

D44VH10 (NPN), D45VH10 (PNP)

Complementary Silicon Power Transistors

These complementary silicon power transistors are designed for high-speed switching applications, such as switching regulators and high frequency inverters. The devices are also well-suited for drivers for high power switching circuits.

Features

- Fast Switching
- Key Parameters Specified @ 100°C
- Low Collector-Emitter Saturation Voltage
- Complementary Pairs Simplify Circuit Designs
- These Devices are Pb-Free and are RoHS Compliant*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|----------------|------------|-----------|
| Collector-Emitter Voltage | V_{CEO} | 80 | Vdc |
| Collector-Emitter Voltage | V_{CEV} | 100 | Vdc |
| Emitter Base Voltage | V_{EB} | 7.0 | Vdc |
| Collector Current – Continuous | I_C | 15 | Adc |
| Collector Current – Peak (Note 1) | I_{CM} | 20 | Adc |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 83 0.67 | W W/°C |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to 150 | °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 | $R_{\theta JC}$ | 1.5 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 62.5 | °C/W |
| Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds | T_L | 275 | °C |

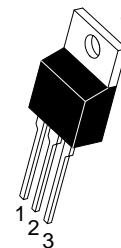
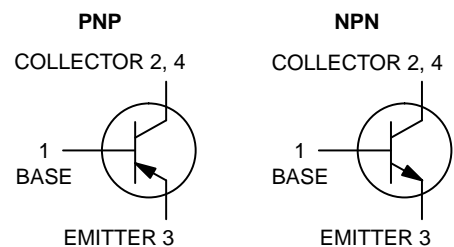
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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15 A COMPLEMENTARY SILICON POWER TRANSISTORS 80 V, 83 W



TO-220
CASE 221A
STYLE 1

MARKING DIAGRAM



x = 4 or 5
A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

ORDERING INFORMATION

| Device | Package | Shipping |
|----------|---------------------|---------------|
| D44VH10G | TO-220 (Pb-Free) | 50 Units/Rail |
| D45VH10G | TO-220 (Pb-Free) | 50 Units/Rail |

D44VH10 (NPN), D45VH10 (PNP)

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|----------------|-----|-----|-----------|-----------------|
| OFF CHARACTERISTICS | | | | | |
| Collector–Emitter Sustaining Voltage (Note 2) ($I_C = 25\text{ mAdc}$, $I_B = 0$) | $V_{CEO(sus)}$ | 80 | – | – | Vdc |
| Collector–Emitter Cutoff Current ($V_{CE} = \text{Rated } V_{CEV}$, $V_{BE(off)} = 4.0\text{ Vdc}$) ($V_{CE} = \text{Rated } V_{CEV}$, $V_{BE(off)} = 4.0\text{ Vdc}$, $T_C = 100^\circ\text{C}$) | I_{CEV} | – | – | 10 100 | μAdc |
| Emitter Base Cutoff Current ($V_{EB} = 7.0\text{ Vdc}$, $I_C = 0$) | I_{EBO} | – | – | 10 | μAdc |

ON CHARACTERISTICS (Note 2)

| | | | | | |
|---|---------------|------------------|------------------|--------------------------|-----|
| DC Current Gain ($I_C = 2.0\text{ Adc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 4.0\text{ Adc}$, $V_{CE} = 1.0\text{ Vdc}$) | h_{FE} | 35 20 | – – | – – | – |
| Collector–Emitter Saturation Voltage ($I_C = 8.0\text{ Adc}$, $I_B = 0.4\text{ Adc}$) D44VH10 ($I_C = 8.0\text{ Adc}$, $I_B = 0.8\text{ Adc}$) D45VH10 ($I_C = 15\text{ Adc}$, $I_B = 3.0\text{ Adc}$, $T_C = 100^\circ\text{C}$) D44VH10 D45VH10 | $V_{CE(sat)}$ | – – – – | – – – – | 0.4 1.0 0.8 1.5 | Vdc |
| Base–Emitter Saturation Voltage ($I_C = 8.0\text{ Adc}$, $I_B = 0.4\text{ Adc}$) D44VH10 ($I_C = 8.0\text{ Adc}$, $I_B = 0.8\text{ Adc}$) D45VH10 ($I_C = 8.0\text{ Adc}$, $I_B = 0.4\text{ Adc}$, $T_C = 100^\circ\text{C}$) D44VH10 ($I_C = 8.0\text{ Adc}$, $I_B = 0.8\text{ Adc}$, $T_C = 100^\circ\text{C}$) D45VH10 | $V_{BE(sat)}$ | – – – – | – – – – | 1.2 1.0 1.1 1.5 | Vdc |

