

# 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

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

### 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 @ $T_C = 25^\circ\text{C}$ @ $T_A = 25^\circ\text{C}$	$P_D$	70 2.0	W
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–55 to +150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$	1.8	$^\circ\text{C/W}$
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	$^\circ\text{C}$

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.

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

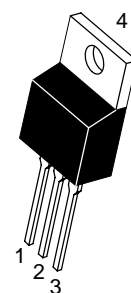
\*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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## 10 AMP COMPLEMENTARY SILICON POWER TRANSISTORS 60, 80 VOLTS



### MARKING DIAGRAM



TO–220AB  
CASE 221A–09  
STYLE 1

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†
D44H8	TO–220	50 Units/Rail
D44H8G	TO–220 (Pb–Free)	50 Units/Rail
D44H11	TO–220	50 Units/Rail
D44H11G	TO–220 (Pb–Free)	50 Units/Rail
D45H8	TO–220	50 Units/Rail
D45H8G	TO–220 (Pb–Free)	50 Units/Rail
D45H11	TO–220	50 Units/Rail
D45H11G	TO–220 (Pb–Free)	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.

## D44H Series (NPN),

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

Characteristic	Symbol	Min	Typ	Max	Unit
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#### 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	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 5.0\text{ Vdc}$ )		$I_{EBO}$	–	–	10	$\mu\text{A}$

#### 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

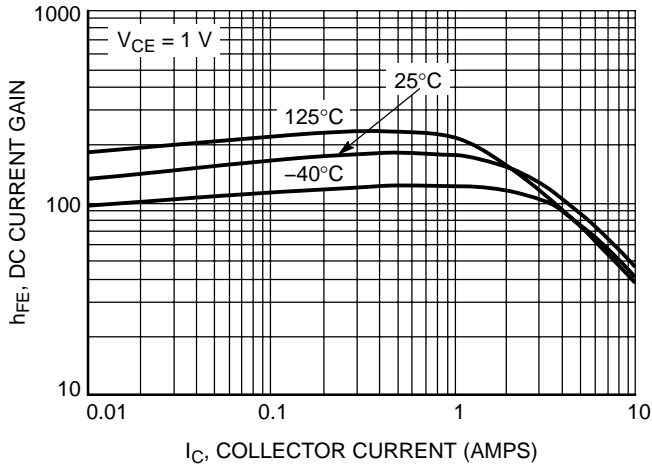
#### DYNAMIC CHARACTERISTICS

Collector Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $f_{\text{test}} = 1.0\text{ MHz}$ )	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

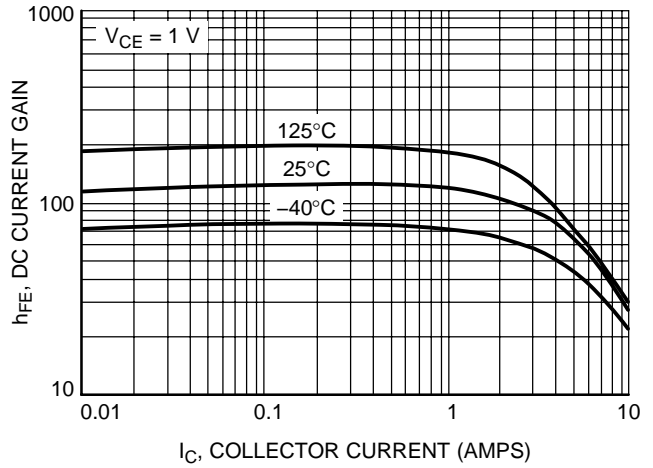
#### SWITCHING TIMES

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 ( $I_C = 5.0\text{ Adc}$ , $I_{B1} = 10I_{B2} = 0.5\text{ Adc}$ )	D44H Series D45H Series	$t_f$	– –	140 100	– –	ns

