

# D44H Series (NPN), D45H Series (PNP)

Preferred Devices

## Complementary Silicon Power Transistors

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

- Pb-Free Package is Available
- Low Collector-Emitter Saturation Voltage  
 $V_{CE(sat)} = 1.0 \text{ V (Max) @ } 8.0 \text{ A}$
- Fast Switching Speeds
- Complementary Pairs Simplifies Designs

### 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 – Peak (Note 1)	$I_C$	10 20	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ @ $T_A = 25^\circ\text{C}$	$P_D$	50 2.0	W
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.5	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	$T_L$	275	$^\circ\text{C}$

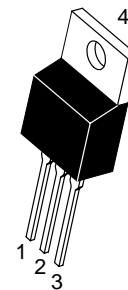
1. Pulse Width  $\leq 6.0 \text{ ms}$ , Duty Cycle  $\leq 50\%$ .



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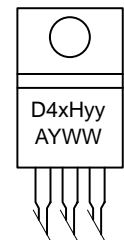
<http://onsemi.com>

## 10 A COMPLEMENTARY SILICON POWER TRANSISTORS 60, 80 V



TO-220AB  
CASE 221A  
STYLE 1

### MARKING DIAGRAM



x = 4 or 5  
yy = 8 or 11  
A = Assembly Location  
Y = Year  
WW = Work Week

### ORDERING INFORMATION

Device	Package	Shipping†
D44H8	TO-220	50 Units/Rail
D44H11	TO-220	50 Units/Rail
D45H8	TO-220	50 Units/Rail
D45H8G	TO-220 (Pb-Free)	50 Units/Rail
D45H11	TO-220	50 Units/Rail

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Preferred devices are recommended choices for future use and best overall value.

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

## D44H Series (NPN), D45H Series (PNP)

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

Characteristic	Symbol	Min	Max	Unit
DC Current Gain ( $V_{CE} = 1.0\text{ Vdc}$ , $I_C = 2.0\text{ Adc}$ )	$h_{FE}$			–
		D44H8, 11	20	–
		D45H8, 11	40	–
( $V_{CE} = 1.0\text{ Vdc}$ , $I_C = 4.0\text{ Adc}$ )		D44H8, 11	20	–
		D45H8, 11	40	–

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

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CEO}$ , $V_{BE} = 0$ )	$I_{CES}$	–	–	10	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 5.0\text{ Vdc}$ )	$I_{EBO}$	–	–	100	$\mu\text{A}$

### ON CHARACTERISTICS

Collector–Emitter Saturation Voltage ( $I_C = 8.0\text{ Adc}$ , $I_B = 0.4\text{ Adc}$ ) ( $I_C = 8.0\text{ Adc}$ , $I_B = 0.8\text{ Adc}$ )	D44H/D45H8, 11 D44H	$V_{CE(sat)}$	–	–	1.0	Vdc
			–	–	1.0	
Base–Emitter Saturation Voltage ( $I_C = 8.0\text{ Adc}$ , $I_B = 0.8\text{ Adc}$ )		$V_{BE(sat)}$	–	–	1.5	Vdc

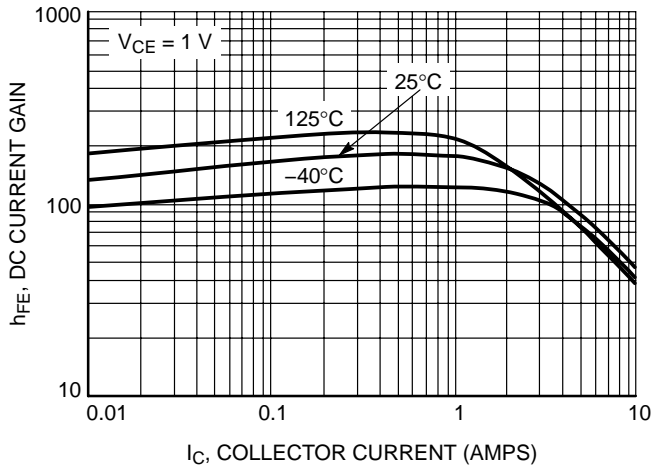
### DYNAMIC CHARACTERISTICS

Collector Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $f_{test} = 1.0\text{ MHz}$ )	D44H Series D45H Series	$C_{cb}$	–	130	–	pF
			–	230	–	
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	–	MHz
			–	40	–	