DYNAMIC CHARACTERISTICS

| | | | | | |
|--|----------|--------|------------|--------|-----|
| Current Gain Bandwidth Product ($I_C = 0.1\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f = 20\text{ MHz}$) | f_T | – | 50 | – | MHz |
| Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_C = 0$, $f_{test} = 1.0\text{ MHz}$) D44VH10 D45VH10 | C_{ob} | – – | 120 275 | – – | pF |

SWITCHING CHARACTERISTICS

| | | | | | | |
|--------------|---|-------|---|---|-----|----|
| Delay Time | $(V_{CC} = 20\text{ Vdc}$, $I_C = 8.0\text{ Adc}$, $I_{B1} = I_{B2} = 0.8\text{ Adc}$) | t_d | – | – | 50 | ns |
| Rise Time | | t_r | – | – | 250 | |
| Storage Time | | t_s | – | – | 700 | |
| Fall Time | | t_f | – | – | 90 | |

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.

2. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.

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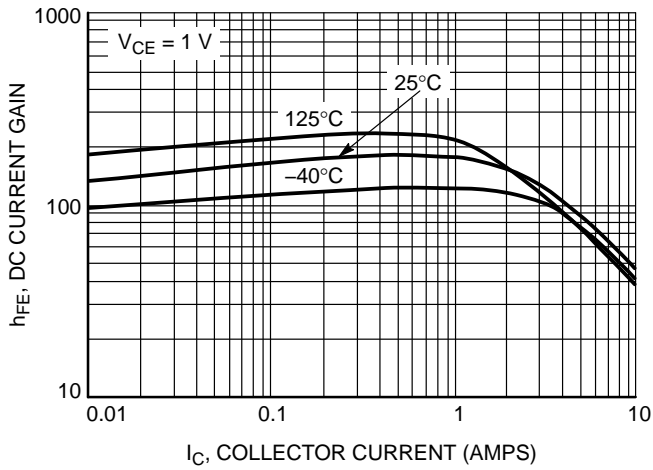