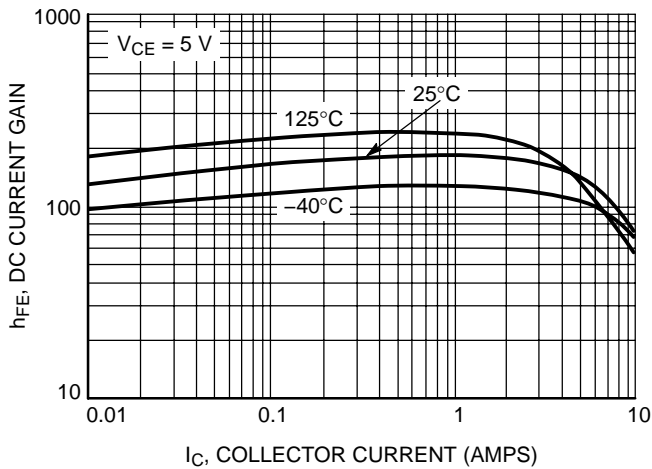
# D44H Series (NPN),



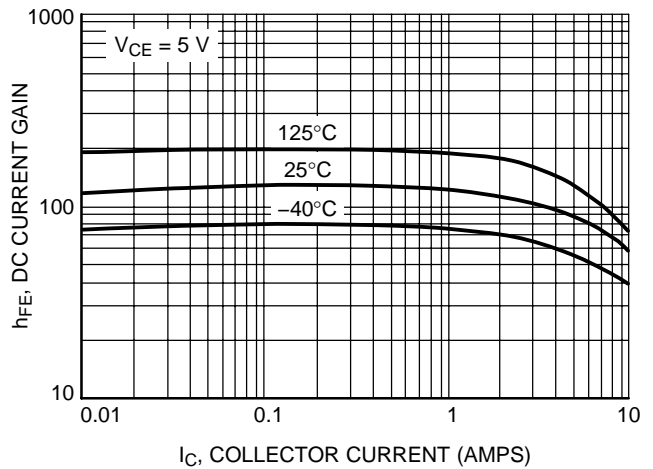
**Figure 1. D44H11 DC Current Gain**



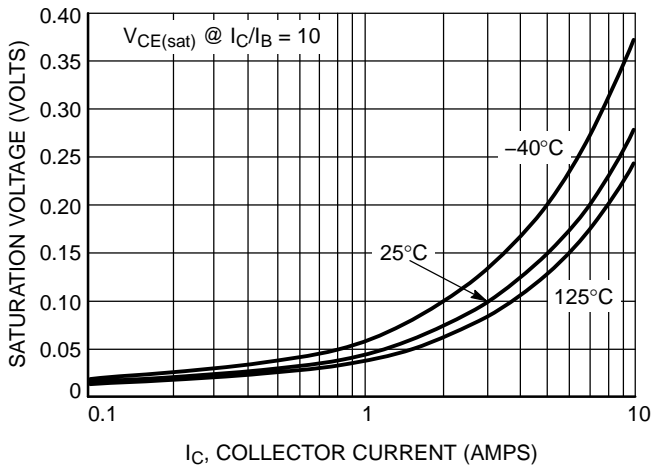
**Figure 2. D45H11 DC Current Gain**



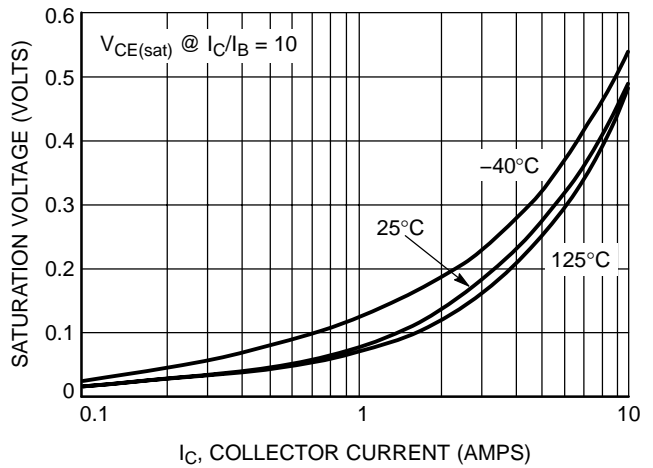
**Figure 3. D44H11 DC Current Gain**



**Figure 4. D45H11 DC Current