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D44VH Series

30-80 VOLTS
15 AMP, 83 WATTS

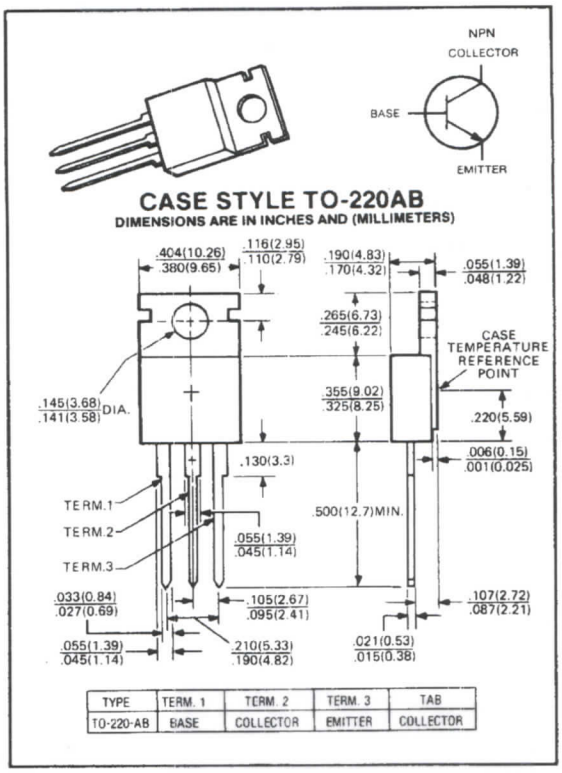
VERY HIGH SPEED
NPN POWER TRANSISTORS

COMPLEMENTARY TO THE D45VH SERIES

The D44VH is an NPN power transistor especially designed for use in switching circuits such as switching regulators, high-frequency inverters/converters and other applications where very fast switching and low-saturation voltages are necessary. This device complements the D45VH PNP power transistor and is characterized with performance information which relates directly to switching.

Features:

- Fast Switching $t_s \leqslant 700$ ns resistive
  $t_f \leqslant 200$ ns
- Low $V_{CE(sat)} \leqslant 0.4V$ @ $I_C = 8A$



TYPE	TERM. 1	TERM. 2	TERM. 3	TAB
TO-220-AB	BASE	COLLECTOR	EMITTER	COLLECTOR

maximum ratings (T_A = 25°C) (unless otherwise specified)

RATING	SYMBOL	D44VH1	D44VH4	D44VH7	D44VH10	UNIT
Collector-Emitter Voltage	$V_{CEO(sus)}$	30	45	60	80	V
Collector-Emitter Voltage	V_{CEX}	40	55	70	90	V
Collector-Emitter Voltage	V_{CEV}	50	65	80	100	V
Emitter Base Voltage	V_{EB}		7			V
Collector Current — Continuous — Peak (1)	I_C I_{CM}		15 20			A
Base Current — Continuous — Peak (1)	I_B I_{BM}		5 10			A
Total Power Dissipation @ T_C = 25°C @ T_C = 100°C Derate above 25°C	P_D		83 33 .67			Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}		-55 to +150			°C

thermal characteristics

CHARACTERISTICS	SYMBOL	MAX	UNIT
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	74	°C/W
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	T_L	235	°C

(1) Pulse measurement condition PW ≤ 6.0 ms, See Figure 14.

electrical characteristics (T_C = 25°C) (unless otherwise specified)

CHARACTERISTICS	SYMBOL	MIN	MAX	UNIT
off characteristics(1)				
Collector-Emitter Sustaining Voltage(1) (I_C = 100mA, I_B = 0) D44VH1 D44VH4 D44VH7 D44VH10	$V_{CEO(sus)}$	 30 45 60 80	 — — — —	V
Collector-Emitter Voltage(2) (I_C = 1A, V_{CLAMP} = Rated V_{CEX}, T_C = 100°C) D44VH1 D44VH4 D44VH7 D44VH10	V_{CEX}	 40 55 65 90	 — — — —	V
Collector Cutoff Current (V_{CEV} = Rated Value, $V_{BE(off)}$ = 4.0V) (V_{CEV} = Rated Value, $V_{BE(off)}$ = 4.0V, T_C = 100°C)	I_{CEV}	 — —	 10 100	μA
Collector Cutoff Current (V_{CE} = Rated V_{CEV}, R_{BE} = 50 Ω, T_C = 100°C)	I_{CER}	—	100	μA
Emitter Cutoff Current (V_{EB} = 7V, I_C = 0)	I_{EBO}	—	10	μA

second breakdown

Second Breakdown with Base Forward Biased	F_{BSOA}	SEE FIGURE 7
Second Breakdown with Base Reverse Biased	R_{BSOA}	SEE FIGURE 8

on characteristics(1)

DC Current Gain (I_C = 2 A, V_{CE} = 1V) (I_C = 4 A, V_{CE} = 1V)	h_{FE}	 35 20	 — —	—
Collector-Emitter Saturation Voltage (I_C = 8A, I_B = 0.4A) (I_C = 8A, I_B = 0.4A, T_C = 100°C) (I_C = 15A, I_B = 3.0A, T_C = 100°C)	$V_{CE(sat)}$	 — — —	 0.4 0.5 0.8	V
Base-Emitter Saturation Voltage (I_C = 8A, I_B = 0.4A) (I_C = 8A, I_B = 0.4A, T_C = 100°C)	$V_{BE(sat)}$	 — —	 1.2 1.1	V

dynamic characteristics

		Typical	
Current-Gain — Bandwidth Product (I_C = 0.1A, V_{CE} = 10V, f_{test} = 1 MHz)	f_T	50	MHz
Output Capacitance (V_{CB} = 10V, I_E = 0, f_{test} = 1 MHz)	C_{OB}	120	pF

switching characteristics

			Maximum		
Resistive Load (See Figure 16 for Test Circuit)		T_C	25°C	100°C	
Delay Time	V_{CC} = 20V, I_C = 8A I_{B1} = I_{B2} = 0.8A t_p = 25 μsec	t_d	50	—	nsec
Rise Time		t_r	250	—	nsec
Storage Time		t_s	700	—	nsec
Fall Time		t_f	200	—	nsec
Inductive Load, Clamped (See Figure 15 for Test Circuit)					
Storage Time	V_{CC} = 20V, I_C = 8A V_{CLAMP} = Rated V_{CEX} I_{B1} = o.8A, $V_{BE(off)}$ = -5V L = 200 μh	t_s	800	—	nsec
Fall Time		t_f	180	400	nsec
		Typical			
Storage Time		t_s	280	370	nsec
Fall Time		t_f	130	150	nsec

(1) Pulse Duration = 300 μsec, Duty Factor ≤ 2%.
(2) See Figure 15 for Test Circuit.