Figure 1. D44VH10 DC Current Gain

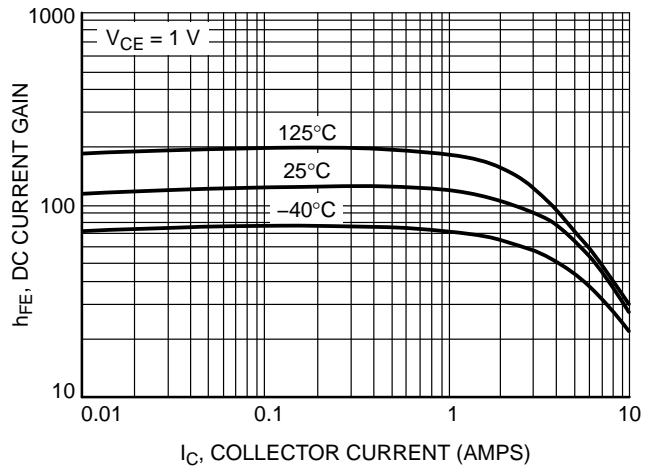


Figure 2. D45VH10 DC Current Gain

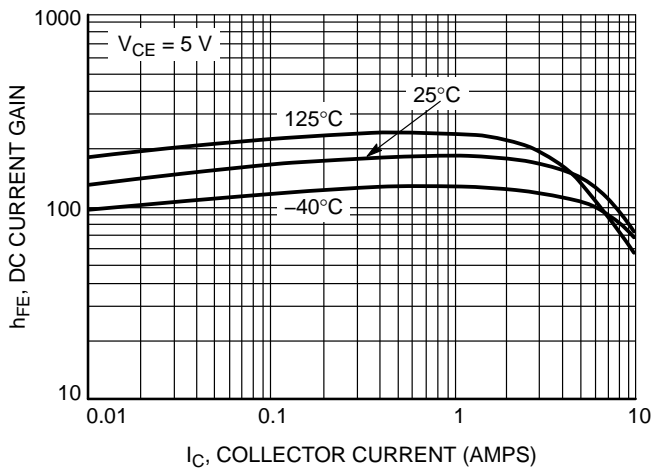


Figure 3. D44VH10 DC Current Gain

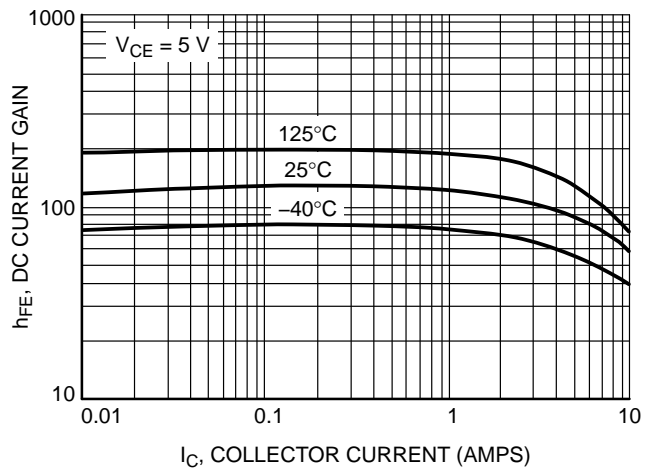


Figure 4. D45VH10 DC Current Gain

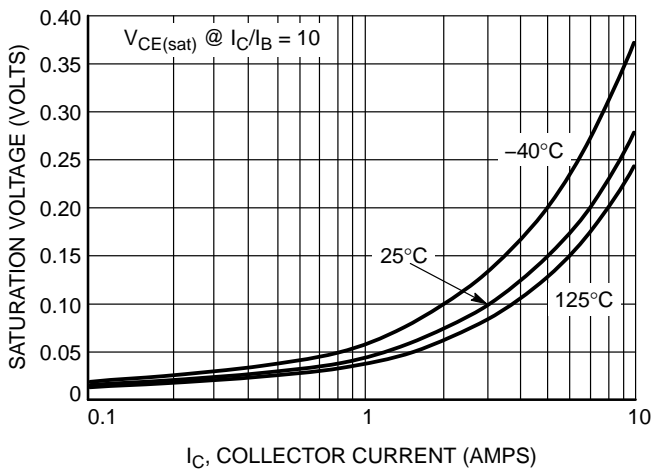


Figure 5. D44VH10 ON-Voltage

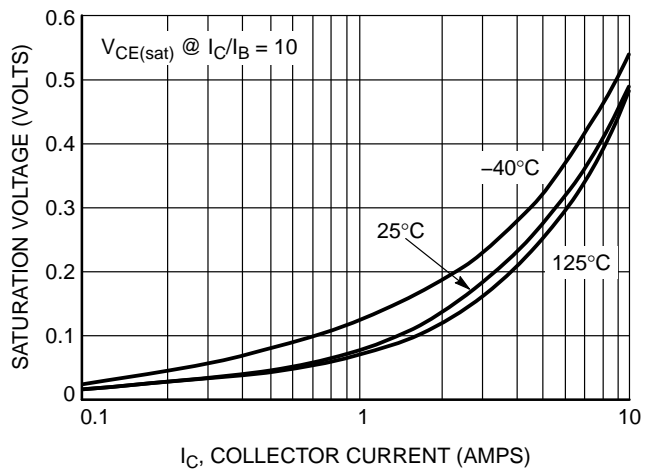
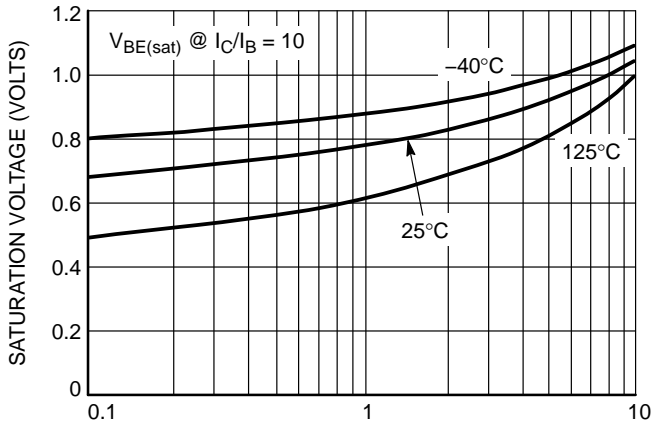


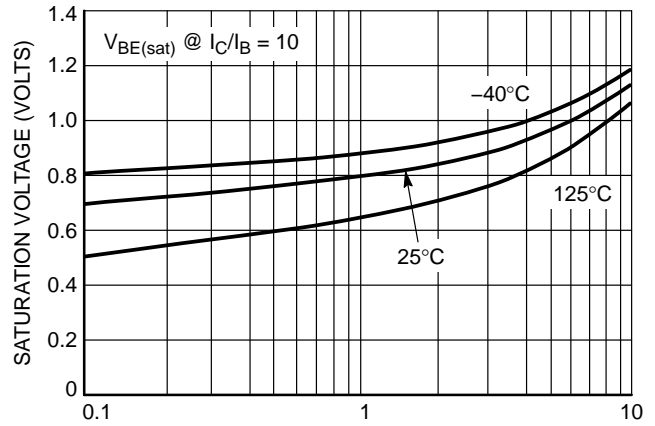
Figure 6. D45VH10 ON-Voltage

D44VH10 (NPN), D45VH10 (PNP)



