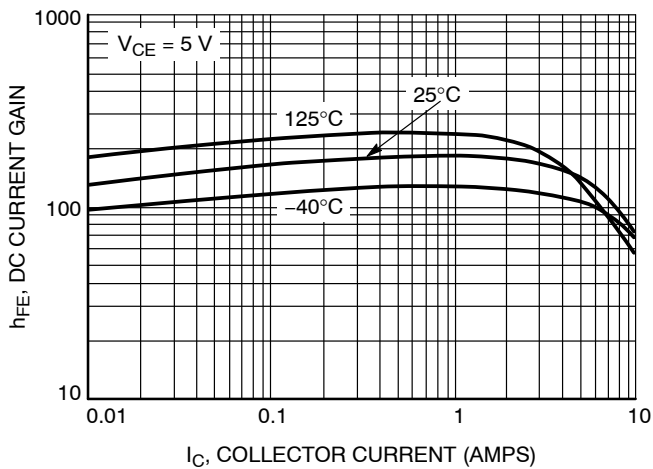


Figure 3. D44H11 DC Current Gain

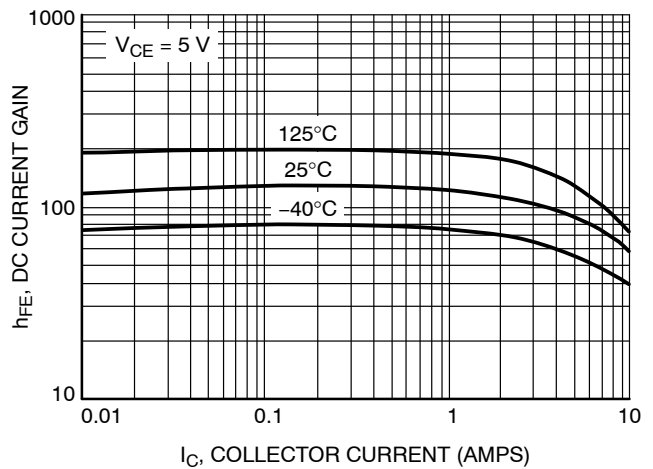


Figure 4. D45H11 DC Current Gain

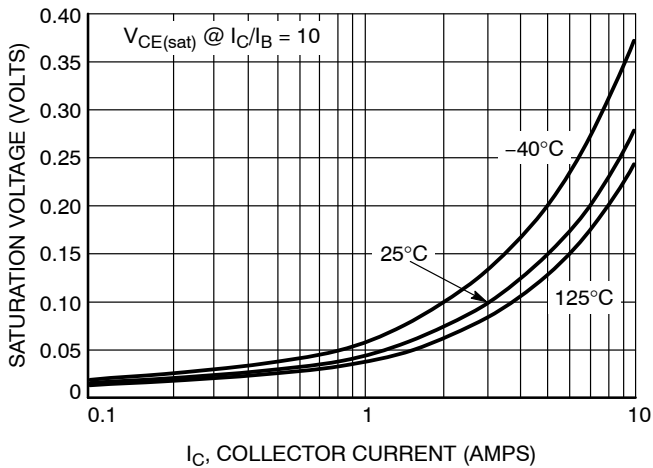


Figure 5. D44H11 ON-Voltage

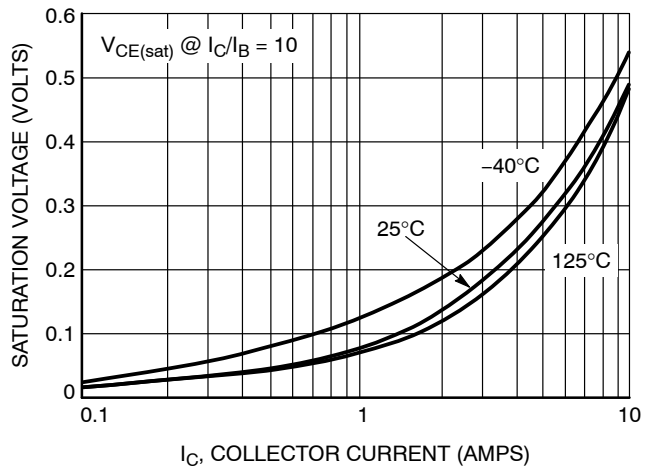


Figure 6. D45H11 ON-Voltage

D44H Series (NPN), D45H Series (PNP)

