

New Jersey Semi-Conductor Products, Inc.

20 STERN AVE.
 SPRINGFIELD, NEW JERSEY 07081
 U.S.A.

D44VH Series

**30-80 VOLTS
 15 AMP, 83 WATTS**

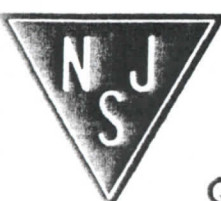
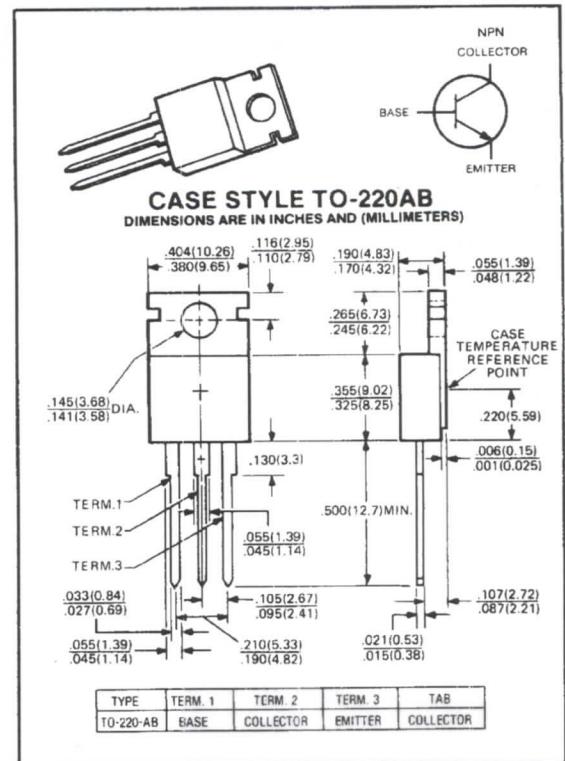
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**VERY HIGH SPEED
 NPN POWER TRANSISTORS
 COMPLEMENTARY TO THE D45VH SERIES**

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



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

Quality Semi-Conductors

maximum ratings ($T_A = 25^\circ\text{C}$) (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	I_C		15			A
— Peak (1)	I_{CM}		20			
Base Current — Continuous	I_B		5			A
— Peak (1)	I_{BM}		10			
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_D		83			Watts
Derate above 25°C			33			W/ $^\circ\text{C}$
			.67			
Operating and Storage Junction Temperature Range	T_J, T_{STG}		-55 to +150			$^\circ\text{C}$

thermal characteristics

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

(1) Pulse measurement condition $PW \leq 6.0$ ms, See Figure 14.

electrical characteristics ($T_C = 25^\circ\text{C}$) (unless otherwise specified)

CHARACTERISTICS	SYMBOL	MIN	MAX	UNIT
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off characteristics⁽¹⁾

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

second breakdown

Second Breakdown with Base Forward Biased	FBSOA	SEE FIGURE 7
Second Breakdown with Base Reverse Biased	RBSOA	SEE FIGURE 8

on characteristics⁽¹⁾

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

dynamic characteristics

Typical

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

switching characteristics

Maximum

Resistive Load (See Figure 16 for Test Circuit)		T_C	25°C	100°C		
Delay Time	$V_{CC} = 20\text{ V}$, $I_C = 8\text{ A}$ $I_{B1} = I_{B2} = 0.8\text{ A}$ $t_p = 25\ \mu\text{sec}$	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	$V_{CC} = 20\text{ V}$, $I_C = 8\text{ A}$ $V_{CLAMP} = \text{Rated } V_{CEX}$ $I_{B1} = 0.8\text{ A}$, $V_{BE(off)} = -5\text{ V}$ $L = 200\ \mu\text{h}$	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 $\leq 2\%$.

(2) See Figure 15 for Test Circuit.