I_C , COLLECTOR CURRENT (AMPS)

Figure 7. D44VH10 ON-Voltage



I_C , COLLECTOR CURRENT (AMPS)

Figure 8. D45VH10 ON-Voltage

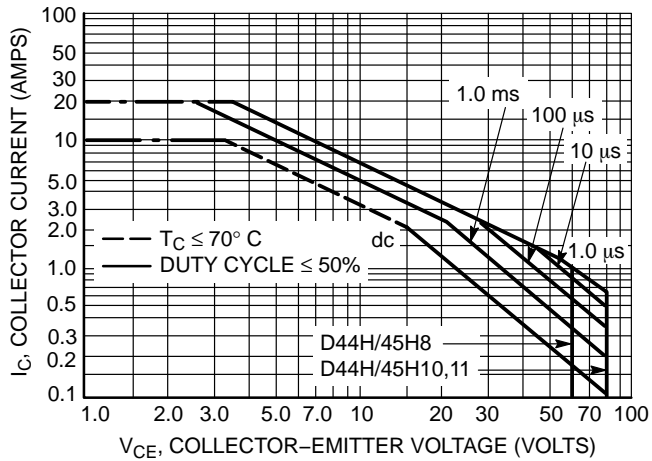


Figure 9. Maximum Rated Forward Bias Safe Operating Area

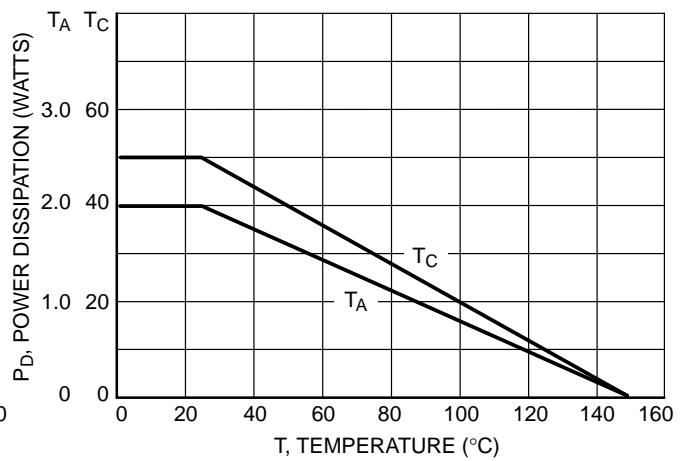


Figure 10. Power Derating

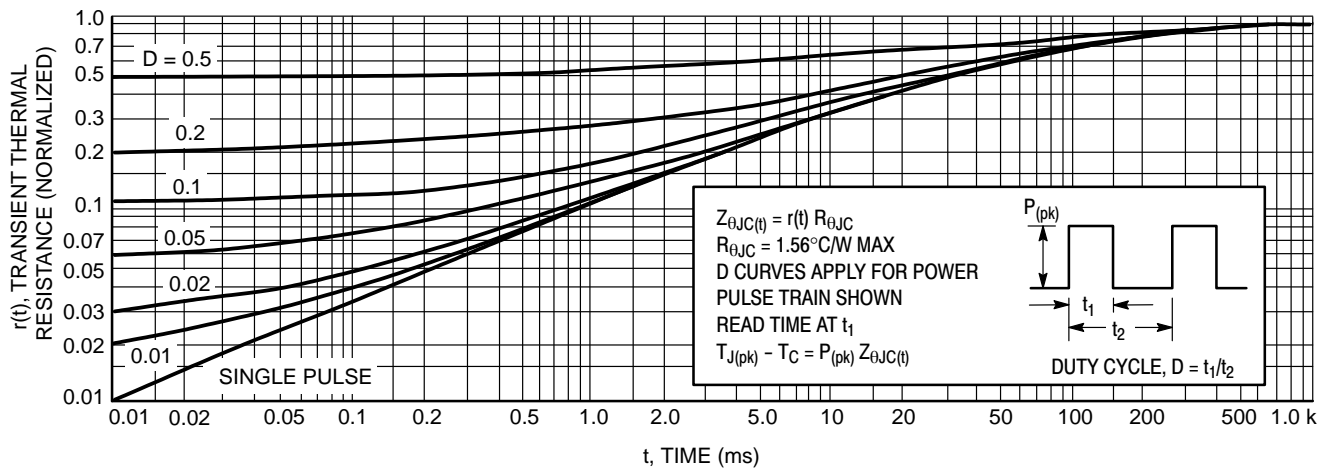


Figure 11. Thermal Response

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