Gain**



**Figure 5. D44H11 ON-Voltage**



**Figure 6. D45H11 ON-Voltage**

# D44H Series (NPN),

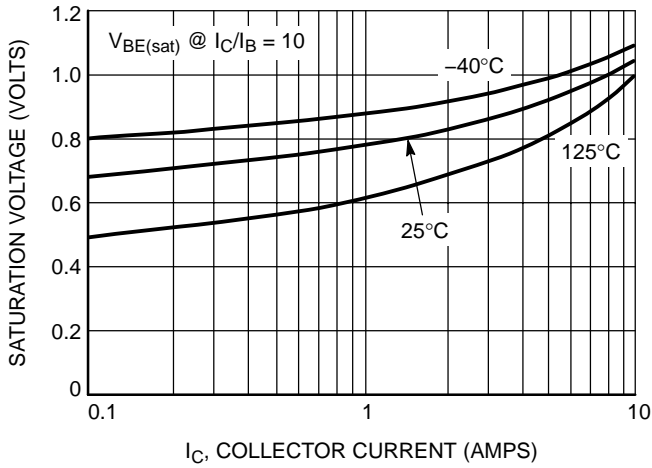


Figure 7. D44H11 ON-Voltage

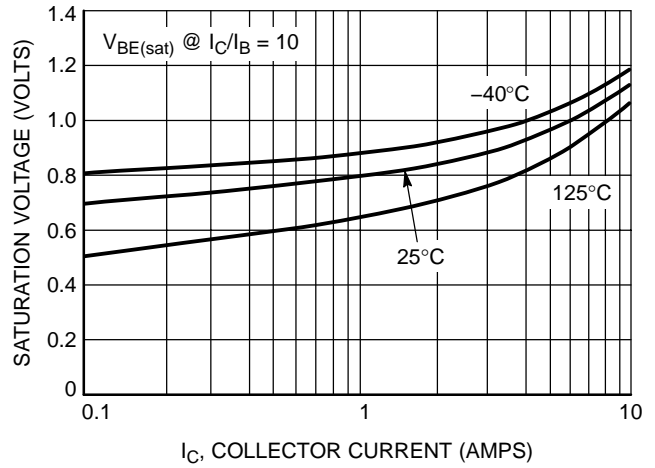


Figure 8. D45H11 ON-Voltage

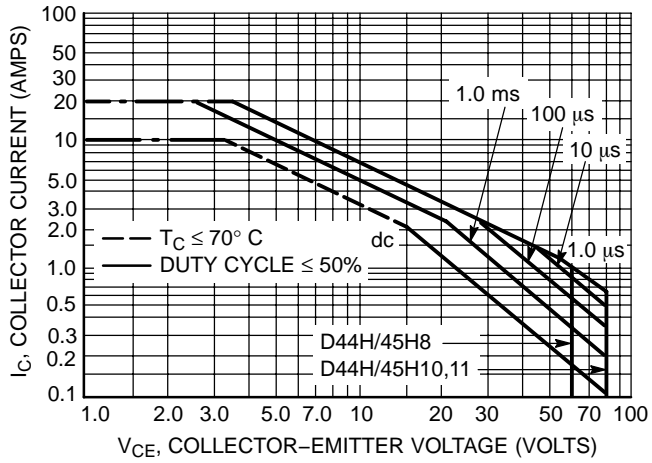


Figure 9. Maximum Rated Forward Bias Safe Operating Area