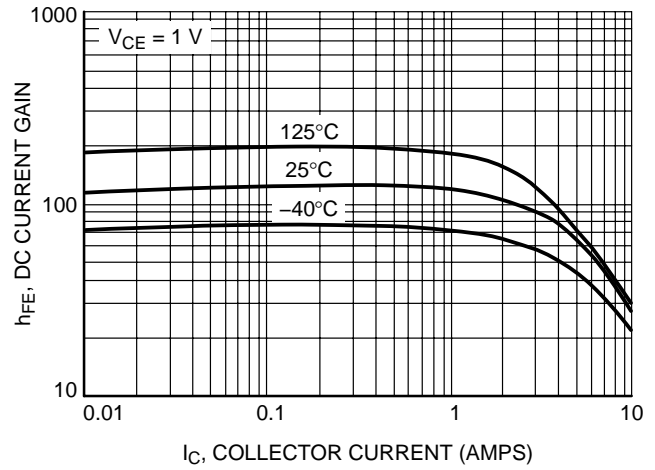
### SWITCHING TIMES

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	–	ns
			–	135	–	
Storage Time ( $I_C = 5.0\text{ Adc}$ , $I_{B1} = I_{B2} = 0.5\text{ Adc}$ )	D44H Series D45H Series	$t_s$	–	500	–	ns
			–	500	–	
Fall Time ( $I_C = 5.0\text{ Adc}$ , $I_{B1} = 102 = 0.5\text{ Adc}$ )	D44H Series D45H Series	$t_f$	–	140	–	ns
			–	100	–	

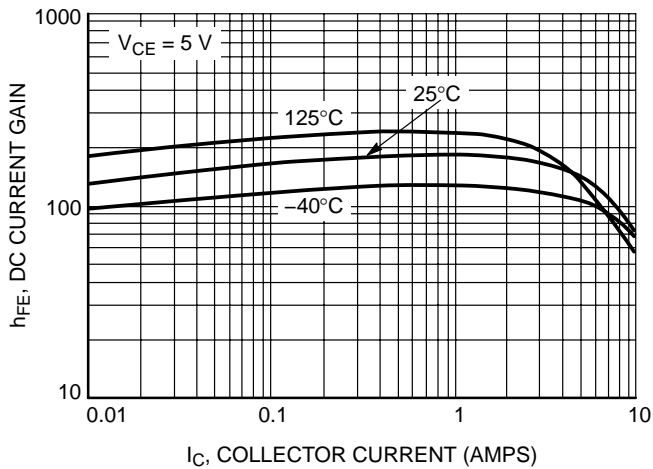
## D44H Series (NPN), D45H Series (PNP)