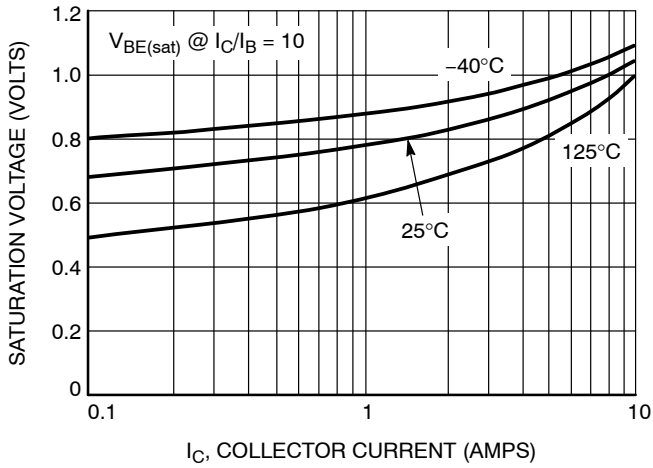


Figure 7. D44H11 ON-Voltage

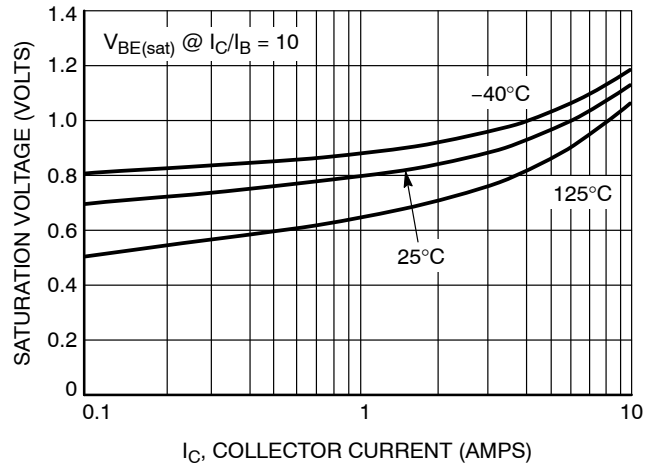


Figure 8. D45H11 ON-Voltage

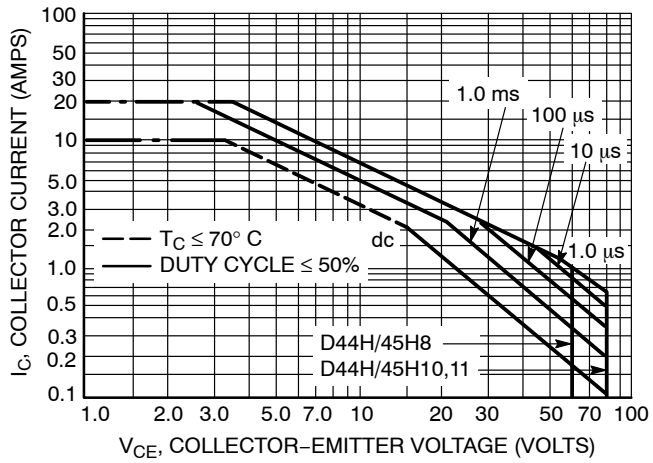


Figure 9. Maximum Rated Forward Bias Safe Operating Area

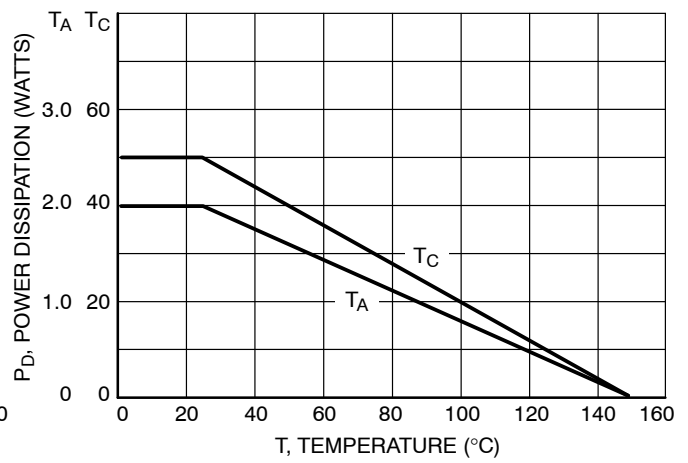


Figure 10. Power Derating

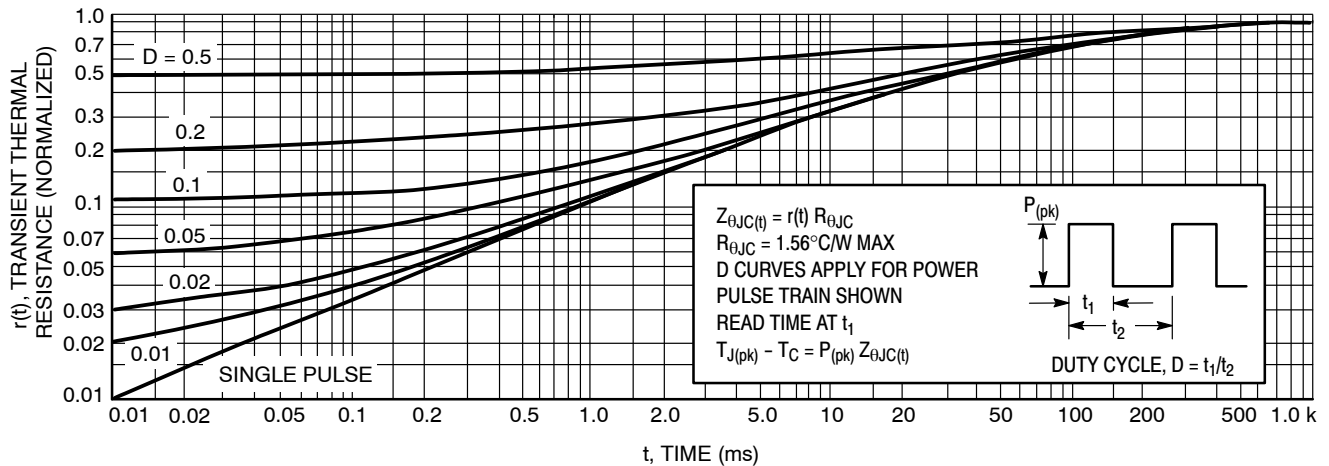


Figure 11. Thermal Response

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SCALE 1:1



TO-220 CASE 221A ISSUE AK

DATE 13 JAN 2022

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. MAX WIDTH FOR F102 DEVICE = 1.35MM

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN. | MAX. | MIN. | MAX. |
| A | 0.570 | 0.620 | 14.48 | 15.75 |
| B | 0.380 | 0.415 | 9.66 | 10.53 |
| C | 0.160 | 0.190 | 4.07 | 4.83 |
| D | 0.025 | 0.038 | 0.64 | 0.96 |
| F | 0.142 | 0.161 | 3.60 | 4.09 |
| G | 0.095 | 0.105 | 2.42 | 2.66 |
| H | 0.110 | 0.161 | 2.80 | 4.10 |
| J | 0.014 | 0.024 | 0.36 | 0.61 |
| K | 0.500 | 0.562 | 12.70 | 14.27 |
| L | 0.045 | 0.060 | 1.15 | 1.52 |
| N | 0.190 | 0.210 | 4.83 | 5.33 |
| Q | 0.100 | 0.120 | 2.54 | 3.04 |
| R | 0.080 | 0.110 | 2.04 | 2.79 |
| S | 0.045 | 0.055 | 1.15 | 1.41 |
| T | 0.235 | 0.255 | 5.97 | 6.47 |
| U | 0.000 | 0.050 | 0.00 | 1.27 |
| V | 0.045 | --- | 1.15 | --- |
| Z | --- | 0.080 | --- | 2.04 |

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2:
PIN 1. BASE
2. EMITTER
3. COLLECTOR
4. EMITTER

STYLE 3:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

STYLE 4:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2

STYLE 5:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 6:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. ANODE

STYLE 8:
PIN 1. CATHODE
2. ANODE
3. EXTERNAL TRIP/DELAY
4. ANODE

STYLE 9:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 10:
PIN 1. GATE
2. SOURCE
3. DRAIN
4. SOURCE

STYLE 11:
PIN 1. DRAIN
2. SOURCE
3. GATE
4. SOURCE

STYLE 12:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. NOT CONNECTED

| | | |
|------------------|-------------|--|
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