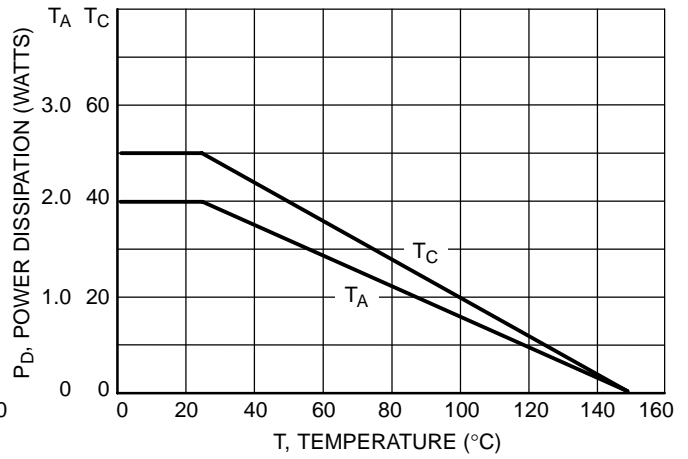


Figure 10. Power Derating

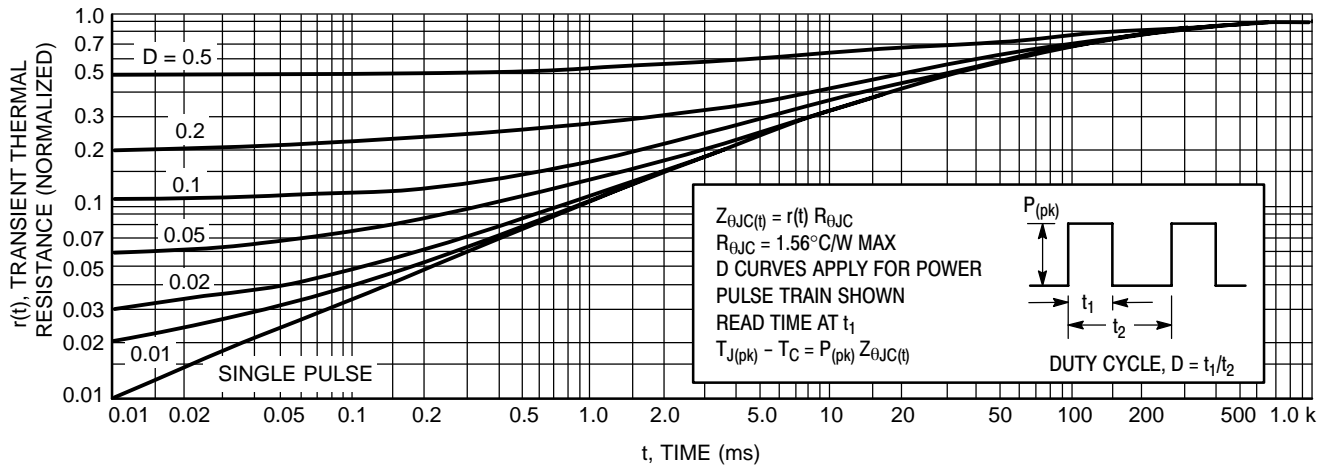
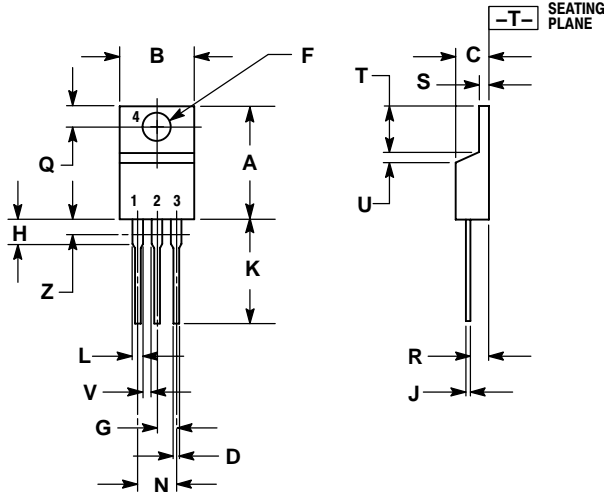


Figure 11. Thermal Response

# D44H Series (NPN),

## PACKAGE DIMENSIONS

TO-220  
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

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