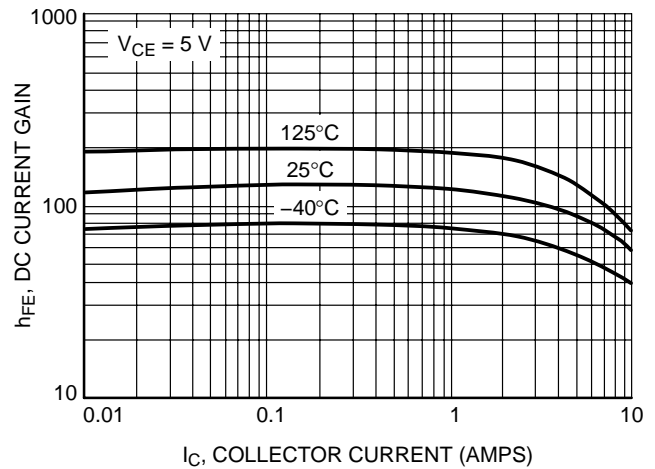
**Figure 1. D44H11 DC Current Gain**



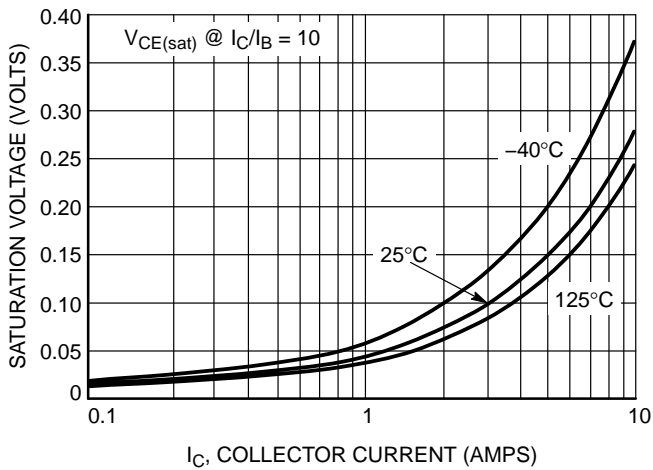
**Figure 2. D45H11 DC Current Gain**



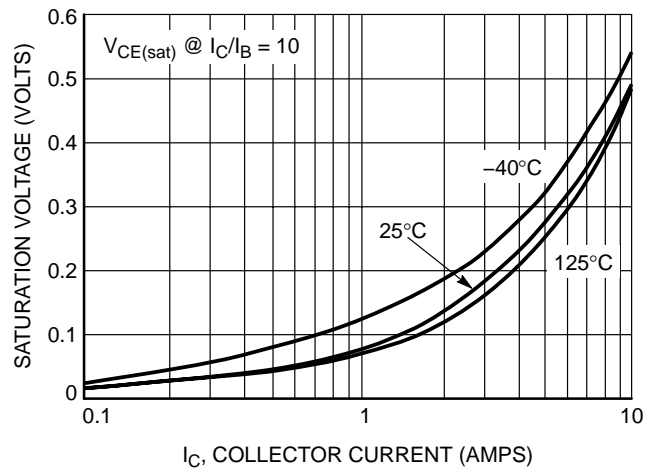
**Figure 3. D44H11 DC Current Gain**



**Figure 4. D45H11 DC Current Gain**

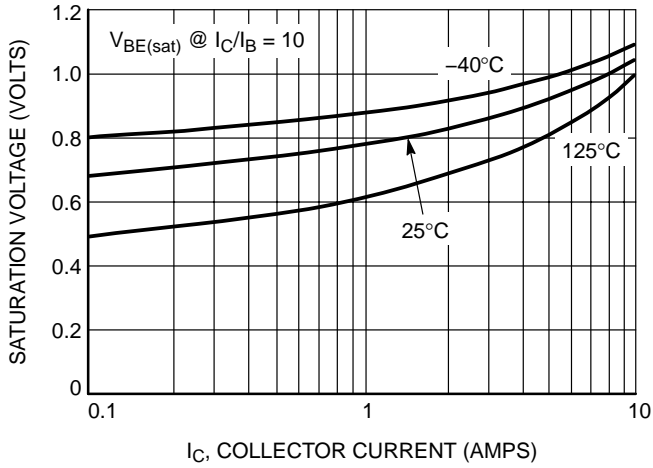


**Figure 5. D44H11 ON-Voltage**

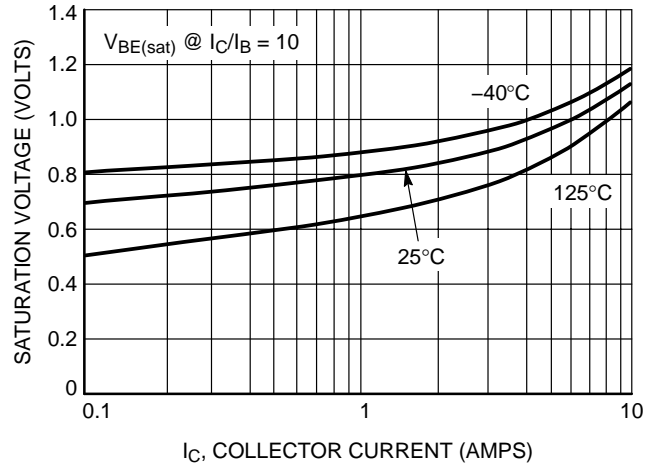


**Figure 6. D45H11 ON-Voltage**

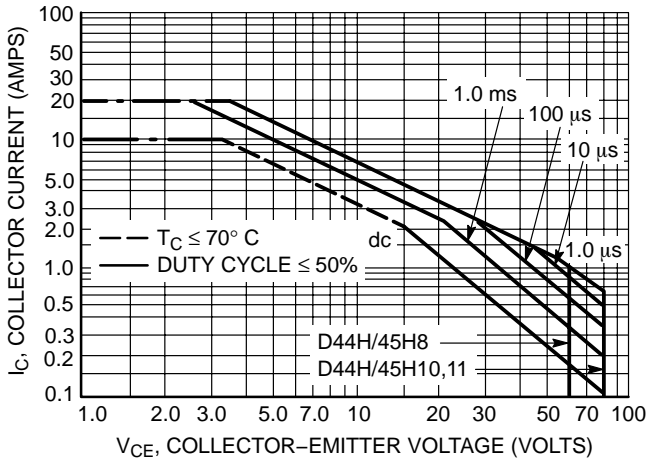
## D44H Series (NPN), D45H Series (PNP)



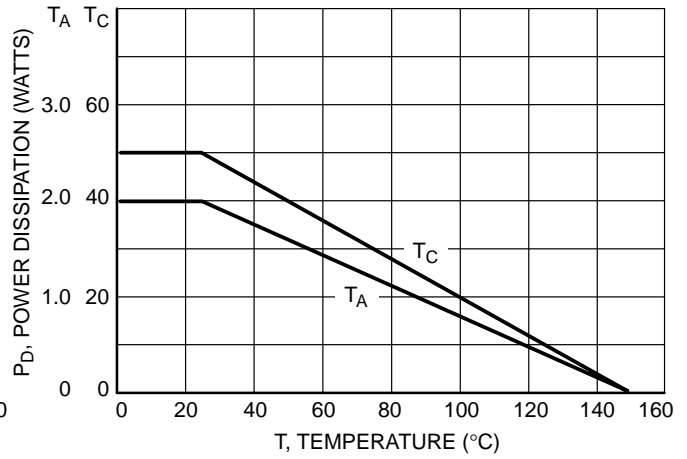
**Figure 7. D44H11 ON-Voltage**



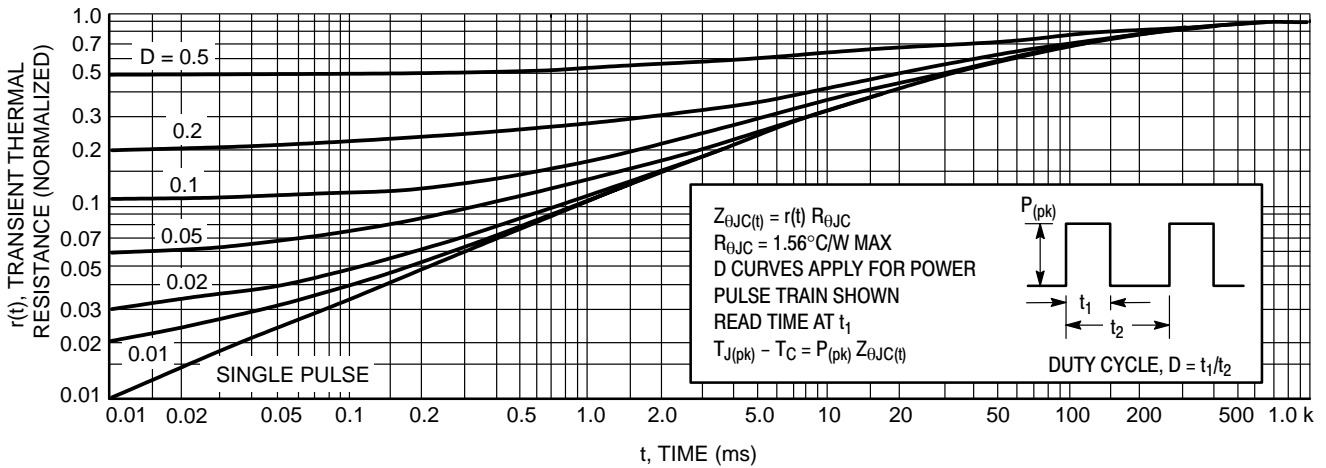
**Figure 8. D45H11 ON-Voltage**



**Figure 9. Maximum Rated Forward Bias Safe Operating Area**



**Figure 10. Power Derating**

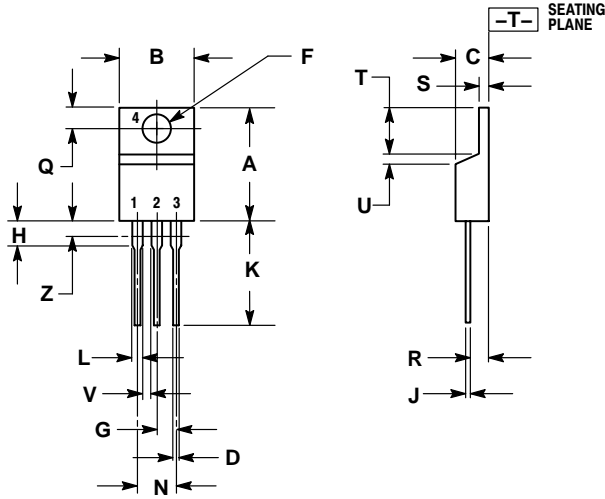


**Figure 11. Thermal Response**

# D44H Series (NPN), D45H Series (PNP)

## PACKAGE DIMENSIONS

TO-220  
 PLASTIC  
 CASE 221A-09  
 ISSUE AA



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
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	1.39
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

## D44H Series (NPN), D45H Series (PNP)

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